MANAGED BY JOURNAL OF PSYCHOLOGICAL MEDICINE AND RESEARCH ISSN: 0253-7176
Vol 42 • Issue 2 • March/April 2020 • www.ijpm.info

INDIAN JOURNAL OF PSYCHOLOGICAL MEDICINE

Official Publication of
Indian Psychiatric Society
South Zonal Branch

Health Professionals

Schizophrenia

PubMed Medknow Wolters Kluwer

From the makers of

RISCURE
(Risperidone 0.5 / 1 / 2 mg Tablets)

Patinex
(Paroxetine 12.5 / 25 / 37.5 mg Prolonged Release Tablets)

VENLITE-OD
(Desvenlafaxine 50 / 100 mg Extended Release Tablets)

Olinstab
(Olanzapine 2.5 / 5 / 7.5 / 10 mg Mouth Dissolving Tablets)

Ariday
(Aripiprazole 2.5 / 5 / 10 / 15 mg Tablets)

CITALIN
(Escitalopram 5 / 10 / 20 mg Tablets)

Joypride
(Amisulpride 50 / 100 / 200 / 300 / 400 mg Tablets)

DIVALIDER
(Divalproex Sodium 250 / 500 mg / 1 g Tablets)

IGNIcar
(L-Carnosine 100 mg / 5 ml Syrup)

LURASTAR
(Lurasidone 40 / 80 mg Tablets)

Dedicated to Psychiatric care

LINUX Laboratories

Visit us at www.linuxlaboratories.in

INFINA
A division of LINUX

INDIAN JOURNAL OF

PSYCHOLOGICAL MEDICINE

MANAGED BY JOURNAL OF PSYCHOLOGICAL MEDICINE AND RESEARCH
PRINT: ISSN 0253-7176 E-ISSN 0975-1564

Official Publication of
Indian Psychiatric Society
South Zonal Branch

INDIAN JOURNAL OF

PSYCHOLOGICAL MEDICINE

MANAGED BY JOURNAL OF PSYCHOLOGICAL MEDICINE AND RESEARCH
PRINT: ISSN 0253-7176 E-ISSN 0975-1564

Official Publication of
Indian Psychiatric Society
South Zonal Branch

INDIAN JOURNAL OF
PSYCHOLOGICAL MEDICINE

MANAGED BY JOURNAL OF PSYCHOLOGICAL MEDICINE AND RESEARCH
PRINT: ISSN 0253-7176 E-ISSN 0975-1564

Official Publication of
Indian Psychiatric Society
South Zonal Branch

General Information

The journal

Indian Journal of Psychological Medicine (ISSN: Print-0253-7176, Online - 0975-1564) was started in 1978. It is a peer-reviewed journal published by Indian Psychiatric Society, South Zonal Branch. Dr. Abraham Verghese, then Professor of Psychiatry at Christian Medical college, Vellore, was the first editor. The journal publishes articles on psychiatry, psychology and allied disciplines. It is published bimonthly in January, March, May, July, September and November.

Abstracting and indexing information

The journal is registered with the following abstracting partners:
CNKI (China National Knowledge Infrastructure), EBSCO Publishing's Electronic Databases, Exlibris – Primo Central, Google Scholar, Hinari, Infotrieve, Journal Guide, National Science Library, OpenJGate, ProQuest, TdNet.

The journal is indexed with: Indian Science Abstracts, Pubmed Central, SCOPUS.

The journal is included in UGC-CARE list.

Information for authors

There are no page charges for submissions to the journals. Please check http://www.ijpm.info for details.
All manuscripts must be submitted online at http://www.journalonweb.com/ijpsym

Subscription information

Soft copies of the journal will be provided free of cost to the members of Indian Psychiatric Society South Zonal Branch. A subscription to the hard copies of Indian Journal of Psychological Medicine comprises 6 issues. Prices include postage. Annual Subscription Rate are:

- Institutional : INR 7150.00 for India
  USD 440.00 for outside India
- Personal : INR 4180.00 for India
  USD 385.00 for outside India

For mode of payment and other details, please visit www.medknow.com/subscribe.asp.

Claims for missing issues will be serviced at no charge if received within 60 days of the cover date for domestic subscribers, and 3 months for subscribers outside India. Duplicate copies cannot be sent to replace issues not delivered because of failure to notify publisher of change of address.

The journal is published and distributed by Wolters Kluwer India Private Limited. Copies are sent to subscribers directly from the publisher's address. It is illegal to acquire copies from any other source. If a copy is received for personal use as a member of the association/society, one cannot resale or give-away the copy for commercial or library use.

The copies of the journal are sent by ordinary post. The editorial board, association or publisher will not be responsible for non-receipt of copies. If any subscriber wishes to receive the copies by registered post or courier, kindly contact the publisher's office. If a copy returns due to incomplete, incorrect or changed address of a subscriber on two consecutive occasions, their names will be deleted from the mailing list of the journal. Providing complete, correct and up-to-date address is the responsibility of the subscriber.

All change of address information to be sent to subscriptions@medknow.com (i.e not only for non-members).

Advertising policies

The journal accepts display and classified advertising. Frequency discounts and special positions are available. Inquiries about advertising should be sent to Wolters Kluwer India Private Limited, advertise@medknow.com.

The journal reserves the right to reject any advertisement considered unsuitable according to the set policies of the journal.

The appearance of advertising or product information in the various sections in the journal does not constitute an endorsement or approval by the journal and/or its publisher of the quality or value of the said product or of claims made for it by its manufacturer.

Copyright

Permissions

For information on how to request permissions to reproduce articles/information from this journal, please visit http://www.ijpm.info

Disclaimer

The information and opinions presented in the Journal reflect the views of the authors and not of the Journal or its Editorial Board or the Publisher. Publication does not constitute endorsement by the journal. Neither the Indian Journal of Psychological Medicine nor its publishers nor anyone else involved in creating, producing or delivering the Indian Journal of Psychological Medicine or the materials contained therein, assumes any liability or responsibility for the accuracy, completeness, or usefulness of any information provided in the Indian Journal of Psychological Medicine, nor shall they be liable for any direct, indirect, incidental, special, consequential or punitive damages arising out of the use of the Indian Journal of Psychological Medicine. The Indian Journal of Psychological Medicine, nor its publishers, nor any other party involved in the preparation of material contained in the Indian Journal of Psychological Medicine represents or warrants that the information contained herein is in every respect accurate or complete, and they are not responsible for any errors or omissions or for the results obtained from the use of such material. Readers are encouraged to confirm the information contained herein with other sources.

Addresses

Editorial office
Dr. Shahul Ameen
St. Thomas Hospital, Kurisummoodu PO,
PIN - 686 104, Kottayam Dt., Kerala, India
E-mail: shahulameen@yahoo.com

Published by
Wolters Kluwer India Private Limited
A-202, 2nd Floor, The Qube,
C.T.S. No.1498A/2 Village Marol, Andheri (East),
Mumbai - 400 059, India.
Phone: 91-22-66491818
Website: www.medknow.com

Printed at
Nikeda Art Prints Pvt. Ltd.,
Bhandup (W), Mumbai - 400078, India.

INDIAN JOURNAL OF
PSYCHOLOGICAL MEDICINE

MANAGED BY JOURNAL OF PSYCHOLOGICAL MEDICINE AND RESEARCH
PRINT: ISSN 0253-7176 E-ISSN 0975-1564

Official Publication of
Indian Psychiatric Society
South Zonal Branch

Volume 42 | Issue 2 | March-April 2020
(Volume 10 | Issue 1 as per RNI Registration no. MAHENG/2011/38799)

Contents

Contents contd....

Indian Journal of Psychological Medicine on Web

http://www.journalonweb.com/ijpsym

The Indian Journal of Psychological Medicine now accepts articles electronically. It is easy, convenient and fast. Check following steps:

1 Registration

- Register from http://www.journalonweb.com/ijpsym as a new author (Signup as author)
- Two-step self-explanatory process

2 New article submission

- Read instructions on the journal website or download the same from manuscript management site
- Prepare your files (Article file, First page file and Images, Copyright form & Other forms, if any)
- Login as an author
- Click on 'Submit new article' under 'Submissions'
- Follow the steps (guidelines provided while submitting the article)
- On successful submission you will receive an acknowledgement quoting the manuscript ID

3 Tracking the progress

- Login as an author
- The report on the main page gives status of the articles and its due date to move to next phase
- More details can be obtained by clicking on the ManuscriptID
- Comments sent by the editor and reviewer will be available from these pages

4 Submitting a revised article

- Login as an author
- On the main page click on 'Articles for Revision'
- Click on the link "Click here to revise your article" against the required manuscript ID
- Follow the steps (guidelines provided while revising the article)
- Include the reviewers' comments along with the point to point clarifications at the beginning of the revised article file.
- Do not include authors' name in the article file.
- Upload the revised article file against New Article File - Browse, choose your file and then click "Upload" OR Click "Finish"
- On completion of revision process you will be able to check the latest file uploaded from Article Cycle (In Review Articles-> Click on manuscript id -> Latest file will have a number with 'R', for example XXXX_100_15R3.docx)

Facilities

- Submission of new articles with images
- Submission of revised articles
- Checking of proofs
- Track the progress of article until published

Advantages

- Any-time, any-where access
- Faster review
- Cost saving on postage
- No need for hard-copy submission
- Ability to track the progress
- Ease of contacting the journal

Requirements for usage

- Computer and internet connection
- Web-browser (Latest versions - IE, Chrome, Safari, FireFox, Opera)
- Cookies and javascript to be enabled in web-browser

Online submission checklist

- First Page File (rtf/doc/docx file) with title page, covering letter, acknowledgement, etc.
- Article File (rtf/doc/docx file) - text of the article, beginning from Title, Abstract till References (including tables). File size limit 4 MB. Do not include images in this file.
- Images (jpg/jpeg/png/gif/tif/tiff): Submit good quality colour images. Each image should be less than 10 MB) in size
- Upload copyright form in .doc / .docx / .pdf / .jpg / .png / .gif format, duly signed by all authors, during the time mentioned in the instructions.

Help

- Check Frequently Asked Questions (FAQs) on the site
- In case of any difficulty contact the editor

Guest Editorial

Are Specialist Treatment Services Needed for Doctors with Mental Health Problems?

In this brief paper, we will look at whether doctors who experience mental health difficulties require specialist treatment services. In doing so, as there is only limited research evidence in this area from India, we will also look at what international evidence informs us. Although our discussion here is limited to doctors, the core issues discussed are equally relevant to doctors in training (medical students and postgraduate students). We acknowledge that early interventions are of utmost importance in terms of prevention of mental health problems; hence, any proposed service should also accommodate doctors early in their careers—medical students and post-graduate trainees.

The practice of medicine is a risky "business" that exposes its practitioners to wide-ranging risks to their own health, especially mental health. Such risks have been categorized into occupational and individual.[1] Occupational stressors include high expectations from patients, demanding work environments, poor support structures, lack of time, resources to maintain a work–life balance, and so on. Other proposed explanations for doctors being more vulnerable/at risk for mental health problems have included psychological theories, such as "helping profession syndrome"[2] and '"compulsive caregiving theory;"[3] individual vulnerability;[4] socio-environmental factors specific to medical training (such as over competitiveness related to exams and career advancement, easy access to drugs, a "macho" culture) and later, professional practice (such as more knowledge of and easy access to drugs, peer attitudes, and socialization opportunities); and stress at work.

A more recently discussed concept is that of "moral injury"[5] among doctors, described as the inability to just be a doctor and the inability to do what they know is right for the patient because they are caught up in targets and rules and regulations. This too can lead to stress and burnout. Perhaps, it is most likely that stressors are multifactorial in doctors, with an interplay of various stressors/risks and individual vulnerability, buffered by individual resilience, ultimately determining who develops mental illness.

Medical practitioners suffer from high rates of mental health problems, such as anxiety,[6] depression,[7] substance misuse,[8,9] and emotional exhaustion and burnout.[10] Precise prevalence estimates are lacking and the existing studies abound with methodological limitations. However, international evidence has noted that:

1. The career-time prevalence of depression in doctors in the United Kingdom (UK) is 10 to 20%[7]
2. Studies from the United States of America (USA) and Canada have also noted high rates of suicide, substance misuse, and burnout among their doctors.[1]

In the largest study to date from India, Grover *et al*.[11] studied psychological problems and burnout among medical professionals and found that "a significantly higher proportion of doctors in Indian setting experience stress, depression and burnout" and concluded that stress, depression, and burnout were associated with "long working hours and negative patient-related outcomes, adverse doctor-patient interactions, and interpersonal interactions among the colleagues." They[10] also noted that compared with faculty members, residents/students (postgraduate trainees) had higher rates of stress, depression, and burnout. Although conditions like depression, anxiety, substance misuse, and stress tend to be more common among medical practitioners, a minority (just as in the general population) will also need help for severe mental illnesses, such as schizophrenia.

Despite doctors having higher risks and higher rates of mental illnesses, they are reluctant to seek timely professional help. Barriers to timely help-seeking include stigma, fears about confidentiality, feelings of guilt and shame, poor insight, anxieties about the

potential impact on their career, fears about the negative response from colleagues and employer/s, mistrust of regulatory bodies, lack of awareness about where to get help, and so on.[12] White *et al*.,[13] in a survey of 319 psychiatrists from the UK noted concerns about confidentiality, stigma, and career implications as the most common reasons for psychiatrists not disclosing their own mental health difficulties. Undiagnosed and untreated mental illness in doctors can negatively affect the doctor, their family, and their patients. It can impair a doctor's performance, risk professional misconduct, can risk patient safety and undermine public confidence in the medical profession. These barriers are of great concern and a missed opportunity because early and appropriate treatment interventions are effective in this "patient" group.

Doctors with mental health problems are "different;" hence, they deserve more intellectual attention and resource allocation and warrant specialist treatment services. They differ from nondoctors in the following ways:

1. High-risk profession
2. Expensive and scarce resource
3. Limited insight and acknowledgment of problems
4. Easier access to drugs and tendency to self-medicate
5. Barriers to help-seeking
6. Issues of patient safety and public confidence
7. Issues with the medical council.

This said, we acknowledge that not all would subscribe to the view that doctors are "different," and debating this issue is crucial in answering the question we pose in this paper—"Are specialist treatment services needed for doctors with mental health problems?"

Furthermore, should confidential, easy to access, and appropriate professional help/treatment be available, more doctors would seek timely help. International evidence is very much in favor of such specialist treatment services for doctors: The Physician Health Programs in the USA,[14,15] The Program for the Integral Care of the Ill Physician in Spain,[16] and the Practitioner Health Programme in England[17-19] are some of the popular healthcare services for doctors in distress. A recent study from the UK specifically called on the employers to take measures to reduce the stigma of mental illness among doctors so that doctors would seek timely help for their own psychological issues.[20]

A SPECIALIST TREATMENT SERVICE FOR DOCTORS IN INDIA: CALL FOR A PILOT

Now, we consider what a specialist treatment service for doctors with mental health problems should be like. Any strategy aimed at preventing/minimizing mental health problems in doctors should consist of primary, secondary, and tertiary prevention strategies. Here, primary prevention refers to preventing the onset of mental health problems (interventions targeted at awareness-raising, enhancing coping skills, teaching stress management techniques, etc.). Such primary intervention strategies should especially target medical students, as they are early in their medical careers; hence, these interventions are likely to have the most impact. Secondary prevention implies early diagnosis (measures for screening, reducing stigma, facilitating easy access, supportive "culture" to seek help, etc.) and treatment of such disorders (easy to access and professional treatment). Tertiary prevention includes offering treatments/interventions to prevent or minimize the chronic negative consequences of mental health disorders in doctors.

It is also worth noting here that the World Psychiatric Association (WPA), in its position statement on e-Mental health,[21] recommends the use of digital technologies to "support, deliver and enhance mental health services and improve the mental health and wellbeing of individuals"—this includes a wide range of digital technologies and digital technology aids that can help deliver psychiatric/psychological services.

If a comprehensive prevention strategy seems the best way forward, a logical question follows: who/which organization should help conceive and implement such a strategy? There are interesting, albeit preliminary, initiatives underway in India. First is the Cochin branch of the Indian Medical Association's (IMA) "Hope" service—a confidential telephone helpline and face-to-face consultation service for doctors and their families suffering from mental health issues. This service commenced functioning in January 2019 only, and preliminary evaluation findings favor its feasibility and acceptability.[22] Second is the IMA National Standing Committee for Emotional Health and Emotional Well-being of Medical Students and Doctors' "Doctors 4 Doctors" (D-4-D) Programme. This program is being planned as a joint venture of the IMA, Indian Psychiatric Society (IPS), and the Royal College of Psychiatrists (RCPsych), UK (South Asian Division).

Both our preliminary work in India and the UK, and the international literature suggest that such multiagency, multidisciplinary, and collaborative ventures are the way forward. Any such pilot program should also have built-in evaluative components for its appropriateness, adequateness, and effectiveness.

CONCLUSION

To conclude, medical professionals are at a high risk of developing mental health problems such as depression, anxiety, stress, and substance misuse. Despite this, doctors are reluctant to seek timely and appropriate professional help for their own mental health difficulties. Undetected and untreated mental health problems often result in considerable negative consequences to the doctor, their family, and their patients. Given the above unique features, we recommend specialist treatment services for doctors who experience mental health difficulties. More debate is warranted on what the structure and functions of such a service ought to be and how it can be translated from strategy into action.

Sanju George, Sandip Deshpande[1], Roy A. Kallivayalil[2]

Department of Psychiatry and Psychology, Centre for Behavioural Sciences and Research, Rajagiri College of Social Sciences, Kalamassery, Kochi, Kerala, [1]Department of Psychiatry, People Tree Maarga, Bengaluru, Karnataka, [2]Department of Psychiatry, Pushpagiri Institute of Medical Sciences, Tiruvalla, Kerala, India

Address for correspondence: Prof. Sanju George
Centre for Behavioural Sciences and Research, Rajagiri College of Social Sciences, Kalamassery, Kochi - 683 104, Kerala, India.
E-mail: sanjugeorge531@gmail.com

Submitted: 20-Jul-2019
Revised: 28-Aug-2019
Accepted: 23-Oct-2019
Published: 09-Mar-2020

REFERENCES

1. Brooks S, Gerada C, Chadler T. Review of literature on the mental health of doctors: Are specialist services needed? J Ment Health 2011;20:146-56.
2. Malan D. Individual Psychotherapy and the Science of Psychodynamics. London: Butterworth; 1979.
3. Tillett R. The patient within – psychopathology in the helping professions. Adv Psychiatr Treat 2003;9:272-9.
4. Firth- Cozens J, Caceres Lema V, Firth RA. Speciality choice, stress and personality: Their relationships over time. Hosp Med 1999;60:751-5.
5. Kane L. How Healthcare Is Causing' Moral Injury' to Doctor. Medscape 2019.
6. Kroenke K, Spitzer RL, Williams JB, Monahan PO, Lowe B. Anxiety disorders in primary care: Prevalence, impairment, comorbidity, and detection. Ann Intern Med 2007;146:317-25.
7. Firth-Cozens J. A perspective on stress and depression. In Cox J, King J, Hutchinson A, McAvoy P, editors. Understanding Doctors' Performance. Oxford: Radcliffe Publishing; 2006. p. 22-5.
8. Bennett J, O'Donovan D. Substance misuse by doctors, nurses and other healthcare workers. Curr Opin Psychiatry 2001;14:195-9.
9. Ghodse H, Galea S. Misuse of drugs and alcohol. In Cox J, King J, Hutchinson A, McAvoy P, editors. Understanding Doctors' Performance. Oxford: Radcliffe Publishing; 2006. p. 38-45.
10. Isaksson KE, Gude T, Tyssen R, Aasland OG. Counselling for burnout in Norwegian doctors: One year cohort study. BMJ 2008;337:a2004.
11. Grover S, Sahoo S, Bhalla A, Avasthi A. Psychological problems and burnout among medical professionals of a tertiary care hospital of North India: A cross-sectional study. Indian J Psychiatry 2018;60:175-88.
12. Gerada C. Healing doctors through groups: Creating time to reflect together. Br J Gen Pract 2016;66:e776-8.
13. White A, Shiralkar P, Hassan T, Galbraith N, Callaghan R. Barriers to mental healthcare for psychiatrists. Psych Bull 2006;30:382-4.
14. DuPont R, McLellan AT, Carr G, Gendel M, Skipper GE. How are addicted physicians treated? A national survey of physician health programs. J Subst Abuse Treat 2009;37:1-7.
15. McLellan AT, Skipper GS, Campbell M, DuPont RL. Five year outcomes in a cohort study of physicians treated for substance use disorders in the United States. BMJ 2008;337:a2038.
16. Bosch X. First impaired physicians therapy program appears to be successful in Spain. JAMA 2000;283:3186-7.
17. Gerada C. Doctors, suicide and mental health. BJPsych Bull 2018;42:165-8.
18. Gerada C. Doctors and mental health. Occup Med 2017;67:660-1.
19. Brooks SK, Gerada C, Chalder T. The specific needs of doctors with mental health problems: Qualitative analysis of doctor-patients' experiences with the Practitioner Health Programme. J Ment Health 2017;26:2:161-6.
20. Rimmer A. Doctors still see own mental health problems as sign of weakness, research finds. BMJ 2019;365:1861.
21. World Psychiatric Association. Position statement on e-Mental health. 2018. Available from: http://www.psikiyatri.org.tr/userfiles/file/WPA13.pdf. [Last accessed on 2019 Oct 21].
22. George S, Menon V, Sameed S, Hazzein A, Haneesh MM, Rahman J, *et al*. The establishment and short-term evaluation of a specialist and confidential service for doctors with mental health difficulties in India. Asian J Psychiatry 2019;44:65-7.

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_313_19	

How to cite this article: George S, Deshpande S, Kallivayalil RA. Are specialist treatment services needed for doctors with mental health problems? Indian J Psychol Med 2020;42:105-7.

Review Article

Prevalence and Factors Associated with Burnout among Healthcare Professionals in India: A Systematic Review and Meta-Analysis

Vartika Kesarwani, Zeeshan Gulam Husaain[1], Jaiben George[1]

ABSTRACT

Background: With increasing workload and dismal working conditions, healthcare professionals (HCPs) in India often suffer from burnout. Understanding the extent of these problems and the contributing factors is necessary to build a healthy workforce capable of serving the society. The purpose of this study was to systematically review and analyze: 1) the prevalence of burnout among HCPs in India and 2) the factors associated with burnout in this population. **Methods:** A systematic search of MEDLINE and EMBASE, from the inception of these databases to October 2019, was conducted using keywords. The search results were screened to identify studies evaluating burnout among HCPs in India using a standard burnout tool. Using a random effect model, the pooled prevalence of burnout was estimated using Maslach Burnout Inventory (MBI) in three domains: emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). Risk factors for burnout were assessed qualitatively. **Results:** A total of 15 studies assessing burnout in 3845 Indian HCPs were identified. The pooled prevalence of burnout was 24% in the EE domain, 27% in the DP domain, and 23% in the PA domain. Younger age, female gender, unmarried status, and difficult working conditions were associated with increased risk of burnout. **Conclusion:** Burnout is highly prevalent among Indian HCPs, with close to one-fourth of them suffering from burnout. A number of personal and professional factors are associated with burnout, and these should be considered while developing solutions to tackle burnout.

Key words: *Burnout, doctors, healthcare, India, meta-analysis*

Key messages: *As a considerable proportion of Indian HCPs suffer from burnout, appreciation of burnout as a major health-care-related problem is necessary to ensure timely interventions to tackle burnout.*

Burnout is common in many professions and refers to a clinical syndrome characterized by excessive stress, lack of satisfaction, and a feeling of being overworked.[1]

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_387_19	

How to cite this article: Kesarwani V, Husaain ZG, George J. Prevalence and factors associated with burnout among healthcare professionals in India: A systematic review and meta-analysis. Indian J Psychol Med 2020;42:108-15.

Academic Section, All India Institute of Medical Sciences, Jodhpur, Rajasthan, [1]Academic Section, All India Institute of Medical Sciences, New Delhi, India

Address for correspondence: Dr. Jaiben George
Academic Section All India Institute of Medical Sciences, Ansari Nagar, New Delhi - 110 029, India. E-mail: jaibengeorge@gmail.com

Submitted: 13-Sep-2019, **Submitted:** 08-Oct-2019, **Accepted:** 26-Dec-2019, **Published:** 09-Mar-2020

Healthcare professionals (HCPs) are at an increased risk of developing burnout due to chronic exposure to high work stress.[2] HCPs comprise of doctors, trainees, nurses, etc., who work collectively to take care of the different health-related needs of the society. Increased patient load, long and unsociable working hours, lack of a supportive work environment, daily confrontation with death, and lack of appreciation are some of the factors that have contributed to the development of burnout in HCPs.[3] Burnout is increasingly getting recognition as it has severe consequences on the physicians' sense of wellness, institutions' performance, and patient outcomes.[4] Burnout among HCPs can result in medical errors, hostile attitude toward patients, and a difficult working environment. Those suffering from burnout are also more prone to depression, anxiety, sleep disturbance, substance abuse, problems with marriage, early retirement, and even suicide.[5-7] Due to the tremendous consequences of burnout in HCPs, it is very important to understand and tackle this emerging problem.

Although burnout and work-related stress have been studied widely in the western/developed countries, there has been a paucity of literature about burnout in India.[6,8-11] A number of factors such as long working hours, lack of infrastructure, lack of leisure/recreational time, etc., can lead to burnout among HCPs.[12,13] The growing incidence of violence on HCPs, especially doctors, may also contribute to stress in the healthcare profession.[13,14] Previous studies have evaluated the extent of burnout among various HCPs from different parts of India. However, most of these studies included only a few specialties and were restricted to one or a few institutions. Although it would not be surprising to find a high prevalence of burnout among HCPs in India due to weaker health infrastructure, scarcity of resources, overburdened health system, and shortage of healthcare providers, a systematic review has not been conducted yet about the prevalence of burnout and its associated factors.[7,15] Such a review will provide a much broader understanding of burnout and will help administrators and policymakers to ensure the wellbeing of HCPs in India.

Therefore, the purpose of this study was to systematically review and analyze: 1) the prevalence of burnout among HCPs in India and 2) the factors associated with burnout in this population.

METHODS

Study design

A systematic review was conducted on studies of burnout prevalence among HCPs in India according to Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines. No ethical approval was required as this systematic review was based on published data that did not contain any protected health information.

Eligibility criteria

All studies that were published in English from inception of these databases to October 2019, sampled a population of HCPs from India and used standardized tools to identify and estimate the prevalence of burnout were included in the review.

Literature search

Two large electronic databases (MEDLINE and EMBASE) were systematically searched for relevant publications from their inception to 15th October 2019 using a combination of relevant search terms. The following Boolean phrase was used:("professional burnout" OR "burnout" OR "occupational stress") AND ("health personnel" OR "healthcare professionals" OR "nurses" OR "residents" OR "physicians" OR "doctors") AND ("India" OR "Indian"). The reference list of each full-text article was reviewed along with a search of related articles in Google Scholar to identify additional articles to be included in this review.

Study selection and data collection

After removal of duplicates, titles and abstracts of the identified studies were initially reviewed by two authors (VK, JG) independently. Studies considered eligible for full-text screening were retrieved for a full review. The following information was extracted from each paper satisfying the eligibility criteria: publication details, the region of the study, study population, sample size, and tool used to assess burnout. When necessary and feasible, the authors of the included studies were contacted to obtain additional information. Several scales and questionnaires are available to measure burnout; these include the Maslach Burnout Inventory (MBI), the Copenhagen Burnout Inventory (CBI), the Burnout Clinical Subtype Questionnaire (BCSQ), the Shirom-Melamed Burnout Measure (SMBM), and the Oldenburg Burnout Inventory. Among these, MBI is the most widely used tool in the medical literature for identifying and measuring burnout. MBI consists of 22 items that measure burnout in three different domains (emotional exhaustion, EE; depersonalization, DP; personal accomplishment, PA), with nine items in the EE subscale, five in the DP subscale and eight in the PA subscale.[16] Scoring is based on the Likert scale, with each question assessed on a scale of 0 (not at all) to 5 (yes, absolutely). The prevalence of burnout is reported separately for all the three domains using prespecified thresholds (≥27 in EE, ≥13 in DP, ≤31 in PA), and was recorded for the present study. The prevalence of burnout reported using other tools was also recorded as appropriate.

Risk of bias in individual studies

Modified five-point Nottingham–Ottawa scale was used to assess the risk of bias in individual studies.[17] The risk of bias was assessed on five separate domains: representativeness of the sample (low risk – multiple institutions/specialties; high risk – single institution/specialty), sample size (high risk – less than 200; low risk – more than or equal to 200), response rate (low risk - ≥80% response rate; high risk - <80% response rate), assessment of burnout (low risk – use of MBI for assessment of burnout; high risk – use of a standard tool other than MBI), and quality of reporting (low risk – burnout defined using predefined thresholds published in literature; high risk – lack of reporting of burnout prevalence or burnout defined using authors' own thresholds). Each criterion was given a score of either 1 (low risk of bias) or 0 (high risk of bias), with the maximum obtainable score being 5 (higher scores indicate higher quality of study). The total numerical score was calculated for individual studies and a score of ≤3 corresponds to a high risk of bias (low-quality study). Two of the authors (VK, ZGH) independently assessed the risk of bias for each eligible study, and disagreements were resolved by the third author (JG).

Statistical analysis

The primary outcome of interest was the pooled prevalence of burnout. As different studies used different burnout tools, the pooled prevalence of burnout was computed only using the studies using MBI and reporting burnout in the three domains. Forest plots were developed to assess the pooled prevalence of burnout. Due to the expected heterogeneity among the studies, a random-effects model was used to estimate the pooled prevalence. The I-squared (I^2) test was used to assess heterogeneity. The factors associated with burnout were assessed qualitatively. Ninety five percent confidence intervals (CI) were computed, and a *P* value of less than 0.5 was taken as the threshold for statistical significance. Analyses were performed using R software (version 3.1.3, Vienna, Austria).[18]

RESULTS

Study characteristics

The PRISMA flowchart summarizing the data collection process is presented in Figure 1. A total of 212 studies were initially identified. A systematic stepwise process was used to exclude studies that did not fulfill the eligibility criteria. A total of 15 studies that met the inclusion criteria were finally included in this review. Data extracted from each study have been summarized in a tabular form and presented in Table 1.

All the 15 papers included for review were cross-sectional studies. The final sample size of the included studies varied from 56 to 576. Gandhi *et al*.[19] reported the highest

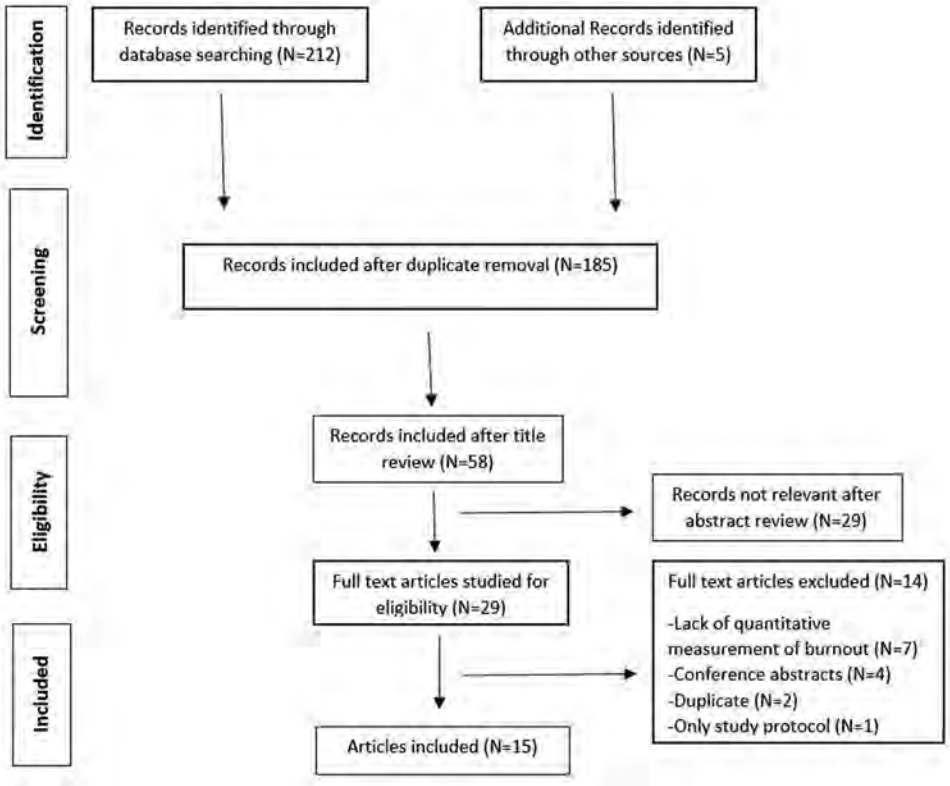

Figure 1: The flow diagram showing the inclusion of studies based on Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines

Table 1: Characteristics of included studies

Study	Number of respondents (response rate, %)	Department/specialty	Participants	Location	Scale/s used to asses burnout
Khanna *et al*., 2013[25]	576 (36%)	All medical specialties	Doctors, nurses, physiotherapists	Rajasthan	MBI
Swami *et al*., 2013[23]	56 (64%)	Medical and surgical specialties	Resident doctors	Rajasthan	SMBM
Reddy *et al*., 2014	416 (unclear)	Dentistry	Faculties and students	Andhra Pradesh	MBI
Shetty *et al*., 2015[26]	72 (57%)	Dentistry	Post graduate dental students	Karnataka	MBI
Jugale *et al*., 2016[1]	68 (59%)	Dentistry	Dentists	Karnataka	6 item MBI
Kulkarni *et al*., 2016[24]	97 (80%)	Dentistry	Newly graduate dentists	Udaipur	CBI
Langade *et al*., 2016[20]	482 (5%)	All medical specialties	Registered medical practitioners	Across India	Abbreviated MBI and BCQS-12
Ratnakaran *et al*., 2016[22]	558 (77%)	All medical specialties	Interns and residents	Kerala	CBI
Shetty *et al*., 2017[27]	299 (14%)	Orthopedic surgery	Physicians	Across India	MBI
Wilson *et al*., 2017[16]	105 (unclear)	Emergency department	Nurses, residents and doctors	South India	MBI
Gandhi *et al*., 2018[19]	200 (100%)	Anesthesia, and surgical branches	Residents	Chandigarh	BCSQ-12
Grover *et al*., 2018[13]	445 (26%)	All specialities (except psychiatry)	Residents and faculty	Chandigarh	MBI
Sreelatha *et al*., 2018[28]	100 (55%)	All specialities	Residents	Andhra Pradesh	MBI
Chichra *et al*., 2019[29]	303 (58%)	All specialities	Faculty	Tamil Nadu	MBI
Baruah *et al*., 2019[30]	68 (unclear)	Emergency department	Doctors, nurses, paramedics	Assam	MBI

MBI - Maslach Burnout Inventory; CBI - Copenhagen Burnout Inventory; BCSQ - Burnout Clinical Subtype Questionnaire; SMBM - Shirom-Melamed Burnout Measure

response rate with 100% (200/200) of the contacted HCPs responding to the survey, whereas Langade *et al*.[20] reported the lowest response rate of 5% (482/9,691). The total number of HCPs from the 15 studies was 3845, out of which 2202 (57%) were males and 1034 (27%) were females. Gender characteristics were not defined for 609 (16%) participants. The majority of the HCPs were doctors (n = 3650, 95%), of which 1168 (32%) were residents from different specialties. Nurses from different specialties ranked second, with n = 131, followed by paramedical staff (n = 36) and physiotherapists (n = 28). Eight studies included HCPs from multiple specialties, four from dentistry, two from the emergency department, and one from orthopedics. To estimate burnout, nine studies used 22 item MBI scale, two used the CBI scale, one used abbreviated MBI along with BCSQ-12, one used BCSQ-12, one used 6-item MBI scale, and one used SMBM.

The mean total score for bias was 2.7 ± 1.1 (range, 0–4). Eleven studies had a high risk of bias (score ≤3), whereas the remaining four had a low risk of bias. Sample size (7 out of 15 studies had a high risk of bias) and response rate (13 out of 15 studies had a high risk of bias) were the two most common domains where a high risk of bias was present [Figure 2].

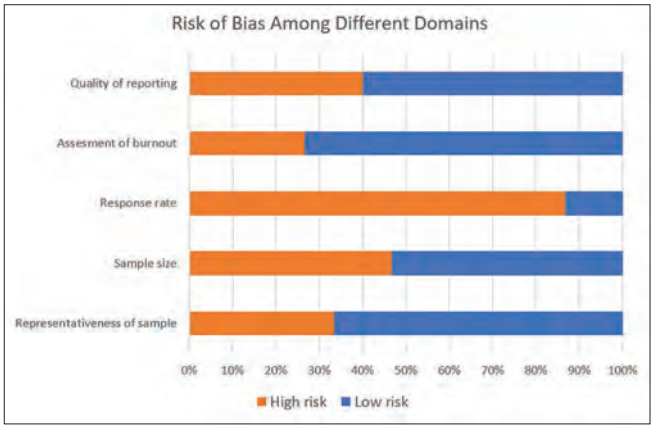

Figure 2: Bar chart showing the distribution of risks of bias among various domains for all the included studies (n = 15)

Prevalence of burnout

Out of the 15 included studies, ten were used to estimate the pooled prevalence of burnout using MBI in three domains (EE, DP and PA). Prevalence was obtained from the published data for eight studies and the unpublished data, for the remaining two studies (Jugale *et al*. 2016,[1] Grover *et al*. 2018[13]) [Figure 3]. Using random-effects model, 24% (95% CI: 16 – 36%) of the HCPs were found to have high scores in the EE domain, 27% (95% CI: 15–44%) were found to have high scores in DP domain, and 23% (95% CI: 11– 42%) had a low score in the PA domain [Figure 3]. There was significant heterogeneity among the studies for all the three domains (EE: I^2 = 97%, P < 0.01; DP: I^2 = 98%, P < 0.01; PA I^2 = 98%, P < 0.01). Although Reddy *et al*.,[21] used MBI, information on prevalence could not be obtained from published or unpublished data, and hence, that study was not included in quantitative analysis. Using the CBI, Ratnakaran *et al*.[22] found that 55% of the respondents had personal burnout, 35% had work-related burnout, and 35% had patient-related burnout. Studies by Swami *et al*.[23] and Kulkarni *et al*.[24] assessed only the factors associated with burnout and did not report the prevalence of burnout.

Factors associated with burnout

Age was assessed by nine studies,[1,20,24-30] of which three found that younger age was associated with a higher risk

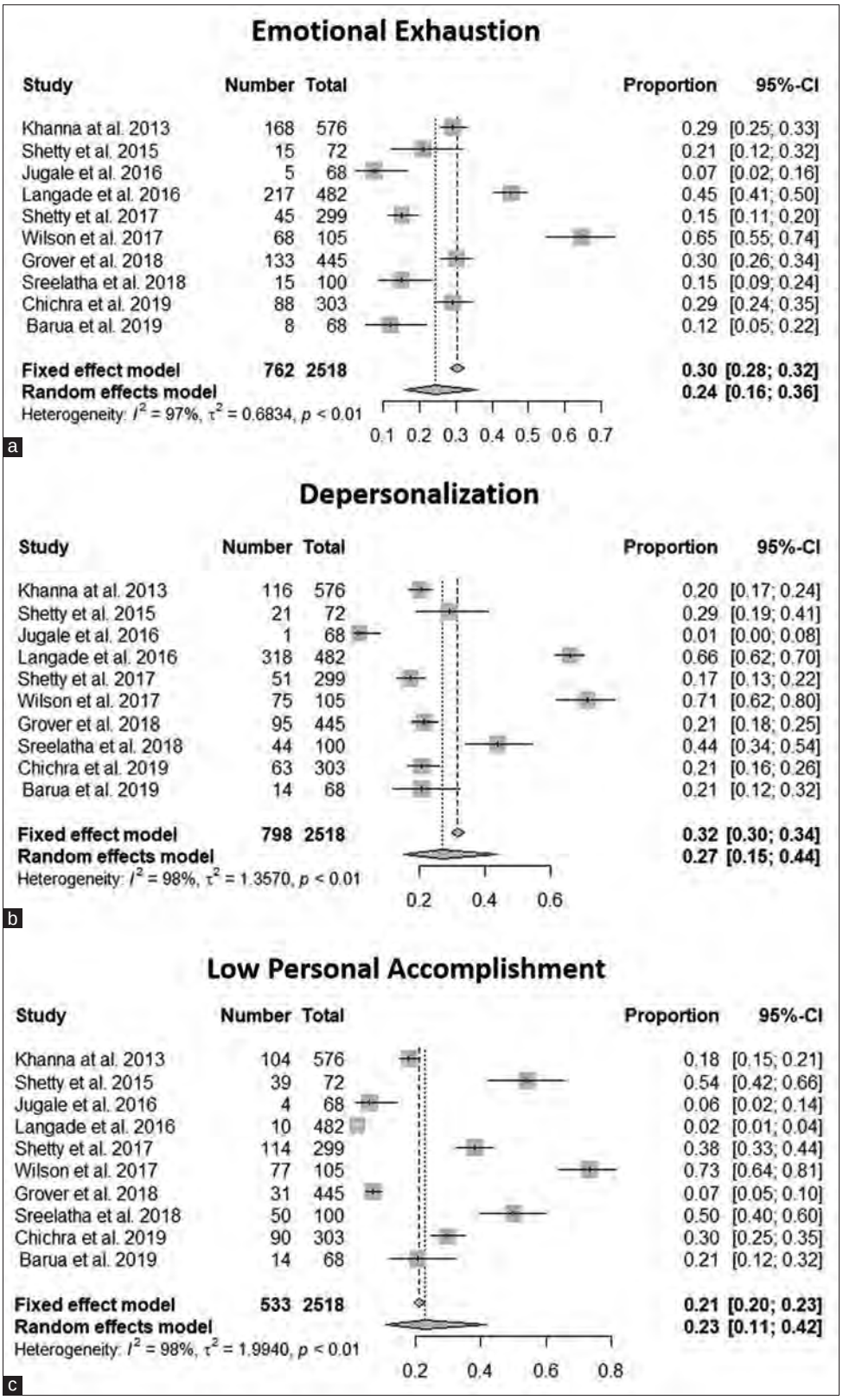

Figure 3: (a) The forest plot showing the pooled prevalence of burnout among the Emotional Exhaustion domain of Maslach Burnout Inventory. (b) The forest plot showing the pooled prevalence of burnout among the Depersonalization domain of Maslach Burnout Inventory. (c) The forest plot showing the pooled prevalence of burnout among the Low Personal Accomplishment domain of Maslach Burnout Inventory

of burnout,[1,25,29] whereas the remaining six studies failed to show a statistically significant association between age and burnout.[20,24,26-28,30] Gender was evaluated by 11 studies,[1,13,19,20,22,24-29] of which three found that

females were more likely to suffer from burnout.[13,25,26] Langade *et al*.[20] too reported an association between females and burnout, though statistical analysis was not performed. The other seven studies did not find any significant association between burnout and gender.[1,19,22,24,27-29] Jugale *et al*.,[1] Shetty *et al*.,[27] and Sreelatha *et al*.[28] evaluated the association between marital status and burnout and found that unmarried respondents were more likely to have burnout. A number of other closely related factors, such as longer working hours,[20,26] professional dissatisfaction,[25,26] perceived stress,[23] low remuneration,[20] lack of time for leisure activities,[26] disturbed sleep-wake cycle,[16] and lack of respect at work[20,22] were also mentioned as risk factors for burnout.

DISCUSSION

Burnout among HCPs has been associated with depression, anxiety, drug and alcohol abuse, deterioration in health,[31] and suboptimal patient care.[32] Burnout and work-related stress have been studied widely in developed countries, but there is a paucity of literature about the same in the Indian context. This study was designed to systematically review and analyze prevalence and risk factors of burnout among Indian HCPs. After a systematic search of online databases, 15 studies that assessed burnout among 3845 Indian HCPs were included. Our study found that burnout is widely prevalent among Indian HCPs, and many personal and professional factors are associated with increased risk of burnout.

In the present study, the pooled prevalence of burnout ranged from 23% to 27% depending on the domain in which burnout was assessed. Most studies from different parts of the world have reported a similar prevalence of burnout.[9,33-35] Trufelli *et al*.[35] conducted a systematic review on the prevalence of burnout among 2,375 oncologists across the world. They reported a burnout prevalence of 36% in the EE domain, 34% in the DP domain, and 25% in the PA domain. Rodrigues *et al*.[36] conducted a meta-analysis and found the overall prevalence of burnout among residents from all specialties to be 35%. In a systematic review, of more than 100 studies, by Rotenstein *et al*.,[37] the assessment and prevalence of burnout showed substantial variation between studies, with the prevalence in some studies being more than 80%, while in some others it was less than 10%. In another systematic review among 4,108 Arab HCPs, the burnout prevalence for the three domains ranged from 20 to 81% for EE, 9 to 80% for DP, and 13 to 86% for low PA[3]. Similarly, the overall prevalence of burnout among Iranian nurses was estimated to be 36% based on 21 studies including 4,180 participants.[38] In yet another meta-analysis, the prevalence of burnout among oncology nurses was found to be 30%, 15%, and 35% in EE, DP, and PA domains, respectively.[39] This suggests that burnout is a universal problem across specialties and different sets of HCPs, with miniscule difference between the developed and developing world.

Multiple factors such as younger age, female gender, unmarried status, and difficult working conditions were found to be associated with burnout in some studies included in this review. However, many studies failed to show an association between burnout and age/gender, suggesting that there is inconclusive evidence to consider them as risk factors for burnout. The heterogeneity in the results of the studies could be related to unadjusted confounding factors. Although younger HCPs can be expected to have increased workloads, low remuneration, and less respect, the incidence of burnout might also be affected by the specialty and the hospital. The higher rate of burnout found in females highlights the need for gender equality and family-friendly work environments, especially in a patriarchal society like India.[40-42] The higher burnout observed in unmarried HCPs could be related to the lack of family support, which is a known risk factor for depression and suicide.[43,44] Similar to our findings, Amoafo *et al*.,[45] in a review of 47 studies, found that younger age, female sex, and unmarried status are predictors of burnout. In a meta-analysis of 65 studies, Lee *et al*.[11] reported that burnout was negatively associated with autonomy, positive work attitudes, and quality and safety culture, whereas it was positively associated with workload, constraining organizational structure, conflicts, low standards, negative work attitudes, and work-life conflict. Therefore, maintaining a friendly and stress-free working environment is of paramount importance in reducing burnout among HCPs.

Even though our study is the first of its kind among Indian HCPs, it has many limitations. Only a handful of studies could be included in this review. Even among these studies, there was heterogeneity with respect to the tool used to assess burnout, making it difficult to perform a comparison between the studies. As a result, only ten studies could be used to evaluate the pooled prevalence of burnout. Many studies had small sample sizes, and the response rates were very low in most of them. This in itself is a limitation compared to the fact that there are about 12–15 million registered HCPs in India[46] belonging to different geographical, ethnic, and subspecialty classes. The working environment is also markedly different across the various health care systems in India and was not accounted for in this study. Finally, the present study was also unable to perform quantitative analysis with respect to risk factors

associated with burnout, due to the heterogeneity in the assessment of risk factors among the included studies.

CONCLUSION

In summary, our analysis found that, based on the pooled results, approximately one-fourth of Indian HCPs suffer from burnout. There was substantial variation in the reported prevalence of burnout among the studies. Appreciation of burnout as a major health -related problem will help in its early detection and will ensure timely interventions to tackle this problem effectively. Some of the possible strategies to prevent burnout include a reduction in working hours, scheduled staff meetings, encouraging cooperation/discussion between professionals, workshops to improve coping skills, etc.[47,48] As the Indian healthcare system is constantly changing, with significant differences in physician-patient relations and working environment compared to other healthcare systems, it is important to implement strategies specifically addressing burnout in the Indian system. Therefore, further studies are required to assess the effectiveness of these various interventions in reducing burnout among Indian HCPs.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Jugale PV, Mallaiah P, Krishnamurthy A, Sangha R. Burnout and work engagement among dental practitioners in Bangalore city: A cross-sectional study. J Clin Diagn Res 2016;10:ZC63-7.
2. Romani M, Ashkar K. Burnout among physicians. Libyan J Med 2014;9:23556.
3. Elbarazi I, Loney T, Yousef S, Elias A. Prevalence of and factors associated with burnout among health care professionals in Arab countries: A systematic review. BMC Health Serv Res 2017;17:1-14.
4. Morse G, Salyers MP, Rollins AL, Monroe-DeVita M, Pfahler C. Burnout in mental health services: A review of the problem and its remediation. Adm Policy Ment Heal Ment Heal Serv Res 2012;39:341-52.
5. Feteh VF, Njim T, Nji MA, Ayeah CM, Sama CB, Tianyi FL. Prevalence and determinants of burnout syndrome among physicians in Cameroon: A research proposal. BMC Res Notes 2017;10:1-7.
6. Dewa CS, Loong D, Bonato S, Thanh NX, Jacobs P. How does burnout affect physician productivity? A systematic literature review. BMC Health Serv Res 2014;14:1-12.
7. Al-Mendalawi M. Prevalence of burnout and its correlates among residents in a tertiary medical center in Kerala, India: A cross-sectional study. J Postgrad Med 2016;62:271-2.
8. Epp K. Burnout in critical care nurses: A literature review. Dynamics 2012;23:25-31.
9. Rama-Maceiras P, Jokinen J, Kranke P. Stress and burnout in anaesthesia: A real world problem? Curr Opin Anaesthesiol 2015;28:151-8.
10. Roberts DL, Cannon KJ, Wellik KE, Wu Q, Budavari AI. Burnout in inpatient-based versus outpatient-based physicians: A systematic review and meta-analysis. J Hosp Med 2013;8:653-64.
11. Lee RT, Seo B, Hladkyj S, Lovell BL, Schwartzmann L. Correlates of physician burnout across regions and specialties: A meta-analysis. Hum Resour Health 2013;11:1-24.
12. Murthy S, Rao K, Ramani S, Chokshi M, Khandpur N, Hazarika I. What do doctors want? Incentives to increase rural recruitment and retention in India. BMC Proc 2012;6(Suppl 1):5.
13. Grover S, Sahoo S, Bhalla A, Avasthi A. Psychological problems and burnout among medical professionals of a tertiary care hospital of North India: A cross-sectional study. Indian J Psychiatry 2018;60:175-88.
14. Ambesh P. Violence against doctors in the Indian subcontinent: A rising bane. Indian Heart J 2016;68:749-50.
15. Purohit B, Vasava P. Role stress among auxiliary nurses midwives in Gujarat, India. BMC Health Serv Res 2017;17:1-8.
16. Wilson W, Raj JP, Narayan G, Ghiya M, Murty S, Joseph B. Quantifying burnout among emergency medicine professionals. J Emerg Trauma Shock 2017;10:199-204.
17. Mata DA, Ramos MA, Bansal N, Khan R, Guille C, Di Angelantonio E, *et al*. Prevalence of depression and depressive symptoms among resident physicians. JAMA 2015;314:2373-83.
18. R Core Team. R: A Language and Environment for Statistical Computing. 2015. Available from: http://www.r-project.org/. [Last accessed on 2017 Jan 07].
19. Gandhi K, Sahni N, Padhy SK, Mathew PJ. Comparison of stress and burnout among anesthesia and surgical residents in a tertiary care teaching hospital in North India. J Postgrad Med 2018;64:145-9.
20. Langade D, Modi PD, Sidhwa YF, Hishikar NA, Gharpure AS, Wankhade K, *et al*. Burnout syndrome among medical practitioners across India: A questionnaire-based survey. Cureus 2016;8:e771. Available from: https://doi.org/10.7759/cureus. 771. [Last accessed on 2019 Oct 12].
21. Reddy RS, Lavanya R, Ramesh T, Vijayalaxmi N, Swapna LA, Singh TR. Burnout among dental faculty and students in a dental college. Indian J Public Heal Res Dev 2014;5:64-8.
22. Ratnakaran B, Prabhakaran A, Karunakaran V. Prevalence of burnout and its correlates among residents in a tertiary medical center in Kerala, India: A cross-sectional study. J Postgrad Med 2016;62:157-61.
23. Swami MK, Mathur DM, Pushp BK. Emotional intelligence, perceived stress and burnout among resident doctors: An assessment of the relationship. Natl Med J India 2013;26:210-3.
24. Kulkarni S, Dagli N, Duraiswamy P, Desai H, Vyas H, Baroudi K. Stress and professional burnout among newly graduated dentists. J Int Soc Prev Community Dent 2016;6:535-41.
25. Khanna R, Khanna R. Is medicine turning into unhappy profession? Indian J Occup Environ Med 2013;17:2-6.
26. Shetty A, Shetty A, Hegde MN, Narasimhan D, Shetty S. Stress and burnout assessment among post graduate. Nitte Univ J Health Sci 2015;5:31-6.
27. Shetty SH, Assem Y, Khedekar RG, Asha S, Arora M. Indian orthopaedic surgeons are less burned out than their Western colleagues. J Arthrosc Jt Surg 2017;4:1-7.
28. Sreelatha P, Premlal L, Ryali VS. Burnout and coping strategies among residents of a private medical college

in South India: A cross-sectional study. Ind Psychiatry J 2018;27:213-8.
29. Chichra A, Abhijnhan A, Tharyan P. Job stress and satisfaction in faculty of a teaching hospital in south India: A cross-sectional survey. J Postgrad Med 2019;65:201-6.
30. Baruah A, Das S, Dutta A, Das B, Sharma T, Hazarika M. Degree and factors of burnout among emergency healthcare workers in India. Int J Sci Res (Ahmedabad, India) 2019;8:41-5.
31. Prins JT, Gazendam-Donofrio SM, Tubben BJ, van der Heijden FMMA, van de Wiel HBM, Hoekstra-Weebers JEHM. Burnout in medical residents: A review. Med Educ 2007;41:788-800.
32. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. Ann Intern Med 2002;136:358-67.
33. Dyrbye LN, Thomas MR, Massie FS, Power D V, Eacker A, Harper W, *et al*. Burnout and suicidal ideation among U.S. medical students. Ann Intern Med 2008;149:334-41.
34. de Oliveira GS, Chang R, Fitzgerald PC, Almeida MD, Castro-Alves LS, Ahmad S, *et al*. The prevalence of burnout and depression and their association with adherence to safety and practice standards: A survey of United States anesthesiology trainees. Anesth Analg 2013;117:182-93.
35. Trufelli DC, Bensi CG, Garcia JB, Narahara JL, Abrão MN, Diniz RW, *et al*. Burnout in cancer professionals: A systematic review and meta-analysis. Eur J Cancer Care (Engl) 2008;17:524-31.
36. Rodrigues H, Cobucci R, Oliveira A, Cabral JV, Medeiros L, Gurgel K, *et al*. Burnout syndrome among medical residents: A systematic review and meta-analysis. PLoS One 2018;13:e0206840.
37. Rotenstein LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, *et al*. Prevalence of burnout among physicians a systematic review. JAMA 2018;320:1131-50.
38. Rezaei S, Karami Matin B, Hajizadeh M, Soroush A, Nouri B. Prevalence of burnout among nurses in Iran: A systematic review and meta-analysis. Int Nurs Rev 2018;65:361-9.
39. Cañadas-De la Fuente GA, Gómez-Urquiza JL, Ortega-Campos EM, Cañadas GR, Albendín-García L, De la Fuente-Solana EI. Prevalence of burnout syndrome in oncology nursing: A meta-analytic study. Psychooncology 2018;27:1426-33.
40. von Hippel C, Kalokerinos EK, Zacher H. Stereotype threat and perceptions of family-friendly policies among female employees. Front Psychol 2017;7:2043.
41. Tsai SY. Impact of a breastfeeding-friendly workplace on an employed mother's intention to continue breastfeeding after returning to work. Breastfeed Med 2013;8:210-6.
42. Lantz PM. Gender and leadership in healthcare administration: 21st century progress and challenges. J Healthc Manag 2009;53:291-301; discussion 302-3.
43. Roy A. Risk factors for suicide in psychiatric patients. Arch Gen Psychiatry 1982;39:1089-95.
44. Cavanagh JT, Carson AJ, Sharpe M, Lawrie SM. Psychological autopsy studies of suicide: A systematic review. Psychol Med 2003;33:395-405.
45. Amoafo E, Hanbali N, Patel A, Singh P. What are the significant factors associated with burnout in doctors? Occup Med (Chic Ill) 2015;65:117-21.
46. Ministry of Statistics and Programme Implementation. Statistical Year Book India. New Delhi Gov. India. 2017; Section-30.8.
47. Spinetta JJ, Jankovic M, Ben Arush MW, Eden T, Epelman C, Greenberg ML, *et al*. Guidelines for the recognition, prevention, and remediation of burnout in health care professionals participating in the care of children with cancer: Report of the SIOP Working Committee on Psychosocial Issues in Pediatric Oncology. Med Pediatr Oncol 2000;35:122-5.
48. Nelis D, Quoidbach J, Mikolajczak M, Hansenne M. Increasing emotional intelligence: (How) is it possible? Pers Individ Dif 2009;47:36-41.

Original Article

Pattern and Correlates of Depression among Medical Students: An 18-Month Follow-Up Study

Shabna Mohammed, Harish Tharayil[1], Soumya Gopakumar[2], Christina George

ABSTRACT

Background: Medical students are subjected to various challenges, which are possibly etiological in the onset and persistence of depression. There is inadequate research on the longitudinal pattern and correlates of the emotional health of medical students in India. We aim to delineate the longitudinal pattern of depression among medical students and the factors predictive of depression. **Methods:** An 18-month follow-up design with 350 students (2012 intake) from two medical colleges in Kerala, India, was employed. A semistructured questionnaire and the Patient Health Questionnaire 9 were administered 2, 8, and 18 months into the course. **Results:** Depression was present in 42.80%, 36.20%, and 42.50% of the students at the three assessments. Variables significantly associated with depression on univariate analysis were the course not being of the student's choice at the first assessment; having an unemployed parent (mother) at the second assessment; alcohol use and male gender at the third assessment. On multivariate analysis, male gender (OR = 1.95[1.11–3.41]) and the presence of depression at 2 months (OR = 2.30[1.31–4.05]) and 8 months (OR = 2.48[1.39–4.44]) were predictive of depression at 18 months. **Conclusions:** The high rates of depression and the pattern of high rates early in the course among the medical students contrasts with that reported from other countries. Early depression and male gender were predictive of depression later in the course. The implications of this are to be taken into consideration when undergraduate intervention programs are planned.

Key words: *Depression, medical students, predictors*

Key messages: *Early depression was predictive of depression later in the course, and such medical students may be vulnerable to the multiple deleterious effects of depression. This presents important implications for the need to develop early and acceptable interventions. Male gender also emerged as a possible risk factor and requires closer examination.*

Depression is one of the most common mental illnesses, with a prevalence of 16.2% in the general population.[1] It contributes significantly to the

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_28_19	

How to cite this article: Mohammed S, Tharayil H, Gopakumar S, George C. Pattern and correlates of depression among medical students: An 18-month follow-up study. Indian J Psychol Med 2020;42:116-21.

Departments of Psychiatry and [2]Community Medicine, Dr. SMCSI Medical College, Karakonam, [1]Department of Psychiatry, Govt Medical College, Kozhikode, Kerala, India

Address for correspondence: Dr. Christina George
A1, Aiswarya Nagar, Kesavadasapuram, Kerala, India. E-mail: mukkath@yahoo.com

Submitted: 14-Jan-2019, **Revised:** 24-Jan-2019, **Accepted:** 28-Jun-2019, **Published:** 09-Mar-2020

global burden of disease and is an important cause of years lost due to disability.[2] Medical education is challenging, and medical students have been shown to have a prevalence of depression higher than that in the general population.[3] The effects of this are likely to be long-lasting and could explain why physicians have a high suicide rate.[4] Depression is also documented to have negative effects on academic and work outcomes.[5,6] Factors that could explain the increased levels of distress among medical students include life stressors and stressors related to a demanding learning environment.[7] In order to prevent the negative consequences of depression in medical students, it is important to identify the factors responsible and address them as possible.[8] There are no Indian studies with a longitudinal design examining the predictors of depression in medical students. The literature available shows higher rates of psychological distress among medical students in India than that seen in western studies. Singh *et al*. in 2011 found a prevalence of 49.1% depression among medical students. It was significantly higher in the first year (59.3%) and second year (65.6%), as compared with third (34.4%) and fourth year (37.2%).[9]

Prevalence of depression and its associated factors was measured among 400 medical students in a medical college in Karnataka. One hundred students were selected from years 1 to 4; the overall prevalence of depression was found to be 71.25%.[10]

In a study of 237 medical students in North India, there was a prevalence of provisionally diagnosed depressive disorder and major depressive disorder in 21.5% and 7.6%, respectively. Year of study and poor academic performance were associated with depression. First-year students reported the highest prevalence of depression.[11]

This study was envisaged to study the longitudinal pattern of depression among medical students and the correlates of depression. The study also examined measures of burnout and empathy, which are not presented here.

SUBJECTS AND METHODS

Study Design

A longitudinal follow-up design was employed.

Study setting

The study was conducted in Dr. SMCSI Medical College, Karakonam, a college in the private sector that admits 100 students per year and Government Medical College, Kozhikode, in the public sector that admits 250 students per year. Students of the 2012 MBBS batch constituted the sampling frame for the study. All students who were willing to participate in the study and gave written informed consent were included in the study.

Sample size calculation

Assuming an alpha error of 0.05 and power at 80% and considering the prevalence of depression to be 21.5% in a similar setting[11] and precision as 5%, the sample size was estimated to be 270. Given an expected nonresponse rate of 20%, all 350 students were invited to participate.

Data collection methods

The students were assessed thrice over a period of 18 months, with assessments being done 2, 8, and 18 months after entry into the MBBS course.

They were administered:

1. A semistructured questionnaire with sociodemographic variables (such as age, gender, parents' occupation, perceived support from friends and family, relationship status, etc.) and academic-related variables (such as medium of schooling, enrollment in residential coaching prior to the course, number of attempts prior to joining the course, whether joining the medical course was their personal choice, field of interest, experience of failure in the past year, etc.)
2. The Patient Health Questionnaire-9 (PHQ 9).

The PHQ 9 is a selfadministered diagnostic instrument, which scores each of the nine DSM-IV criteria for depression as "0" (not at all) to "3" (nearly every day). The PHQ 9 has been used in similar settings, both in India and other countries, to establish the prevalence of depression in medical students.[8,12-15] A PHQ 9 score of ≥10 was taken to indicate the presence of depression.[9] This cutoff provides that subjects are most likely to meet DSM-IV criteria for major depressive disorder (likelihood ratio ≥7.1) and has a sensitivity of 88% and a specificity of 88% for major depression.[12] It was employed because of the ease of administration. In order to ensure confidentiality and to make comparisons over time, a code number system was used.

Study period

The study duration was from September 2012 to August 2014.

Analysis

The data collected was entered and analyzed using SPSS version 20. For continuous variables, mean and standard deviation were calculated, whereas frequencies and percentages were employed for

categorical variables. Chi-square tests were employed for calculating statistical significance for categorical variables. Analysis of variance (ANOVA) test for repeated measures was employed to examine trends in PHQ scores. Multivariate analysis was employed to predict depression employing variables significantly associated ($P < 0.05$) with depression on univariate analysis. The PHQ 9 score was dichotomized into presence and absence of depression using a cutoff of 10. For analysis, fields of interest were divided into person- and technical-oriented fields. Person-oriented specialties include family medicine, internal medicine, psychiatry, obstetrics and gynecology, pediatrics, and physical medicine and rehabilitation; technical-oriented fields include anesthesiology, dermatology, radiology, emergency medicine, otolaryngology, pathology, orthopaedics, ophthalmology and surgery.[16] For the purpose of this study, nonclinical subjects were included with technical-oriented specialities.

If a student had left one question unanswered or marked more than one answer for a question, the scale containing that particular question was not calculated. A P value ≤0.05 was taken as significant at all stages.

Ethical considerations

The study was conducted according to the guidelines of the Helsinki declaration and after obtaining clearance from the Institutional Ethics Committee of the institutions on 09/10/12 and 23/10/12. Written informed consent was obtained from the students prior to data collection. The students were given the option of seeking help for any problems detected during the data collection process. The data was anonymized to ensure confidentiality.

RESULTS

Descriptive statistics

From September 2012 to August 2014, a total of 348 medical students who gained entry into the MBBS course were eligible for inclusion in the three longitudinal assessments. Data on depression was available for 325 (at 2 months), 279 (at 8 months), and 320 (at 18 months) students.

The mean age of the students was 18.81 (SD 0.92) years. About 204 (58.6%) of the students were female and 246 (70.7%) were students of the government medical college. The majority belonged to the Hindu faith. One (0.3%) identified themselves as not religious. A majority of the fathers were skilled workers, whereas a majority of mothers were unemployed. Overall, 269 (77.3%) had English as a medium of schooling and 278 (79.9%) had attended a residential coaching program to prepare for the medical education entrance exam. A number of students (n = 30; 8.6%) indicated that they had not been interested in joining MBBS. A majority (n = 265; 76.1%) had got into the MBBS course on their second attempt.

At first assessment, 334 (96%) of the students were reportedly single and 77 (22.2%) had taken a student loan. At follow-up one and a half years later, 33 (11.6%) were in a romantic relationship and 62 (21.90%) had a student loan. After failing the exams at the end of the first year, 11.80% were in the additional batch. Psychiatry consultations were sought by 22 (7.60%) 8 months in to the course and by 7 (4%) at 18 months.

Surgery was the most popular field of interest at first assessment and second assessment, but by the third assessment, internal medicine had become more popular.

The highest proportion of depression [n=139(42.8%)] was at 2 months [Table 1]. The change in mean squares of depression over time on PHQ 9 was found to be significant on repeated measures ANOVA (F = 1378.89, $P < 0.01$).

Of the students assessed both at intake and 8 months, 113 were depressed at intake, and 53 (47.7%) did not report depression at 8 months. Of the students assessed at intake and 18 months, 45 out of the 102 (44.1%) who reported depression at intake had recovered at 18 months. About 60 (62.5%) of the students who endorsed depression at 8 months had reported depression at intake and 55 (57.6%) of those depressed at 18 months had reported depression at intake.

The variables found to be significantly associated with depression on univariate analysis were the course not having been of the student's choice at the first assessment (P = 0.045) and having an unemployed parent (mother) at the second assessment (P = 0.025). Alcohol use (P = 0.025), depression at 2 months ($P < 0.001$) and at 8 months ($P < 0.001$), and being male (P = 0.001) were significantly associated with

Table 1: Longitudinal Pattern of Prevalence of Depression (PHQ >10) in Medical Students

Variable	First MBBS-2 months *n* (%) *n*=325	First MBBS-8 months *n* (%) *n*=279	Second MBBS-18 months (%) *n*=320
Depression			
Present	139 (42.8)	101 (36.2)	136 (42.5)
Absent	186 (57.2)	178 (63.8)	184 (57.5)

PHQ – Patient health questionnaire, MBBS – Bachelor of medicine and bachelor of surgery

depression at the third assessment (18 months into the course) [Table 2]. Sociodemographic variables such as the age of the student, religion, employment of father, consumption of alcohol early in the course, negative life events, being in a romantic relationship, and perceived support of friends or parents were not significantly associated with the presence of depression at any of the assessments. However, the students reporting alcohol use were slightly more likely to report depression. Academic variables such as number of attempts to gain admission, attending a residential coaching program prior to admission, history of academic failures, type of college, student loans, field of interest (people oriented vs. technologically oriented), whether in additional batch, nature of clinical postings attended, and whether student felt the clinical training was rewarding were not significantly associated with depression.

After multivariate analysis employing logistic regression by enter method with variables significant at $P < 0.05$ on univariate analysis for depression at 18 months, male gender (OR = 1.95, 95% CI = 1.11–3.41) and the presence of depression at 2 months (OR = 2.30, 95% CI = 1.31–4.05) and 8 months (OR = 2.48, 95% CI = 1.39–4.44) were predictive of depression at 18 months [Table 3].

Table 2: Factors Significantly* Associated With Depression (2, 8, and 18 months into the course) in Medical Students on Univariate Analysis

Assessment	Characteristic	Depression status		Bivariate statistics	
		Present (%)	Absent (%)	OR	95% CI
At 2 months (*n*=325)	Course not of student's choice	12 40%	18 60%	2.16	1.00-4.64
At 8 months (*n*=279)	Unemployed mother	88 57.9%	64 42.1%	1.77	1.07-2.92
	Depression at two months	55 47.4%	61 52.6%	3.27	1.94-5.50
At 18 months (*n*=320)	Alcohol use	4 28.6%	10 71.4%	3.57	1.09-11.64
	Male gender	59 64.8%	68 35.2%	2.12	1.34-3.34
	Depression at 2 months	53 41.4%	75 58.6%	2.93	1.82-4.71
	Depression at 8 months	36 39.6%	55 60.4%	2.97	1.75-5.05

*Statistical significance *P* less than or equal to 0.05

Table 3: Multivariate analysis for predictors of depression at 18 months into the MBBS course

Factors	OR (adjusted)	df	95% CI	*P*
Alcohol use	1.80	1	0.47-6.97	0.393
Depression at 2 months	2.30	1	1.31-4.05	0.004
Depression at 8 months	2.48	1	1.39-4.44	0.002
Male gender	1.95	1	1.11-3.41	0.019

MBBS – Bachelor of medicine and bachelor of surgery

DISCUSSION

Depression is known to be prevalent among medical students, with higher rates than the general population.[1,17,18] Our study found that the prevalence of depression was the highest (42.8%) very soon after entry into the course (2 months into first MBBS); this decreased to 36.2% at the end of first MBBS and increased again to 42.5% after an average of eight months exposure to clinical rotations.

Literature shows that the prevalence of depression among medical students in India is higher than that seen in western studies.[8,9,11] Western literature reports lower levels of depression among students as 12.9% (16.1% female; 8.1% males)[17] and ranging from 5.7% to 10.6% in another study by Quince *et al*. at Cambridge.[19]

In India, Singh *et al*. found that 49.1% of medical students reported depressive symptoms with higher values in the first two years of the course.[9] Other investigators in India and other southeast Asian countries have also reported such high figures.[9,11,20] Sidana *et al*. replicated these findings, which was in keeping with the findings of this investigation.

In a Cambridge-based study, levels of depression steadily increased from the first year through to the third year of study,[19] unlike our study where the levels of depression were highest soon after entry into the medical college. This could be postulated to be due to the possible difficulty coping with the bulk of the syllabus in the first year[21] or the stress induced by the preparation for the highly competitive entrance exams prior to entering the medical school. In India, students often drop a year during which they are subject to rigorous residential entrance coaching.[22] The average age and academic experience of medical students in India is less than that of students in western settings, making them possibly less equipped to cope with the rigors of medical education. It is interesting that there is no longitudinal increase in the prevalence of depression over time, unlike studies from other countries. Unlike western medical schools, where students are involved in clinical work and subjected to questioning during real-life rounds from the third year of training, in India, the students are largely only expected to learn from the clinical material available and are usually not given any clinical responsibilities. All these reasons may contribute to a levelling off or reduction in depression as the course progresses in our country.

In our study, depression was significantly more among males one and a half years into the course. This is not

consistent with higher rates of depression found in females in other studies.[9,17,18,23] This may be possibly explained by an expectation of the length of the course, disillusionment about the course, and the added pressure on males in Indian societies to fulfil the role of breadwinners. Women in India are less likely to be expected to support their families financially. This is a novel finding and will require further exploration.

Current alcohol use was found to be significantly associated with the presence of depression at 18 months on univariate analysis. This association has been detected by other investigators.[24] It may be postulated that either alcohol is etiologically related to depression or even that alcohol is being employed to ameliorate the negative affective state related to depression. However, alcohol use was not predictive of depression on multivariate analysis.

The course not being of the student's choice was also a risk factor for depression at entry. In India, there is high societal and parental pressure to get into the medical course leading some students to take up a course they do not necessarily like.[25] This is in keeping with cultural norms, with offspring often being expected to follow family values and expectations, with less value attached to personal autonomy. Interestingly this lack of initial interest in joining the course was not correlated with depression later in the course, leading one to postulate that students were largely accepting of the choice they were obliged to make.

We are unable to fully explain the significance of having an unemployed mother leading to increased levels of depression at the second assessment. It could be postulated to be due to possible financial constraints or may be due to a type 1 error, given the large number of variables assessed and the absence of statistical corrections for the same.

A significant predictor of depression at 18-month follow-up, other than the male gender, was the occurrence of depression earlier during the course. Therefore, the presence of depression, a potentially identifiable and modifiable risk factor, early in the course predicts depression. The presence of depression later in the course has been detected in up to 1/5 of the students with initial depression by other investigators,[26] demonstrating that early depression is a significant risk factor. This has important implications, as early unrecognized depression seems to be a significant risk factor for depression later on, which, in turn, may negatively impact quality of life and academic and social functioning.[5,6] This is particularly important for these young people who are already set for a challenging course, requiring the attainment of a wide range of competencies in cognitive, psychomotor, emotional and behavioral areas.

Strengths and limitations

Strengths

This was a study assessing depression in medical students from institutes both in the private and public sector. It utilized a longitudinal design, allowing the examination of predictors. A wide range of academic and sociodemographic variables was examined, multivariate analysis was conducted, and the sample size allowed for meaningful interpretations.

Limitations

The study population was drawn from a southern state in India and findings naturally may not pertain to other regions of the country or world. The PHQ9, though widely used to detect depression, is not a rater/clinician-administered interview schedule to diagnose depression.

Being a follow-up study, there was some attrition at each stage of the study.

Implications for future research

The findings give impetus to the urgent need to recognise and mitigate emotional distress in the form of depression to prevent adverse outcomes, such as depression later in the course. This indicates a need to sensitize students and faculty to signs of emotional distress in medical students, particularly early in their course. An examination of specific environmental and curriculum factors may also be valuable, as well as work on feasible and acceptable interventions for early recognition and amelioration of depression among medical students.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kessler RC, Berglund P, Demler O, Jin R, Koretz D, Merikangas KR, *et al*. The epidemiology of major depressive disorder. JAMA 2003;289:3095.
2. Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. Depression, chronic diseases, and decrements in health: Results from the World Health Surveys. Lancet 2007;370:851-8.
3. Rosal MC, Ockene IS, Ockene JK, Barrett S V, Ma Y, Hebert JR. A longitudinal study of students' depression at one medical school. Acad Med 1997;72:542-6.
4. Frank E, Biola H, Burnett CA. Mortality rates and causes among U.S. physicians. Am J Prev Med 2000;19:155-9.
5. Wang PS, Beck AL, Berglund P, McKenas DK, Pronk NP,

Simon GE, *et al*. Effects of major depression on moment-in-time work performance. Am J Psychiatry 2004;161:1885-91.
6. Hysenbegasi A, Hass SL, Rowland CR. A feasibility trial of a novel approach to depression prevention: Targeting proximal risk factors and application of a model of health-behaviour change the impact of depression on the academic productivity of university students. J Ment Heal Policy Econ J Ment Heal Policy Econ 2005;8:145-51.
7. Ngasa SN, Sama CB, Dzekem BS, Nforchu KN, Tindong M, Aroke D, *et al*. Prevalence and factors associated with depression among medical students in Cameroon: A cross-sectional study. BMC Psychiatry 2017;17:216.
8. Iqbal S, Gupta S, Venkatarao E. Stress, anxiety and depression among medical undergraduate students and their socio-demographic correlates. Indian J Med Res 2015;141:354-7.
9. Singh A, Lal A, Singh S. Prevalence of depression among medical students of a Private Medical College in India. Online J Health Allied Sci 2011;9:8.
10. Kumar GS, Jain A, Hegde S. Prevalence of depression and its associated factors using Beck Depression Inventory among students of a medical college in Karnataka. Indian J Psychiatry 2012;54:223-6.
11. Sidana S, Kishore J, Ghosh V, Gulati D, Jiloha R, Anand T. Prevalence of depression in students of a medical college in New Delhi: A cross-sectional study. Australas Med J 2012;5:247-50.
12. Sen S, Kranzler HR, Krystal JH, Speller H, Chan G, Gelernter J, *et al*. A Prospective cohort study investigating factors associated with depression during medical internship. Arch Gen Psychiatry 2010;67:557.
13. Vankar J, Prabhakaran A, Sharma H. Depression and stigma in medical students at a private medical college. Indian J Psychol Med 2014;36:246.
14. Yoon S, Lee Y, Han C, Pae CU, Yoon HK, Patkar AA, *et al*. Usefulness of the Patient health questionnaire-9 for Korean medical students. Acad Psychiatry 2014;38:661-7.
15. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. J Gen Intern Med 2001;16:606-13.
16. Manuel RS, Borges NJ, Jones BJ. Person-oriented versus technique-oriented specialties: Early preferences and eventual choice. Med Educ Online2009;14:4504.
17. Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students: A cross-sectional study. Med Educ 2005;39:594-604.
18. Schwenk TL, Davis L, Wimsatt LA. Depression, stigma, and suicidal ideation in medical students. JAMA 2010;304:1181.
19. Quince TA, Wood DF, Parker RA, Benson J. Prevalence and persistence of depression among undergraduate medical students: A longitudinal study at one UK medical school. BMJ Open 2012;2:e001519-e001519.
20. Cuttilan AN, Sayampanathan AA, Ho RC-M. Mental health issues amongst medical students in Asia: A systematic review [2000-2015]. Ann Transl Med 2016;4:72.
21. Hafferty FW, Franks R. The hidden curriculum, ethics teaching, and the structure of medical education. Acad Med 1994;69:861-71.
22. Aesha Datta. The coaching class industry - The Hindu Business Line [Internet]. Available from: https://www.thehindubusinessline.com/economy/The-coaching-class-industry/article20702929.ece. [Last cited on 2018 Oct 31].
23. Goebert D, Thompson D, Takeshita J, Beach C, Bryson P, Ephgrave K, *et al*. Depressive symptoms in medical students and residents: A multischool study. Acad Med 2009;84:236-41.
24. Parker DA, Parker ES, Harford TC, Farmer GC. Alcohol use and depression symptoms among employed men and women. Am J Public Health 1987;77:704-7.
25. Jothula KY, Ganapa P, Naidu NK. Study to find out reasons for opting medical profession and regret after joining MBBS course among first year students of a medical college in Telangana. Int J Community Med Public Heal Jothula KY al Int J Community Med Public Heal 2018;5:1392-6.
26. Silva V, Costa P, Pereira I, Faria R, Salgueira AP, Costa MJ, *et al*. Depression in medical students: Insights from a longitudinal study. BMC Med Educ 2017;17:184.

Original Article

Prevalence and Correlates of Burnout among Undergraduate Medical Students – A Cross-sectional Survey

K. Vidhukumar, Majida Hamza

ABSTRACT

Background: Burnout among medical students is important for its prevalence, consequences, and modifiable risk factors. Although there are studies on the topic across the globe, Indian studies are few in number. A prevalence estimate of burnout and its determinants among Indian medical graduates will keep us informed about the emotional and motivational factors hindering their professional growth. **Methods:** From a total of 500 students spanning 5 professional years, data could be collected from 375 students. The study used a questionnaire primarily consisting of "personal burnout" domain of the Copenhagen Burnout Inventory (CBI), which is a validated instrument to assess the burnout at a cutoff score of 50. The questionnaire also included a set of potential personal correlates of burnout. In addition to summary statistics, both univariate and multivariate analyses were used for discerning the relationship of these correlates with burnout. **Results:** The prevalence of burnout among medical students in the college under study was 48.5% (95% confidence interval 43.4–53.7). The proportions of moderate, higher, and severe burnout were 44.8%, 3.2%, and 0.5% respectively. Univariate and multivariate analyses revealed that female gender and perceived stress were associated with burnout. Choosing medicine by one's own choice and maintaining hobbies and interests were associated with less chance for burnout. **Conclusion:** Burnout is a prevalent phenomenon among medical students. There are modifiable risk factors for burnout and addressing them will help in training a medical student with high motivation and professionalism.

Key words: *Burnout, correlates, medical students, prevalence*

Key messages: *Nearly 50% of medical students experience burnout. Exposure to stressful life events, female gender, and dissatisfaction with choice of the profession are related to burnout. Maintaining hobbies and interests seems to be protective against burnout. Measures to prevent burnout are important in the formation of a doctor with motivation, a sense of personal accomplishment, and professionalism.*

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_192_19	

How to cite this article: Vidhukumar K, Hamza M. Prevalence and correlates of burnout among undergraduate medical students – A cross-sectional survey. Indian J Psychol Med 2020;42:122-7.

Department of Psychiatry, Government Medical College, Ernakulam, Kerala, India

Address for correspondence: Dr. K. Vidhukumar
Department of Psychiatry, Government Medical College, Ernakulam, Kerala, India. E-mail: kumarv68@gmail.com

Submitted: 18-Apr-2019, **Revised:** 31-May-2019, **Accepted:** 16-Sep-2019, **Published:** 09-Mar-2020

Burnout is a construct characterized by varying degrees of emotional exhaustion, depersonalization (i.e., feeling detached from or being callous toward patients), and a low sense of personal accomplishment.[1] Herbert Freudenberger, a psychologist, described the term "burnout" for the first time while he was studying the emotional problems among social workers. According to him, the central characteristic of burnout is the extinction of motivation or incentive, especially when one's devotion to a cause or relationship fails to produce the desired results. "Burnout" is usually used to describe the consequences of severe stress experienced by and high standards expected of people working in the "helping" professions, such as doctors and nurses.[2] In addition to efficient patient care, the doctors are supposed to uphold the ideals of the profession and perform the role of healthcare managers. Optimism about the future of medicine and satisfaction with career choice is expected from them. Their curriculum and training are geared toward these goals. But some components of the training and lack of adjustment push a sizable proportion to chronic stress and burnout.[3]

Systematic and narrative reviews have concluded that around 50% of the medical students have burnout.[3,4] Emotional exhaustion, depersonalization, and overall burnout were substantially more prevalent among medical students and residents than age-matched college graduates not studying medicine.[5] Burnout has serious professional and personal consequences, including a lack of professionalism (e.g., lack of honesty, integrity, altruism, or self-regulation).[3] Burnout also affects trainee's view about medicine as a career and may lead to serious thoughts about dropping out.[6] It may even affect the selection of the specialty.[7] Significant personal consequences such as substance use and suicidal ideation are also associated with burnout.[8,9]

The findings that medical students during their matriculation have a similar or even better mental health profile than age-matched college graduates pursuing other careers and that medical students' mental health deteriorates once they are in the medical school to become worse than that of the age-matched college graduates suggest that the origins of burnout are rooted in the learning environment and curriculum.[5,10] Some of the curriculum-related factors associated with burnout include grading system and peer collaboration.[11,12] Learning-environment-related factors such as nonsupportive and cynical supervisors and perception of maltreatment are also related to burnout.[13] Whether they are really causing or just the consequences of burnout need to be debated.[3] Individual factors associated with burnout include nonethnic status, neuroticism, life stressors, and financial burden.[14] Competition for residency and expansion of curricular requirements are other postulated risk factors for burnout.[3]

Despite the high prevalence, potential consequences, modifiable risk factors, and effective interventions, there had been very few Indian studies on burnout among medical students.[15,16] Hence, this study was planned to find the prevalence and correlates of burnout among medical students of a Government Medical College in Kerala. The results could help facilitate organizational efforts and the mentoring practices by the faculty in medical education.

MATERIALS AND METHODS

A cross-sectional survey was done among the undergraduate medical students of a Government Medical College in Kerala during the months of November and December 2017. A full batch of students (including regulars and repeaters) of 4 professional years, starting from the second year, and a batch of interns were enrolled for the study.

In a study done in Pakistan using the Copenhagen Burnout Inventory (CBI), 30% of the medical students were facing severe burnout.[2] Using this estimate and a margin of error of 20%, the sample size calculated was 233 (based on the formula $(Z\alpha/2)\ 2\ P(1\text{-}P)/d2$). In view of the ensuing multivariate analysis, the investigators planned to enroll all the 500 students. The third- and fourth-year students could not be fully traced because of the study leave. Data could also not be collected from a group of interns. Hence, 124 students could not be traced mostly from third- and fourth-year students and interns. Data were collected from 376 students, that is, 75% of the students.

CBI was the primary instrument used.[17] "Personal burnout" domain of the CBI was used for the study. Because the domains of work- and client-related burnouts do not directly concern a medical student, they were avoided in this study. The instrument has been validated and extensively used for various caring and noncaring professions. Internal consistency reliability of the instrument was 0.85 for the personal domain of the questionnaire. The personal domain of the questionnaire consists of six items, and they are scored 100, 75, 50, 25, and 0. A summary score is the mean of the individual item scores. Scores of 1–49 are considered "low" burnout, 50–74 "moderate," 75–99 "high," and a score of 100 is considered "severe" burnout. For this study, a mean score 50 or above was considered as burnout, as done in previous studies.[2] The original instrument in English was used for the study.

Other variables included in the questionnaire, in addition to the sociodemographic data, were grades of physical activity, year of education of the student, regular/repeater status, financial status, the experience of stressful events during the past 6 months, self-reported academic performance, perceived quality of teaching, hobbies/interests, and seeking support from parents or teachers when stressed.

Predictor or correlator variables were measured by single questions, with responses on a Likert scale ranging from 1 to 5. To avoid response bias, the study questionnaire had multiple variables mixed up with the burnout inventory. The CBI items were also transformed to a Likert score ranging from 1 to 5, to maintain the coherence of the instrument.

Data collection

The questionnaire consisting of the above variables was given to batches of medical students, as a group, for self-administration. Only those students who were willing to participate were included, and informed consent was obtained from them. Data collection was managed by the second author. There were no refusals, and 376 students participated in the survey. Only one response was discarded due to incomplete entry. Thus, 375 students were considered for final analysis.

The data was analyzed by R-GUI 3.4.3 version, a free software for statistical computing.[18] CBI scores from 1 to 5 were transformed to scores from 0 to 100. Other ordinal variables such as grades of physical activity, year of education of the student, regular/repeater status, financial status, the experience of major stressful events, self-reported academic performance, perceived quality of teaching, hobbies/interests, and seeking support from parents or teachers were dichotomized based on the median cut-off. The means and percentages were used to summarize data. Because data could not be collected from almost half of the students from the third and fourth years and interns, a comparison of prevalence across the professional years was made. Chi-square test and Fisher's exact test were used for significance testing wherever appropriate. The odds ratio was used for denoting the strength of association. Multivariate analysis was done by logistic regression. An alpha level of 0.05 was maintained throughout the analysis. The variables found to be at 0.10 significance levels in univariate analysis were considered for mutivariate analysis.

The study was done after clearance from the Institutional Ethics Committee of the institution. Confidentiality of personal information was maintained. Anonymity was maintained during the data collection. Written informed consent was obtained prior to participation in the study.

RESULTS

Of the 375 participants, 233 (62%) were females, and 344 (91.5%) were hostellers. The percentages of the second-, third-, fourth-, and final-year students and interns in the sample were 24%, 26.4%, 12.53%, 16%, and 22%, respectively.

The overall prevalence of burnout was 48.53% (95% confidence interval 43.4–53.7). This includes moderate, high, and severe burnout at 44.8%, 3.2%, and 0.5%, respectively. To see whether burnout varied among different academic years, the subgroups of medical students were compared. The percentages of burnout were 52.2%, 47.5%, 38.3%, 45%, and 54.43%, respectively for second-, third-, fourth-, and final-year students, and interns. Although it was found that burnout was less in the fourth-year group, no statistical difference was found across groups (Chi-square value = 9.01, df = 7, $P = 0.25$). The study addressed primarily personal characteristics as correlates of burnout. It was found that female gender, exposure to stressors, and dissatisfaction with career option were associated with burnout, both in univariate [Table 1] and multivariate analyses [Table 2], and not maintaining hobbies in univariate analysis alone.

DISCUSSION

The finding of a prevalence of 48.52% burnout among undergraduate medical students in this study is an estimate consistent with the literature. Most of the studies on medical student burnout had used Maslach Burnout Inventory (MBI),[1] CBI, or nonspecific measures. Prevalence estimates centered around 10%–26% when stricter criteria of MBI were used and 37%–50% when liberal criteria of MBI were used.[19-21] Based on 'personal burnout" domain of CBI, which the investigators used in the study, the prevalence estimate of burnout was around 80% among Malaysian medical students.[22] But 47.4% was the estimate of burnout in a group of medical students in Pakistan.[2] Reviews had reported that approximately half of the medical students suffer from burnout, similar to the results of this study.[3]

Fortunately, despite the similarity of the overall prevalence, the degree of burnout is less in our students compared with the samples of other studies. Severe and high burnout was seen in 31.6% of the Pakistani students, compared with 3.73% in our population.[2] The instrument has been the same in both the studies. The reasons behind such a disparity are worth exploring.

To see whether the burnout varied among students of different academic years, the subgroups of medical

Table 1: Univariate analysis of correlates of burnout

Variable	Burnout (%) *n*=182	No burnout (%) *n*=193	Chi-square	Odds ratio (confidence intervals)	*P*
Female gender	124 (68.1)	109 (56.5)	4.92	1.65 (1.08-2.51)	0.026
Participation in regular exercise	131 (72%)	154 (79.8%)	2.72	0.65 (0.40-1.05)	0.098
Having hobbies	111 (61)	139 (72)	4.64	0.61 (0.39-0.94)	0.031
Repeater status	72 (60.4)	86 (55.4)	0.77	1.23 (0.80-1.89)	0.381
Good financial status	143 (78.6)	156 (80.8)	0.17	0.87 (0.51-1.48)	0.678
Stressors	171 (94)	140 (72.5)	28.86	5.86 (2.89-12.93)	<0.001
Good academic performance	139 (76.4)	155 (80.3)	0.64	0.79 (0.47-1.34)	0.423
Seek support	107 (58.8)	108 (56)	0.20	1.12 (0.73-1.78)	0.653
MBBS by choice	91 (50)	121 (62.7)	6.14	0.59 (0.39-0.92)	0.016
Satisfaction with teaching	160 (87.9)	170 (88.1)	-	0.98 (0.50-1.93)	1.000
Substance abuse	14 (7.7)	13 (6.7)	0.02	1.15 (0.49-2.75)	0.874
Hosteller	167 (91.7)	177 (91.8)	-	0.99 (0.44-2.22)	1.000
Lower age (<22 years)	41 (22.5)	38 (19.7)	0.03	1.19 (0.70-2.01)	0.584

Table 2: Multivariate analysis of correlates of burnout by logistic regression - Main effects model

Variable	Coefficient	Standard error	*Z*	Significance levels	Odds ratio (95% CI)
MBBS by choice	−0.617	0.225	−2.74	0.006	0.54 (0.35-0.84)
Stressors	1.801	0.359	5.02	<0.001	6.06 (3.00-12.2)
Female gender	0.466	0.234	1.99	0.046	1.59 (1.01-2.52)
Exercise	−0.299	0.260	−1.15	0.25	0.74 (0.44-1.23)
Hobbies	−0.441	0.237	−1.86	0.063	0.64 (0.40-1.02)

CI – Confidence interval. Change in−2 log-likelihood=50.31, $P<0.001$, Hosmer and Lemeshow Chi-square=5.22, $P=0.73$

students were compared. There was no statistically significant difference across the groups. This was not in accordance with previous studies on burnout.[4] In previous studies, it had been found that senior medical students had more burnout. But in this study although statistically not significant, the distribution is bimodal: early years and final years were associated with more burnout, with a lesser peak during intermediate years. This difference should be interpreted with caution because the response rate was poor for intermediate-year students.

The study found that female gender, exposure to stressors, and dissatisfaction with career option are associated with burnout, both in univariate [Table 1] and multivariate analyses [Table 2], and not maintaining hobbies in univariate analysis alone.

The association of burnout with female gender had been consistently reported in the literature.[2,23,24] Negative life events had more impact on female students than their male counterparts in terms of both frequency and intensity[25] Moreover, female medical students are more stressed during contact with patients and autopsy more frequently than male students.[24] Interventions specific to female gender are needed to prevent and ameliorate burnout among them.

Burnout has been described in association with stressful life experiences.[26] Such a relationship has been demonstrated by this study also. Previous studies have reported that students who regretted choosing medical studies have higher burnout scores than students who were comfortable with the medical discipline as their chosen career path.[27] Choosing medical discipline based on one's own interest was assessed in this study for its relationship with burnout. Burnout was found significantly related to an enforced choice. Whether it is a falsified response to the current dissatisfaction with the choice of medicine is to be examined.

It had been shown among physicians and residents that regular engagement in hobbies, recreation, or physical exercise reduces the chance of burnout.[3] We found that maintaining regular hobbies and interests is protective against burnout.

Substance use was not related to burnout. It may be because medical students form too young a group to have problematic substance use. However, psychological distress and suicidal ideation were found to be associated with alcohol use in a study done among college students in Kerala.[28] Financial status was also not associated with burnout, unlike in previous studies. The personal strategy of seeking support from parents and teachers, staying away from parents (being hosteller), and advancing age were also not associated with burnout.

The learning environment- and curriculum-related variables, as assessed by perception about the quality of teaching, perception about the academic performance,

and failure in the professional examination, were not found to be associated with burnout. It may be because the students are uniformly exposed to such factors and the measurements were not sensitive enough to pick up the subtleties.

Limitations

The study had certain limitations. Students from a single institution only were enrolled. The sample represents two sources of students: one group which had joined the course while the institution was self-financing (later professional years) and the other while the institution had become government-sponsored (earlier professional years). How this factor had affected the study is not known. The study focused on the personal variables than on the learning environment- and curriculum-related factors. This was an inherent fallacy of the design because the students are uniformly exposed to these variables. Comparing institutions with different learning environments or trend studies may shed better light on the impact of the learning environment and curriculum factors. A subgroup of students from fourth and final years and another subgroup of interns were not enrolled into the study, but by comparing the prevalence across the groups, the above lacunae were at least partially circumvented. Although hosteller status was not found to be associated with burnout, the study did not evaluate the real impact of cultural adaptation and homesickness.

Even with these limitations, the study could offer, with reasonable precision, an estimate of burnout among the medical students. Because it is a cross-sectional study, the correlates we found may not be true causal factors. Still, certain key variables important in the prevention of student burnout were delineated for future research.

CONCLUSION AND RECOMMENDATIONS

Almost half of the medical students are afflicted with burnout, which has immediate and long-lasting consequences. Certain variables such as female gender, the experience of stressors, and dissatisfaction with the choice of profession are associated with medical student burnout. Personal strategies of stress management like engaging in hobbies are associated with less burnout. Aptitude testing at entry, inculcating programs for self-care in the curriculum (reduction of stress and fatigue), facilitating self-awareness of burnout, and maintaining health and personal interests, work–life balance, and adaptive coping strategies when faced with stressors (e.g., positive reframing, problem solving) may be useful for primordial and primary prevention. Interventions like peer-facilitated support program have also been found to be effective in reducing student distress.[29] More comparative studies, which could address the learning environment- and curriculum-related variables, could bring up a better causal model of medical student burnout. Qualitative research designs could also bring in a better conceptualization of the phenomenon.

The undergraduate curriculum in India is being modified to more of a competency-based one. Emotional factors, stress, and burnout among medical graduates need to be addressed in the above curriculum. Salient modifications in the curriculum like foundation program, electives, and programs for communication skill enhancement could prevent student stress and burnout. The study helps emphasize the need for the above components in the undergraduate curriculum.

Acknowledgement

We thank Dr. SajithKumar R, Dr. Radha TR, Dr. Vijayan CP, Dr. Lillykutty Pothen, Dr. Suresh S Vadakkedam, Dr. Geetha Devi M, Dr. Saritha J Shenoy, Dr. Mary Chacko P, Dr. Sathi MS, Dr. Ajay Kumar, Dr.Gino Abraham and Dr. Evelyn Thomas, faculty of Medical Council of India (MCI)-Nodal Centre for Faculty Development at Govt. Medical College, Kottayam, for their invaluable suggestions during the development of the protocol and the conduct of the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Maslach C, Jackson SE, Leiter M. The Maslach Burnout Inventory: Manual. In: Maslach Burnout Inventory. 3rd ed. Palo Alto (CA):Consulting Psychologists Press; 1996.p.191-218.
2. Muzafar Y, Khan HH, Ashraf H, Hussain W, Sajid H, Tahir M, *et al*. Burnout and its Associated Factors in Medical Students of Lahore, Pakistan. Cureus [Internet]. 2015; Available from: http://www.cureus.com/articles/3357-burnout-and-its-associated- factors-in-medical-students-of-lahore-pakistan. [Last accessed on 2019 Apr 15].
3. Dyrbye L, Shanafelt T. A narrative review on burnout experienced by medical students and residents. Med Educ 2016;50:132-49.
4. Chunming WM, Harrison R, MacIntyre R, Travaglia J, Balasooriya C. Burnout in medical students: A systematic review of experiences in Chinese medical schools. BMC Med Educ 2017;17:217.
5. Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J, *et al*. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. Acad Med 2014;89:443-51.
6. Dyrbye LN, Thomas MR, Power DV, Durning S, Moutier C, Massie FS, *et al*. Burnout and serious thoughts of dropping out of medical school: A multi-institutional study. Acad Med

2010;85:94-102.
7. Enoch L, Chibnall JT, Schindler DL, Slavin SJ. Association of medical student burnout with residency speciality choice. Med Educ 2013;47:173-81.
8. Shanafelt TD, Boone S, Tan L, Dyrbye LN, Sotile W, Satele D, *et al*. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. Arch Intern Med 2012;172:1377-85.
9. Dyrbye LN, Thomas MR, Massie FS, Power DV, Eacker A, Harper W, *et al*. Burnout and suicidal ideation among U.S. medical students. Ann Intern Med 2008;149:334-41.
10. Brazeau CMLR, Shanafelt T, Durning SJ, Massie FS, Eacker A, Moutier C, *et al*. Dis tress among matriculating medical students relative to the general population. Acad Med 2014;89:1520-5.
11. Reed DA, Shanafelt TD, Satele DW, Power DV, Eacker A, Harper W, *et al*. Relationship of pass/fail grading and curriculum structure with well-being among preclinical medical students: A multi-institutional study. Acad Med 2011;86:1367-73.
12. Van Vendeloo SN, Brand PLP, Verheyen CCPM. Burnout and quality of life among orthopedic trainees in a modern educational programme. Bone Jt J 2014;96B: 1133-8.
13. Dyrbye LN, Thomas MR, Harper W, Massie FS, Power DV, Eacker A, *et al*. The learning environment and medical student burnout: A multicentre study. Med Educ 2009;43:274-82.
14. Dyrbye L, Thomas M, Huntington J, Lawson K, Novotny P, Sloan J, *et al*. Personal life events and medical student burnout: A multicenter study. Acad Med 2006;81:374-84.
15. Mandal A, Bera T, Bhattacharya S, Mohan Biswas N, Ghosh A, Bera S. Indian medical gazette clinical survey burn out among medical students – A study across three medical colleges in Eastern India. Ind Med Gaz 2013;9:356-9.
16. Vinodh RS, Pradeep C. Evaluation of burnout syndrome in medical students. J Pharm Chem Biol Sci 2016;4:299-306.
17. Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. Work and Stress 2005;19:192-207.
18. R Development Core Team (2008). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0. Available from: http://www.R-project.org. [Last downloaded on 2018 Dec 20].
19. Costa EF, Santos SA, Santos AT, Melo EV, Andrade TM. Burnout syndrome and associated factors among medical students: A cross-sectional study. Clinics (Sao Paulo) 2012;67:573-80.
20. Boni RADS, Paiva CE, de Oliveira MA, Lucchetti G, Fregnani JHTG, Paiva BSR. Burnout among medical students during the first years of undergraduate school: Prevalence and associated factors. PLoS One 2018;13:e0191746.
21. Barbosa ML, Ferreira BLR, Vargas TN, Ney da Silva GM, Nardi AE, Machado S, *et al*. Burnout prevalence and associated factors among Brazilian medical students. Clin Pract Epidemiol Ment Health 2018;14:188-95.
22. Chin RWA, Chua YY, Chu MN, Mahadi NF, Yusoff MSB, Wong MS, *et al*. Prevalence of burnout among Universiti Sains Malaysia medical students. Education in Medicine Journal 2016;8:61–74.
23. Backović DV, Zivojinović JI, Maksimović J, Maksimović M. Gender differences in academic stress and burnout among medical students in final years of education. Psychiatr Danub 2012;24:175-81.
24. Dahlin ME, Runeson B. Burnout and psychiatric morbidity among medical students entering clinical training: A three year prospective questionnaire and interview-based study. BMC Med Educ 2007;7:6.
25. Misra R, McKean M. College students' academic stress and its relation to their anxiety, time management, and leisure satisfaction. Am J Health Sci 2000;16:41-1.
26. Dyrbye LN, Thomas MR, Huntington JL, Lawson KL, Novotny PJ, Sloan JA, *et al*. Personal life events and medical student burnout: A multicenter study. Acad Med 2006;81:374-84.
27. Njim T, Makebe H, Toukam L, Kika B, Fonkou S, Fondungallah J, *et al*. Burnout syndrome amongst medical students in Cameroon: A cross-sectional analysis of the determinants in preclinical and clinical students, Psychiatry J 2019;2019:4157574.
28. Jaisoorya TS, Gowda GS, Nair BS, Menon PG, Rani A, Radhakrishnan KS, *et al*. Correlates of high-risk and low-risk alcohol use among college students in Kerala, India. J Psychoactive Drugs 2018;50:54-61.
29. Moir F, Henning M, Hassed C, Moyes SA, Elley CR. A peer-support and mindfulness program to improve the mental health of medical students. Teach Learn Med 2016;28: 293-302.

Original Article

Problematic Internet Use, Mental Health, and Sleep Quality among Medical Students: A Path-Analytic Model

Mohammad Reza Shadzi, Alireza Salehi[1], Hossein Molavi Vardanjani

ABSTRACT

Background: There is a close association between problematic Internet use (PIU), sleep quality, and mental health problems. To evaluate which mental health problem is more associated with coexistence of both PIU and poor sleep quality, we hypothesized a model in which PIU influences sleep quality directly and also through the mediation of three different mental health problems. **Methods:** A total of 402 medical students completed the Persian versions of the Internet Addiction Test, 21-item Depression Anxiety Stress Scale, and Pittsburgh Sleep Quality Index. A maximum likelihood structural equation model was used to assess the hypothesis. For assessment of the indirect effects, bootstrapping was conducted. **Results:** PIU predicted poor sleep quality through indirect pathways by the mediation of mental health problems ($P < 0.001$). Poor sleep quality were associated with depressive symptoms ($P < 0.001$), anxiety ($P = 0.035$), and stress ($P < 0.001$); however, the direct pathways from stress and anxiety to poor sleep quality were not statistically significant ($P > 0.05$). **Conclusion:** Findings extend our previous knowledge about the interrelationships between PIU, sleep disturbances, and mental health problems by unveiling the key role of depressive symptoms.

Key words: *Internet, Iran, medical students, mental health, sleep*

Key messages: *Depressive symptoms are the most prevalent mental health problems in co-occurrence of both problematic Internet use and poor sleep quality among medical students. The critical point to prevent poor sleep quality as a consequence of problematic Internet use and mental health problems is to prevent depressive symptoms.*

The Internet has become an essential and inseparable part of the modern lifestyle. However, "problematic behavior of human interactions with information and communication technologies" has made it a long-term concern.[1] The term "Internet addiction," which is defined as "a psychological dependence on the internet, regardless of the type of activity once

Access this article online	
Website: www.ijpm.info	Quick Response Code
DOI: 10.4103/IJPSYM.IJPSYM_238_19	

How to cite this article: Shadzi MR, Salehi A, Vardanjani HM. Problematic internet use, mental health, and sleep quality among medical students: A path-analytic model. Indian J Psychol Med 2020;42:128-35.

MPH Department, Shiraz University of Medical Sciences, [1]Research Center for Traditional Medicine and History of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

Address for correspondence: Dr. Alireza Salehi
Research Center for Traditional Medicine and History of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran.
E-mail: salehialireza45@yahoo.com

Submitted: 27-May-2019, **Revised:** 09-Jul-2019, **Accepted:** 02-Oct-2019, **Published:** 09-Mar-2020

logged on," describes this problematic behavior.[2] The prevalence of problematic internet use (PIU) varies from 0.8% to 26.7% in different populations, with higher prevalence in adolescents and young adults.[3] Even in developing countries like Iran, the prevalence of 10.8%–28.7% has been reported in medical students.[4-6]

The negative impact of PIU on both sleep duration and sleep quality is shown in the literature.[7] PIU leads to irregular sleep patterns and excessive day-time sleepiness,[8,9] and those with PIU experience more sleep disturbances.[10] Those with PIU are 1.7 times more likely to experience poor sleep quality in comparison to those with non-PIU.[11]

PIU is one of the influential factors predicting psychiatric and psychosocial problems.[12] According to a longitudinal study, in those with PIU, in comparison to those with non-PIU, the risk of developing depressive symptoms is about 2.5 times higher.[13] PIU also increases the risk of anxiety and stress.[14] Adolescents and young adults with PIU are more susceptible to develop symptoms of depression and anxiety.[14]

In addition, different mental health problems such as depressive symptoms,[15,16] anxiety,[1] and stress[17] can separately account for negative sleep outcomes. In more than 70% of people suffering from both insomnia and anxiety, poor mental health anteceded the onset of insomnia.[18] Besides, adolescents and young adults are more prone to both mental health and sleep problems.[17,19]

Study aims and hypotheses

We hypothesized a model in which different mental health problems, including depression, anxiety, and stress, lead to poor sleep quality. PIU influences sleep quality not only through the direct pathway but also through the mediation of mental health problems. In other words, we assessed the direct and indirect influences of PIU on sleep quality through the mediators of the three mental health problems (depression, anxiety, and stress). This study was done to evaluate which of the three mental health problems is more associated with the coexistence of PIU and poor sleep quality.

Because the health of the community is influenced by medical students' health, consequent to their important role in the health system in the early future, assessment of the relationship between PIU, mental health, and sleep quality may yield new information leading to better planning of preventive services for this group.

METHODS

Participants

A cross-sectional study was conducted from May to August 2018. The study population was the first- to the seventh-year medical students of Shiraz University of Medical Sciences, where a total of 1,568 students were studying general medicine at the time of the study. To obtain adequate sample size for conducting the structural equation modeling,[20] near one-third of the whole group of medical students were selected to participate in the study. The sampling population was stratified into three educational levels of basic sciences, physiopathology, and clinical stage. Then, sampling was done using a random number table, based on the student identification number, in proportion to the size of each educational level.

A total of 487 medical students were asked to participate in the study. After being informed about the study, 67 students refused to participate. After applying the exclusion criteria, 18 students were excluded from the study, leaving the final sample of 402 students. This study was approved by the ethics committee of Shiraz University of Medical Sciences, and all participants provided written informed consent while completing the questionnaires.

Exclusion criteria

Participants who had one of the following criteria were excluded:

A. Students who did not answer more than three questions (four students)
B. Students who did not answer one of the first to fourth questions of the Pittsburgh Sleep Quality Index (PSQI) (14 students).

Because each of the first to four questions of the PSQI has a basic role in creating the domains of the global sleep quality, criterion B was defined to prevent data misanalysis.

Measures

Problematic Internet use

PIU was assessed using the Internet Addiction Test (IAT).[21] The Persian version of the IAT, which is a validated and reliable questionnaire, was used in this study.[22,23] IAT includes 20 questions that are scored on a 5-point Likert scale ranging from 1 (rarely) to 5 (always). These scores are summed to calculate the final global score, which ranges from 20 to 100. A higher global score represents more problematic internet behavior. Moreover, Mohammadsalehi *et al*. showed that the Persian version of the questionnaire can be divided into three reflecting factors, including personal activities disorder (PAD), emotional and mood

disorder (EMD), and social activities disorder (SAD), with good discriminant validity between the items of different factors and high convergent validity among the items in each factor.[23] Thus, we considered the PIU as a latent factor consisting of PAD, EMD, and SAD as the observed variables. In accordance with the suggestions of Alavi *et al*., a total score of 46 was considered as the PIU cut-off point.[22]

Mental health

The Depression Anxiety Stress Scale (DASS-21) is able to differentiate between symptoms of different mental health problems.[24] The questionnaire includes three subscales of depression, anxiety, and stress, each one being assessed by seven items (21 items in total). Response options range from 0 (did not apply to me at all) to 3 (applied to me very much), and higher scores indicate poorer mental health on their particular dimensions. Scores of each subscale must be doubled because the DASS-21 is the short form of the 42-item questionnaire.[24] Because DASS-21 assesses the mental health problems during the previous week, sleeping behaviors do not confound the information yielded by the questionnaire, and it prevents the conceptual overlap with the sleep quality scale. In this study, the Persian version of the DASS-21 was used to measure the different aspects of mental health problems.[25] As suggested by Samani and Jokar on the basis of the Lovibond and Lovibond's study,[24] we classified the participants into three levels for each subscale of depression (normal: scores 0–9, moderate: scores 10–20, and severe: scores 21–42), anxiety (normal: scores 0–7, moderate: scores 8–14, and severe: scores 15–42), and stress (normal: scores 0–14, moderate: scores 15–25, and severe: scores 26–42).[25]

Sleep quality

The PSQI[26] is a 19-item questionnaire which is used to assess different "domains" of the global sleep quality, including sleep duration, sleep latency, habitual sleep efficiency, sleep disturbances, sleeping medications, day-time dysfunction, and subjective sleep quality. In each domain, scores range from 0 to 3. The final global score varies from 0 to 21 and is calculated by the summations of the scores of these seven domains. A higher global score represents a poorer sleep quality. Acceptable validity and reliability of the Persian version of the PSQI, which was used in this study, has been previously shown.[27] We considered the total score of 6 as a cut-off point to identify the participants with poor sleep quality.[27]

Background variables

Participants were asked about their age, sex, whether living in a dormitory or not, marital status, and educational level: basic sciences, physiopathology, or clinical stage. In the corresponding university, medical students study basic sciences such as physiology, anatomy, and pathology during the first 30 months of university admission (basic sciences level). In the second level, which lasts 12 months, students learn the physiopathology of internal diseases as well as the pediatric and gynecologic diseases (physiopathology level). It is then followed by clinical stage, which lasts 42 months. In this level, besides a daily visit of patients, the students must fulfill at least seven 24-h hospital shifts in each month as a standby doctor.

Statistical analysis

First, we calculated descriptive statistics of the sample characteristics. The total score of each questionnaire among the participants based on demographic characteristics was compared using Mann–Whitney *U*-test or Kruskal–Wallis test. Pearson's correlation coefficient was used for assessing the correlation between each pair of continuous variables. We used Chi-square test to compare the prevalence of all main variables among different demographic groups. This test was also used to evaluate the prevalence of mental health problems and poor sleep quality on the basis of whether a student is a problematic Internet user or not.

Durbin–Watson test was used to evaluate the autocorrelation in residual before the conduction of structural equation modeling. The test acceptance level is for the values of 1.5–2.5. Multivariate normality assumption on residuals was evaluated by normal P-P plot of regression standardized residual. Cook's distance index was used for data screening if there were an outlier or influential. The values of less than 1 were considered for acceptance level of the index. Multicollinearity of predictor variables was evaluated by variance inflation factor (VIF), with the values of less than 3 as the acceptance level.

Using a maximum likelihood structural equation model, we assessed the hypothesis that three indicators of PAD, EMD, and SAD represent the PIU as a latent factor. PIU then predicts poor sleep quality directly and also with the mediation of different mental health problems. To evaluate how well the hypothesized model fits the observed data, we used Chi-square test (χ^2), root mean square error of approximation (RMSEA), and goodness-of-fit index (GFI). Because of the dependency of χ^2 *P* value on sample size, minimum discrepancy divided by its degrees of freedom (CMIN/DF) was calculated to solve this problem. To correct the effects of the number of indicators of latent variables on GFI, adjusted goodness-of-fit index (AGFI) was used. We also used the comparative fit index (CFI), normed fit index (NFI), and non-normed fit index (NNFI) as incremental fit tests to assess the relative position of

the model between the worst fit to the perfect fit. After ensuring the model fit, for assessment of the indirect effects, we conducted bootstrapping, which provides accurate results.[28,29] Finally, to establish the mediatory role of mental health problems, the model was run by rotatory deletion of each mental health variable. RMSEA <0.07, CMIN/DF <2, χ^2 *P* value >0.05, GFI >0.95, AGFI >0.95, CFI >0.95, NFI >0.95, and NNFI >0.95 were considered for acceptance of the model fit.[30] All the analysis was performed by SPSS Statistics and SPSS Amos version 24.

RESULTS

Descriptive and comparative information

Half of the participants (50.3%) were female. Most of the students were single (93.5%) and living in a dormitory (62.8%). Their mean age (±standard deviation) was 22.4 (±2.18) years. About 44% were studying at the basic science level, 15.5% at pathophysiology, and 40.5% at the clinical stage. PIU was present in 38.6% of the participants, and 40% experienced poor sleep quality. Moderate to severe levels of mental health problems were documented in 48.8% of the participants for depression, 50.5% for anxiety, and 48% for stress. Higher rates of poor sleep quality (49% vs. 34.4%, $P = 0.004$), depression (69% vs. 36%, $P < 0.001$), anxiety (67.7% vs. 39.7%, $P < 0.001$), and stress (66.5% vs. 36.4%, $P < 0.001$) were documented in those with PIU. Chi-square test revealed statistically significant higher prevalence of depression (51% vs. 19.2%, $P = 0.007$) and stress (50.4% vs. 19.2%, $P = 0.007$) among the single students. Statistically significant higher prevalence of poor sleep quality was also seen among the students living in a dormitory (46.2% vs. 29.5%, $P = 0.001$).

Table 1 shows the results of Mann–Whitney *U*-test and Kruskal–Wallis test. The stress scores of basic science students were significantly higher than those of the clinical students ($P = 0.005$). The PSQI scores of clinical students were significantly higher than those of both the basic science ($P = 0.004$) and the pathophysiology ($P = 0.031$) students. In addition, the IAT scores of basic science students were higher than those of both the pathophysiology ($P = 0.011$) and the clinical ($P = 0.013$) students. The correlation matrix of variables is shown in Table 2.

The results confirmed the applicability of structural equation modeling. Durbin–Watson test value was 1.9, and residuals were normally distributed. The residual mean was 0, and the standardized residuals were scattered between −2.7 and +2.9. The maximum Cook's distance index was 0.04, and the maximum VIF was 2.6.

Predictive model

The hypothesized model did not fit the data [Table 3]. Modification indices of the software suggested that all the different mental health problems are probably connected to each other in a direct pathway. Accordingly, based on the literature, three direct pathways were added to the model.[31-34] The second model exhibited significant improvement in model fit indices [Table 3]. The results of bootstrapping clarified the different relationship pathways between the variables [Table 4]. As shown in Figure 1, PIU is directly and positively connected to each of the mental health problems. PIU also predicts poor sleep quality only through the indirect pathways by the mediation of mental health problems. All the mental health problems are totally associated with one another and poor sleep quality; however, the direct pathways from stress and anxiety to poor sleep quality were not statistically significant.

DISCUSSION

This study reestimated the prevalence of PIU, mental health problems, and poor sleep quality in Iran. In

Table 1: Mean score±standard deviation of each questionnaire based on the background variables

Background variable	Sex		Married		Dormitory		Educational Level		
Questionnaire	Male	Female	Yes	No	Yes	No	B.S	P	C
Depression score	11.40±8.74	10.85±10.11	6.08±7.05	11.44±9.48	11.53±9.63	10.05±8.83	11.40±8.85	13.19±11.68	9.91±8.95
	0.158		0.002*		0.152			0.138	
Anxiety score	8.72±7.31	8.82±7.96	6.46±7.09	8.96±7.64	9.21±7.91	7.86±7.17	9.49±7.46	8.74±8.38	7.93±7.45
	0.781		0.071		0.098			0.078	
Stress score	14.51±8.72	15.05±9.60	10.31±7.93	15.07±9.15	15.24±9.27	13.74±8.92	15.91±8.80	14.77±10.34	13.29±8.91
	0.581		0.009*		0.106			0.022*	
PSQI score	6.09±3.22	6.24±3.60	6.27±3.52	6.19±3.46	6.69±3.66	5.35±2.93	5.75±3.25	5.74±3.62	6.77±3.53
	0.940		0.769		<0.001*			0.008*	
IAT score	44.98±13.86	43.41±12.95	42.69±15.91	44.40±13.27	44.75±13.30	43.33±13.84	46.26±13.36	41.58±13.28	42.85±13.27
	0.351		0.332		0.228			0.009*	

B.S – Basic sciences; P – Physiopathology; C – Clinical; PSQI – Pittsburgh sleep quality index; IAT – Internet addiction test. Doubled score of each subscale of DASS-21 is shown in the table; *P* of each Mann-Whitney *U*-test or Kruskal-Wallis test is shown beneath the mean scores. *Significant *P*

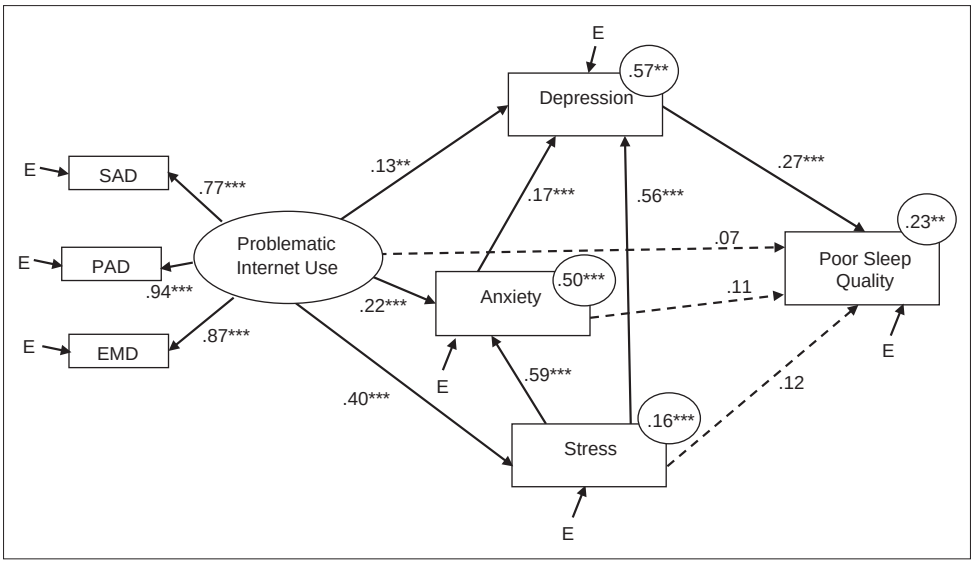

Figure 1: The final model of problematic Internet use to poor sleep quality. Squared multiple correlations (R^2) are presented in circles; standardized regression weights are presented on vectors; E – Error; SAD – Social activities disorder; PAD – Personal activities disorder; EMD – Emotional and mood disorder; *P < 0.05; **P < 0.01; ***P < 0.001

Table 2: Descriptive statistics and correlation matrix of observed variables

Variable	M	SD	1.	2.	3.	4.	5.	6.
1. Personal activities disorder	23.60	7.73						
2. Emotional and mood disorder	13.32	4.18	0.80					
3. Social activities disorder	7.24	2.60	0.72	0.67				
4. Depression	11.07	9.42	0.41	0.36	0.29			
5. Anxiety	8.74	7.61	0.43	0.40	0.30	0.61		
6. Stress	14.67	9.15	0.37	0.34	0.27	0.73	0.67	
7. Poor sleep quality	6.16	3.45	0.27	0.21	0.22	0.45	0.38	0.41

M – Mean; SD – Standard deviation. All correlations are significant at P<0.01

Table 3: Model fit indices

Index	First model	Second model
χ^2 P	<0.001	0.56
CMIN/DF	38.88	0.85
RMSEA	0.31	<0.001
GFI	0.75	0.99
AGFI	0.37	0.98
CFI	0.72	>0.999
NFI	0.72	0.99
NNFI	0.47	>0.999

χ^2, Chi-square; CMIN/DF – Minimum discrepancy divided by its degrees of freedom; RMSEA – Root mean square error of approximation; GFI – Goodness-of-fit index; AGFI – Adjusted goodness-of-fit index; CFI – Comparative fit index; NFI – Normed fit index; NNFI – Non-normed fit index

addition, this is the first study on the effects of PIU on both mental health and sleep quality simultaneously. The prevalence of PIU in this study (38.6%) was considerably higher than that found in the previous studies.[35,36] Even similar studies among Iranian medical students had reported a prevalence of PIU up to 30%.[4-6] The prevalence of poor sleep quality in our study was about 10% more than what was reported in Chinese adolescents from Hong Kong (40% vs. 30.7%).[35] The higher prevalence of poor sleep quality in our study might be attributed to the higher prevalence of PIU. Surprisingly, with a lower prevalence of PIU (17.2%) in Tan *et al*.'s research, the prevalence of depression (54.4%) and poor sleep quality (40%) in that study was similar to that of our study.[36] The difference might be due to different patterns of PIU between these two populations. Nevertheless, the increasing rate of PIU and consequently its negative outcomes now have turned an important issue which needs special attention by not only the health system but also the whole society.

We also found that being male or female makes no difference in susceptibility to PIU, poor sleep quality, or different mental health problems. But students living in dormitory experienced more sleep disturbances, and single participants suffered from stress and depression more than the married ones. Higher rates of stress and PIU were observed in the basic science students; this might be due to maladaptation to a new lifestyle not experienced before. In addition, poorer sleep quality in clinical students is probably due to multiple and long hospital shifts as a standby doctor.

This study provides support to the hypothesis that PIU is directly related to each of the mental health problems. In our model, total correlations between PIU and each of the mental health problems did not exceed 0.5, which was similar to the results of previous studies.[37-39] Moreover, the total correlation between PIU and poor sleep quality was lower than that. These

Table 4: Results of bootstrapping: Standardized regression weights

Variable	Total effect				
	1.	2.	3.	4.	5.
1. Problematic Internet use		0.40***	0.45***	0.44***	0.28***
2. Stress			0.59***	0.66***	0.36***
3. Anxiety	0.23***			0.17***	0.15*
4. Depression	0.30***	0.10***			0.27***
5. Poor sleep quality	0.21***	0.24***	0.05***		
	Indirect effect				

*$P<0.05$; **$P<0.01$; ***$P<0.001$

amounts of correlations between these variables show that a noticeable proportion of the experience of the mental health problems and sleep quality cannot be explained by PIU alone; however, the role of PIU in the existence of both mental health problems and poor sleep quality cannot be ignored. In other words, it is a clue indicating that there should be more fundamental variables that come before and predicts the coexistence of all the PIU, mental health problems, and poor sleep quality. An example of such a variable is well-demonstrated in a large population-based study in Singapore where "impulsivity" was reported as a risk factor of pathological gaming and mental health problems.[40]

The results also revealed that PIU and different mental health problems predicted poor sleep quality positively. Previously, studies had indicated a close association between PIU and poor sleep quality,[7-11] and also between mental health problems and sleep quality.[15-17] Nonetheless, the mediatory role of the mental health problems between PIU and sleep quality is less discussed in the literature. This study represents that PIU is related to poor sleep quality through the full mediation of mental health problems. Previously, Cheung and Wong claimed that PIU does not affect sleep duration.[35] On the other hand, it seems that sleep duration is the most important domain of sleep quality which is disturbed among medical students. This might be the reason why, in our model, PIU is not related to poor sleep quality in a direct pathway.

In addition, according to Cheung and Wong, PIU does not have a simple direct impact on sleep quality; rather, it may be through a psychological process.[35] Interestingly, stepwise backward deletion of variables in our models revealed that only in the absence of both depression and anxiety, PIU is directly related to sleep quality. According to Yuan *et al*., in those with PIU, abnormal metabolism rate in specific brain regions (basal ganglia) can trigger symptoms of depression and anxiety.[41] Besides, poor sleep quality is associated with reduced serotonergic function in basal ganglia.[42] It seems that depressive and anxiety symptoms are the said psychological process that links PIU and poor sleep quality.

Our results were somehow different from Tan *et al*.'s who showed that depressive symptoms partially mediated the association between PIU and sleep problems.[36] This again reminds that the pattern of being a problematic internet user was probably different in that study. Probably, different factors predispose medical and nonmedical students to PIU. As an example, the use of Internet-based mobile applications for learning diagnostic and treatment algorithms as well as the use of medical calculators is too prevalent among medical students.[43] Even so, the high percentage of the association (70.6%) between PIU and sleep quality through the indirect pathway (by the mediation of depressive symptoms) in that research suggests that basically the process of being a problematic Internet user in medical students has overlaps with that of the other population. Similarly, we found out that both anxiety and stress can lead to the experience of sleep disturbance only by full mediation of depressive symptoms.

In our model, the direct correlation between PIU and depression was less than half of its total effect (0.13 vs. 0.44). This means that the indirect pathways between PIU and depression via the mediation of anxiety and stress are more probable pathways than the direct one. These results imply that when people suffer from depressive symptoms as a consequence of PIU, they probably suffer from other mental health problems too. Moreover, comparison of the direct effect between depression and sleep quality separately (0.45) and in the model (0.27) connotes that when depression is a consequence of PIU and other mental health problems, it has less correlation to poor sleep quality. This explains why all PIU and mental health problems can only predict 23% of poor sleep quality changes, while more than half of the depressive symptom changes (57%) are predicted by its previous variables in the model. All these findings suggest that the relationship between these variables is more complicated than has been thought and it necessitates conducting longitudinal studies to better understand these complex relationships.

Limitation

Although DASS-21 evaluates the symptoms of mental health problems in a standard manner, it is a self-reported questionnaire, and consequently lacks a clinical evaluation component for mental health problems. In addition, because this was a cross-sectional study, it does not have the temporal criterion for the causal pathway. In this study, we localized the variables in a simple model only on a lead-lag relationship based on the literature. Accordingly, to discover fundamental

variables and to clarify their complex relationships, longitudinal research is recommended.

CONCLUSION

Besides the high rates of co-occurrence of PIU, different mental health problems, and poor sleep quality among medical students, the findings extend our previous knowledge about the interrelationships between these abnormal human activities and behaviors by unveiling the key role of depressive symptoms. Therefore, the critical point to prevent insomnia and sleep disturbance as a consequence of PIU and mental health problems is to prevent depressive symptoms.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kennedy GJ, Kelman HR, Thomas C. Persistence and remission of depressive symptoms in late life. Am J Psychiatry 1991;148:174-8.
2. Kandell JJ. Internet addiction on campus: The vulnerability of college students. Cyberpsychol Behav 1998;1:11-7.
3. Kuss DJ, Griffiths MD, Karila L, Billieux J. Internet addiction: A systematic review of epidemiological research for the last decade. Curr Pharm Des 2014;20:4026-52.
4. Ghamari F, Mohammadbeigi A, Mohammadsalehi N, Hashiani AA. Internet addiction and modeling its risk factors in medical students, Iran. Indian J Psychol Med 2011;33:158-62.
5. Mohammadbeigi A, Mohammadsalehi N. Prevalence of Internet addiction and related risk factors in students. J Guilan Univ Med Sci 2011;20:41-8.
6. Fatehi F, Monajemi A, Sadeghi A, Mojtahedzadeh R, Mirzazadeh A. Quality of life in medical students with Internet addiction. Acta Med Iran 2016;54:662-6.
7. Lam LT. Internet gaming addiction, problematic use of the internet, and sleep problems: A systematic review. Curr Psychiatry Rep 2014;16:444.
8. Van den Bulck J. Television viewing, computer game playing, and Internet use and self-reported time to bed and time out of bed in secondary-school children. Sleep 2004;27:101-4.
9. Choi K, Son H, Park M, Han J, Kim K, Lee B, *et al*. Internet overuse and excessive daytime sleepiness in adolescents. Psychiatry Clin Neurosci 2009;63:455-62.
10. Chen Y, Gau SSF. Sleep problems and internet addiction among children and adolescents: A longitudinal study. J Sleep Res 2016;25:458-65.
11. Kim K, Lee H, Hong JP, Cho MJ, Fava M, Mischoulon D, *et al*. Poor sleep quality and suicide attempt among adults with internet addiction: A nationwide community sample of Korea. PLoS One 2017;12:e0174619.
12. Ko CH, Yen JY, Yen CF, Chen CS, Chen CC. The association between Internet addiction and psychiatric disorder: A review of the literature. Eur Psychiatry 2012;27:1-8.
13. Lam LT, Peng ZW. Effect of pathological use of the internet on adolescent mental health: A prospective study. Arch Pediatr Adolesc Med 2010;164:901-6.
14. Kim NR, Hwang SS, Choi JS, Kim DJ, Demetrovics Z, Király O, *et al*. Characteristics and psychiatric symptoms of internet gaming disorder among adults using self-reported DSM-5 criteria. Psychiatry Investig 2016;13:58-66.
15. Brooks PR, Girgenti AA, Mills MJ. Sleep patterns and symptoms of depression in college students. Coll Stud J 2009;43:464-73.
16. Szklo-Coxe M, Young T, Finn L, Mignot E. Depression: Relationships to sleep paralysis and other sleep disturbances in a community sample. J Sleep Res 2007;16:297-312.
17. Hicks RA, Garcia ER. Level of stress and sleep duration. Percept Mot Skills 1987;64:44-6.
18. Johnson EO, Roth T, Breslau N. The association of insomnia with anxiety disorders and depression: Exploration of the direction of risk. J Psychiatr Res 2006;40:700-8.
19. Ehlers CL, Gilder DA, Criado JR, Caetano R. Sleep quality and alcohol-use disorders in a select population of young-adult Mexican Americans. J Stud Alcohol Drugs 2010;71:879-84.
20. Hoogland JJ, Boomsma A. Robustness studies in covariance structure modeling: An overview and a meta-analysis. Sociol Methods Res 1998;26:329-67.
21. Young KS. Internet addiction: The emergence of a new clinical disorder. Cyberpsychol Behav 1998;1:237-44.
22. Alavi SS, Eslami M, Meracy M, Najafi M, Jannatifard F, Rezapour H. Psychometric properties of Young internet addiction test. JBS 2010;4:183-9.
23. Mohammadsalehi N, Mohammadbeigi A, Jadidi R, Anbari Z, Ghaderi E, Akbari M. Psychometric properties of the Persian language version of Yang internet addiction questionnaire: An explanatory factor analysis. Int J High Risk Behav Addict 2015;4:e21560.
24. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther 1995;33:335-43.
25. Samani S, Jokar B. Assesment of reliability and validity of the short form of Depression, Anxiety and Stress Scale [Persian]. Social sciences and humanities of Shiraz University 2007;52:65-78.
26. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193-213.
27. Moghaddam JF, Nakhaee N, Sheibani V, Garrusi B, Amirkafi A. Reliability and validity of the Persian version of the Pittsburgh Sleep Quality Index (PSQI-P). Sleep and Breathing 2012;16:79-82.
28. Fan X. Using commonly available software for bootstrapping in both substantive and measurement analyses. Educ Psychol Meas 2003;63:24-50.
29. MacKinnon DP, Fairchild AJ, Fritz MS. Mediation analysis. Annu Rev Psychol 2007;58:593-614.
30. Hooper D, Coughlan J, Mullen M. Structural equation modelling: Guidelines for determining model fit. Electronic Journal of Business Research Methods 2008;53-60.
31. Frewen PA, Schmittmann VD, Bringmann LF, Borsboom D. Perceived causal relations between anxiety, posttraumatic stress and depression: Extension to moderation, mediation, and network analysis. Eur J Psychotraumatol 2013;4.
32. Wittchen HU, Beesdo K, Bittner A, Goodwin RD. Depressive episodes – Evidence for a causal role of primary anxiety disorders? Eur Psychiatry 2003;18:384-93.

33. Gana K, Martin B, Canouet MD. Worry and anxiety: Is there a causal relationship? Psychopathology 2001;34:221-9.
34. Yarcheski A, Mahon NE. A causal model of depression in early adolescents. West J Nurs Res 2000;22:879-94.
35. Cheung LM, Wong WS. The effects of insomnia and internet addiction on depression in Hong Kong Chinese adolescents: An exploratory cross-sectional analysis. J Sleep Res 2011;20:311-7.
36. Tan Y, Chen Y, Lu Y, Li L. Exploring associations between problematic internet use, depressive symptoms and sleep disturbance among southern Chinese adolescents. Int J Environ Res Public Health 2016;13:313.
37. Wei HT, Chen MH, Huang PC, Bai YM. The association between online gaming, social phobia, and depression: An internet survey. BMC Psychiatry 2012;12:92-8.
38. Kaess M, Durkee T, Brunner R, Carli V, Parzer P, Wasserman C, *et al*. Pathological Internet use among European adolescents: Psychopathology and self-destructive behaviours. Eur Child Adolesc Psychiatry 2014;23:1093-102.
39. Park S, Hong K-EM, Park EJ, Ha KS, Yoo HJ. The association between problematic internet use and depression, suicidal ideation and bipolar disorder symptoms in Korean adolescents. Aust N Z J Psychiatry 2013;47:153-9.
40. Gentile DA, Choo H, Liau A, Sim T, Li D, Fung D, *et al*. Pathological video game use among youths: A two-year longitudinal study. Pediatrics 2011;127:e319-29.
41. Yuan K, Qin W, Liu Y, Tian J. Internet addiction: Neuroimaging findings. Commun Integr Biol 2011;4:637-9.
42. Wilson H, Giordano B, Turkheimer FE, Chaudhuri KR, Politis M. Serotonergic dysregulation is linked to sleep problems in Parkinson's disease. Neuroimage Clin 2018;18:630-7.
43. Khalifian S, Markman T, Sampognaro P, Mitchell S, Weeks S, Dattilo J. Medical student appraisal: Searching on smartphones. Appl Clin Inform 2013;4:53-60.

Original Article

Non-Scholastic Qualities and their Association with Social Media usage among Medical Students in Puducherry, India

Sahla Sathar, Ganesh Kumar S[1], Srikanta Kanungo[2]

ABSTRACT

Background: Non-scholastic qualities, namely personal characteristics, interpersonal activities, and communication skills, are needed for the effective functioning of a medical professional. The study aimed to assess non-scholastic qualities and their association with social media usage among medical students. **Methods:** This is a descriptive, cross-sectional study in a tertiary care medical institution in Puducherry, coastal south India. The non-scholastic qualities were assessed by standard questionnaire and categorised as low, moderate and high qualities. Social media usage was assessed by SONTUS (Social Networking Time Use Scale) and the participants were categorised as low, average, high, and extremely high users. Multiple logistic regression analysis was done. **Results:** Out of 270 medical students, 63% belonged to the moderate non-scholastic quality category. About 36% of the students had high non-scholastic quality. Most of the students were extremely high users of social media (60%). About 48% (47/98) of students with high non-scholastic qualities had extremely high social media usage, while 67% (115/172) of students with low and moderate non-scholastic qualities had extremely high social media usage, and both the associations were statistically significant ($P = 0.003$). Those with a high level of social media usage had 2.27 times (95% CI: 1.239-4.166) higher non-scholastic qualities compared to extremely high social media usage. **Conclusions:** The majority had moderate non-scholastic qualities and extremely high use of social media.

Key words: *Non-scholastic qualities, social media use, undergraduate medical students*
Key messages: *Majority of medical students had moderate non-scholastic qualities and extremely high use of social media usage.*

Non-scholastic qualities are needed for the effective functioning of any medical professional.[1] These qualities include three domains, namely, personal characteristics, interpersonal activities, and communication skills.[2] A study, which analysed these qualities, showed that the overall mean score of non-scholastic abilities was

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_197_19	

How to cite this article: Sathar S, Kumar SG, Kanungo S. Non-scholastic qualities and their association with social media usage among medical students in Puducherry, India. Indian J Psychol Med 2020;42:136-40.

MBBS Undergraduate Student, [1]Additional Professor of Preventive and Social Medicine, JIPMER, Puducherry, [2]Scientist-C, ICMR Regional Medical Research Center, Bhubaneswar, Odisha, India

Address for correspondence: Dr. Ganesh Kumar S
Additional Professor of Preventive and Social Medicine, JIPMER, Puducherry, India. E-mail: sssgan@yahoo.com

Submitted: 23-Apr-2019, **Revised:** 22-Jun-2019, **Accepted:** 31-Jan-2020, **Published:** 09-Mar-2020

average and that the mean personal quality domain score was proportionately lesser than other domains of non-scholastic abilities.[2] Recent guidelines of National Medical Commission Bill 2017 in India highlighted the importance of high-quality medical professionals as one of the components in medical education and practice. Constitution of Under Graduate Medical Education Board to regulate medical education at the undergraduate level also mentioned competency-based curriculum based on these values. In view of the above, non-scholastic qualities are one of the important abilities required among undergraduate medical students.[1]

For more than a decade, the Social Networking Sites (SNSs) have increased in number and popularity across the world.[3] In 2019, it is estimated that there will be around 258.27 million social network users in India, up from close to 168 million in 2016.[4] A study among 18- to 44-year-old smartphone users found that nearly eight in ten adults and nine in ten young adults reach for their phone within 15 minutes of waking.[5] A recent meta-analysis found that the majority (75%) of the medical students admitted using SNSs, whereas 20% used these sites for sharing academic and educational information.[6] Studies have been conducted regarding the effects of social media in the aspects of attitude and depression.[7,8] Whether non-scholastic qualities are related to social media usage among medical students is an unexplored area of research. Therefore, this study aimed to assess non-scholastic qualities and their association with social media usage among undergraduate medical students.

METHODS

Ethical clearance was obtained from the Institutional Ethics Committee for Human Studies of the tertiary care medical institution. Informed written consent was taken from all the students participating in the study.

This descriptive, cross-sectional study was conducted among medical students of a tertiary care medical institution in Puducherry, India, from July 2018 to September 2018. Using the formula, $n = (Z\sigma/E)^2$, where $Z = 1.96$, standard deviation (σ) of the mean non-scholastic quality score as 3.27[2] and Standard Error as 0.4, the minimum sample size was found to be 257.

The study population included the 3rd, 5th, and 7th-semester undergraduate medical students. There were 156, 131, and 155 students in the 3rd, 5th, and 7th semesters, which were regular batches. The 1st and 9th-semester students were omitted due to feasibility constraints. We included 270 medical students, with 90 students from each semester. The convenience sampling method was used to select 90 students from each semester.

The non-scholastic qualities were assessed based on a standard questionnaire taken from a previous study conducted among medical students.[1] The personal quality domain has 14 questions, which include qualities like regularity, punctuality, hard work and attitude to work, inventiveness, originality and initiative, dependability, and psychological robustness of the student during the last three months. Interpersonal activities has seven questions. Communication skill has six questions on skills in writing and talking; ability to communicate with peers, teachers and patients; and assertiveness. Thus, the total number of questions in the assessed parameters was 27, with a score of 0 or 1 for each question, and the total score ranges from 0 to 27. An individual with a total score that ranges from 0 to 9 is regarded as low in non-scholastic quality; a score that ranges from 10 to 18 is regarded as moderate, and score that ranges from 19 to 27 is regarded as high non-scholastic quality.[2] A score of 1 is given for each positive response except 4th, 7th, and 9th questions in the personal quality domain, 7th question in the interpersonal activity domain, and 1st question in the communication skill domain, where a positive response is given 0 score.

Social media usage time was assessed by SONTUS (Social Networking Time Use Scale).[3] The questionnaire consists of 52 situation-related questions and 29 duration-of-usage-related questions. The global scores are made under the following five components: relaxation and free periods, academic-related period, public place related use, stress-related periods, and motive for use. The Global SONTUS score is interpreted as follows: An individual with a global score that ranges from 5 to 9 is regarded as low user of SNSs, a score that ranges from 10 to 14 is regarded as average user of SNSs, score that ranges from 15 to 19 is regarded as high user of SNSs, score that is more than 19 is regarded as extremely high user of SNSs.

The study was explained in brief by the Principal Investigator in classroom and written consent was obtained. The consent forms and the questionnaires were distributed in the classroom to the designated medical undergraduates and was self-administered. The questionnaire included the details of age, gender, semester studying, place of stay, marks obtained in the previous examination, assessment of non-scholastic qualities, and social media usage questionnaire (SONTUS).

Statistical analysis

Analysis was done through Statistical Package for the Social Sciences (SPSS) version 19.0 [IBM PASW Statistics, Country office Bangalore, India]. Data regarding non-scholastic qualities is presented as the mean and standard deviation in each domain and overall score categories. Social media usage is presented as a categorical variable and expressed in percentages. Age, semester, gender, place of stay, marks obtained in the previous exam, and social media usage were the independent variables, and two-level outcomes, namely low with moderate vs. high non-scholastic qualities, were the dependent variables in Multiple Logistic Regression Analysis.

RESULTS

All the 270 students completed the assessment. The overall mean non-scholastic quality score was 17.34 (SD = 3.44). The social media usage score was 19.4 (SD = 3.91). The non-scholastic qualities were grouped into three categories based on the total number of positive responses. Most of the students (63%, 170/270) were having moderate non-scholastic qualities. Very few students (0.7%, 2/270) had low non-scholastic qualities, while 36.3%(98/270) had high-level non-scholastic qualities. About 60% (162/270) of the students were extremely high users of SNSs, while a significant proportion (26.7%, 72/270)) of students were high users and 11.8% were average users. Low users were only 1.5% (4/270).

Less than half of the students (38.1%) currently practice any spiritual-related activity. Some interpersonal problems were present in 48.5%, and 51.5% avoid talking to people when it is necessary.

57.4% (155/270) belonged to the age group of 20-22 years. 53.3% (144/270) were males. The majority of the students who scored 80% and above in the previous examination belonged to the group with low and moderate non-scholastic qualities (76.5%, 13/17). A significant association was found between social media usage and non-scholastic qualities (P = 0.008). About 48% (47/98) of students with high non-scholastic qualities had extremely high social media usage, and 67% (115/172) of students with low and moderate non-scholastic qualities had extremely high social media usage, and both the associations were statistically significant (P = 0.003). 67% (115/172) of low and moderate non-scholastic qualities had extremely high social media usage, and this association was found to be significant (P = 0.003). After adjusting for variables which included age, semester, gender, place of stay, marks in the previous examination and social media use, multiple logistic regression analysis showed that those with high level of social media usage have 2.27 times higher high non-scholastic abilities compared to extremely high social media usage and it was significant (P = 0.008, 95% CI: 1.24 4.166), but the low and average users did not demonstrate significant association [Table 1].

DISCUSSION

The majority of students had average non-scholastic quality, but the mean score was marginally lesser (17.34) compared to a previous study by Kumar and Sarkar (19.4), which may be due to the inclusion of three classes and larger sample size.[2] The Kumar and Sarkar study analysed these qualities amongst medical students and showed that an overall mean score of non-scholastic abilities was average; and mean personal quality domain score was found to be proportionately lesser than other domains of non-scholastic abilities.[2]

Personal qualities, interpersonal activities, and communication skills are very essential to excel in the medical profession. There is a rise in the need for doctors with the right moral values and good communication abilities for an ethical and empathetic practice.[9]

Social media usage was extremely high. Whether such excessive use decreases non-scholastic quality level

Table 1: Association of high non-scholastic qualities: Multiple Logistic Regression Analysis

Variable	Adjusted odds ratio (95% CI)	*P*
Age (in years)		
18-19	0.97 (0.49-1.96)	0.94
20-22	Ref	-
Semester		
3rd semester	1.28 (0.56-2.93)	0.56
5th semester	1.20 (0.57-2.53)	0.62
7th semester	Ref	-
Gender		
Male	1.51 (0.62-1.81)	0.83
Female	Ref	-
Place of stay		
Hostel	1.28 (0.68-2.41)	0.45
Outside hostel	Ref	-
Marks obtained		
<50%	0.34 (0.06-1.88)	0.22
50%-80%	2.05 (0.62-6.79)	0.24
>80%	Ref	-
Social Media Usage		
Low and Average	2.05 (0.95-4.42)	0.07
High	2.27 (1.24-4.17)	0.008*
Extremely high	Ref	-

*$P<0.05$ is considered as significant (Categories High vs. Low and moderate non scholastic qualities)

should be explored by follow-up studies. Studies done in undergraduate students had found that excessive social media usage is associated with social anxiety disorder and nomophobia.[10,11] It may affect the quality of patient care in various ways. Excessive social media usage among medical professionals can cause sleep disturbances, distraction from work, impatience, etc., and can affect their professional conduct and skills.[12]

However, social media has been also used to discuss various professional information and to help patients.[13,14] Social media in workplaces can be used to discuss any medical issues or doubts. They provide a platform for a thorough discussion about the diagnosis and management of rare cases. Social media connects medical professionals from various parts of the world to confer and conclude with experienced colleagues. So, the reasons for using social media must be explored by further studies. If social media usage is affecting adversely, then, ways to reduce the excessive usage and appropriate use of social media for beneficial purposes must be explained to the students.

An earlier study had found that non-scholastic qualities had association with marks obtained in the previous exam.[2] Contrary to the expected result from our study, it was found that the majority of students scoring 80% and above belonged to the group with low and moderate non-scholastic qualities. This may be because of the confounding effect of other variables and a lesser number of students with higher marks category. There are other factors of the cognitive domain which influence the marks obtained in the previous examination. Studies have found that non-cognitive skills have a relationship with cognitive measures and performance in examinations.[12,13]

A limited number of studies had assessed non-scholastic qualities in medical students. Also, social media usage has an association with overall non-scholastic qualities, with comparatively more extremely high social media usage among those with low and moderate non-scholastic qualities. Such studies may have an important impact on the skills of a healthcare professional.

The use of standard scales and representation from three batches of students are strengths of the study. The context of social media usage is an important factor that may influence the non-scholastic qualities, which was not assessed. There may have been a subjective bias that influenced the findings. There might be other factors that influence non-scholastic qualities like prior exposure during childhood period or training on some of these aspects, which were not assessed. Further studies should explore the reasons for this average level of non-scholastic qualities. Conducting multi-centre studies in other medical college students, including all the semesters or classes, and prospective studies to analyse behavioural factors associated with it may explore non-scholastic qualities in a larger context and its associated factors.

The results of this study highlight the importance of the reduction of extreme social media usage among medical students.

Financial support and sponsorship

The study was conducted as Indian Council of Medical Research (ICMR) studentship project in the year 2018.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kumar S, Z Zayapragassarazan Multi-Source Feedback (360 Degree Feedback) for Assessing Non-Scholastic Abilities. Available from: http://www.jipmer.edu/September%20 2010/2%20Articles.pdf. [Last accessed on 2019 Jul 10].
2. Kumar SG, Sarkar S. Assessment of nonscholastic abilities and its associated factors among medical students: An exploratory study. J Educ Health Promot 2017;6:3.
3. Olufadi Y. Social networking time use scale (SONTUS): A new instrument for measuring the time spent on the social networking sites. Telem Inform 2016;33:452-71.
4. Statista.com [Homepage on the internet]. India: Number of social network users 2022 | Statistic [Internet]. [Updated July 2017]. Available from: https://www.statista.com/ statistics/278407/number-of-social-network- users-in-india. [Last accessed on 2018 Jan 20].
5. IDC-Facebook Always Connected | Facebook | Smartphone [Internet]. Scribd. Available from: https://www.scribd.com/ document/133435243/IDC-Facebook-Always-Connected. [Last accessed on 2018 Jan 22].
6. Guraya SY. The usage of social networking sites by medical students for educational purposes: A meta-analysis and systematic review. N AM J Med Sci 2016:8;268-78.
7. Rosen LD, Whaling K, Carrier LM, Cheever NA, Rokkum J. The media and technology usage and attitudes scale: An empirical investigation. Comput Human Behav 2013;29:2501-11.
8. Lin LY, Sidani JE, Shensa A, Radovic A, Miller E, Colditz JB, *et al*. Association between social media use and depression among U.S. young adults. Depress Anxiety 2016;33:323-31.
9. Jung HY, Kim JW, Lee S, Yoo SH, Jeon JH, Kim TW, *et al*. A study of core humanistic competency for developing humanism education for medical students. J Korean Med Sci 2016;31:829-35.
10. Honnekeri BS, Goel A, Umate M, Shah N, De Sousa A. Social anxiety and internet socialization in undergraduate students: An exploratory study. Asian J Psychiatr 2017;27:115-20.
11. Dasgupta P, Bhattacherjee S, Dasgupta S, Roy JK, Mukherjee A, Biswas R. Nomophobic behaviour among smartphone using medical and engineering students in two colleges of West Bengal. Indian J Public Health

2017;61:199-204.
12. Surani Z, Hirani R, Elias A, Quisenberry L, Varon J, Surani S, *et al*. Social media usage among healthcare providers. BMC Res Notes 2017;10:654.
13. Maloney S, Moss A, Ilic D. Social Media in health professional education: A student perspective on user levels and prospective applications. Adv Health Sci Educ Theory Pract 2014;19:687-97.
14. Cartledge P, Miller M, Phillips B. The use of social networking sites in medical education. Med Teach 2013;35:847-57.

Original Article

Sleep Quality and Daytime Sleepiness among the Clinicians Working in a Tertiary Care Center in Sikkim, India

Rishav Dey, Sanjiba Dutta, Samrat Singh Bhandari

ABSTRACT

Background: Doctors in India have increased workload and are at risk for poor sleep and excessive daytime sleepiness which have not been explored much. **Methods:** One hundred doctors selected by convenience sampling from different departments of the hospital were assessed cross-sectionally. Physical parameters which were assessed included height, weight, blood pressure, and diabetes status. Other variables assessed included durations of duty hours and social media usage. Sleep quality and daytime sleepiness were assessed with the Pittsburg Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS), respectively. **Results:** Mean age of the participants was 35.3 years with a SD of 6.21. In all, 42% were female. The overall prevalence of poor quality of sleep was 28.3%. Among the participants, junior and senior residents were the most affected; 45% of the junior residents were having a poor quality of sleep. Daytime sleepiness was significantly more common among the junior residents as compared with doctors of other designations ($P = 0.02$). The mean duration of duty hours was highest for the junior residents. Male participants were more likely to be obese and to have systemic hypertension. No significant difference was found for social media usage among different designations or gender. **Conclusion:** Poor sleep quality and excessive daytime sleepiness are highly prevalent among the doctors, especially those who are lower in the hierarchy. Interventions for physical and psychological morbidity among the doctors and strict implementation of guidelines governing duty hours and call schedule of junior physicians are recommended.

Key words: *Daytime sleepiness, doctors, Sikkim*

Key messages: *Clinicians are suffering from poor quality sleep and daytime sleepiness. The clinicians who are lower in the hierarchy are likely to get more affected. Regular screening for physical and psychological morbidity among clinicians is warranted and timely intervention is needed. Proper guidelines governing duty hours and implementation is the need of the hour.*

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_439_18	

How to cite this article: Dey R, Dutta S, Bhandari SS. Sleep quality and daytime sleepiness among the clinicians working in a tertiary care center in Sikkim, India. Indian J Psychol Med 2020;42:141-6.

Department of Psychiatry, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, Gangtok, Sikkim, India

Address for correspondence: Dr. Samrat Singh Bhandari
Department of Psychiatry, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University, Gangtok, Sikkim - 737 102, India.
E-mail: samrat.bhandari@yahoo.co.in

Submitted: 22-Oct-2018, **Revised:** 18-Dec-2018, **Accepted:** 17-Jun-2019, **Published:** 09-Mar-2020

Sleep is defined based on both changes in the behaviour of a person who is asleep and the related physiological changes in the brain electrical activity. The behavioural criteria include closed eyes, lack of mobility or slight mobility, reduced reactivity to an external stimulus, elevated arousal threshold, impaired cognition, and a reversible unconscious state. The physiological criteria are based on the changes in the electroencephalography, electromyography, and electrooculography.[1]

The function of sleep is an area which is still being explored. Research on sleep deprivation has shown impaired performance consequent of which is 'decreased motivation' and frequent 'micro-sleeps'. There is impairment of attention, concentration, vigilance, and memory.[1] Prolonged sleep deprivation may lead to increased sympathetic compared to parasympathetic tone, resulting in decreased β cell responsiveness, which results in impaired glucose tolerance and negative effects on cardiac function, regulation of blood pressure, and kidney function.[2] The restorative function of sleep also includes removal of a neurotoxic product which accumulates in the central nervous system when one is awake.[3]

Any profession which involves high demand is usually stressful. Stress causes not only physiological activation but also psychological activation, which is incompatible for falling asleep. Stress causes activation of the sympathy-adreno-medullary (SAM) and hypothalamo-pituitary-adrenocortical (HPA) systems which negatively affects sleep.[4] Doctors belong to one of the most stressful professions. They are required to meet clinical commitments and also need to fulfil the administrative responsibilities entrusted on them. With the increasingly litigious environment, which is usually unforgiving; constant change in medical knowledge which they have to keep themselves updated and bureaucratic requirements which also keep changing, doctors remain under constant stress, which usually results in sleep disturbance, substance abuse, mental illness, and suicide.[5]

Sikkim with a population of slightly more than 6 lakhs has a single tertiary healthcare centre. This center caters to the needs of not only the population of Sikkim but also from nearby bordering states. The physical and mental health status of the doctors serving here has never been assessed. We felt the need to fill up this gap starting with the assessment of the quality of their sleep and excessive daytime sleepiness.

Aim of the study

To assess the quality of sleep among the doctors working in a tertiary healthcare center and to find out the effect of the disturbed sleep on daytime sleepiness.

MATERIALS AND METHODS

This was a cross-sectional study done within a period of six weeks. Data collection started on 4 April 2018 and completed on 13 May 2018. The sampling was done by convenience sampling technique, and the sample size was 100. The participants were the doctors from all the clinical department of the Sikkim Manipal Institute of Medical Sciences. The participants included in the study were those who expressed their willingness after they were informed about the details of the study and gave their written consent. Joining a new institution or joining after a time lag is usually stressful and may affect the quality of sleep, so those who recently joined the institution as a new recruit or recently joined the department after their leave was over were excluded from participation. Also, those who were already diagnosed with sleep disorders or were on any medication which can alter the sleep were not included. Those who were above 50 years of age were excluded from the study to avoid interference of age-related sleep problems. Approval form the Institution Ethical Committee was obtained before the commencement of collection of data.

Data were collected in a predetermined format which included age, gender, weight and height blood pressure (BP), diabetes status, position in the hierarchy in the department, working hours, and hours spent in social media. The participants were then administered the Pittsburgh Sleep Quality Index (PSQI) questionnaire and the Epworth Sleepiness Scale (ESS). Body Mass Index (BMI) was calculated as defined by the World Health Organization (WHO) and the participants were classified as per the BMI given by WHO.[6]

The PSQI is a self-rated, 19-item questionnaire which helps in evaluating the subjective quality of sleep over the last 1 month. The questions are combined to seven clinically derived component scores, each score between 0 and 3. The seven components scores are added to get a global score (0-21). A cut-off score of 5 is used to identify sleep disorders with 89.6% sensitivity and 86.5% specificity.[7,8]

The ESS is a self-administered questionnaire where the respondents rate their usual chances of dozing off or falling asleep during different activities. There are eight questions which are answered on a 4-point scale (0-3). The total score is 24. The higher the score, the more is the chance of daytime sleepiness. The total score on ESS is also interpreted as 0-5: Lower Normal Daytime Sleepiness, 6-10: Higher Normal Daytime Sleepiness,

11-12: Mild Excessive Daytime Sleepiness, 13-15: Moderate Excessive Daytime Sleepiness and 16-24: Severe Excessive Daytime Sleepiness.[9,10]

Statistical analysis

Descriptive analysis of data was done where categorical data were expressed as percentage and continuous data as mean with standard deviation (SD). Normality of data was checked by the Shapiro-Wilk test. PSQI score was dichotomized into normal quality (≤5)) and poor quality (>5), and ESS score was also recoded into another variable with five gradings (lower normal daytime sleepiness, higher normal daytime sleepiness, mild excessive daytime sleepiness, moderate excessive daytime sleepiness, severe excessive daytime sleepiness). ANOVA was used to test the difference in PSQI score, when used as a continuous variable, among the different designations. Kruskal Wallis test was used to find the association between different designations and ESS score when used as a continuous variable. Values of $P < 0.05$ were regarded as statistically significant.

RESULTS

One hundred doctors participated in the study. The mean age of the participants was 35.32 (SD = 6.21) years. The mean age and other characteristics of the group as per the designation is given in Table 1.

Among the participants, 42% (n = 42) were females. 5% (n = 5) had diabetes mellitus, and 13% (n = 13) had systemic hypertension. According to the BMI division, 43% (n = 43) of the participants were overweight, 3% (n = 3) were obese, and 1% (n = 1 was underweight. There was a significant difference between systolic and diastolic blood pressure and BMI across the two genders. Male participants were more likely to be overweight and obese and to have systemic hypertension. For systolic BP, F (1,98) = 10.43, P = 0.002. For diastolic BP, F (1,98) = 8.01, P =0.006. Chi-square test of independence was done to examine the relation between gender of the participants and different BMI groups. It was found male gender was significantly associated with overweight and obese category, χ^2 (3) = 11.33, P = 0.01. On exploratory data analysis it was found that there was no significant difference in the PSQI score between participants having diabetes mellitus and those who did not have, F (1,98) =0.612, P = 0.68 and also between the participants who had systemic hypertension and those who did not have, F (1,98) = 0.54, P = 0.81. We also did not find any significant difference in the ESS score between the two groups of those who had and did not have diabetes mellitus, F (1,98) = 1.38, P = 0.24. Similarly, no difference was found in the ESS scores of the participants who had systemic hypertension and those who did not have, F (1,98) = 0.605, P = 0.43 respectively.

Table 1: Characteristic of participants

	Faculty (n=69)		SR (n=11)		JR (n=20)	
	Mean	SD	Mean	SD	Mean	SD
Age (years)	37.75	5.10	33.36	6.29	28.0	2.67
BMI	24.64	3.15	24.20	2.25	22.94	3.12
SBP	120.39	10.83	120.18	9.85	118.20	12.91
DBP	78.04	7.89	78.36	6.91	77.56	6.19
Duty hours	8.54	1.39	8.55	1.81	10.05	2.14
SMU	1.93	1.89	1.72	1.25	1.62	1.13
PSQI score	4.32	2.85	4.91	3.33	5.65	3.77
ESS score	7.28	4.10	8.18	3.92	9.30	2.49

SR – Senior Residents, JR – Junior Residents, BMI – Body Mass Index, SBP – Systolic Blood Pressure, DBP – Diastolic Blood Pressure, SMU – Social Media Usage in hours, PSQI – Pittsburgh Sleep Quality Index, ESS – Epworth Sleepiness Scale

There was no significant difference found in the mean score of either PSQI or ESS as per the different grades of BMI, F (3,93) = 0.92, P = 0.43 and H (3) = 1.07, P = 0.78, respectively.

The mean daily duration of duty hours was highest for the junior residents (10.05 ± 2.14 hours) and the lowest for the faculty (8.54 ± 1.38 hours).

Social media usage

The mean duration of social media usage was highest for the faculty, followed by the senior residents. There was no significant difference between the different designations and social media usage, F (3,93) = 0.82, P = 0.48. No gender difference was found with regard to social media usage, F (1,98) = 0.15, P = 0.69.

Sleep quality

The mean PSQI score for the participants was 4.65 ± 3.11. The overall prevalence of poor sleepers across different designations was 28%. The PSQI score was above 5 for the junior residents (5.65 ± 3.77) [Table 2]. Forty-five percent (n = 9) of the junior residents reported poor sleep quality Though the mean PSQI score for the senior residents was below 5, however,- 27.3% (n = 3) of the senior residents also reported poor quality of sleep. The members of the faculty group had mean score <5. There was no statistical difference in the mean score of PSQI by different designations [Table 3].

Daytime sleepiness

The mean ESS score was 7.78 with SD of 3.87. In all, 46% of the participants (n = 46) reported higher normal daytime sleepiness, 11% (n = 11) reported mild excessive daytime sleepiness, while 7% (n = 7) and 4% (n = 4) reported moderate and severe daytime sleepiness respectively. Among the different designations, ESS mean score was the highest for the junior residents (9.3 ± 2.5) and the

lowest for the faculty (7.28 ± 4.10) [Table 2]. Twenty percentage (n = 4) of the junior residents reported mild excessive daytime sleepiness and 15% (n = 3) reported moderate excessive daytime sleepiness; 9.1% (n = 1) reported moderate and an equal number reported severe daytime sleepiness. Kruskal Wallis test compared the daytime sleepiness of different designations. A significant result was found, H (2) = 6.02, P = 0.049, indicating that the groups differed from each other. Follow-up pairwise comparisons indicated that the junior residents had significantly higher daytime sleepiness than the other two groups [Figure 1]. There was no gender difference with regard to the severity of daytime sleepiness, χ^2 (4) = 1.19, P = 0.88.

A low positive but significant correlation was found between PSQI score and ESS score, rho (98) = 0.244, P = 0.013. Eighteen percentage (n = 5) of poor sleepers reported mild excessive daytime sleepiness and equal percentage 17.9% (n = 5) reported moderate excessive daytime sleepiness. Higher normal daytime sleepiness was reported by 46.4% (n = 13) of the participants having poor sleep.

DISCUSSION

This study intended to find the sleep quality and daytime sleepiness among the clinicians in a tertiary care center. Though we found a prevalence of 28% of poor sleepers (PSQI > 5), poor sleep quality and daytime sleepiness were more among the doctors who were lower in the hierarchy. In all, 45% of the junior residents and approximately 27% of the senior residents reported poor sleep quality. The junior residents were more likely to have excessive daytime sleepiness compared to participants of other designations.

Surani *et al*. reported a prevalence of 36.8% of "poor sleepers" in a sample of 334 junior physicians.[10] We found a slightly higher percentage (45% of the junior residents) of "poor sleepers." Our study center is in a geographically difficult area, and it is a single tertiary center, so the number of patients attending the hospital at regular and odd hours is higher compared to the centers in the plain area. These patients are not only referred from the primary health centers but also from the nearest hospitals as these patients are usually in conditions which need lifesaving care. So, the amount of stress experienced by the junior doctors, who are the patient's first contact, is paramount. Besides, the academic pressure in terms of preparation for various presentations during the postgraduate training program also adds to the stress. Surani *et al*.[11] and Rodríiguez-Muñoz *et al*.[12] also reported that female physicians are more likely to be poor sleepers. In this study, though the mean scores of both PSQI and ESS were slightly higher in females, we did not find any significant difference in the mean PSQI score between the two genders.

We found an overall prevalence of 5% (n = 5) among the participants who had diabetes mellitus also found that male doctors were more likely to be overweight and obese and to have systemic hypertension when compared to female counterparts. Possible explanation can be unhealth eating by male doctors, eating in nearby restaurants and fast food outlets provides options to choose among number of food items which is easier than cooking, whereas females are more conscious even when buying food from such outlets.[13] Also because of the

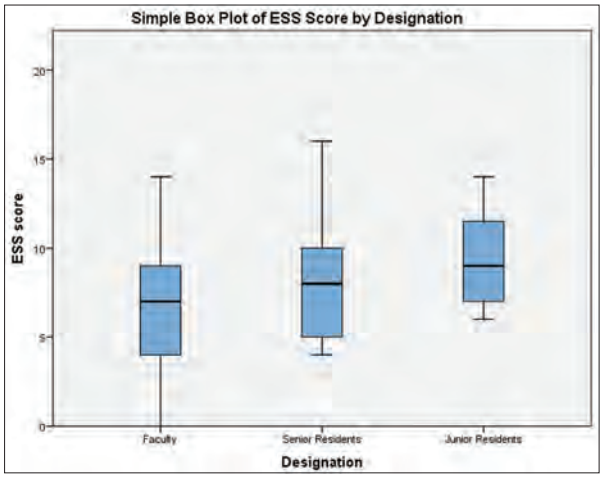

Figure 1: Epworth sleepiness scale score of different designations

Table 2: Mean PSQI and ESS score of participants according to designation

	n	Mean	Std. deviation	Std. error	95% confidence interval for mean	
					Lower bound	Upper bound
PSQI score						
Faculty	69	4.32	2.85	0.34	3.63	5.00
Senior Resident	11	4.91	3.33	1.00	2.67	7.15
Junior Resident	20	5.65	3.77	0.84	3.88	7.42
Total	100	4.65	3.12	0.31	4.03	5.27
ESS score						
Faculty	69	7.28	4.10	0.49	6.29	8.26
Senior Resident	11	8.18	3.92	1.18	5.55	10.82
Junior Resident	20	9.30	2.49	0.56	8.13	10.47
Total	100	7.78	3.87	0.39	7.01	8.55

PSQI – Pittsburgh Sleep Quality Index, ESS – Epworth Sleepiness Scale

Table 3: One-way Analysis of variance in PSQI score by designation

	Sum of squares	df	Mean square	*F*	Sig.
PSQI score					
Between Groups	28.305	2	14.153	1.469	0.235
Within Groups	934.445	97	9.633		

PSQI – Pittsburgh Sleep Quality Index

geographical location the options for outdoor activities are limited. We did not find that presence of overweight or obesity or systemic hypertension has any significant association with either PSQI or ESS scores. Sharma *et al*. also reported a high prevalence of cardiovascular risk factors among doctors in a tertiary center; attributed it to a sedentary lifestyle, inadequate fruit and vegetable intake, excessive alcohol consumption and stress; and recommended a comprehensive health promotional and prevention program.[14]

The study has certain limitations. The sampling was done by convenience sampling, which may result in selection bias. The sample size was small, which may have led to the failure of finding any significant association between the different physical parameters measured in the study and PSQI and ESS scores and this is in contradiction to findings in other studies which have found that hypertension, diabetes, and obesity have significant bearing on the sleep quality and excessive daytime sleepiness.[15,16] The PSQI questionnaire used in the current study assessed subjective sleep quality over the last 1-month period, so this study was not in a position to differentiate between acute and chronic poor sleepers. Some information in PSQI questionnaire requires subjects to recall and report events up to a month prior to administration, and this can lead to recall bias, which could over- or underestimate the true picture of the burden of poor sleep quality. Since this study was based on PSQI, which is a self-administered questionnaire that assesses subjective sleep quality, it could have led to the possibility of biases related to the accuracy of reported information. Various studies conducted among non-health care workers have shown significant differences between subjectively reported and objectively measured sleep quality.[17] The duration of social media usage was assessed through self-reports and any validated measures was not used which is another limitation of this study.

CONCLUSION

Poor sleep quality and excessive daytime sleepiness are highly prevalent among the doctors in the only tertiary care center of Sikkim and the doctors who are lower in the hierarchy are more likely to be affected. Hypertension, diabetes mellitus, obesity and long duration of duty hours may have a negative role on the sleep cycle and consequently, on the sleep quality of the doctors, which can be established in future studies with larger samples.

There is a need for public health policies for screening for sleep quality and physical or psychiatric morbidity which can affect the sleep quality and may result in excessive daytime sleepiness among doctors. Behavioural and educational interventions for improving sleep quality are essential for ensuring the proper sleep and lifestyle of doctors. Necessary actions should also be taken to establish proper policies and guidelines governing duty hours, call schedule, and workload of junior physicians. Further studies employing objective measures are required to validate the relationship of various factors leading to impaired sleep quality.

Acknowledgements

This work was supported by India-US Fogarty Training in Chronic Non-Communicable Disorders and Diseases Across Lifespan Grant #1D43TW009120 (SS Bhandari, Fellow; LB Cottler, PI).

Financial support and sponsorship

This study was supported by Dr. Ramdas Pai and Mrs. Vasanthi Pai endowment fund, Sikkim Manipal Institute of Medical Sciences, Sikkim Manipal University as seed grant.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Chokroverty S. Overview of normal sleep. In: Chokroverty S, editor. Sleep Disorders Medicine. 4th ed. New York: Springer-Verlag; 2017. p. 5-27.
2. Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on metabolic and endocrine function. Lancet 1999;354:1435-9.
3. Xie L, Kang H, Xu Q, Chen MJ, Liao Y, Thiyagarajan M, *et al*. Sleep drives metabolite clearance from the adult brain. Science 2013;342:373-7.
4. Akerstedt T. Psychosocial stress and impaired sleep. Scand J Work Environ Health 2006;32:493-501.
5. Kumar S. Burnout and doctors: Prevalence, prevention and intervention. Healthcare (Basel) 2016;4:37.
6. WHO | Obesity: Preventing and managing the global epidemic [Internet]. WHO. Available from: http://www.who.int/entity/nutrition/publications/obesity/WHO_TRS_894/en/index.html. [Last cited on 2019 Jun 17].
7. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193-213.
8. Buysse DJ, Hall ML, Strollo PJ, Kamarck TW, Owens J, Lee L, *et al*. Relationships between the Pittsburgh sleep quality index (PSQI), Epworth sleepiness scale (ESS), and clinical/polysomnographic measures in a community sample. J Clin Sleep Med 2008;4:563-71.
9. Johns MW. A new method for measuring daytime sleepiness: The Epworth sleepiness scale. Sleep 1991;14:540-5.
10. The Epworth Sleepiness Scale. About the ESS. 2018. Available from: http://epworthsleepinessscale.com/about-the-ess/. [Last accessed on 2018 Oct 12].
11. Surani A, Surani A, Zahid S, Ali S, Farhan R, Surani S. To assess sleep quality among Pakistani junior physicians (House Officers): A cross-sectional study. Ann Med Health Sci Res 2015;5:329-33.
12. Rodríiguez-Muñoz A, Moreno-Jiménez B,

Fernández-Mendoza JJ, Olavarrieta-Bernardino S, de la Cruz-Troca JJ, Vela-Bueno A. Insomnia and quality of sleep among primary care physicians: A gender perspective. Rev Neurol 2008;47:119-23.
13. Ballew B. Variations in Fast Food Habits Between Males and Females at Grand Valley State University. Honors Projects. 2014. Available from: https://scholarworks.gvsu.edu/cgi/viewcontent.cgi?article=1313&context=honorsprojects. [Last accessed on 2019 Jun 17].
14. Sharma D, Vatsa M, Lakshmy R, Narang R, Bahl VK, Gupta SK. Study of cardiovascular risk factors among tertiary hospital employees and their families. Indian Heart J 2012;64:356-63.
15. Bixler EO, Vgontzas AN, Lin HM, Calhoun SL, Vela-Bueno A, Kales A. Excessive daytime sleepiness in a general population sample: The role of sleep apnea, age, obesity, diabetes, and depression. J Clin Endocrinol Metab 2005;90:4510-5.
16. Hannon TS, Tu W, Watson SE, Jalou H, Chakravorty S, Arslanian S. Morning blood pressure is associated with sleep quality in obese adolescents. J Pediatr 2014;164:313-17.
17. Baker FC, Maloney S, Driver HS. A comparison of subjective estimates of sleep with objective polysomnographic data in healthy men and women. J Psychosom Res 1999;47:335-41.

Original Article

Emotion Recognition, Emotion Awareness, Metacognition, and Social Functioning in Persons with Schizophrenia

Radhika Kolavarambath, Paulomi M. Sudhir[1], P. V. Prathyusha[2], Jagadisha Thirthalli[3]

ABSTRACT

Background: Emotion processing has received significant research attention in persons with schizophrenia. However, some aspects of this construct, such as emotion awareness, are less researched. In addition, there is limited work on metacognitive awareness and social functioning in persons with schizophrenia. **Methods:** Our sample comprised of 27 participants with schizophrenia- and 26 nonclinical controls. The clinical group was assessed on Scale for Assessment of Positive Symptoms, Scale for Assessment of Negative Symptoms, Tool for Recognition of Emotions in Neuropsychiatric Disorders, Toronto Alexithymia Scale, Metacognitive Assessment Scale, self-reflectiveness subscale of Beck's Cognitive Insight Scale, Scale S and Scale U subscales of the Metacognitive Assessment Scale, and Groningen's Social Dysfunction Scale. **Results and Conclusion:** Participants with schizophrenia had greater deficits in emotion recognition than nonclinical controls ($P = 0.05$, df = 51). There was no significant correlation between emotion recognition and metacognition in the clinical group. The presence of negative symptoms was significantly associated with social functioning in persons with schizophrenia.

Key words: *Alexithymia, emotion recognition, metacognition, schizophrenia, social functioning*

Key messages: *Clinical symptoms, in particular negative symptoms, play an important role in social functioning in persons with schizophrenia and it is necessary to address these along with social cognition in order to improve functioning.*

Schizophrenia is one of a group of psychiatric disorders traditionally called "functional psychoses," comprising of both positive and negative symptoms. Schizophrenia is associated with significant disturbance in social and occupational functioning.[1]

Neurocognition refers to groups of cognitive abilities that include verbal and visual learning, memory, working memory, attention, and speed of processing.[1,2]

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_149_19	

How to cite this article: Kolavarambath R, Sudhir PM, Prathyusha PV, Thirthalli J. Emotion recognition, emotion awareness, metacognition, and social functioning in persons with schizophrenia. Indian J Psychol Med 2020;42:147-54.

Department of Psychology, Montfort College, [1]Departments of Clinical Psychology, [2]Biostatistics and [3]Psychiatry, National Institute of Mental Health and Neurosciences, Bengaluru, Karnataka, India

Address for correspondence: Dr. Paulomi M. Sudhir
Department of Clinical Psychology, National Institute of Mental Health and Neurosciences, Hosur Road, Bengaluru - 560 029, Karnataka, India.
E-mail: paulomi@nimhans.ac.in

Submitted: 18-Mar-2019, **Revised:** 05-May-2019, **Accepted:** 23-Dec-2019, **Published:** 09-Mar-2020

Although studies report significant associations between neurocognition and functional deficits, only 20–60% of the variance in functional outcome is attributed to neurocognitive deficits, suggesting that other factors possibly contribute to functional outcomes. Social cognition has been widely examined in relation to functional outcomes in persons with schizophrenia. It is defined as the "mental operations underlying social interactions, which include human ability and capacity to perceive the intentions and dispositions of others" and includes attribution bias, emotion processing, social perception, and theory of mind.[3,4] Social cognition contributes to functioning beyond the influence of neurocognition and may mediate pathways between neurocognition and functioning.[1,5] It is correlated with neurocognitive functions and negative symptoms. Impairments in social cognition can be present independent of neurocognitive performance, suggesting that social cognition is a distinct construct that can contribute to functioning.[6] A meta-analysis examining associations between neurocognition, social cognition, and functional outcome in schizophrenia concluded that social cognition was more strongly related to community functioning than neurocognition.[7]

Emotion recognition is part of emotion processing and includes facial recognition and identification of emotions.[4] Deficits in emotion recognition are present in individuals with schizophrenia and partially mediates the relationship between cognitive and social functioning.[7]

Although there has been extensive research on understanding emotion recognition in schizophrenia, aspects of emotion processing such as alexithymia are now gaining research attention. Sifneos (1996) introduced the term "alexithymia," now a widely studied phenomenon, to describe individuals with low levels of emotion awareness.[8] Alexithymia is the difficulty in identifying and describing one's own emotional state. It has been examined in the context of social cognition.

Emotion awareness is the conscious metarepresentation of an individual's emotional state and offers the flexibility of emotional response to help adapt.[9,10]

Research on social cognition in schizophrenia indicates that when trying to reflect on their own and others' mental activities, persons with schizophrenia have difficulty in identifying emotions, suggesting the presence of deficits in social cognition and metacognition.[7,11] Lysaker *et al*. note that deficits in emotion recognition may result in part from difficulties in the ability to judge affective and cognitive states of others.[11] However, insofar as the association with social functioning is considered, the domain of emotion recognition has received less attention compared to the domain of theory of mind." Although social cognition is known to affect social functioning in persons with schizophrenia, there is a need to understand the relative contributions of metacognitive processes and emotion recognition to dysfunction.

Metacognition is the evaluation and regulation of one's own cognitive processes by involving in monitoring and controlling of cognitive processes. Metacognitive deficits are thought to be a key barrier to functioning in schizophrenia. Lysaker *et al*. (2013) found that deficits in social cognition and metacognition represent different forms of dysfunction in schizophrenia. There has been an increasing interest in the study of metacognition in persons with schizophrenia, particularly, aspects such as cognitive insight, self-reflection, and awareness.[12]

There is a paucity of research examining associated variables, such as alexithymia and metacognitive awareness that reflect an awareness of self. Alexithymia and metacognitive awareness are essential for social competence and functioning. Deficits in these processes are also likely to impact functioning. The findings would also contribute to guidance for training programs in specific aspects of emotion processing and metacognition. We, therefore, examined emotion recognition, emotion awareness, and metacognition in persons with schizophrenia. We hypothesized an association between aspects of emotion processing, namely emotion recognition, emotion awareness, metacognitive processes, and self-reflectiveness. Based on the available literature, we hypothesized that social functioning would be associated with one or more of these variables.

SAMPLE AND METHODS

A cross-sectional design with two groups was adopted. Formal sample size calculation was not carried out; 60 consenting participants were recruited based on specified criteria. The final sample comprised of a clinical sample (n = 27) with a primary diagnosis of schizophrenia or schizoaffective disorder (F20, F25; ICD-10)[13] attending mental health services at a tertiary center in Bangalore, India, and a nonclinical control group (n = 26). Participants in the clinical sample were aged between 18 and 45 years, with a minimum of class VIII education, and clinically stable with no major change (not >20%) in medication dose in the preceding 4 months. Persons with a history of epilepsy, organic illness, mental retardation, or current psychoactive substance dependence (except nicotine) and those who have received cognitive behavioral

therapy, cognitive retraining, or electroconvulsive treatment in the preceding 6 months were excluded.

The nonclinical control group was group-matched for age and gender with the clinical sample and recruited from the community using the snowball technique. They were screened for any major medical or psychiatric illness based on a clinical interview.

MEASURES

Scale for Assessment of Negative Symptoms (SANS), a clinician-rated 25-item scale, assesses negative symptoms of schizophrenia.[14] The scale has adequate psychometric properties (reliability ranges = 0.83 to 0.92; Cronbach's alpha = 0.90).

Scale for Assessment of Positive Symptoms (SAPS)[15] consists of 34 items that rate the severity of four positive symptoms of schizophrenia. The average interrater reliability for SAPS score was 0.84, with an internal consistency of 0.65.

Tool for Recognition of Emotions in Neuropsychiatric Disorders (TRENDS)[16] was used to assess emotion recognition and is validated for use in the Indian population. It has a static arm with 52 images and a dynamic arm with 28 images, of six basic emotions – happiness sadness, anger, fear, surprise, disgust, and a neutral expression and are validated separately. The overall Cronbach's alpha score was 0.67 for static images. In the present study, static images were used in order to reduce the length of time taken for assessment. The total number of images of threatful emotions (fear, anger, disgust) that were identified as any of the non-threatful emotions (sad, happy, and neutral) was calculated and called the TRENDS under-identification score. The total number of images of nonthreatful emotions (sad, happy, neutral) identified as threatful emotion (fear, anger, disgust) was calculated and called the TRENDS over-identification score.[17]

Social functioning was assessed using the Groningen Social Disabilities Schedule (GSDS).[18] GSDS assesses the patient's functioning on eight role functions — self-care, family, kinship, partner, parent, social, occupational, and citizen — to give an index of disability. Each role function has subdomains (0 to 3); lower scores indicate better functioning. The GSDS is reported to have good interrater reliability.[18]

Mean GSDS scores were derived based on domains assessed for each patient (0–1 = mild or no disability, 2 or more = having disability). Mean scores were calculated by summing up the scores in all applicable domains and dividing it by the number of applicable domains. Thus, if the respondent was not a parent, then his/her scores were added without the parent role and divided by 7. If a respondent had all domains scored, then his/her score would be added for all eight domains and divided by 8. In this study, patients and caregivers were interviewed to assess the patient's current level of functioning (last 4 weeks). Where caregivers were unavailable, the patients were interviewed if they were able to provide reliable information. In the present sample, a majority did not respond to categories of partner and parent domains. However, as no further enquiry was made regarding their attempts to find a partner, these domains were not scored.

Metacognition Assessment Scale (MAS)[19] is a 30-item rating scale. It assesses metacognitive abilities using verbalizations. The abbreviated version of the MAS is based on the Indian Psychiatric Illness Inventory guidelines to assess illness narrative. It is a semistructured interview[20] with good overall psychometric properties. Two subscales of MAS — understanding of one's mind/one's ability to think about oneself (Scale S) and understanding others' minds/one's ability to think about others (Scale U) — were used in this study.

The nine-item self-reflectiveness sub-scale of Beck's Cognitive Insight Scale[21] was used to assess self-reflectiveness. The scale has adequate psychometric properties ($\alpha = 0.70$). Responses range from a scale of 0 (do not agree at all) to 3 (agree completely).

Toronto Alexithymia scale[22] is a 20-item scale comprising of three factors — difficulties identifying feelings, difficulties expressing feelings, and externally orientated thinking. Higher scores indicate a higher degree of alexithymia. The measure has good psychometric properties (Cronbach's $\alpha = 0.81$; test-retest reliability $r = 0.77$, $P = 0.01$).[22]

Procedure

The study was reviewed and approved by a department subcommittee and subsequently the Institute Ethics Committee. All patients provided written informed consent. Participation was voluntary, and they were not compensated in any way for their participation.

Following the screening for eligibility, the clinical sample was recruited. A total of 100 case records were screened, of which 50 met the criteria and those patients were contacted for participation. Of these, 27 patients consented to participate — whereas 15 refused consent, eight were not cooperative after the initial measures were administered, due to either interference caused by their symptoms or constraints of time. The clinical sample was administered the SANS, SAPS, MAS, GSDS, the self-reflectiveness subscale of the BCI Scale, TRENDS, and TAS.

The control group was assessed on self-reflectiveness with BCI Scale, TRENDS, and TAS. The MAS was administered only on the clinical sample. All assessments were carried out individually.

Data analysis

Data were analyzed using the Statistical Package for Social Sciences, IBM-SPSS Version 22 for Windows (IBM Corp. Released 2013. Armonk, NY: IBM Corp). The two groups were compared on measures of alexithymia, emotion awareness, and self-reflectiveness using Student's *t*-test. The Mann–Whitney U test was used to compare the groups on TRENDS, due to the narrow range of scores. The relationship among the variables and social functioning in the clinical sample was examined using Pearson's product-moment correlation. Stepwise multiple regressions were used to identify factors associated with scores on social functioning.

RESULTS

Demographic characteristics of the sample

The mean age was 31.07 years (SD = 8.9) for the clinical sample and 33.62 years (SD = 7.2) for the nonclinical sample. The majority in the clinical sample were single (74%), males (52%), and graduates (44%). Nearly, 70% were not employed. The control group comprised of a majority of females (62%) and married (69%). A total of 54% of nonclinical participants were either postgraduates or pursuing higher degrees. There was no statistically significant difference between the groups on age, education, or gender. However, there was a significant difference with respect to marital status [Table 1].

The mean age of onset of illness was 25 years (SD = 6.0), mean illness duration was 7 years (SD = 4.07). A total of 67% had a primary diagnosis of paranoid schizophrenia, a little more than half (56%) had no comorbid diagnosis. The majority were outpatients; some patients were part of the inpatient facility.

Mean scores on SAPS and SANS respectively indicate that at the time of assessment, the clinical sample did not have substantial symptoms [Table 2].

On GSDS, the mean score obtained was 1.58 (SD = 0.60), indicating a trend toward a lower level of social dysfunction. Based on mean GSDS scores, the majority reported mild or no disability in the areas of self-care and kinship. Disability in functioning (≥2) was reported in the domains of family, occupation, and social. For 69% and 73%, partner and parent roles, respectively, could not be scored as they were single. Of those who were assessed, an equal number (19%) reported mild or no disability with respect to partner and parent roles [Table 2].

There was a significant difference between the groups on emotion recognition [TRENDS; Table 2]. There was also a significant difference between the groups on underidentification [Table 2], with the clinical sample performing poorer than control group, indicating the presence of emotion recognition deficits in the clinical sample. The two groups did not differ in self-reflectiveness.

Compared to those who were single, those who were married had better levels of functioning with respect to functioning on GSDS (t = 2.36, df = 23.07, $P = 0.027$).

Correlations between measures of positive and negative symptoms, emotion recognition, self-reflectiveness, and metacognition and functioning on the GSDS in the clinical sample [Table 3] indicated a negative correlation between negative symptoms (SANS) and S subscale on MAS, which measures the ability to

Table 1: Demographic characteristics of the sample

Variable		Mean (SD)			
		Clinical (*N*=27)	Nonclinical (*N*=26)	t/χ^2	*P*
Age in years		31.07 (8.88)	33.62 (7.18)	t=1.14	0.25
		Frequency (percentage)			
Sex	Male	14 (52%)	10 (38%)	χ^2=0 0.95	0.33
	Female	13 (48%)	16 (62%)		
Marital status	Single	20 (74.1%)	8 (31%)		
	Married	7 (25.9%)	18 (69%)	χ^2 8.30	0.003
Education	Class 12	7 (25.9%)	2 (7%)		
	Graduation	12 (44.4%)	10 (39%)		
	Postgraduation	8 (29.62%)	14 (54%)		
Occupation	Unemployed	19 (70%)	0	χ^2=18.76	
	Home maker	3 (11%)	5 (19%)		0.001
	Student	1 (4%)	8 (31%)		
	Professional	2 (8%)	8 (31%)		
	Other	2 (7%)	5 (19%)		

Table 2: Comparison of scores of the two groups on measures of insight, emotion awareness, emotion recognition, and GSDS (functioning)

Variable	Clinical sample (*N*=27) Mean (SD)	Control sample (*N*=26) Mean (SD)	*t*/*U* (*P*)
BCI- self reflectiveness scale	12.04 (4.9)	10.96 (4.43)	0.839 (0.40)
TAS	69.59 (12.41)	66.04 (10.60)	1.11 (0.27)
F1 ability to identify describe feelings	10.30 (5.13)	8.85 (3.62)	1.18 (0.24)
F2 Externally oriented thinking	13.74 (4.95)	12.12 (3.27)	1.31 (0.19)
F3 Ability to identify, describe feelings and daydream	17.19 (4.02)	16.12 (3.05)	1.08 (0.28)
F4 Ability to interpret bodily manifestations of emotions	11.07 (4.23)	9.77 (4.03)	1.14 (0.26)
TRENDS	33.63 (5.24)	37.35 (6.54)	2.286 (0.03)
Under Identification	Median: 4.00 Mean=4.11 (2.11)	Median: 2.00 Mean=2.69 (2.8)	199* (0.01) 0.042
Over Identification	Median 1.00 Mean=1.11 (1.01)	Median: 1.00 Mean=0.85 (0.88)	281* (0.27) 0.31
	GSDS (clinical sample *n*=27)		
GSDS Domains on GSDS	**0-1 (mild or no disability)**	**2 or more**	
Self-care	21 (77.77%)	6 (22.22%)	
Family	11 (40.7%)	1 6(59%)	
Kinship	15 (55.55%)	12 (44.44%)	
Partner	5 (18.5%)	3 (11.11%)	
Parent	5 (18.5%)	2 (7.40%)	
Citizen	12 (44.44%)	15 (55.55%)	
Social	7 (25.92%)	20 (74.07%)	
Occupation	10 (37.03%)	17 (62.9%)	
Variable	**Mean**	**SD**	
SAPS	7.00	4.24	
SANS	6.44	3.16	
MAS- S scale	4.07	1.09	
MAS- U Scale	2.91	0.88	

BCI – Beck's Cognitive Insight Scale; TAS – Toronto Alexithymia Scale; TRENDS – The Tool for Recognition of Emotions in Neuropsychiatric Disorders; GSDS – The Groningen Social Disabilities Schedule; SAPS – Scale for assessment of positive symptoms; SANS – Scale for assessment of negative symptoms; MAS – Metacognitive assessment scale *Mann Whitney U test

think about oneself (r = -0.42; P = 0.04). Emotion recognition (TRENDS) was negatively correlated with social functioning (r = -0.31). Self-reflectiveness (BCI) was positively associated with scores on the U scale of MAS, which measures the ability to understand others' minds and think about others (r = 0.43; P = 0.028) and the subscale of TAS, which measures the person's ability to interpret bodily manifestations of emotions (r = 0.40; P = 0.043). Greater the negative symptoms, lower was the functioning (GSDS; r = 0.39; P = 0.05).

A stepwise regression analysis to identify associates of social functioning was conducted. Scores on emotion recognition, emotion awareness, SAPS, and SANS; age; gender; and marital status were entered as independent variables. Negative symptoms were significantly associated with scores on social functioning [Table 4; t = 2.07, P = 0.04, adjusted R^2 = 0.0784].

Table 3: Correlations among emotion recognition, self-reflectiveness, symptom severity, metacognition and social functioning in the clinical sample (*n*=27)

	BCI	TAS	SAPS	SANS	SS scale	U scale	Mean GSDS
TRENDS	-0.10	-0.35	0.07	0.33	0.21	0.23	-0.31
BCI		0.28	0.06	0.06	0.30	0.43*	-0.37
TAS			0.07	0.056	-0.22	0.04	-0.005
SAPS				0.58**	-0.31	0.25	0.22
SANS					-0.40**	-0.21	0.39*
S-subscale of MAS						0.83**	-0.33
U_ subscale of MAS							0.34

*P=0.05 level;**P=0.01 level BCI – Beck's Cognitive Insight Scale; TAS – Toronto Alexithymia Scale; TRENDS – The Tool for Recognition of Emotions in Neuropsychiatric Disorders ; SAPS – Scale for assessment of Positive Symptoms, SANS – Scale for assessment of negative symptoms; Subscales of Metacognitive assessment scale; S – Scale Understanding one's own mind; U scale – Understanding of Others' Mind

DISCUSSION

We examined emotion recognition, emotion awareness, metacognition, and social functioning in persons with schizophrenia.

The clinical sample had a majority of single males, currently not employed and was educated. Education was considered as a categorical variable, and the actual difference in years of education was not calculated. This

Table 4: Social functioning and associates in individuals with schizophrenia

Predictor	Beta (S.E.)	*t*	*P*	Adjusted R^2
SANS	0.073 (0.035)	2.07	0.04	0.078
Constant	1.16 (0.21)	5.41	<0.001	

Variables entered-age of onset, Beck's Cognitive Insight Scale, F1 (ability to identify describe feelings), F4 (ability to interpret bodily manifestations of emotions), Toronto Alexithymia Scale, marital status, Tool for Recognition of Emotions in Neuropsychiatric Disorders, SANS. SANS – Scale for assessment of negative symptoms

might be a limitation, as mere years of education may not always indicate the level of intellectual functioning. Age of onset in young adulthood and long duration of illness are similar to those found in other recent studies.[23-25] Patients had greater positive than negative symptoms, and none had conceptual disorganization.

Social dysfunction was at the lower end of the continuum. The clinical sample had the greatest disability in performing partner/parent roles, socializing with friends, occupation, and family relationships. Disability in occupational domains would likely render them vulnerable to criticism and reduce the ability to hold a stable job. Difficulties in social functioning have been linked to difficulty in affect recognition.[26] Social dysfunction in these studies appears to be mostly in maintaining interpersonal relationships, with the assumption that emotion recognition deficits affect social communication. This is reflected in our findings as well.

The clinical sample had emotion recognition deficits in the form of overidentification and underidentification. However, underidentification (emotions of anger, fear, and disgust) was greater than overidentification (emotions like sadness, happiness, and neutral facial expression) and the clinical sample differed significantly from the control sample, with the clinical sample performing lower than the control sample. This could be due to the presence of positive symptoms such as paranoid delusions in the clinical sample.

The clinical sample did not have significant deficits in emotion awareness. This is contrary to findings in literature on emotion awareness in persons with schizophrenia. These deficits have been reported more in males and those with paranoid schizophrenia. Emotion awareness is associated with presence of negative symptoms.[27] Thus, predominance of negative symptoms in this sample, was associated with poor ability to introspect, greater externally oriented thinking, and greater difficulty in identifying one's feelings and daydreams. Emotion awareness has also been reported to be associated with anhedonia, a negative symptom of schizophrenia.[22] In the present study, emotion awareness was negatively correlated with emotion recognition. Both domains being domains of emotional processing, they have not been previously studied in association with each other. These results may not be conclusive and need further examination.

The consequences of difficulties in emotion expression and in identifying and describing emotions have been examined in persons with schizophrenia. Alexithymia has been reported to be associated with greater neurocognitive deficits, whereas difficulty in describing feelings has been associated with emotional distress, indicating that alexithymia could be associated with neurocognitive and affective symptoms, differentially.[9] When those with better or poorer social functioning were compared, those with better functioning had higher emotion awareness.[26,28,29]

Our results show that although the clinical sample had greater difficulty than nonclinical controls in understanding others' thoughts and emotions as compared to their own, this difference was not statistically significant. The cognitive insight, which includes metacognitive processes and willingness to acknowledge fallibility, differs from clinical insight, which is one's awareness about having an illness, its effects, and the need for treatment. Research evidence on the association between these two constructs is mixed.[21,30] Self-reflectiveness can be interpreted as "expression of introspection and a willingness to acknowledge fallibility" and suggests a cognitive ability to generate alternative explanations to one's experiences. It has been associated with cognitive insight. Cognitive insight has been associated with better outcomes of cognitive behavior therapy, suggesting that individuals high on this ability may also have better functioning.[31,32] However, Beck *et al*. (2004) caution against the use of self-reflectiveness subscale for individual clinical assessments and this should be considered when interpreting our findings.[21]

The clinical sample was educated, with knowledge about the illness. These factors are likely to have contributed to the level of self-reflectiveness. Although results with respect to insight in persons with schizophrenia are mixed, there is evidence that higher self-reflectiveness in persons with schizophrenia leads to better functional outcome.[31,32]

There was no significant relationship amongst emotion recognition, metacognition, and self-reflectiveness. There is some evidence for the presence of metacognitive deficits in persons with schizophrenia.[19] In a recent study, metacognitive awareness was significantly related to disorganization symptoms, capacity for relatedness, and flexibility in abstract thought,[11] which might account for the fact that there were no prominent

deficits in self-reflectiveness or metacognitive processes in the present sample.

We examined the factors associated with social functioning. Marital status, negative symptoms, age of onset, self-reflectiveness, and difficulty in expressing emotions were entered as independent variables. Higher scores on SANS emerged as a significant indicator of greater disability in the clinical sample. This finding is consistent with previous studies that indicate that negative symptoms of schizophrenia is a significant contributor to social functioning.[32,33] The presence of negative symptoms is known to have a greater adverse impact on social functioning than positive symptoms. Moreover, improvement in negative symptoms improves the psychosocial functioning.[34,35]

Our results indicate that single persons experienced higher social dysfunction. Although there was a correlation between marital status and social functioning, the direction of causality is unclear. However, it is likely that participants who were married had greater opportunities for engaging in social roles and also were required to meet social expectations as compared to those who were single.

Findings from a recent study suggest that negative symptoms are predictive of deficits in real-world functioning, emphasizing the need to treat negative symptoms. However, findings are mixed, thus indicating the complexity of the relationship between clinical variables, such as age at onset, symptoms, deficits, and functioning.[33,36] Contrary to findings in the literature, emotion awareness, emotion recognition, or metacognitive processes did not emerge as significant associates of social functioning.

There is a need for more research that can help identify factors impacting social functioning in schizophrenia, as several factors have been implicated in symptom exacerbation and relapse.[37]

The limitations of the present study include a small sample size and an unequal representation of gender, both of which limit the generalizability of the findings. The absence of a formal sample size calculation is another limitation. A post hoc power analysis conducted based on the current sample ($N = 53$), indicated the power of the study to be 0.612 (effect size = 0.62; $\alpha = 0.05$), suggesting a moderate effect size. Participants being clinically stable at the time of assessment are likely to have had an impact on their responses. GSDS was administered only to the clinical sample. Nonavailability of caregivers is likely to have impacted the rating of difficulties in social contexts. No further questions were asked with respect to attempts to seek a partner in those who were single. The use of only the static arm of TRENDS limited information obtained with respect to emotion recognition. There are studies in the literature that have used only static images in the assessment of emotion recognition, though.[38] The use of a single subscale of Beck's Insight Scale is another limitation, as it would not provide a comprehensive view of self-reflection.

Some of the strengths of the study are the use of culturally relevant and appropriate measures for emotion recognition and the inclusion of inpatients who were admitted for psychosocial interventions.

CONCLUSION

Our findings support previous results on emotion recognition deficits in persons with schizophrenia. Emotion recognition and metacognitive processes were not associated and did not impact each other or social functioning, but more rigorous studies are needed to understand the relationship among these variables. Nearly, 85% of the variance of social functioning in schizophrenia still remains unknown.[39,40] Understanding these nuances can help in enriching treatment approaches by incorporating techniques specifically aimed at addressing these deficits.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Couture SM, Granholm EL, Fish SC. A path model investigation of neurocognition, theory of mind, social competence, negative symptoms and real-world functioning in schizophrenia. Schizophr Res 2011;125:152-60.
2. Nuechterlein KH, Barch DM, Gold JM, Goldberg TE, Green MF, Heaton RK. Identification of separable cognitive factors in schizophrenia. Schizophr Res 2004;72:29-39.
3. Behere RV, Arasappa R, Jagannathan A, Varambally S, Venkatasubramanian G, Thirthalli J, *et al*. Effect of yoga therapy on facial emotion recognition deficits, symptoms and functioning in patients with schizophrenia. Acta Psychiatr Scand 2011;123:147-53.
4. Green MF, Penn DL, Bentall R, Carpenter WT, Gaebel W, Gur RC, *et al*. Social cognition in schizophrenia: An NIMH workshop on definitions, assessment, and research opportunities. Schizophr Bull 2008;34:1211-20.
5. Green MF, Horan WP, Lee J. Social cognition in schizophrenia. Nat Rev Neurosci 2015;16:620.
6. Mehta UM, Thirthalli J, Naveen Kumar C, Keshav Kumar J, Keshavan MS, Gangadhar BN. Schizophrenia patients experience substantial social cognition deficits across multiple domains in remission. Asian J Psychiatr 2013;6:3249.

7. Fett AK, Liechtbauer W, Dominguez MD, Penn DL, van Os J, Krabbendam L. The relationship between neurocognition and social cognition with functional outcomes in schizophrenia: A meta-analysis. Neurosci Biobehav Rev 2011;35:573-88.
8. Sifneos PE. Alexithymia: Past and present. Am J Psychiatry 1996;153 (7 Suppl):137-42.
9. O'Driscoll C, Laing J, Mason O. Cognitive emotion regulation strategies, alexithymia and dissociation in schizophrenia, A review and meta-analysis. Clin Psychol Rev 2014;34:482-95.
10. Gawęda L, Prochwicz K, Krężołek M, Kłosowska J, Staszkiewicz M, Moritz S. Self-reported cognitive distortions in the psychosis continuum: A Polish 18-item version of the davos assessment of cognitive biases scale (DACOBS-18). Schizophr Res 2018;192:317-26.
11. Lysaker PH, Gumley A, Luedtke B, Buck KD, Ringer JM, Olesek K, *et al*. Social cognition and metacognition in schizophrenia: Evidence of their independence and linkage with outcomes. Acta Psychiatr Scand 2013;127:239-47.
12. Lysaker PH, Leonhardt BL, Brüne M, Buck KD, James A, Vohs J, *et al*. Capacities for theory of mind, metacognition, and neurocognitive function are independently related to emotional recognition in schizophrenia. Psychiatry Res 2014;219:79-85.
13. World Health Organization. ICD-10: International Statistical Classification of Diseases and Related Health Problems: Tenth Revision. 2nd ed. World Health Organization. Available from: https://apps.who.int/iris/handle/10665/42980 2004. [Last accessed on 2019 Nov 07].
14. Andreasen NC. The scale for the assessment of negative symptoms (SANS): Conceptual and theoretical foundations. Br J Psychiatry 1989;155:49-52.
15. Andreasen NC, Olsen S. Negative v positive schizophrenia: Definition and validation. Arch Gen Psychiatry 1982;39:789-94.
16. Behre RV, Raghunandan VN, Venkatasubramanian G, Subbakrishna DK, Jayakumar PN, Gangadhar BN. Trends-A tool for recognition of emotions in neuropsychiatric disorders. Indian J Psychol Med 2008;30:32.
17. Behere RV, Venkatasubramanian G, Arasappa R, Reddy NN, Gangadhar BN. First rank symptoms and facial emotion recognition deficits in antipsychotic naïve schizophrenia: Implications for social threat perception model. Prog Neuropsychopharmacol Biol Psychiatry 2011;35:1653-8.
18. Wiersma D, DeJong A, Ormel J. The groningen social disabilities schedule: Development, relationship with ICIDH, and psychometric properties. Int J Rehabil Res 1988;11:213-24.
19. Lysaker PH, Dimaggio G, Daroyanni P, Buck KD, LaRocco VA, Carcione A, *et al.* Assessing metacognition in schizophrenia with the metacognition assessment scale: Associations with the social cognition and object relations scale. Psychol Psychother 2010;83:303-15.
20. Lysaker PH, Dimaggio G, Carcione A, Procacci M, Buck KD, Davis LW, *et al.* Metacognition and schizophrenia: The capacity for self-reflectivity as a predictor for prospective assessments of work performance over six months. Schizophr Res 2010;122:124-30.
21. Beck AT, Baruch E, Balter JM, Steer RA. Warman DM. A new instrument for measuring insight: The Beck cognitive insight scale. Schizophr Res 2004;68:319-29.
22. Bagby M, Taylor GJ, Ryan D. Toronto alexithymia scale: Relationship with personality and psychopathology measures. Psychother Psychosom 1986;45:207-15.
23. Kessler RC, Amminger GP, Aguilar-Gaxiola S, Alonso J, Lee S, Ustün TB. Age of onset of mental disorders: A review of recent literature. Curr Opin Psychiatry 2007;20:359-64.
24. Ali A. Disability in schizophrenia and its relationship with duration of illness and age of onset. Int J Rehabil Res 2009;14:37-41.
25. Gangadhar BN, Panner Selvan C, Subbakrishna DK. Janakiramaiah N. Age-at-onset and schizophrenia: Reversed gender effect. Acta Psychiatr Scand 2002;105:317-9.
26. Hooker C, Park S. Emotion processing and its relationship to social functioning in schizophrenia patients. Psychiatry Res 2002;112:41-50.
27. Van't Wout M, Aleman A, Bermond B. Kahn RS. No words for feelings: Alexithymia in schizophrenia patients and first-degree relatives. Compr Psychiatry 2007;48:27-33.
28. Baslet G, Termini L. Herbener E. Deficits in emotional awareness in schizophrenia and their relationship with other measures of functioning. J Nerv Ment Dis 2009;197:655.
29. Kimhy D, Vakhrusheva J, Jobson-Ahmed L, Tarrier N, Malaspina D, Gross JJ. Emotion awareness and regulation in individuals with schizophrenia: Implications for social functioning. Psychiatry Res 2012;200:193-201.
30. Mintz AR, Dobson KS. Romney DM. Insight in schizophrenia: A meta-analysis. Schizophr Res 2003;61:75-88.
31. Lysaker PH, Vohs JL, Ballard Fogley R. Metacognition, self-reflection and recovery in schizophrenia. Future Neurol 2013;8:103-15.
32. Sumiyoshi T, Nishida K, Niimura H, Toyomaki A, Morimoto T, Tani M, *et al*. Cognitive insight and functional outcome in schizophrenia; A multi-center collaborative study with the specific level of functioning scale–Japanese version. Schizophr Res Cog 2016;6:9-14.
33. Rabinowitz J, Levine SZ, Garibaldi G, Bugarski-Kirola D, Berardo CG, Kapur S. Negative symptoms have greater impact on functioning than positive symptoms in schizophrenia: Analysis of CATIE data. Schizophr Res 2012;137:147-50.
34. Bae SM, Lee SH, Park YM, Hyun MH, Yoon H. Predictive factors of social functioning in patients with schizophrenia: Exploration for the best combination of variables using data mining. Psychiatry Investig 2010;7:93.
35. Shamsi S, Lau A, Lencz T, Burdick KE, DeRosse P, Brenner R, *et al.* Cognitive and symptomatic predictors of functional disability in schizophrenia. Schizophr Res 2011;126:257-64.
36. Milev P, Ho B-C, Arndt S, Andreasen NC. Predictive values of neurocognition and negative symptoms on functional outcome in schizophrenia: A longitudinal first-episode study with 7-year follow-up. Am J Psychiatry 2005;162:495-506.
37. Schmidt SJ, Mueller DR. Roder V. Social cognition as a mediator variable between neurocognition and functional outcome in schizophrenia: Empirical review and new results by structural equation modeling. Schizophr Bull 2011;37:S41-54.
38. Chandrashekaran N. Musical deficits in Schizophrenia its relation with deficits in cognition and emotion recognition. Unpublished M Phil thesis in clinical psychology National Institute of Mental Health and Neurosciences, Bangalore, India. 2015.
39. Couture SM, Penn DL, Roberts DL. The functional significance of social cognition in schizophrenia: A review. Schizophr Bull 2006;32(Suppl 1):S44-63.
40. Erol A, Keleş Unal E, Tunç Aydin, E. Mete L. Predictors of social functioning in schizophrenia. Turk Psikiyatri Derg 2009;20:13-21.

Original Article

Neurocognitive Profile in Indian Individuals Genetically at Risk of Schizophrenia

Sunny Chattopadhyay, Nanasaheb M. Patil[1], Raghavendra B. Nayak[1], Sameeran S. Chate[1], Om P. Singh[2]

ABSTRACT

Background: Cognitive deficits have been noted in patients of schizophrenia in remission, as well as in first-degree relatives. This study aims to evaluate the neurocognitive performance in unaffected first-degree relatives of patients of schizophrenia in comparison with healthy controls, as well as patients of schizophrenia in remission. **Methods:** It was a 1-year case-control study by purposive sampling. Patients with a diagnosis of schizophrenia, first-degree relatives of patients of schizophrenia, and controls from nongenetic relatives of patients were recruited as per inclusion and exclusion criteria. Samples were matched for age and educational status. The General Health Questionnaire 28 (GHQ-28) screened them and they were checked for remission by Positive and Negative Syndrome Scale (PANSS) and then subjected to various instruments for assessment of neurocognition, standardized for the Indian population. To remove the effect of symptoms as confounding factors, PANSS score of <3 for each individual item was set as the criterion for remission. Intelligence quotient (IQ) was screened in all participants to exclude mental retardation. Statistical analysis used was the analysis of variance (ANOVA) with *post hoc* Fisher's least significant difference (LSD). **Results:** Significant neurocognitive impairments were detected in the patients and first-degree relatives when compared with the control subjects. The most common impairment in the patient group was in speed of processing, and among unaffected first-degree relatives, it was in the working memory. **Conclusion:** Indian individuals genetically at risk of schizophrenia showed significant neurocognitive impairments in all domains compared with controls.

Key words: *Cognitive impairment, executive function, first-degree relative, verbal memory, working memory*

Key messages: *Neurocognitive deficits occur in stable patients of schizophrenia. On assessment by instruments standardized for the Indian population, deficits were evident in all domains for individuals, asymptomatic but genetically susceptible. Hence, asymptomatic siblings of patients of schizophrenia may require screening.*

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_243_19	

How to cite this article: Chattopadhyay S, Patil NM, Nayak RB, Chate SS, Singh OP. Neurocognitive profile in Indian individuals genetically at risk of schizophrenia. Indian J Psychol Med 2020;42:155-61.

Department of Psychiatry, NRSMC, [2]Department of Health and FW, Govt of W.B, Kolkata, West Bengal, [1]Department of Psychiatry, JNMC, Belgaum, Karnataka, India

Address for correspondence: Dr. Sunny Chattopadhyay
K-19, Kestopur Road, Block-2, Teachers' Housing Society, Burdwan 713 104, Bardhaman, West Bengal, India.
E-mail: sunny11802001@gmail.com

Submitted: 31-May-2019, **Revised:** 16-Jul-2019, **Accepted:** 11-Nov-2019, **Published:** 09-Mar-2020

Emil Kraepelin described dementia praecox or a group of schizophrenias as a disease with an early onset, a deteriorating course with hallucinations and delusions, and cognitive changes.[1] Bleuler further explained that delusions and hallucinations were secondary to cognitive changes.[2] Cognition is the sum total of mental processes that enable us to acquire knowledge and keep us aware of our surroundings, thereby enabling us to make appropriate judgments.[3] The Division of Mental Disorders of the National Institute of Mental Health (NIMH), USA initiated and funded workshops known as the Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS).[4] The different domains of cognition impaired in schizophrenia, according to the NIMH-MATRICS are the speed of processing, attention or vigilance, working memory, verbal memory, visual memory, reasoning, problem-solving, and social cognition. Studies on cognition show that patients with schizophrenia perform at least one standard deviation (SD) below the normal population in global intellectual abilities, which places them in the lower 15 percentile of global intellectual ability.[5] The importance of cognition extends beyond mental processes. Recently, it was noted that weight gain induced by antipsychotic therapy was affected not only by the body mass index (BMI) but also by cognitive performance.[6,7]

Cognitive deficits in relatives of patients of schizophrenia

Genetic factors are a determinant in the etiology of schizophrenia.[8] Schizophrenia heavily affects certain families. This tendency of genetic loading indicates a need to study relatives to better understand the genetic underpinning. Cognitive assessments performed as a part of routine assessment of asymptomatic people had shown deficits in people who developed schizophrenia years later.[9] Relatives of patients with schizophrenia have been shown to have an increased reaction time, indicating a decreased speed of processing.[10] In a recent ongoing study, known as the Pittsburgh Risk Evaluation Program (PREP), first- and second-degree relatives were shown to have neurocognitive impairments.[11]

Although not diagnostic of a disease but certain symptoms are frequently found with the disease. They exhibit close inheritance with the candidate gene or the gene region.[12] The study of these symptoms is an alternative experimental strategy and can increase our etiological understanding of the disorder. Evidence supports the fact that the same gene may be responsible for cognitive impairment as well as schizophrenia, while other genes may also affect cognition.[13]

Research question

Most of the current literature focuses on the Caucasian race, with the Asian population being severely under-represented despite accounting for two-thirds of the world population. Substantial research since the beginning of this century has suggested genetic variation as the basis for differences in the phenotype and disease susceptibility across groups.[14] A literature search for Indian studies on neurocognitive deficits of schizophrenic probands revealed only a few studies with highly inconsistent results [Table 1]. Domains of cognitive deficits, as prescribed by MATRICES, have rarely been examined. As mentioned by Solanki *et al*., the tests used in these studies were not standardized for the Indian population. Moreover, we could not

Table 1: Indian studies on neurocognition in schizophrenia

Study	Tests Used	Domains Accessed	Groups Compared	Conclusion
Garg *et al*. Cognition in unaffected biological siblings of schizophrenia[17]	WCST, CPT, and SWMT	Planning (executive), performance, and concentration	Siblings (*n*=36) and controls (*n*=36).	Global impairment in the cognition of siblings
Nehra *et al*.: Cognitive deficits in the unaffected sibling of patients with schizophrenia[18]	WCST, Brief Visuospatial Memory Test-Revised, HVLT-R, and WAIS DST	Planning (executive), memory, verbal learning performance, and concentration	Patients, siblings, and controls Each group (*n*=20)	Siblings had verbal learning impairment
Bhatia *et al*.; Executive functions and cognitive deficits in schizophrenia: Comparisons between probands, parents, and controls in India[19]	TMT	Perceptual-motor and set-shifting	Patients (*n*=172) and parents (*n*=196)	Siblings showed significant impairments
Solanki *et al*.: An Indian experience of neurocognitive endophenotypic markers in unaffected FDR[20]	DST, visuospatial working memory matrix, and TMT	Verbal retention, executive functioning, and working memory	Siblings (*n*=40) and controls (*n*=40).	Verbal, working memory and executive function deficits in siblings.
Harave *et al*.: Schizophrenia risk and neurocognition[21]	TMT, DST, and WMSspatial span	Attention and executive function	High-risk patients, siblings (*n*=17), and controls (*n*=30)	Executive function task performance, attention, and working memory deficits in first-degree relatives.

WCST – Wisconsin Card Sorting Test, CPT – Continuous performance test, SWMT – Spatial working memory test, HVLT-R – Hopkins Verbal Learning Test-Revised, WAIS DST – Wechsler Adult Intelligence Scale Digit Symbol Test, TMT – Trail-making test, PALT – Paired associate learning test, WMS – Wechsler memory scale

obtain any findings on visual learning and visual memory. The domain of speed of processing also remains unexplored. Although executive function has been explored, the ability to innovate spontaneously has not. A test of design fluency, which has a distinct advantage in estimating executive function, might serve this purpose.[15] The effect of intelligence quotient (IQ) as a confounding factor has also not been investigated.

We, therefore, decided to screen IQ before the cognitive assessment and exclude subjects with subnormal intelligence. Remission was ascertained for the participating patients. The tests used were standardized for the Indian population, and all domains of neurocognition, as mentioned by NIMH- MATRICES, were assessed using tests different from those already used, thus, enhancing reliability.

SUBJECTS AND METHODS

The study was conducted at a tertiary care center in India for a period of 1 year from January 1, 2011 to December 31, 2011. The institutional ethical committee provided ethical clearance. All patients of schizophrenia in remission (stable) attending the psychiatry outpatient department (OPD) and patients admitted in the psychiatry ward of the hospital were included in the study (Group 1). Eligible first-degree relatives of patients of schizophrenia attending the psychiatry OPD and patients admitted in the psychiatry ward of the hospital were identified (Group 2). The controls were nongenetic relatives of patients, who were neither suffering from a mental illness, attending psychiatry OPD nor admitted in the psychiatry ward of the hospital (Group 3). A cross-sectional analysis was carried out in this case-control study by purposive sampling.

The inclusion criteria were an age between 18 and 50 years, an English education up to at least the tenth grade, and consent to participate in the study. The exclusion criteria were having co-morbid conditions, such as drug abuse (except nicotine dependence); affective disorders; dementia; mental retardation; a history of head injury; or a seizure within 1 year. Subjects showing extrapyramidal symptoms were excluded. Mood symptoms were assessed and their presence was a criterion for exclusion.

A specially prepared pro forma was used to collect the patients' sociodemographic data, history, and examination findings. The International Classification of Diseases 10 Diagnostic Criteria for Research (ICD-10 DCR) for Psychiatric Illnesses by the World Health Organization (WHO) were used to diagnose each patient.[16] Mental retardation was ruled out by screening all subjects using Raven's Colored Progressive Matrices (CPM), minimizing the effect of IQ as a confounding factor. All subjects were checked for remission using the Positive and Negative Syndrome Scale (PANSS). The accepted reported criterion for remissions was a PANSS score of <3 for each item in the last 6 months.[24] The General Health Questionnaire 28 (GHQ-28) was used to check the presence of any psychiatric comorbidity. Subsequently, cognitive assessment tests were performed to estimate the extent and nature of cognitive dysfunctions. All these tests have been standardized and validated for the Indian population [Table 2].[21] The speed of processing was tested by the Digit symbol substitution test (DSST), where the time taken to perform the task was the score. Verbal working memory was tested by the N-Back test, while Visual N-Back tested visual working memory. Correct identification was scored as a hit, while not identifying and misidentifying were scored as an error. The Verbal Paired Associates Test tested verbal learning,

Table 2: Tests used in the assessment of each domain of cognition and description

Domain	Test	Description
Speed of processing	DSST[22]	Sheets with four rows each having 26 randomly arranged digits have to be substituted with symbols mentioned on top in a key
Working memory	Verbal N-Back Test[22]	A subject respond in N back-1 test whenever a consonant is repeated consecutively, and in N back-2 the subject responds when it is repeated after an intervening consonant
	Visual N-Back Test[22]	In Visual N-back 1, the subject is told to report if the positions of two dots coincide. In Visual N-back 2, the subject is told to report if the position of the dot coincides to the last but one card
Learning and memory	Verbal Paired Associates Test[23]	Five pairs of nouns are repeated one after the other. After this, the subject is told the first noun and asked to repeat the other.
	PGI- Visual Recognition[23]	First, a subject is shown a card containing ten pictures and asked to memorize. Next, another card containing pictures from the first card, as well as other pictures, is shown, and the subject is asked to identify the pictures.
Attention and vigilance	Digit Forward[24] and Digit Backward[24]	Digits are read at 1 digit per second and a gradually increasing number of digits are presented. In digit forward, the subject has to reproduce in the same order while backward it is to be reproduced in the reverse order.
	Serial Subtraction[22]	The subject has to subtract a number from another repeatedly and report the result.
Executive function	Animal Name Test[22]	The subject is asked to generate from memory as many animal names as possible excluding birds, snakes, and fish.
	DF[22]	The subject has to draw novel designs.

DSST – Digit symbol substitution test, DF – Design fluency

where the number of pairs correctly reproduced forms the score. Visual learning was tested by the PGI-visual recognition test, where a correct identification and naming of the object is given one mark, while a correct identification but wrong naming fetches ½ mark. Attention and concentration were tested by digit forward, digit backward, and serial subtraction test. Animal name and design fluency (DF) tests were used for assessment of executive function, where the number of items generated is the score.

Data

Data obtained were tabulated and the means, SDs, and percentages were calculated. Chi-square was used for testing the association (comparing the proportions) and analysis of variance (ANOVA) for comparison of means. *Post hoc* Fisher's least significant difference (LSD) was used to compare the significance of the group differences. Statistical significance was set at $P < 0.05$. The null hypothesis was that there is no significant difference between the groups. As multiple tests were applied to the same population, Bonferroni's correction was applied. To keep familywise error rates to a minimum, the critical P value derived was 0.003. Microsoft Excel and the Statistical Package for the Social Sciences (SPSS) software, version 16, were used for analysis.

RESULTS

Sociodemographic details

The three groups—patients (Group 1, $n = 34$); unaffected first-degree relatives (Group 2, $n = 37$); and controls (Group 3, $n = 47$)—were matched in age ($P = 0.5$) and educational status ($P = 0.76$) but not on sex distribution ($P = 0.01$) [Table 3]. The mean (± SD) duration of disease was 3.7 years among patients.

Clinical details

Among the patients, most were patients of residual schizophrenia ($n = 27$). Six patients had undifferentiated schizophrenia and one had paranoid schizophrenia.

Cognitive assessment

Unaffected first-degree relatives showed significant impairments compared with controls in all domains except learning [Table 4]. Based on the norms for the Indian population, the most common impairment in the patients was in the speed of processing, while the most common impairment in the unaffected first-degree relatives was in working memory [Table 5].

DISCUSSION

We found neurocognitive impairments in unaffected first-degree relatives similar to those in patients of schizophrenia. Patients and first-degree relatives performed significantly worse than the controls in testing for speed of processing, which could be responsible for the slowness in performing various activities exhibited by the patients of schizophrenia.[25] Garg from India reported similar findings.[17] The bilateral parietal and temporal lobes and left middle frontal gyrus are involved in information processing and, probably, are the affected areas.[26]

Working memory includes verbal and visual memory. The patients and first-degree relatives performed significantly worse than the controls in this domain. From India, Harave and Solanki also reported similar findings. Patients also exhibit reduced blood flow in the inferior frontal gyrus, suggesting it as the area affected in working memory disturbance.[27]

Unlike other domains, unaffected first-degree relatives did not show significant impairments in verbal or visual learning.

Executive function deficits are known to be an integral part of schizophrenia. We found significantly higher executive function impairment even in unaffected first-degree relatives, compared with the controls. We used the animal name test and DF test for executive function assessment. The animal name test results showed that the control subjects performed better than patients of stable schizophrenia and unaffected

Table 3: Demographic Variables

Variable	Group 1 Patient (n=34)	Group 2 First-degree Relative (n=37)	Group 3 Control (n=47)	Chi- Square	F	P
Sex (Male)	22 (64%)	22 (59%)	42 (89%)	10.98		0.01
Age (years)	30.88±8.24	31.27±8.87	29.26±7.91		0.70	0.50
Education						
School	12 (35.5%)	8 (21.6%)	11 (23.4%)	4.95		0.76
High School	6 (17.6%)	5 (13.5%)	10 (21.3%)			
Graduate	7 (20.6%)	9 (24.3%)	10 (21.3%)			
Post Grad	2 (5.9%)	2 (5.4%)	5 (10.6%)			
Professional	7 (20.6%)	13 (35.1%)	11 (23.4%)			
GHQ Score	6.03±1.14	2.00±0.81	1.87±0.74		254	<0.001

GHQ – General Health Questionnaire

Table 4: Performance of the groups in various cognitive assessment tests with post hoc assessment of test of significance of difference among the groups

	Group 1 Patient (*n*=34)	Group 2 First-Degree Relative (*n*=37)	Group 3 Control (*n*=47)	Cumulative		*Post hoc* (LSD) *P*		
				F	*P*	Patient vs First-Degree Relative	Patient vs Control	First-Degree Relative vs Control
DSST (sec)	253 (25)	251 (17)	221 (20)	20.06	<0.001	0.08	<0.001	<0.001
N- Back Test								
N-Back 1 Hit	6.18 (2.29)	6.65 (1.75)	8.49 (0.8)	22.91	<0.001	0.23	<0.001	<0.001
N- Back 1 Error	7.06 (4.24)	5.49 (3.22)	2.91 (1.77)	18.45	<0.001	0.04	<0.001	0.03
N-Back 2 Hit	4.82 (1.91)	5.05 (1.22)	6.55 (1.19)	17.75	<0.001	0.51	<0.001	<0.001
N-Back 2 Error	7.97 (3.5)	8.92 (3.75)	5.00 (1.85)	19.25	<0.001	0.19	<0.001	<0.001
Visual N Back Test								
1 Hit	5.38 (1.39)	5.62 (1.26)	8.04 (0.93)	65.44	<0.001	0.39	<0.001	<0.001
1 Error	8.18 (2.26)	8.00 (2.27)	5.83 (1.85)	16.22	<0.001	0.73	<0.001	<0.001
2 Hit	3.85 (0.99)	3.70 (0.85)	7.23 (1.86)	90.02	<0.001	0.65	<0.001	<0.001
2 Error	13.91 (2.52)	14.41 (2.83)	9.62 (3.61)	30.89	<0.001	0.51	<0.001	<0.001
Verbal Paired Associates Test								
Similar Pair	4.24 (0.89)	4.49 (0.80)	4.70 (0.55)	3.92	0.02	0.16	0.01	0.18
Dis-Similar Pair	12.38 (1.78)	12.84 (1.61)	13.36 (1.47)	3.74	0.03	0.23	0.01	0.14
PGI- Visual repetitive Card	8.21 (1.2)	8.43 (0.73)	8.85 (0.83)	5.11	0.01	0.30	0.01	0.04
Digit Forward	5.68 (0.68)	5.49 (0.56)	5.83 (0.76)	2.63	0.08	0.24	0.32	0.02
Digit Backward	4.47 (0.75)	4.46 (0.61)	4.96 (0.51)	9.06	<0.001	0.94	<0.001	<0.001
Serial Subtraction	10.15 (1.3)	9.95 (0.88)	10.79 (1.16)	6.46	<0.001	0.45	0.01	<0.001
Animal Name Test	5.62 (1.58)	5.76 (0.98)	6.57 (0.95)	8.16	<0.001	0.69	0.01	<0.001
DF Free	4.18	4.03	5.15	10.57	<0.01	0.61	<0.001	<0.001
DF Fixed	3.06	3.11	4.55	12.58	<0.01	0.89	<0.001	<0.001

DSST – Digit symbol substitution test, DF – Design fluency, LSD – Fisher's least significant difference

Table 5: The prevalence of neurocognitive deficits in patients of schizophrenia, first-degree relatives of patients of schizophrenia, and controls

Domains	Patients of Schizophrenia in Remission	First-degree Relatives of Patients of Schizophrenia	Control Subjects
Speed of processing	67.65%	45.95%	12.77%
Learning and memory	48.04%	39.64%	24.82%
Attention and vigilance	29.41%	27.03%	14.89%
Executive function	53.92%	49.55%	19.86%
Working memory	59.19%	56.42%	15.96%

first-degree relatives did. This set of tests assesses the ability to innovate and generate spontaneously, unlike the Trail-making Test (TMT), where the norm is to perform as instructed. In a recent study on the Indian population by Bhatia *et al*., the findings indicated significant impairments in first-degree relatives. Frontostriatal abnormalities are thought to explain these deficits.[12] In the assessment of attention and vigilance, the patients and first-degree relatives had performed significantly worse than the controls.[28]

A recent longitudinal cohort of more than 1,000 patients reported that patients had intellectual deterioration and poor academic performances much prior to the onset of the illness.[27] In a cross-sectional study, cognitive deficits in first-episode psychosis were similar to those in patients of chronic, long-standing illness.[28,29] Cognitive impairments in schizophrenia are stable and persistent, unlike the progressive deficits of dementia. On the other hand, they are not evident at birth as in patients of intellectual disabilities. We showed that there is a statistically significant difference from controls in the domains of neurocognition in unaffected first-degree relatives of patients of schizophrenia. Thus, cognitive deficits are certain inherited vulnerabilities that are present in genetically susceptible individuals.

CONCLUSION

To conclude, our findings suggest that neurocognitive impairments are present not only in patients of stable schizophrenia but also in the unaffected first-degree relatives of patients of schizophrenia. Neurocognitive impairments could also be screening criteria for those at risk. Our findings are in concurrence with studies from the West and suggest that Indian

patients of stable schizophrenia and unaffected first-degree relatives of patients of schizophrenia show similar neurocognitive deficits.

Strengths

1. Tests standardized for the Indian population were applied[20]
2. We screened out the confounding effect of IQ
3. Groups were matched with respect to education and age, which affect cognition
4. Noncomputerized tests were used as many are not well versed in computers
5. Only patients in remission were assessed
6. Conservative correction applied as multiple hypothesis testing was done.

Limitations

Our sample size was constrained as we used patients who visited a general hospital during a period of only 1 year. Nicotine dependence was significantly higher in patients, similar to other Indian community studies.[30]

Acknowledgements

We thank Editage (www.editage.com) for English language editing.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kraepelin E, Barclay RM, Robertson GM. Dementia Praecox and Paraphrenia. Edinburgh: Chicago Medical Book Co; 1919.
2. Bleuler E. Dementia Praecox oder Gruppe der Schizophrenien. Giessen: Psychosozial Verlag; 1911.
3. Sadock BJ, Sadock VA. Kaplan & Sadock's Synopsis of Psychiatry: Behavioral Sciences/Clinical Psychiatry. 10th ed. Philadelphia (PA): Lippincott Williams & Wilkins; 2007.
4. Buchanan RW, Davis M, Goff D, Green MF, Keefe RS, Leon AC, *et al*. A summary of the FDA-NIMH-MATRICS workshop on clinical trial design for neurocognitive drugs for schizophrenia. Schizophr Bull 2005;31:5-19.
5. Harvey PD, Keefe RS. Studies of cognitive change in patients with schizophrenia following novel antipsychotic treatment. Am J Psychiatry 2001;158;176-84.
6. Abdul Rashid NA, Lim J, Lam M, Chong SA, Keefe RS, Lee J. Unraveling the relationship between obesity, schizophrenia and cognition. Schizophr Res 2013;151:107-12.
7. Saddichha S, Ameen S, Akhtar S. Predictors of antipsychotic-induced weight gain in first-episode psychosis: Conclusions from a randomized, double-blind, controlled prospective study of olanzapine, risperidone, and haloperidol. J Clin Psychopharmacol 2008;28:27-31.
8. Cannon TD, Kaprio J, Lonnqvist J, Huttunen M, Koskenvuo M. The genetic epidemiology of schizophrenia in a Finnish twin cohort. A population-based modeling study. Arch Gen Psychiatry 1998;55:67-74.
9. Weiser M, Kanyas K, Malaspina D, Harvey PD, Glick I, Goetz D, *et al*. Sensitivity of ICD-10 diagnosis of psychotic disorders in the Israeli National Hospitalization Registry compared with RDC diagnoses based on SADS-L. Compr Psychiatry 2005;46:38-42.
10. Birkett P, Sigmundsson T, Sharma T, Toulopoulou T, Griffiths T, Reveley A, *et al*. Reaction time and sustained attention in schizophrenia and its genetic predisposition. Schizophr Res 2007;95:76-85.
11. Yung AR, McGorry PD. The prodromal phase of first-episode psychosis: Past and current conceptualizations. Schizophr Bull 1996;22:353-70.
12. Snitz BE, Macdonald AW, Carter CS. Cognitive deficits in unaffected first-degree relatives of schizophrenia patients: A meta-analytic review of putative endophenotypes. Schizophr Bull 2006;32:179-94.
13. Keshavan MS, Diwadkar VA, Montrose DM, Stanley JA, Pettegrew JW. Premorbid characterization in schizophrenia: The Pittsburgh high risk study. World Psychiatry 2004;3:163-8.
14. Mountain JL, Risch N. Assessing genetic contributions to phenotypic differences among 'racial' and 'ethnic' groups. Nat Genet 2004;36:S48-53.
15. Ruff RM, Light RH, Evans RW. The ruff figural fluency test: A normative study with adults. Dev Neuropsychol 1987;3:37-51.
16. World Health Organization. The ICD-10 Classification of Mental and Behavioral Disorders: Diagnostic Criteria for Research. Geneva: WHO; 1993.
17. Garg R, Trivedi JK, Dalal PK, Nischal A, Sinha PK, Varma S. Assessment of cognition in non-affected full biological siblings of patients with schizophrenia. Indian J Psychiatry 2013;55:331-7.
18. Nehra R, Grover S, Sharma S, Sharma A, Kate N. Neurocognitive Functioning in schizophrenia, their unaffected siblings and healthy controls: A comparison. Indian J Psychol Med 2016;38:50-5.
19. Bhatia T, Garg K, Pogue-Geile M, Nimgaonkar VL, Deshpande SN. Executive functions and cognitive deficits in schizophrenia: Comparisons between probands, parents and controls in India. J Postgrad Med 2009;55:3-7.
20. Solanki RK, Kumar A, Satija Y, Gupta S, Singh P. An Indian experience of neurocognitive endophenotypic markers in unaffected first-degree relatives of schizophrenia patients. Indian J Psychiatry 2016;58:20-6.
21. HaraveVS, Shivakumar V, Kalmady SV, Narayanaswamy JC, Varambally S, Venkatasubramanian G. Neurocognitive impairments in unaffected first-degree relatives of schizophrenia. Indian J Psychol Med 2017;39:250-3.
22. Rao SL, Subbakrishna DK, Gopukumar K. NIMHANS Neuropsychology Battery-2004 Manual. Bangalore: National Institute of Mental Health and Neurosciences (Deemed University); 2004.
23. Pogue-Geile MF, Harrow M. Negative and positive symptoms in schizophrenia and depression: A follow up. Schizophr Bull 1984;10:371-87.
24. Pershad D, Verma SK. Handbook of PGI Battery of Brain Dysfunction (PGI-BBD). Agra: National Psychological Corporation; 1990.
25. Keshavan MS. Cognitive impairment, especially executive dysfunction and memory loss, is a key diagnostic component of schizophrenia. J Clin Psychiatry 2009;70(Suppl 1):13-6.
26. Knowles EE, David AS, Reichenberg A. Processing speed deficits in schizophrenia: Reexamining the evidence. Am J Psychiatry 2010;167:828-35.
27. Sharma T, Antonova L. Cognitive function in schizophrenia.

Deficits, functional consequences, and future treatment. Psychiatr Clin North Am 2003;26:25-40.
28. Meier MH, Caspi A, Reichenberg A, Keefe RS, Fisher HL, Harrington H, *et al*. Neuropsychological decline in schizophrenia from the premorbid to the postonset period: Evidence from a population-representative longitudinal study. Am J Psychiatry 2014;171:91-101.
29. Heaton RK, Gladsjo JA, Palmer BW, Kuck J, Marcotte TD, Jeste DV. Stability and course of neuropsychological deficits in schizophrenia. Arch Gen Psychiatry 2001;58:24-32.
30. Rani M, Bonu S, Jha P, Nguyen SN, Jamjoum L. Tobacco use in India: Prevalence and predictors of smoking and chewing in a national cross sectional household survey. Tob Control 2003.

Original Article

Olanzapine Pamoate Use for Schizophrenia: Retrospective Records Based Study from a Tertiary Care Hospital

Sandeep Grover, Himanshu Singla, Subho Chakrabarti, Ajit Avasthi

ABSTRACT

Background: Little is known from India about the experience of using olanzapine long-acting antipsychotic injectables (LAI). In this background, this study aimed to evaluate the clinical profile of patients suffering from schizophrenia who were prescribed olanzapine LAI and to evaluate the usefulness and acceptability of olanzapine LAI among these patients. **Methods:** In this retrospective study, data of all the patients with schizophrenia receiving olanzapine pamoate, was extracted. **Results:** 40 patients (males-55%; mean [SD] age- 36.2 (12) years; mean duration of illness (SD) prior to depot-143.3 (115.9) months) were included in the study. Olanzapine LAI was invariably prescribed in patients with a past history of non-compliance. Data was available for a mean (SD) follow-up duration of 17 (10.8) months. The most frequently used dose of olanzapine LAI used was 300 mg every two weeks (55%). This was followed by 405 mg every four weeks in (32.5%). Mean Clinical Global Impression (CGI) Severity score prior to starting of olanzapine LAI was 5.8 (0.7), which reduced to 2.7 (1.1) at the time of last follow-up or the last use of olanzapine LAI, and this was a statistically significant improvement (paired t-test value = 16.41; $P < 0.001$). Only one (2.5%) patient experienced Post injection Delirium/Sedation Syndrome during the study period. Only one patient was hospitalized after starting depot olanzapine. **Conclusion:** Olanzapine LAI is mostly used in patients with a history of non-compliance. Olanzapine LAI is associated with a significant reduction in the severity of illness.

Key words: *Depot, long-acting injectables, olanzapine*

Key messages: *Olanzapine LAI is mostly used in patients with a past history of poor compliance with oral antipsychotics. The use of Olanzapine LAI is associated with a significant reduction in psychopathology.*

Schizophrenia is a severe mental illness, which usually starts in early-to-mid 20s and is associated with a high level of disability, social stigma, caregiver burden, and premature mortality.[1-6] Antipsychotics are the mainstay of the treatment of schizophrenia. However,

Access this article online	
Website: www.ijpm.info	Quick Response Code
DOI: 10.4103/IJPSYM.IJPSYM_269_19	

How to cite this article: Grover S, Singla H, Chakrabarti S, Avasthi A. Olanzapine pamoate use for schizophrenia: Retrospective records based study from a tertiary care hospital. Indian J Psychol Med 2020;42:162-7.

Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Address for correspondence: Dr. Sandeep Grover
Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Chandigarh - 160 012, India.
E-mail: drsandeepg2002@yahoo.com

Submitted: 25-Jun-2019, **Revised:** 29-Jul-2019, **Accepted:** 06-Oct-2019, **Published:** 09-Mar-2020

medication non-adherence rates are high among patients with schizophrenia, with about half of the patients discontinuing the medications at some point in treatment.[7] The largest pragmatic clinical trial in schizophrenia, the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) study reported that 74% of the study population discontinued medication over a period of 18 months.[8] Non-adherence among patients with schizophrenia is associated with serious consequences such as exacerbation of psychotic symptoms, increased aggression, poor prognosis,[9-11] relapse, rehospitalization,[12,13] suicide,[14] and increased cost of care.[13]

To overcome the issue of medication non-adherence, in the 1960s, long-acting antipsychotic injectable (LAIs) were introduced.[15] The use of LAIs in patients with schizophrenia is recommended by various treatment guidelines.[16-20] A systematic review and meta-analysis of 10 randomized controlled trials (RCTs) showed that use of LAIs is associated with a statistically significant reduction in relapse rates, with relative and absolute risk reductions of 30% and 10%, respectively (RR 0.70, CI 0.57-0.87, NNT 10, CI 6-25, $P = 0.0009$) and reduction in dropout due to inefficacy (RR 0.71, CI 0.57-0.89).[21] Data from systematic reviews and meta-analyses also strongly support the superiority of LAIs in comparison to oral antipsychotics in terms of hospitalization rates and all-cause discontinuations.[22,23] A nationwide cohort study from Finland reported that compared to those taking oral medications, patients receiving LAIs have significantly lower (one third) risk of rehospitalisation.[24]

In the last two decades, various LAIs of second-generation antipsychotics have been marketed. The first second-generation antipsychotic depot of risperidone was introduced in 2003.[25] Subsequently, many other depots of second-generation antipsychotics were introduced. Olanzapine pamoate was approved by the European Union for treatment of schizophrenia[26] and by the Food and Drug Administration of the United States for treatment of schizophrenia in 2009. Available data suggest that oral olanzapine and olanzapine LAI have comparable efficacy in both acute as well as maintenance treatment of schizophrenia,[27,28] with the side effect profile and safety profile of olanzapine LAI being comparable to those of oral olanzapine except for the higher incidence of Post injection Delirium/Sedation Syndrome (PDSS) with olanzapine LAIs.[28,29]

Olanzapine LAI was launched in India in September 2015. There is a lack of data on the use of olanzapine LAI from India. So far, only three case reports have been published about PDSS from India,[30-32] and no data is available from India about the long-term experience and outcome with olanzapine LAI. In this background, the current study aimed to evaluate the clinical profile of patients suffering from schizophrenia who were prescribed olanzapine LAI and to evaluate the usefulness and acceptability of olanzapine LAI among these patients.

METHODOLOGY

This was a retrospective study in which treatment records of all the patients diagnosed with schizophrenia (as per the ICD-10 criteria) and started on olanzapine LAI were reviewed. The study was approved by the Ethics Committee of the institute. All the patients started on olanzapine LAI from 1st January 2016 to 31st January 2019 formed the study sample.

Data were retrieved for the sociodemographic variables and clinical variables such as history of past treatment, prior use and response to oral olanzapine, age of onset of the illness, duration of untreated psychosis, prior hospitalizations, issues related to treatment adherence, and Clinical Global Impression (CGI) severity and improvement scores (at the time of starting of LAI and at the time of receiving the last dose of LAI). Data were also extracted for any PDSS or other injection-related side effects and need for hospitalization. Scores on CGI severity were retrospectively generated for the patients, based on the available data on psychopathology in the treatment records, at the time of the starting of olanzapine pamoate and at the time of the last follow-up. Usefulness of olanzapine LAI was also specifically evaluated for the subgroup of patients who fulfilled the criteria of treatment resistant schizophrenia (TRS). TRS was defined as lack of response to 2 adequate trials of antipsychotics, in the chlorpromazine equivalent doses of 400 mg/day given for more than 6 weeks.

RESULTS

Data of 40 patients who were started on olanzapine pamoate were extracted. The demographic and clinical profile of the patients is shown in Table 1.

Use of olanzapine LAI

The mean duration of treatment with olanzapine LAI for the study sample was 17 months (SD = 10.8). The most frequent dose of olanzapine LAI used was 300 mg every two weeks (N = 22;55%), and this was followed by 405 mg every four weeks in 13 (32.5%) patients [Table 2]. In terms of Severity Rating, the mean CGI score prior to starting of olanzapine LAI was 5.8 (0.7), which reduced to 2.7 (1.1) at the time of last follow-up or last use of olanzapine LAI, and this improvement was statistically significant (paired t-test

Table 1: Demographic Profile of the study sample

Variable	Mean (SD) Range/Frequency (%)
Age (in years)	36.2 (12) (19-62)
Gender: Male/Female	22 (55%)/18 (45%)
Education (in years)	13.8 (3.9) (5-23)
Religion: Hindus/Non-Hindus	34 (85%)/6 (15%)
Occupation: Unemployed/employed/House wife/Student	18 (45%)/7 (17.5%)/10 (25%)/5 (12.5%)
Income: On paid wages/Not on paid wages	7 (17.5%)/33 (82.5%)
Marital Status: Married/Single	20 (50%)/20 (50%)
Family Type: Nuclear/Non-nuclear	29 (72.5%)/11 (27.5%)
Locality: Urban/Rural	29 (72.5%)/11 (27.5%)
Age of onset (in years)	22.9 (6.5) (13-46)
Duration of untreated psychosis in months	69.5 (72.6) (5-345) Median: 54 (IQR: 13.25-106.5)
Duration of illness prior to starting of Olanzapine LAI	143.3 (115.9) (13-478) Median: 100.5 (IQR: 48.5-207.75)
Duration of Treatment prior to starting of Olanzapine LAI	78.8 (89.1) (0-346) Median: 46.5 (IQR: 26.25-123)
Onset of Illness: Acute/Insidious	0/40 (100%)
Course of illness: Episodic/Continuous course	0/40 (100%)
Subtype of Schizophrenia: Paranoid/Undifferentiated/Simple	26 (65%)/13 (32.5%)/1 (2.5%)
Comorbid Substance harmful use/dependence[1]: Yes/No	16 (40%)/24 (60%)
Comorbid physical illness[2]: Absent/Present	27 (67.5%)/13 (32.5%)
Comorbid Psychiatric Illness[3]: Absent/Present	25 (62.5%)/15 (37.5%)
Past history of surreptitious use of antipsychotics: No/Yes	22 (55%)/18 (45%)

[1]Comorbid substance dependence: Alcohol (n=1), Cannabis (n=5), Tobacco (n=13). Comorbid Harmful use of a substance: Alcohol (n=1), Cannabis (n=1), Tobacco (n=13). [2]Comorbid Physical Illness: Hypertension (n=6), Hypothyroidism (n=1), Others (n=10). [3]Comorbid Psychiatric Illness: Depression (n=12), Obsessive Compulsive Disorder (n=2), Paranoid Personality Disorder (n=1). SD – Standard deviation, IQR – Interquartile rage, LAI – Long Acting Injectable

value = 16.41; $P < 0.001$). At the time of starting olanzapine LAI, almost all the patients were rated as severely/extremely ill, and at last assessment, most of the patients were rated as either mildly or moderately ill. There were significant reductions in the CGI severity score in patients with TRS (paired t-test value = 8.51; $P < 0.001$) and those without TRS (paired t-test value = 14.29; $P < 0.001$).

Mean number of hospitalizations per year of illness prior to the starting of olanzapine LAI was 0.076 (SD = 0.11), and after starting olanzapine LAI, at the time of assessment, it came down to 0.075 (0.11), with only one patient getting hospitalized during the period the study sample received olanzapine LAI [Table 3]. Only 1 (2.5%) patient experienced PDSS during the study period, but this did not lead to the stoppage of olanzapine LAI. There was no report of local injection site infection. At the last follow-up, it was found that in 9 (22.5%) patients, olanzapine LAI had been discontinued due to various reasons like patient reluctance (n = 5; 12.5%), lack of response (n = 3; 7.5%) and affordability issues (n = 1; 2.5%).

DISCUSSION

The main objective of the present study was to evaluate the clinical profile of patients with schizophrenia who were prescribed olanzapine LAI and to evaluate the usefulness and acceptability of olanzapine LAI among these patients. The present study included data of 40 patients who were started on olanzapine LAI. The present study suggests that clinicians preferred to use olanzapine depot in patients with a past history of good response to olanzapine, but discontinued the same due to one or other reason. Additionally, the present study suggests that in about one-third of the patients, clinicians continued using oral antipsychotic medications along with olanzapine LAI. Furthermore, the current study also suggests that slightly more than one-third of the patients undergoing treatment with olanzapine LAI had TRS. The most common reason for the use of olanzapine LAI was found to be non-compliance with medications.

To summarize, it can be said that clinicians use olanzapine LAI in a subgroup of patients who have a history of non-compliance, are treatment-resistant, and are difficult to treat. In other words, it can be said that olanzapine LAI is not used as the first-line treatment for schizophrenia. These findings possibly suggest that there are barriers at the level of clinicians in prescribing olanzapine LAI to patients with first-episode schizophrenia or psychosis. A similar pattern has been pointed out in the existing literature regarding the use of long-acting depot antipsychotics in general.[33]

Table 2: Treatment profile of use of Olanzapine Pamoate

Variable	Mean (SD) Range/Frequency (%)
Setting in which olanzapine LAI was started: Inpatient/Outpatient	19 (47.5%)/21 (52.5%)
Trial of oral Olanzapine prior to olanzapine LAI: No/Yes	7 (17.5%)/33 (82.5%)
Number of previous antipsychotic trials	1.4 (1) (0-3)
Duration of treatment with oral olanzapine in months prior to depot	9.5 (15.7) (0-66)
Duration of treatment with olanzapine Pamoate (in months)	17 (10.8) (3-37)
Response to prior Oral Olanzapine: good	33 (82.5%)
Number of lifetime relapses due to non-compliance prior to starting of olanzapine LAI	2 (1.1) (0-5)
The dose of Olanzapine LAI used during the follow-up	
210/2 Weeks	1
405/4 Weeks	13
300/2 Weeks	22
300/4 Weeks	4
Olanzapine oral equivalent dose (mg)	17.3 (3.4) (10-20)
Oral Antipsychotic co-prescription: No/Yes	28 (70%)/12 (30%)
Oral Antipsychotic co-prescription along with olanzapine LAI: Olanzapine/Haloperidol/Clozapine	10 (25%)/1 (2.5%)/1 (2.5%)
History of noncompliance1: No/Yes	1 (2.5%)/39 (97.5%)
Past History of side effects with antipsychotics: No/Yes	29 (72.5%)/11 (27.5%)
Features of difficult to treat schizophrenia	
Inadequate response to conventional antipsychotics	12 (30%)
Problems of adverse drug effects	11 (27.5%)
Problems of compliance	39 (97.5%)
Problems of comorbid medical conditions	13 (32.5%)
Problems of comorbid psychiatric conditions	15 (37.5%)
Treatment failure-relapse on adequate drug dosage	20 (50%)
Does the patient fulfill the criteria of TRS	15 (37.5%)
Reason for prescribing Olanzapine Pamoate: Noncompliance/Patient preference/History of good response in the past	38 (95%)/1 (2.5%)/1 (2.5%)
1-Non-compliance was operationalized as any episode of medication discontinuation or reduction in the doses to the less than the recommended doses, leading to relapse of symptoms	

LAI – Long acting injectable; TRS – treatment resistant schizophrenia

Table 3: Outcome of olanzapine pamoate

Variable	Before Olanzapine LAI Mean (SD)/Frequency (%)	After Olanzapine LAI Mean (SD)/Frequency (%)	Comparison Statistics
Number of lifetime hospitalizations per year of illness	0.076 (0.11) (0-0.46) Median: 0.039 (IQR: 0-.11)	0.075 (0.11) (0-0.40) Median: 0.043 (IQR: 0-0.10)	Wilcoxon signed-rank test: - 3.39 (P=0.001)
Clinical Global Impression severity score	5.8 (0.7) (4-7)	2.7 (1.1) (1-6)	T=16.41 (P<0.001)
Clinical Global Impression severity score Borderline mentally ill			
Mildly mentally ill	-	2 (5%)	
Moderately mentally ill	-	19 (47.5%)	
Markedly mentally ill	1 (2.5%)	12 (30.0%)	
Severely mentally ill	12 (30%)	3 (7.5%)	
Extremely mentally ill	23 (57.5%)	3 (7.5%)	
	4 (10%)	1 (2.5%)	
PDSS	-	1 (2.5%)	
Weight gain while on olanzapine LAI	-	5 (12.5%)	
Discontinuation of olanzapine LAI: No/Yes		31 (77.5%)/9 (22.5%)	
Reason for discontinuation of LAI			
Affordability		1 (2.5%)	
Patient reluctance		5 (12.5%)	
Loss of response		3 (7.5%)	

SD – Standard deviation, IQR – Interquartile rage; PDSS – Post injection delirium/sedation syndrome; LAI – Long Acting Injectable

Accordingly, there is a need to utilize various approaches to minimize these barriers to the use of LAIs.[34]

In terms of usefulness, the present study suggests that there is a significant reduction in symptom severity with the use of olanzapine LAI in patients with schizophrenia. Olanzapine LAI is associated with a significant reduction in CGI severity in patients with and without TRS. This finding supports the available efficacy data of olanzapine LAI in patients with schizophrenia[27,28] and occasional case reports which have reported a beneficial effect of olanzapine LAI in patients with TRS.[35,36]

Present study results also show that the majority of the patients continued to receive olanzapine LAI with a mean duration of 17 months. Only about one-fourth of the patients discontinued olanzapine LAI, of whom half were reluctant to receive the injection. Accordingly, it can be said that olanzapine depot is well accepted among patients with schizophrenia. Taken together, these findings re-emphasize that olanzapine LAI must be considered as a treatment option in patients with a history of treatment non-adherence.

In the present study, the incidence of PDSS was found to be low. Existing literature suggests that the incidence of PDSS with olanzapine LAI is 0.07-0.08% per injection and 1.4% per patient.[37-39] The incidence of 2.5% per patient in the present study is higher than that reported in the existing literature. However, this could be due to the small sample size in the present study.

At the same time, the present study has certain limitations. These include retrospective study design, small sample size, and lack of comparison group. The study followed up patients to a mean period of 37 months on olanzapine LAI, which can be considered as a relatively short period. The usefulness was assessed by using CGI only, and other psychosocial outcomes were not evaluated. Psychopathology was not rated on a standardized scale. The CGI data was retrospectively generated. The side effects of olanzapine LAI were not evaluated by using any standard rating scale. Future studies must attempt to overcome these limitations. Attempts must be made to carry out prospective studies in which efficacy/effectiveness is evaluated by using more standard scales to evaluate the psychopathology and side effects. Additionally, other psychosocial outcomes, such as disability and quality of life, must also be evaluated. Olanzapine LAI is relatively costlier when compared to the LAIs of typical antipsychotics. We did not evaluate the cost-effectiveness of olanzapine LAIs in the present study.

To conclude, the present study suggests that olanzapine depot is useful in the management of schizophrenia in patients who have a history of non-compliance, and it is associated with a low incidence of PDSS. Olanzapine depot is equally useful in patients with and without TRS.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Jablensky A, Sartorius N, Ernberg G, Anker M, Korten A, Cooper JE, *et al*. Schizophrenia: Manifestations, incidence and course in different cultures: A World Health Organization ten-country study. Psychological Medicine Monograph Supplement 20, Cambridge, Cambridge University Press; 1992.
2. Janca A, Kastrup M, Katschnig H, Lopez Iborjr JJ, Mezzich JE, Sartorius N. The world health organization short disability assessment schedule (WHO DAS-S): A tool for the assessment of difficulties in selected areas of functioning of patients with mental disorders. Soc Psychiatry Psychiatr Epidemiol 1996;31:349-54.
3. Leff J, Sartorius N, Jablensky A, Korten A, Ernberg G. The international pilot study of schizophrenia: Five-year follow-up findings. Psychol Med 1992;22:131-45.
4. Leete E. Overcoming the stigma of mental illness. In:, Shetler H, Straw P, editors. A New Day: Voices from Across the Land. Arlington, National Alliance for the Mentally Ill; 1982.
5. Westermeyer J. Economic losses associated with chronic mental disorder in a developing country. Br J Psychiatry 1984;144:475-81.
6. Davies LL, Drummond MF. Economics and schizophrenia: The real cost. Br J Psychiatry 1994;165(Suppl 25):18-21.
7. Lacro JP, Dunn LB, Dolder CR, Leckband SG, Jeste DV. Prevalence of and risk factors for medication nonadherence in patients with schizophrenia: A comprehensive review of recent literature. J Clin Psychiatry 2002;63:892-909.
8. Lieberman JA, Stroup TS, McEvoy JP, Swartz MS, Rosenheck RA, Perkins DO, *et al*. Effectiveness of antipsychotic drugs in patients with chronic schizophrenia. NEJM 2005;353:1209-23.
9. Wyatt RJ. Neuroleptics and the natural course of schizophrenia. Schizophr Bull 1991;17:325-51.
10. Lieberman JA, Sheitman B, Chakos M, Robinson D, Schooler N, Keith S. The development of treatment resistance in patients with schizophrenia: A clinical and pathophysiologic perspective. J Clin Psychopharmacol 1998;18(2 Suppl 1):20S-4S.
11. Tacchi MJ, Scott J. Improving Adherence in Schizophrenia and Bipolar Disorders. Chichester, UK: John Wiley & Sons; 2005.
12. Olfson M, Mechanic D, Hansell S, Boyer CA, Walkup J, Weiden PJ. Predicting medication noncompliance after hospital discharge among patients with schizophrenia. Psychiatr Serv 2000;51:216-22.
13. Sun SX, Liu GG, Christensen DB, Fu AZ. Review and analysis of hospitalization costs associated with antipsychotic nonadherence in the treatment of schizophrenia in the United States. Curr Med Res Opin 2007;23:2305-12.
14. Hawton K, Sutton L, Haw C, Sinclair J, Deeks JJ. Schizophrenia and suicide: Systematic review of risk factors. Br J Psychiatry 2005;187:9-20.
15. Fleischhacker WW, Miyamoto S. Pharmacological treatment of schizophrenia: Current issues and future perspectives. Clin Neuropsychopharmacol Ther 2016;7:1-8.
16. Lehman, AF, Lieberman, JA, Dixon, LB, McGlashan, TH, Miller, AL, Perkins, DO, *et al*. Practice guideline for the treatment of patients with schizophrenia, second edition. Am J Psychiatry 2004;161(2 Suppl):1-56.
17. American Psychiatric Association. Practice guideline for the treatment of patients with schizophrenia, second edition. Am J Psychiatry 2004;161(Suppl):1-56.
18. Miller, AL, Hall, CS, Buchanan, RW, Buckley, PF, Chiles, JA,

Conley, RR, *et al*. The Texas medication algorithm project antipsychotic algorithm for schizophrenia: 2003 update. J Clin Psychiatry 2004;65:500-8.
19. Kane JM, Leucht S, Carpenter D, Docherty JP. Expert consensus guideline series.Optimizing pharmacologic treatment of psychotic disorders. Introduction: Methods, commentary, and summary. J Clin Psychiatry 2003;64(Suppl 12):5-19.
20. Buchanan RW, Kreyenbuhl J, Kelly DL, Noel JM, Boggs DL, Fischer BA, *et al*. The 2009 schizophrenia PORT psychopharmacological treatment recommendations and summary statements. Schizophr Bull 2010;36:71-93.
21. Leucht C, Heres S, Kane JM, Kissling W, Davis JM, Leucht S. Oral versus depot antipsychotic drugs for schizophrenia – A critical systematic review and meta-analysis of randomised long-term trials. Schizophr Res 2011;127:83-92.
22. Kishimoto T, Nitta M, Borenstein M, Jane JM, Correll CU. Long acting injectable vs. oral antipsychotics in schizophrenia: A systematic review and meta-analysis of mirror image studies. Neuropsychopharmacology 2012;38(Suppl.):S417-8.
23. Kishimoto T, Hagi K, Nitta M, Leucht S, Olfson M, Kane JM, *et al.* Effectiveness of long-acting injectable vs oral antipsychotics in patients with schizophrenia: A meta-analysis of prospective and retrospective cohort studies. Schizophr Bull 2017;44:603-19.
24. Tiihonen J, Haukka J, Taylor M, Haddad PM, Patel MX, Korhonen P. A nationwide cohort study of oral and depot antipsychotics after first hospitalization for schizophrenia. Am J Psychiatry 2011;168:603-9.
25. Fleischhacker WW. Second-generation antipsychotic long-acting injections: Systematic review. Br J Psychiatry Suppl 2009;52:S29-36.
26. Rauch AS, Fleischhacker WW. Long-acting injectable formulations of new-generation antipsychotics: A review from a clinical perspective. CNS Drugs 2013;27:637-52.
27. Lauriello J, Lambert T, Andersen S, Lin D, Taylor CC, McDonnell D. An 8-week, double-blind, randomized, placebo-controlled study of olanzapine long-acting injection in acutely ill patients with schizophrenia. J Clin Psychiatry 2008;69:790-9.
28. Kane JM, Detke HC, Naber D, Sethuraman G, Lin DY, Bergstrom RF, *et al*. Olanzapine long-acting injection: A 24-week, randomized, double-blind trial of maintenance treatment in patients with schizophrenia. Am J Psychiatry 2010;167:181-9.
29. Anand E, Berggren L, Deix C, Tóth Á, McDonnell DP. A 6-year open-label study of the efficacy and safety of olanzapine long-acting injection in patients with schizophrenia: A post hoc analysis based on the European label recommendation. Neuropsychiatr Dis Treat 2015;11:1349-57.
30. Sarangula SM, Mythri SV, Sanjay Y, Reddy MS. Postinjection delirium/sedation syndrome with olanzapine depot injection. Indian J Psychol Med 2016;38:366-9.
31. Upadhyay A, Bhandari SS, Sharma V, Das S. Postinjection delirium/sedation syndrome with long acting olanzapine pamoate in a middle-aged female. Indian J Psychiatry 2017;59:517-9.
32. Venkatesan V, Khanra S, Mandal K, Deepak MB. Postinjection delirium/sedation syndrome after 31st long-acting olanzapine depot injection. Clin Neuropharmacol 2019;42:64-5.
33. Kirschner M, Theodoridou A, Fusar-Poli P, Kaiser S, Jäger M. Patients' and clinicians' attitude towards long-acting depot antipsychotics in subjects with a first episode of psychosis. Ther Adv Psychopharmacol 2013;3:89-99.
34. Parellada E, Bioque M. Barriers to the use of long-acting injectable antipsychotics in the management of schizophrenia. CNS Drugs 2016;30:689-701.
35. Baruch N, Das M, Sharda A, Basu A, Bajorek T, Ross C, *et al*. An evaluation of the use of olanzapine pamoate depot injection in seriously violent men with schizophrenia in a UK high-security hospital. Ther Adv Psychopharmacol 2014;4:186-92.
36. Kasinathan J, Sharp G, Barker A. Evaluation of olanzapine pamoate depot in seriously violent males with schizophrenia in the community. Ther Adv Psychopharmacol 2016;6:301-7.
37. Detke HC, McDonnell DP, Brunner E, Zhao F, Sorsaburu S, Stefaniak VJ, *et al*. Post-injection delirium/sedation syndrome in patients with schizophrenia treated with olanzapine long-acting injection, I: Analysis of cases. BMC Psychiatry 2010;10:43.
38. McDonnell DP, Detke HC, Bergstrom RF, Kothare P, Johnson J, Stickelmeyer M, *et al*. Post-injection delirium/sedation syndrome in patients with schizophrenia treated with olanzapine long-acting injection, II: Investigations of mechanism. BMC Psychiatry 2010;10:45.
39. McDonnell DP, Landry J, Detke HC. Long-term safety and efficacy of olanzapine long-acting injection in patients with schizophrenia or schizoaffective disorder: A 6-year, multinational, single-arm, open-label study. Int Clin Psychopharmacol 2014;29:322-31.

Original Article

Suffering in Silence: Stories of Indian Women with Chronic Mental Illness and Sexual Coercion

Akanksha Rani, Fahim Ul Hassan

ABSTRACT

Background: Patriarchy exposes women to various forms of discrimination and oppression. Women are more often blamed for mental illness, which can result in social isolation and stigma. **Method:** Case Study. **Results:** Psycho-social intervention aided in empowering women by giving them voices to speak as well as by utilizing their strengths and available community resources to develop a sense of self-efficacy, coping strategies, and support system. **Conclusion:** Women with chronic mental illness have unique needs and challenges. Mentally ill women face sexual coercion in childhood or adulthood. The factors related to help-seeking in the context of abuse were family reactions, social support, and stigma. Our findings highlight the need to conduct risk assessments and provide community-based and coordinated services during follow-up visits.

Key words: *Abuse, chronic mental illness, psychosocial interventions, survivors*
Key messages: *Trauma-focused intervention should be culturally appropriate and should focus on reducing emotional distress, restoring self-adaptation, and enhancing social support.*

Women face discrimination due to their limited vocabulary, which makes them hold less power and status within the family.[1] They end up paying a terrible price to preserve their identity within the culture, which often justifies violence against women.[2] Davar[3] states that patriarchal institutions such as family, community norms, religion and state institutions influences women's identity. Mental illness is seen as a way of deviating from socially acceptable ways of behavior, so Davar considered it a submissive way of reacting to patriarchy. Women with severe and chronic mental illness are often subjected to sexual and physical abuse, control, coercion, and social neglect, which leads to relapse or exacerbation of symptoms, medical co-morbidities, and poor prognosis.[4] Human Rights Watch published a report in 2018 on women and girls with disabilities who are victims of sexual coercion. The report states that women with disability are reluctant to seek help for abuse because of difficulty in communication and a lack of awareness about their legal rights. Besides, the stigma associated with their

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_296_19	

How to cite this article: Rani A, Hassan FU. Suffering in silence: Stories of Indian women with chronic mental illness and sexual coercion. Indian J Psychol Med 2020;42:168-74.

Department of Psychiatric Social Work, National Institute of Mental Health and Neurosciences, Bengaluru, Karnataka, India

Address for correspondence: Ms. Akanksha Rani
Department of Psychiatric Social Work, Govindswamy Building (2nd Floor), Hosur Road, Near Bangalore Milk Dairy, Bengaluru - 560 029, Karnataka, India. E-mail: akanksha.rani89@gmail.com

Submitted: 11-Jul-2019, **Revised:** 18-Jul-2019, **Accepted:** 30-Sep-2019, **Published:** 09-Mar-2020

sexuality and disability makes it difficult for them to access justice.[5] One study had also reported that women with mental illness become victims of domestic violence as they are not able to fulfill their roles and responsibilities in accordance with the expectations of family. They remain silent about abuse because of cultural acceptance of violence and because maintaining a secrecy helps them to cope up with the abuse.[6] Against this background, we aim to review the existing interventions and describe how we provided appropriate interventions to three women with chronic mental illness and various forms of sexual coercion.

Interventions for survivors of sexual coercion and mental illness

During the 1960s and 1970s, the goals of therapy with women survivors was to help them fulfill their domestic roles by being married happily, to have vaginal orgasms and become a mother. Women who turned away from these roles and aspirations were leveled as suffering from 'masculine protest'.[7] The concept of empowerment emphasizes building therapeutic alliance which focuses on developing a collaborative relationship with the client by viewing the client as an expert on herself, and providing a safe, open and non-judgmental atmosphere where the survivors can feel at ease. To decrease self-blame, normalization of their experience and enhancement of their support were done. The focus was also on 'relational empowerment,' which involved training in assertiveness, limit setting, and direct expression of feelings. Ultimately, all these led to engagement with feminist activism.[7] Interventions in the 1990s and 2000s focused on treating post-traumatic stress disorder through cognitive behavior therapy (CBT) and crisis intervention.[8,9] Young developed culturally appropriate programs requiring intervention to be carried out in a place that is familiar and comfortable to the participants and includes artwork or other culturally relevant items.[10] Most of the studies emphasize the importance of having a therapist who is bilingual/bicultural as the survivors feel at ease while narrating their experiences in the language of their origin.[11]

Interventions with families

Couple therapy aims at addressing marital discord by concentrating on men and women as equal participants in the creation of problems in the relationship. However, it has been criticized by feminist theorists raising concerns regarding woman's safety as women will not be able to discuss the abuse in the presence of violent partner and if she discloses in front of her partner there is risk of increased violence. The abusive partner may also blame the victim and minimize the abuse.[12] The therapist can also develop countertransference reactions in the form of feeling angry, frustrated and hopeless on seeing therapy being not that effective in solving the inter-personal problems between the couple.

The therapist may unintentionally and unconsciously dismiss, negate or minimize survivors' experience of abuse.[13] Although most of the studies on couple therapy did directly indicate a reduction in physical violence, some evidence suggests an increase in the partners' alcohol abuse and psychological aggression.[14] Turell and Herrmann state that the family should provide emotional support to the survivors.[15] The therapist needs to address family's concerns, assist the family to work more cohesively and also enhance communication, which helps in reducing conflict within families. Those authors also provide a list of alternatives to help the family enhance their support. Addlaka,[16] in her book titled *Deconstructing Mental Illness*, discusses how building an alliance with the family plays a symbolic and instrumental role in terms of continuity of treatment.

Need for interventions targeting women with chronic mental illness

Mental illness makes women go voiceless and is often cited as reason for getting battered.[3] Psychosocial interventions help in empowering women by giving them voices to speak as well as by utilizing their strength to develop a sense of self-efficacy and coping strategies to deal with the traumatic experience. We attempted through this study to provide insight into the lives of women suffering from mental illness who had experienced violence. We also discuss the role of appropriate psychosocial interventions delivered by mental health professionals.

SETTING, MATERIAL AND METHODS

The current study used qualitative case study method[17-19] to conduct an in-depth analysis of the lives of the participants as this approach, like other methods of qualitative research, helps to discover and understand the participants' perspectives in their natural setting.[20] This study was conducted as a part of clinical and counseling services provided to women with mental illness referred by a psychiatrist for psychosocial interventions in the outpatient department at a government-run tertiary psychiatric care center. Participants recruited did not have active psychiatric symptoms such as delusions or hallucinations. The diagnosis was made as per ICD-10 criteria (International Classification of Disease, Tenth Revision) and symptoms were measured using a validated diagnostic instrument or clinical records. As participants were needed to have a diagnosis long enough to be considered as chronic and had to be able to describe the impact of the illness on their lives, a minimum

illness duration of one year, and those who have been hospitalized more than twice, were considered as having a chronic mental illness. Ethical approval for the study and publication of the case reports was taken from the Institutional Ethics Committee. In order to protect the privacy of the women, their names or other identifying information are not provided.

Case series with interventions

Case 1

Ms. L, a 40-year-old woman from an economically deprived family, presented with an illness of more than 25 years, characterized by delusion of reference, third-person auditory hallucinations, withdrawn behavior, decreased social interactions, amotivation, poor self-care, and impaired occupational functioning. Response to medication has not been good because of the chronic nature of her illness and non-compliance to medication. She was diagnosed with paranoid schizophrenia. A psychosocial assessment revealed that since adolescence she had prodromal symptoms of schizophrenia like unusual behavior and ideas, deterioration in personal functioning, social withdrawal, apathy, and disturbed communication and affect. The family had sought magico- religious treatment under the influence of relatives, which led to worsening of her symptoms and running away from home. A few years after her disappearance, her father passed away due to cardiac arrest and the mother expired due to throat cancer. When her family lost all hopes of seeing Ms. L again, a relative found her wandering on the streets in Mumbai. When Ms. L was reunited with her siblings, they were reluctant to accept her as they were living in extreme poverty. She was pushed around from one sibling's home to another and finally ended up staying with her uncle's family. Slowly, her relationship with her uncle's family was strained by her dependence on them.

Ms. L stated, "I had a bad childhood. My father used to verbally and physically abuse my mother, and on many occasions, under the influence of alcohol, had sexually abused me. I was scared to tell this to my mother, so I quietly left home. I felt safer on the street than at home. I stayed there for eight years and used to roam around happily. Morning, I would beg on the street, and night, sleep under the bridge. There was a dark side of my life on the street, but it was better than living at home and getting abused by my own father… I have a mental problem, and all my life I had it. I have grown along with it, and I'll die along with it. My aunt calls me mad and ridicules me for being mentally unstable. If I take medicines, I feel more stigmatized rather than feeling good."

Psychosocial intervention with Ms. L began with building a therapeutic relationship by having a genuine concern for her problems, listening actively, showing empathy, encouraging her to ventilate her feelings and concerns, validating them, and providing reassurance. We encouraged Ms. L to pursue a hobby, socialize with others/make new friends, and join a recreational club and provided her with a list of places in her community like women's organization/non-government organization and District Mental Health Center to which she and family can turn for support. With the family, we discussed the need to increase their involvement with Ms. L and made them understand what she had gone through and how they can provide support.

Case 2

Mrs. N, a 48-year-old woman, has been living in a rented house in a village of Mewar district of Rajasthan for 20 years. She lived alone and worked as an agricultural laborer. She was barely 18 when her husband died, leaving behind two toddlers who now work as mechanics and stay in Bangalore. She was diagnosed with Bipolar Affective Disorder 28 years ago. She had 5 episodes of mania and 8 episodes of depression. She now presented with a depressive episode, precipitated by sexual abuse and its subsequent events. The psychosocial assessment revealed that six months back, she was raped by her employer's son. She was so much traumatized with the incident that she didn't come out of the house for a few days. With the relatives' and neighbors' help, she went to the police to lodge a complaint. The police were reluctant, began an investigation without filing a First Information Report (FIR) and did not arrest the accused. Neither did she receive any compensation from the government. The family lost all hopes of getting justice as the upper caste landlords threatened them with dire consequences if Mrs. N or her family proceeded further with the case. Her sons brought her to Bangalore, thinking a change of place would help her to recover fast.

Mrs. N recalled," No matter how much I try, I can't forget that day. It keeps coming to my mind. I was like a mother to him. Ignoring my plea, he raped me. He told he is going to use condoms, so that there would be no evidence of rape. Being poor and being Dalit is like a curse. The constant harassment by the upper caste men. The abusive and derogatory words is part and parcel of our life. I don't understand the law but tell me what its use is when the upper caste men are beyond its reach. I am a poor, helpless Dalit women who lost everything – pride, dignity, and reason to live."

Psychosocial interventions began with helping Mrs. N to deal with the feelings of guilt and shame by acknowledging and appreciating her effort for speaking about the abuse. Subsequently, the intervention also focused on restoring her confidence and self-esteem

by encouraging her to see larger meaning in her suffering, which has helped her to build resilience. Her confidence was restored by pointing out all the courage, strengths, and positive ways of coping that she has shown and which defines her today. We encouraged Mrs. N to strengthen her social support by identifying people with whom she can share her feelings and concerns, which will help to decrease her emotional distress.

We also discussed relaxation techniques like deep breathing, yoga, prayers, and meditation to reduce her distress. We helped her to discover her creative self by expressing her anger and hurtful feelings in a healthy way. The sons were provided with information and support to address their distress and concerns about their mother and her illness. We linked Mrs. N to a legal aid clinic to get an orientation about the legal provisions available and about how she can proceed further with her case as she and her sons wanted to seek justice by pursuing the case further.

Case 3

Mrs. R, a 30-year-old woman, hailed from middle socioeconomic status. She was pursuing her undergraduate degree until the second year when she got married and dropped out of college. After being married for 5 years, she got separated from her husband due to physical, sexual, and psychological abuse. Since then, she has been staying with her widowed mother and elder brother. She presented with an illness of 10 years characterized by delusions of persecution and reference and auditory hallucinations (voices asking her to kill family members). Secondary to the abuse, she had developed features of depression such as low mood, anhedonia, suicidal ideation, decreased sleep, and easy fatigability. She was diagnosed with paranoid schizophrenia.

The psychosocial assessment showed that her family got her married without disclosing her illness. Mrs. R was not able to continue her medication after marriage, fearing husband or his family would come to know about her mental illness, which resulted in a relapse of symptoms. Slowly the frequency of relapses increased as there was constant criticism and verbal and physical abuse by the husband. The husband and his family socially isolated her by not allowing her to visit relatives or friends as they feared that others would come to know about her illness. One day, after being severely beaten up by her husband, she left his house and was found by the police wandering on the street in a disinhibited state. She was sent to State Home for Women, from where she was brought to a tertiary hospital for treatment and care.

Mrs. R said, "I was living with a fear of being killed by him someday, which was induced, over time, by his abuse. He raped me continuously over three years. At that time, I didn't think it was rape. I was married and loved him, but my consent was never important for him. That made me feel angry and sad. He would beat me severely if I didn't listen to him and would say, if I cannot take it anymore, I can get out of his house. When I called him now from the hospital, he said I was as good as dead to him. He was glad that I went away; otherwise, he would have beaten me to death. I really feel relieved now as I can tell my family that he doesn't want me anymore, and I should not be forced to go back to him. Now I have a choice to live freely."

Interventions with Mrs. R focused on understanding her subjective experience of being abused, choices she had and her needs. She was helped to reconsider and evaluate the meaning of the trauma with a flexible mind. She was reintegrated with her family. Intervention with the family focused on addressing their immediate concerns and encouraged them to provide emotional support to her. We educated and informed the family to recognize and accept rather than dismiss suicidal thoughts, feelings, and reactions of Mrs. R and keeping all harmful and sharp objects away, which would help to minimize self-harm. Her husband had filed for divorce on the ground of unsoundness of mind. So we linked her to legal aid center for availing free legal aid services under Legal Service Authority Act, 1987 for fighting for justice in the court.

DISCUSSION

Most of the earlier studies have discussed how individuals exposed to adverse childhood experiences such as conflicts between parents, substance abuse, financial difficulties, and impoverished social conditions are more vulnerable to the development of psychiatric illness in adulthood.[21,22] In the case of Ms. L (Case 1), her childhood was quite traumatic. Her father had alcoholism, which resulted in severe conflict between parents, and she was sexually abused by him several times under the influence of alcohol. Fergusson *et al*.[23] suggested that women with a history of child sexual abuse are more predisposed to emotional and anxiety disorders than non-abused women. In the majority of the cases, the perpetrators are family members, like parents or siblings, and victims are legally, financially and emotionally dependent on the perpetrators, which increases the feelings of vulnerability, betrayal, loss of power and control, and hopelessness. If the abuse persists in adulthood, it can precipitate the onset of mental illness in women with poor stress tolerance or trigger relapses in women already diagnosed with mental illness.[24]

Omvedt had called Dalit women as "Dalit among Dalit" as they are at the bottom of the hierarchal structure of the social system, oppressed and marginalized.[25] They face gender- and caste-based discrimination and violence, which is the result of their social, political, and economic status in the society.[26] Mrs. N (Case 2) was reluctant to report the incident because of the fear of being disbelieved or blamed. She decided to remain silent. In India, though the conviction rate for rapes against women is around 25%, it is only 2% for women of caste-affected communities.[27] A study reported that 60% of 146 women with severe mental illness had not disclosed their experience of sexual coercion to anyone and that they had not sought help because of fear of being disbelieved.[4]

Marriage is considered a significant milestone in life, is so much glorified and sanctified, and remains a socially approved way of treating mental illness.[28] Mrs. R's (Case 3) family got her married without disclosing about her illness, fearing rejection of the proposal she stopped taking medicines. As a result, relapse occurred, and frequency of relapses increased due to domestic violence and social isolation. Most of the time, women with mental illness become victims of domestic violence as they are not able to fulfill their roles and responsibilities in accordance with the expectation of the husband's family.[16] Women do not disclose about abuse and seek help, due to deep-rooted patriarchal values that emphasize male dominance over women and because violence is used as a culturally accepted way of disciplining the women if they do not adhere to the patriarchal norms and values. Women maintain secrecy, as they feel responsible for the violence and are afraid of retaliation by the husband, of abandonment, of the children being taken away, or of being not supported financially. All these deter them from seeking help. There are social consequences which act as a barrier for women to seek help, like fear of being blamed by others, of bringing shame to the family, and of social isolation.[4,6] Secondary to the abuse, Mrs. R has developed the features of depression, with suicidal ideation. A study done to assess the consequences of abuse among women with mental illness had found that long-term consequences of physical and sexual abuse can manifest in the form of severe depression, post-traumatic stress disorder, and substance abuse.[29] Simpson[30] reported that women face subtle social pressure to remain with their partner. Family members may encourage the belief that women stay no matter what. This could also be due to financial dependence and lack of community resources to assist women in this transition, which was true in the case of Mrs. R, where her mother wanted her to reconcile with her husband.

The way forward

Trauma-based interventions should focus on the specific needs of women with chronic mental illness, and their need could differ depending upon the frequency and severity of violence and its consequences in their day-to-day life.[13]

At the individual level:

- Dealing with the feeling of shame and guilt and making the women understand that in no situation, violence in any form should be tolerated;
- Assessing the risk of suicide or self-harm;
- Preparing them to minimize the risk for further violence by discussing safety measures;
- Helping them learn to handle crisis situations (e.g., whom they can contact in case of emergency, where they can go for shelter, what they can do if they are psychologically distressed);
- Enhancing coping skills and discussing support system;
- Creating awareness about their rights.

At the family level:

- Perpetrators are known to be manipulative. The therapist should be careful not to believe what is being said or the promises being made about stopping the violence;
- The therapist needs to convince the client and the family to come for a further session as problems cannot be sorted out in just one session. If they are not willing to come, then referrals can be made to community-based organizations;
- Family counseling will be based on their needs and the problem(s) identified (e.g., relationship issues; difficulty in illness management because of poor understanding of the illness which can lead to verbal, physical, or sexual abuse).

At the community level:

- There is a need for community based coordinated response teams which can be located in the community; comprised of police, medical staff, hospital counselors, and various non-profit organizations or agencies; for providing psychological counseling, medical treatment, legal services, and vocational training to the survivors;'[31]
- Referrals can be made to the community-based organizations for different types of services like individual counseling for emotional support and family counseling for relationship problems. A list can be given of organizations which can psychological, social or legal support they require;
- Law enforcement agencies like police or judiciary need to be sensitized. Amendment should be made in the existing laws related to marriage, divorce, rape, and domestic violence. Amendments should

focus on making any form of sexual coercion against women with mental illness a cognizable offence with enhanced punishment.[32]

Challenges while working with the survivors of the sexual coercion

One of the barriers for the survivors could be mental health professionals who are more interested in the victim's role in the abuse, their blaming interpretations or asking the victim to move on which can increase psychological distress. One of the difficulties the therapists face is in being more empathic towards client's experience. Empathy can be developed in the therapist by being more patient and sensitive and by avoiding asking inquisitive questions which may lead to re-victimization. Therapists should also provide the women with a private and safe space for disclosure, which can begin the process of healing. So, mental health professionals should acknowledge their personal belief system and obtain adequate training that would provide them the required knowledge and skills to work more effectively with the survivors.

Professionals can also struggle with maintaining boundaries and countertransference, which often become difficult to manage. It is important to talk about therapist's own emotions related to the client's experience so that the therapists become aware of their own biases, values and principles, and it is ensured that they do not interfere with the counseling process. Regular debriefing sessions with another peer or senior supervisor for guidance and support would also help the therapist to maintain professional objectivity.

The issue of informed consent becomes quite complicated when it comes to women diagnosed with chronic mental illness subjected to domestic violence. In such cases, it is important that the therapist explores the willingness of both the client and the family members in seeking therapy, and their decisions need to be respected and honored. One of the ethical issues is maintaining confidentiality, especially when the women's safety is at stake. In such cases, the client's consent needs to be taken and the therapist should help her to see the pros and cons of disclosure and to take an informed decision.

Strengths and limitations of the study

It was a qualitative case series which emphasized the subjective experience of women with chronic mental illness with abuse leading to psychosocial disability. It also described the interventions provided to survivors and family members, focusing on their strengths and competencies and utilizing available resources which fasten the process of the clients' recovery, growth, and healing. The limitation of this study is that a clinic-based intervention was provided to a small sample in a limited time period.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Pandey GK, Dutt D, Banerjee B. Partner and relationship factors in domestic violence: Perspectives of women from a slum in Calcutta, India. J Interpers Violence 2009;24:1175-91.
2. Brownridge DA. Partner violence against women with disabilities: Prevalence, risk, and explanations. Violence Against Women 2006;12:805-22.
3. Davar BV. From mental illness to disability: Choices for women users/survivors of psychiatry in self and identity constructions. Indian J Gend Stud 2008;15:261-90.
4. Chandra PS, Deepthivarma S, Carey MP, Carey KB, Shalinianant MP. A cry from the darkness: Women with severe mental illness in India reveal their experiences with sexual coercion. Psychiatry 2003;66:323-34.
5. Human Rights Watch. Invisible victims of sexual violence: Access to justice for women and girls with disabilities in India. United States of America. 2018.
6. Gill A. Voicing the silent fear: South Asian women's experiences of domestic violence. Howard J Crim Justice 2004;43:465-83.
7. Williams EF, editor. Voices of Feminist Therapy. Routledge; 2018 Apr 24.
8. Foa EB, Rothbaum BO. Treating the Trauma of Rape: Cognitive-Behavioral Therapy for PTSD. Guilford Press; 2001 Oct 24.
9. Zhang L, Zhou J, Li L. Crisis intervention in the acute stage after trauma. Int J Emerg Ment Health 2015;4:714-6.
10. Young DR, Gittelsohn J, Charleston J, Felix-Aaron K, Appel LJ. Motivations for exercise and weight loss among African-American women: Focus group results and their contribution towards program development. Ethn Health 2001;6:227-45.
11. Dutton MA, Orloff LE, Hass GA. Characteristics of help-seeking behaviours, resources and service needs of battered immigrant Latinas: Legal and policy implications. Geo J on Poverty L & Pol'y 2000;7:245.
12. Armstrong D. Foucault and the Sociology of Health and Illness' in Foucault, Health and Medicine. London & New York: Routledge; 1997.
13. Pearlman LA, Saakvitne KW. Trauma and the Therapist: Countertransference and Vicarious Traumatization in

Psychotherapy with Incest Survivors. WW Norton & Co; 1995.
14. Hage SM. Profiles of women survivors: The development of agency in abusive relationships. J Couns Dev 2006;84:83-94.
15. Turell SC, Herrmann MM. "Family" support for family violence: Exploring community support systems for lesbian and bisexual women who have experienced abuse. J Lesbian Stud 2008;12:211-24.
16. Addlakha R. Indigenisation' not 'Indianisation' of psychiatry: An anthropological perspective. Sociol Bull 2010;59:46-68.
17. Mills J, Harrison H, Franklin R, Birks M. Case study research: Foundations and methodological orientations. In Forum Qualitative Sozialforschung/Forum: Qualitative Social Research 2017 (Vol. 18, No. 1, p. 17). DEU.
18. Fetters MD, Curry LA, Creswell JW. Achieving integration in mixed methods designs—principles and practices. Health Serv Res 2013;48:2134-56.
19. Moorkath F, Vranda MN, Naveen Kumar C. Lives without roots: Institutionalized homeless women with chronic mental illness. Indian J Psychol Med 2018;40:476-81.
20. Kipke MD, Palmer RF, LaFRANCE ST, O'CONNOR SU. Homeless youths' descriptions of their parents' child-rearing practices. Youth Soc 1997;28:415-31.
21. Mueser KT, Bellack AS, Morrison RL, Wixted JT. Social competence in schizophrenia: Premorbid adjustment, social skill, and domains of functioning. J Psychiatric Res 1990;24:51-63.
22. Silverman AB, Reinherz HZ, Giaconia RM. The long-term sequelae of child and adolescent abuse: A longitudinal community study. Child Abuse Negl 1996;20:709-23.
23. Fergusson DM, Horwood LJ, Lynskey MT. Childhood sexual abuse and psychiatric disorder in young adulthood: II. Psychiatric outcomes of childhood sexual abuse. J Am Acad Child Adolesc Psychiatry 1996;35:1365-74.
24. Goodman LA, Rosenberg SD, Mueser KT, Drake RE. Physical and sexual assault history in women with serious mental illness: Prevalence, correlates, treatment, and future research directions. Schizophr Bull 1997;23:685-96.
25. Omvedt G. Dalits and the Democratic Revolution: Dr Ambedkar and the Dalit Movement in Colonial India. SAGE Publications India; 1994 Jan 30.
26. Mangubhai JP, Lee JG. Dalit Women Speak Out: Caste, Class and Gender Violence in India. Zubaan; 2012 Jun 25.
27. Gupta A. Reporting and incidence of violence against women in India. Rice Institute. 2014 Sep 25;130.
28. Kermode M, Bowen K, Arole S, Joag K, Jorm AF. Community beliefs about treatments and outcomes of mental disorders: A mental health literacy survey in a rural area of Maharashtra, India. Public Health 2009;123:476-83.
29. Jina R, Thomas LS. Health consequences of sexual violence against women. Best Pract Res Clin Obstet Gynecol 2013;27:15-26.
30. Simpson EK. Family Violence and Family Identity. 2001.
31. Clark SJ, Burt MR, Schulte MM, Maguire KE. Coordinated community responses to domestic violence in six communities. Beyond the Justice System 1996.
32. Ghosh B, Choudhuri T. Legal protection against domestic violence in India: Scope and limitations. J Fam Violence 2011;26:319-30.

Original Article

Relationship between the Level of Motivation and Personality Disorder in Patients with Opioid Dependence Syndrome

Manu Sharma, Sankalp Doda, Devendra Mohan Mathur, Jitendra Jeenger

ABSTRACT

Background: The relationship between the level of motivation and personality disorder (PD) in patients with opioid dependence syndrome is understudied. **Method:** A cross-sectional study was conducted on consecutively selected 100 adult inpatients with opioid dependence syndrome. All participants were assessed on ICD-10-AM Symptom Checklist for Mental Disorders, University of Rhode Island Change Assessment (URICA), Stage of Change Readiness and Treatment Eagerness Scale (SOCRATES 8D), International Personality Disorder Examination (IPDE), and Severity of Opioid Dependence Questionnaire (SODQ). **Results:** Most patients expressed the level of motivation at contemplation level, medium level of recognition for the need for change, and high levels of ambivalence and taking steps for change. PD was diagnosed in 40% of the patients. The most common PD identified was dissocial, followed by an emotionally unstable personality disorder-impulsive type. There was no statistically significant difference in URICA, SOCRATES 8D, or SODQ scores in opioid-dependent patients with and without PDs. Patients with severe opioid dependence reported higher readiness to change. **Conclusion:** Most of the patients with opioid dependence syndrome presenting for treatment are at the contemplation level of motivation. More than one-third of patients with opioid dependence syndrome have PD. A diagnosis of comorbid PD is unrelated to the level of motivation in patients with opioid dependence syndrome. Further multicentric research on personality and PD in a diverse sociocultural population with opioid use disorders is needed.

Key words: *Dependence, motivation, opioid, personality disorder*

Key messages: *Most patients with opioid dependence syndrome presenting for treatment are at the contemplation level of motivation. Patients with severe opioid dependence report higher readiness to change. A diagnosis of comorbid personality disorder is unrelated to the level of motivation in patients with opioid dependence syndrome.*

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_217_19	

How to cite this article: Sharma M, Doda S, Mathur DM, Jeenger J. Relationship between the level of motivation and personality disorder in patients with opioid dependence syndrome. Indian J Psychol Med 2020;42:175-81.

Department of Psychiatry, Geetanjali Medical College and Hospital, Udaipur, Rajasthan, India

Address for correspondence: Dr. Sankalp Doda
Department of Psychiatry, Geetanjali Medical College and Hospital, Udaipur, Rajasthan, India. E-mail: sankalp704@gmail.com

Submitted: 07-May-2019, **Revised:** 22-Jun-2019, **Accepted:** 17-Dec-2019, **Published:** 09-Mar-2020

Motivation is an important first step towards any action or change in behavior. The concept of motivation broadly includes an individual's concerns about or interest in the need for change, his or her goals and intentions, the need to take responsibility and make a commitment to change and sustaining the behavior change, and having adequate incentives for change.[1-3] Among substance-abusing individuals, motivation and intentions related to the modification of the addictive behavior play an important role in the recovery process. Motivational considerations in recovery from addiction are complex. Findings from numerous studies demonstrate a positive relationship between the motivation for treatment and for change, assessed in multiple ways, and substance abuse treatment outcomes.[4,5]

Personality disorders (PDs) have their onset in adolescence or early adulthood. They are defined as maladaptive, pervasive, inflexible, and enduring patterns of inner experiences and behaviors that markedly deviate from the expectations of the individual culture.[6] The prevalence of PDs is higher in individuals seeking treatment and in those who come in contact with the criminal justice system.[7]

It is possible that substance use disorders (SUDs) with comorbid conditions share common risk factors,[8] and that the emergence of one disorder increases the likelihood for a comorbid complication.[9] Furthermore, when two disorders are present, each tends to increase the likelihood that the other persists. Research indicates that patients with SUDs commonly suffer from one or another type of PD.[10] Evidence from previous studies indicates that the comorbidity of SUD and PD is associated with greater resistance to treatment, higher rates of involuntary treatment, inflexible coping mechanisms, impulsivity, and difficulties with interpersonal relationships.[11] These factors may directly or indirectly influence the level of motivation for adaptive change. It is likely that PDs account for the high rates of relapse associated with SUD.[12,13] Comorbidity of PDs with alcohol use disorders seems to be less "destructive" than that with heroin or cocaine use disorders.[14] Therefore, gaining a better understanding of the relationship between SUD and PDs may have important implications for facilitating behavior change needed for treatment and sustained abstinence among those with substance abuse.[15] Previous studies are limited by methodological and interpretative problems, making it difficult to draw conclusions. For example, the use of different inclusion and exclusion criteria and assessment instruments for diagnosing PDs.[10,11] In addition, there is a paucity of published research, especially from the Indian subcontinent, addressing the comorbidity of opioid dependence syndrome (ODS) and PD. Given this background, the present study was undertaken with the following objectives:

1. To evaluate motivation to change in patients with ODS
2. To evaluate the frequency and nature of comorbid PDs in patients with ODS
3. To study the relationship between the level of motivation and PD in patients with ODS.

MATERIALS AND METHOD

The present cross-sectional study was conducted in the department of psychiatry of a teaching institute from January 2017 to January 2018. The private sector institute provides multispecialty tertiary level health services to the south-western region of the state of Rajasthan, India. The institutional ethics committee approved the study protocol and written informed consent was obtained from the research participants. The participants comprised of consecutively selected adult (18–65 years of age) inpatients with Diagnostic Criteria for Research-10 (F11.2) diagnosis of opioid dependence syndrome. Based on a confidence interval of 95%, a margin of error of 5%, and estimated prevalence of opioid use of 0.7% in the general population, of whom around 22% are dependent users,[16] the sample size estimated, using an online calculator (www.surveysystem.com), was 384. The following exclusion criteria were applied: Patient with other substance dependence (except nicotine/caffeine), comorbid psychiatric disorders other than personality disorders, serious or terminal medical illness, clinical condition requiring intensive care management, lack of English language proficiency precluding the use of study tools, refusal to participate in the study, and lack of cooperativeness [Figure 1]. Most patients presenting with opioid dependence at our center are generally managed in the out-patient clinic. However, some are advised hospitalization for the individually tailored management of acute withdrawal symptoms (typically using clonidine, benzodiazepines, nonsteroidal anti-inflammatory drugs, etc.), assessment of general medical status, psychoeducation, and motivational enhancement.

The following tools were used:

1. ICD-10-AM Symptom Checklist for Mental Disorders: This is a semi-structured instrument designed for use by clinicians for the assessment of the main psychiatric symptoms and syndromes in the F0 to F6 categories of ICD-10[17]
2. University of Rhode Island Change Assessment (URICA): This is a self-assessment tool to assess the levels of a person's readiness to change (motivation) as they progress through the stages of change in modifying their behavior.[18] The URICA version used in the current study

consists of four subscales; precontemplation, contemplation, action, and maintenance. The questionnaire consists of 32 questions in which each item is allocated a 5-point Likert scale ranging from "strongly agree" to "strongly disagree." The test contains eight items for each of the subscales. Each response is assigned to one of the subscales, which, in turn, is used to calculate a score that indicates the level of readiness to change. URICA test scores of 9–10, 10–12, and ≥12 are indicative of the level of motivation at precontemplation, contemplation, and action level, respectively.[18] In the present study, URICA was administered on the first day of hospitalization

3. Stage of Change Readiness and Treatment Eagerness Scale (SOCRATES 8D): SOCRATES is an instrument designed to assess the readiness for change in those who abuse alcohol or opioids.[19] The 19-item version-8 instrument yields three factorially-derived scale scores: recognition (Re), ambivalence (Am), and taking steps (Ts). It is a useful, brief screening instrument for motivation, and the scores have been found to predict the outcome and are used clinically to suggest areas for further discussion. Subscale scores 7–26 indicate very low, 27–30 low, 31–34 medium, and 35 high Re, respectively. Subscale scores 4–8 indicate very low, 9–13 low, 14–15 medium, 16–18 high, and 19–20 very high, Am respectively. Scores 8–25 indicate very low, 26–30 low, 31–33 medium, 34–36 high, and 37–40 very high Ts, respectively[19]
4. International Personality Disorder Examination (IPDE): The IPDE contains a self-administered screening questionnaire that can identify those patients whose scores suggest the presence of a PD, and then the IPDE clinical interview can be administered. Results from the IPDE semi-structured interview allow the examiner to assign a definite, probable, or negative diagnosis for each ICD-10 PD.[20] In the present study, the screening section of the IPDE was administered to all patients after 7 days of hospitalization, and those who screened positive were subjected to the detailed assessment of PDs.
5. The Severity of Opioid Dependence Questionnaire (SODQ) consists of five main sections of questions corresponding to (1) quantity and pattern of opiate use, (2) physical symptoms of withdrawal, (3) effective symptoms of withdrawal including craving, (4) withdrawal-relief drug-taking, and (5) rapidity of reinstatement of withdrawal symptoms after a period of abstinence.[21] When completing the questionnaire on the first day of hospitalization, the respondent is instructed to focus his/her attention on a recent typical period of opiate use chosen by himself/herself. The SODQ was designed for self-completion; however, it can also be administered by the researcher. Items are scored on a four-point scale ranging from "never or almost never" (scored 0), through "sometimes" (1) and "often" (2), to "always or nearly always" (3). The total scores are calculated by summing together scores from the withdrawal sections. The reinstatement section has not been included in these total scores due to some conceptual and practical difficulties with this section.[22]

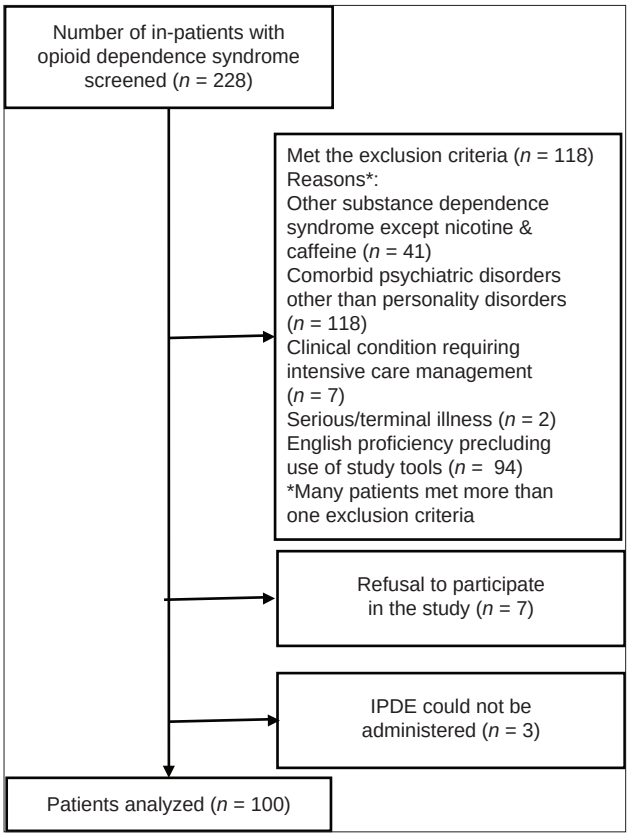

Figure 1: Flowchart of the study procedure

The study tools in the English language were administered by the psychiatry resident and ratified by the consultant psychiatrist. A few participants sought clarification; it was rendered and restricted to a minimum without influencing the meaning and interpretation of the tool item(s).

Data analysis

Statistical analyses were done using the Statistical Package for Social Sciences for Windows, version 16 (SPSS Inc., Chicago, Ill., USA). Continuous variables were expressed as mean with standard deviation. All statistical analyses were done at a 95% confidence interval, and $P < 0.05$ was considered statistically significant.

RESULTS

During the study period, 228 patients were screened, and data for 100 patients were analyzed [Figure 1]. The mean (±SD) age of onset of opioid use and duration of opioid dependence was 19.64 (±2.71) years and 6.87 years (±3.83) years, respectively. The intravenous route was the predominant route of opioid use in 38% of the patients.

Table 1 shows the characteristics of the study sample. Most patients expressed the level of motivation at the contemplation level, medium level of recognition for the need for change, and high levels of ambivalence and taking steps for change [Table 2]. Forty percent of the patients were diagnosed with PD. The most common type of PD diagnosed was dissocial, followed by an emotionally unstable PD-impulsive type (30%), emotionally unstable PD-borderline type (6%), and anxious PD (3%). There was no statistically significant difference in URICA, SOCRATES, or SODQ scores in opioid-dependent patients with and without PD [Table 3]. There were no statistically significant differences observed regarding other sociodemographic variables. Significant positive correlations were observed between the severity of opioid dependence and the level of motivation ($r = 0.47$, $P = <0.001$) and readiness to change (SOCRATES Re: $r = 0.35$, $P = <0.001$; Am: $r = 0.37$, $P = <0.001$; Ts: $r = 0.34$, $P = <0.001$).

Table 1: Sociodemographic characteristics of the study population

	Group	Frequency	Percentage
Age (in years)	18–39	74	74.0%
	40–65	26	26.0%
Sex	Male	98	98%
	Female	02	2.0%
Religion	Hindu	50	50%
	Muslim	50	50%
	Primary school	24	24%
	Middle school	48	48%
	High school	16	16%
	12th/predegree	04	4%
	Degree	06	6%
	Postgraduate	02	2%
Domicile	Urban	60	60%
	Rural	40	40%
Family income (rupees)	1000–20000	77	77%
	21000–40000	14	14%
	41000–60000	05	5%
	81000–100000	03	3%
	>100000	01	1%
Family type	Nuclear	64	64%
	Joint	36	36%
Family history of drug use	Alcohol	18	18%
	Opioid	10	10%
	Tobacco	84	84%
Medical conditions	HIV	10	10%
	Hypertension	14	14%
	Diabetes	12	12%
	Tuberculosis	5	5%
	Chronic obstructive pulmonary disease	2	2%
	Lumbar radiculopathy	2	2%
Psychosocial problems due to drug use	Financial	95	95%
	Interpersonal/Family	90	90%
	Employment	80	80%
	Legal	12	12%

HIV – Human Immunodeficiency Virus

Table 2: Level of motivation, readiness to change, and severity of opioid dependence in the study population

Measure	Mean±SD (*n*=100)
URICA	11.60±0.94
SOCRATES (RE)	32.75±3.28
SOCRATES (AM)	18.48±1.95
SOCRATES (TS)	36.00±3.25
SODQ	55.50±6.10

URICA – University of Rhode Island change assessment scale; SOCRATES – Stages of change readiness and treatment eagerness scale; SOCRATES (RE) – Recognition; SOCRATES (AM) – Ambivalence; SOCRATES (TS) – Taking steps; SODQ – Severity of Opiate Dependence Questionnaire; SD – Standard deviation

DISCUSSION

The present cross-sectional, observational study was conducted with the aim to evaluate the relationship between motivation in terms of readiness to change and PD in patients presenting for treatment for opioid use disorders at a tertiary care center. The prevalence of opium use is more in the south-western region of Rajasthan, India due to geographical, sociocultural, and economic factors.[23]

The subjects in the present study were predominantly middle school educated, young, employed men from the low socioeconomic background, living in an urban area. Most were married and staying with their spouse. A previous household survey[24] and hospital-based study[25] have reported the prevalence of opioid use in females to be 0.5% and 5.2%, respectively. In our study, females accounted for 2% of the study sample, which is consistent with the findings reported by Chaturvedi and colleagues.[26] As the prevalence of opioid dependence in females was low in our sample, the interpretations of our findings apply largely to males with ODS.

At our center, most patients seeking treatment for opioid use disorder are usually advised by their families to do so, and some are introduced by their drug-detoxified peers. There is a relative paucity of Indian data on motivation profiles of patients seeking treatment for opioid-related problems. In the context of the evaluation of the level of motivation, results indicate that most patients were

Table 3: Relationship between level of motivation, readiness to change, and severity of opioid dependence with presence or absence of personality disorders

Variable	Mean score (±SD) in patients with Personality Disorder (*n*=40)	Mean score (±SD) in patients without Personality Disorder (*n*=60)	*t*	*P*
URICA	11.74 (±0.68)	11.50 (±1.07)	1.25	0.21
SOCRATES (RE)	32.68 (±3.08)	32.80 (±3.42)	0.18	0.85
SOCRATES (AM)	18.40 (±1.82)	18.53 (±2.04)	0.33	0.74
SOCRATES (TS)	35.95 (±2.68)	36.03 (±3.60)	0.12	0.90
SODQ	54.73 (±6.57)	56.02 (±5.76)	1.03	0.30

URICA – University of Rhode Island change assessment scale; SOCRATES – Stages of change readiness and treatment eagerness scale; SOCRATES (RE) – Recognition; SOCRATES (AM) – Ambivalence; SOCRATES (TS) – Taking steps; SODQ – Severity of Opiate Dependence Questionnaire; SD – Standard deviation

in the contemplation level. This may imply that some patients come to participate in the treatment without being fully motivated and ready to make changes, which possibly leads to a high dropout or relapse rate as found in other studies.[27,28] Our observation with regard to the level of motivation in opioid users is consistent with the results of a hospital-based study in northern India.[29] Contrastingly, North American researchers have reported that 52% of chronic opioid users have high motivation for treatment. It may be possible that treatment-seeking and motivation for change in Indian adults with opioid dependence are influenced by physical, drug-related, cultural, and psychosocial factors that merit further study.

Previous research suggests that the processes of change have clinical relevance with drug use severity, problem acknowledgment, and concern about use.[30] Greater problem severity was associated with higher levels of interpersonal help-seeking and internalized motivation.[31] The present investigation found that patients with more severe opioid dependence reported higher readiness to change. There is evidence that higher levels of motivation are related to more severe substance use.[32,33] An explanation for the positive correlation between the severity of opioid dependence and the level of motivation could be that greater problems confer greater readiness to change.

In a clinic-based study from north India, 13.2% of the patients attending addiction services over an 11-year period had non-substance-related psychiatric disorders.[34] However, no national-level data are available on comorbidity in patients with opioid use disorders.

Rates of PD in opioid users, using DSM-III criteria and evaluating all possible diagnoses, have ranged from 11% to 68%.[35-38] We found the prevalence of PD to be 40% using the IPDE. These differences are partly accounted for by the variations in sampling characteristics such as the distribution of gender and age, treatment setting, and specific diagnostic criteria employed, for example, whether substance-related characteristics are excluded from the diagnosis.[39] It should be noted that the reported rates do not include PD not otherwise specified (DSM) or mixed PD (ICD-10). In some earlier studies, the evaluation for PD was done during the patients' inpatient stay, which may be associated with increased symptom reporting.[36,40] Dissocial PD was the most identified PD in our study, followed by an emotionally unstable PD-impulsive type. This is in congruence with previous studies, which showed a high prevalence of PDs, especially dissocial PD, in subjects with opioid dependence.[41-43] Therefore, our investigation reiterates the fact that PDs are highly prevalent in individuals with ODS.

Our results indicate that readiness to change is unrelated to PD [Table 3]. Most empirical studies of motivation with regard to treatment have focused on treatment outcome rather than the initial motivation to seek treatment.[44,45] Our findings support the notion that resistance to (or the low motivation for) change and short treatment duration should not be considered attributes inherent to PD but rather independent patient attributes.[46] In a study by Verheul *et al*.[46] motivation for the change was unrelated to personality pathology but moderated the relationship between Axis II diagnoses and relapse such that personality pathology was a strong predictor of relapse among the less motivated individuals but not among the more motivated individuals. To our knowledge, little is known from India about the level of motivation to seek treatment, in PD patients.

The present study is encumbered by the cross-sectional design and a small sample size limited to English-speaking males at a single center. The estimated sample size could not be attained as the present investigation was a time-bound project. Ninety-four patients were excluded due to a lack of English proficiency. At our center, most of the patients are Hindi-speaking. Due to the absence of validated URICA and SOCRATES scales in the Hindi language, only English-speaking patients were recruited for the present study. These

factors limit the generalization of the findings. Patients who are generally motivated seek treatment. Therefore, there may be a potential selection bias. Self-reported instruments are encumbered by the possibility of recall bias and self-report bias. It is likely that patients with dissocial or emotionally unstable traits misrepresent or manipulate study tools and provide more socially desirable responses. Another potential limitation could be that DSM separates state- and trait-based disorders on two axes and provides for clusters of PDs, while the ICD-10 diagnostic guidelines do not place the PDs and state disorders on a separate axis or subdivide PDs into clusters.

Despite its limitations, the novelty of the present investigation is that it adds to Indian hospital-based data on comorbid PDs in opioid dependence and their relationship with motivation. The relative merits also include the exclusion of other comorbid psychiatric disorders and the use of valid instruments to diagnose PD and evaluate motivation. Research from India is needed to further elucidate the relationship of PD with relapse and treatment outcome in patients with opioid dependence and the cultural factors in the diagnosis of PD in Indian patients.

CONCLUSION

Most of the patients with ODS presenting for treatment are at the contemplation level of motivation. More than one-third of patients with ODS have PD. Dissocial PD is the most common, followed by emotionally unstable PD. A diagnosis of comorbid PD is unrelated to the level of motivation. Further multicentric research on personality and PD in a diverse sociocultural population with opioid use disorders is needed.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. DiClemente CC, Schlundt D, Gemmell L. Readiness and stages of change in addiction treatment. Am J Addict 2004;13:103-19.
2. Miller WR, Rollnick S, Conforti K. Motivational Interviewing. 2nd ed. Preparing people for change. New York (NY): Guilford Publications; 2002.
3. Vuchinich RE. Behavioral economics as a framework for organizing the expanded range of substance abuse interventions. Changing addictive behavior: Bridging clinical and public health strategies. 1999:191-218.
4. Leon GD, Melnick G, Kressel D, Jainchill N. Circumstances, motivation, readiness, and suitability (the CMRS scales): Predicting retention in therapeutic community treatment. Am J Drug Alcohol Abuse 1994;20:495-515.
5. Simpson DD, Joe GW. Motivation as a predictor of early dropout from drug abuse treatment. Psychother Theor Res Pract Train 1993;30:357.
6. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-5R) American Psychiatric Pub; 2013.
7. Tyrer P, Reed GM, Crawford MJ. Classification, assessment, prevalence, and effect of personality disorder. Lancet 2015;385:717-26.
8. Sullivan T, Frances J. Substance use in borderline personality disorder. Am J Psychiatry 1990;147:1002-7.
9. Ballenger JC, Goodwin FK, Major LF, Brown GL. Alcohol and central serotonin metabolism in man. Arch Gen Psychiatry 1979;36:224-7.
10. Parmar A, Kaloiya G. Comorbidity of personality disorder among substance use disorder patients: A narrative review. Indian J Psychol Med 2018;40:517.
11. Thomas VH, Melchert TP, BankenJA. Substance dependence and personality disorders: Comorbidity and treatment outcome in an inpatient treatment population. J Stud Alcohol 1999;60:271-7.
12. Daly JE, Pelowski S. Predictors of dropout among men who batter: A review of studies with implications for research and practice. Violence Vict 2000;15:137.
13. Martínez-Raga J, Marshall EJ, Keaney F, Ball D, Strang J. Unplanned versus planned discharges from in-patient alcohol detoxification: Retrospective analysis of 470 first-episode admissions. Alcohol Alcohol 2002;37:277-81.
14. Ross S, Dermatis H, Levounis P, Galanter M. A comparison between dually diagnosed inpatients with and without Axis II comorbidity and the relationship to treatment outcome. Am J Drug Alcohol Abuse 2003;29:263-79.
15. Peteet JR, Brenner S, Curtiss D, Ferrigno M, Kauffman J. A stage of change approach to addiction in the medical setting. Gen Hosp Psychiatry 1998;20:267-73.
16. Ray R. National Survey on Extent, Pattern and Trends of Drug Abuse in India. Ministry of Social Justice and Empowerment, New Delhi: Government of India and United Nations Office on Drugs and Crime; 2004.
17. Janca A, Üstün TB, Early TS, Sartorius N. The ICD-10 symptom checklist: A companion to the ICD-10 classification of mental and behavioural disorders. Soc Psychiatry Psychiatr Epidemiol 1993;28:239-42.
18. McConnaughy EA, Prochaska JO, Velicer WF. Stages of change in psychotherapy: Measurement and sample profiles. Psychother Theor Res Pract 1983;20:368.
19. Miller WR, Tonigan JS. Assessing drinkers' motivation for change: The Stages of change readiness and treatment eagerness scale (SOCRATES). Psychol Addict Behav1996;10:81.
20. In: Loranger AW, Janca A, Sartorius N, editors. Assessment and Diagnosis of Personality Disorders: The ICD-10 Personality Disorder Examination (IPDE). Cambridge University Press; 1997.
21. Sutherland G, Edwards G, Taylor C, Phillips G, Gossop M, Brady R. The measurement of opiate dependence. Br J Addict 1986;81:485-94.
22. Dawe S, Mattick RP. Review of Diagnostic Screening Instruments for Alcohol and Other Drug Use and Other Psychiatric Disorders. Canberra: AGPS; 1997.
23. Lakshminarayana J, Singh MB. Opium addiction among rural population in desert districts of Western Rajasthan: Some observations from the study. Int J Hum Ecol 2009;25:1-4.
24. Mohan D, Sharma NK, Sundaram KR. Patterns and prevalence of opium use in rural Punjab (India). Bull Narc

1979;31:45-56.
25. Kumar S, Wairagkar NS, Mahanta J, Satyanarayana K, Chetial M, Phukan RK, *et al*. Profile of heroin addicts in Nagaland, India. Southeast Asian J Trop Med Public Health 1996;27:768-71.
26. Chaturvedi HK, Mahanta J, Bajpai RC, Pandey A. Correlates of opium use: Retrospective analysis of a survey of tribal communities in Arunachal Pradesh, India. BMC Public Health 2013;13:325.
27. Joe GW, Simpson DD, Broome KM. Effects of readiness for drug abuse treatment on client retention and assessment of process. Addiction 1998;93:1177-90.
28. Longshore D, Teruya C. Treatment motivation in drug users: A theory-based analysis. Drug Alcohol Depend 2006;81:179-88.
29. Jain N, Chavan BS, Sidana A, Das S. Efficacy of buprenorphine and clonidine in opioid detoxification: A hospital-based study. Indian J Psychiatry 2018;60:292.
30. Li L, Ding Y, Lai W, Lin C, Luo W. Motivational profiles of clients seeking methadone maintenance therapy in China. Drug Alcohol Depend 2011;118:335-40.
31. Ryan RM, Plant RW, O'Malley S. Initial motivations for alcohol treatment: Relations with patient characteristics, treatment involvement, and dropout. Addictive Behav 1995;20:279-97.
32. Velasquez MM, Carbonari JP, DiClemente CC. Psychiatric severity and behavior change in alcoholism: The relation of the transtheoretical model variables to psychiatric distress in dually diagnosed patients. Addict Behav 1999;24:481-96.
33. Pantalon MV, Nich C, Frankforter T, Carroll KM University of Rhode Island change assessment. The URICA as a measure of motivation to change among treatment-seeking individuals with concurrent alcohol and cocaine problems. Psychol Addict Behav 2002;16:299-307.
34. Basu D, Sarkar S, Mattoo SK. Psychiatric comorbidity in patients with substance use disorders attending an addiction treatment center in India over 11 years: Case for a specialized "Dual Diagnosis Clinic." J Dual Diagn 2013;9:23-9.
35. Blow FC, Cook CA, Booth BM, Falcon SP, Friedman MJ. Age-related psychiatric comorbidities and level of functioning in alcoholic veterans seeking outpatient treatment. Hosp Community Psychiatry 1992;43:990-5.
36. Brooner RK, King VL, Kidorf M, Schmidt CW, Bigelow GE. Psychiatric and substance use comorbidity among treatment-seeking opioid abusers. Arch Gen Psychiatry 1997;54:71-80.
37. Khantzian EJ, Treece C. DSM-III psychiatric diagnosis of narcotic addicts. Arch Gen Psychiatry 1985;42:1067-71.
38. Kosten TR, Rounsaville BJ, Kleber HD. DSM-III personality disorders in opiate addicts. Compr Psychiatry 1982;23:572-81.
39. Verheul R, van den Brink W, Hartgers C. Prevalence of personality disorders among alcoholics and drug addicts: An overview. Eur Addict Res 1995;1:166-77.
40. Bryant KJ, Rounsaville BJ, Spitzer RL, Williams JB. Reliability of dual diagnosis. J Nerv Ment Dis 1992;180:251-57.
41. Karow A, Verthein U, Krausz M, Schäfer I. Association of personality disorders, family conflicts and treatment with quality of life in opiate addiction. Eur Addict Res 2008;14:38-46.
42. Fassino S, Daga GA, Delsedime N, Rogna L, Boggio S. Quality of life and personality disorders in heroin abusers. Drug Alcohol Depend 2004;76:73-80.
43. Vivek K, Dalal P, Trivedi J, Pankaj K. A study of psychiatric comorbidity in opioid dependence. Delhi Psychiatry J 2010;13:86-8.
44. Friedman AS, Terras A, Glassman K. The role of participant motivation in the outcome of a prevention/early intervention program for adolescent substance use problems and illegal behavior. Journal Child Adolesc Subst Abuse 2004;13:1-28.
45. Simpson DD, Joe GW, Rowan-Szal GA, Greener JM. Drug abuse treatment process components that improve retention. J Subst Abuse Treat 1997;14:565-72.
46. Verheul R, van den Brink W, Hartgers C. Personality disorders predict relapse in alcoholic patients. Addict Behav 1998;23:869-82.

Original Article

Effectiveness of a Structured Training Module on Different Learning Domains among Yuva Parivarthakas under Yuva Spandana Program

Pradeep Banandur S., Gautham M. Sukumar, Mutharaju Arelingaiah, Lavanya Garady[1], Jyoti M. Koujageri[1], Sateesh L. Sajjanar[2], Basavaraj Hadapad[3], M. S. Ramesh[3], Gururaj Gopalkrishna

ABSTRACT

Background: Yuva Spandana (YS) is a youth mental health promotion program implemented across all 30 districts of Karnataka. Yuva Parivarthakas (YPs - youth change agents) are trained to provide mental health promotion services to any "youth with issues" through Yuva Spandana Kendras (guidance centers) situated within district stadiums across Karnataka. Aim of the study was to evaluate the change (comparing before and after training) in different learning domains (cognitive – knowledge, affective – attitude, and psychomotor – practice) among trainees (YPs) attending YS training. **Methods:** Quasiexperimental study design was utilized for this study. A semistructured interview schedule was developed and used before and after the training. Data were analyzed by descriptive statistics. The difference in change of mean score was assessed using the paired *t*-test. The shift in the proportion of trainees post-training in the three domains was assessed using McNemar's test. **Results:** The mean (±SD) age of trainees was 27.5 ± 3.3 years. Majority of them were males (63.8%), had completed bachelor's degree (53.4%), and were residing in rural Karnataka (77.7%). The knowledge and attitude scores significantly improved ($P < 0.001$) post-training, without significant improvement in practical skills. **Conclusion:** It is recommended that future training programs need to be focused on creating opportunities to YPs in order to increase their practical skills to work with youth having issues.

Key words: *Attitude, knowledge, learning domains, practice, training*

Key messages: *Yuva Spandana training program brings in significant positive change in the domains of knowledge and attitude among trainees. This research suggests incorporation of more practice-related aspects in both in-house as well as hands-on field training.*

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_144_19	

How to cite this article: Banandur SP, Sukumar GM, Arelingaiah M, Garady L, Koujageri JM, Sajjanar SL, *et al*. Effectiveness of a structured training module on different learning domains among Yuva Parivarthakas under Yuva Spandana program. Indian J Psychol Med 2020;42:182-8.

Yuva Spandana Program, Department of Epidemiology, Centre for Public Health, NIMHANS, [1]Department of Epidemiology, Yuva Spandana Program, NIMHANS, [2]Department of Youth Empowerment and Sports, Government of Karnataka, [3]Department of Youth Empowerment and Sports, Youth Services, Government of Karnataka, Bengaluru, Karnataka, India

Address for correspondence: Dr. Gautham M.Sukumar
#214, 2nd Floor, Department of Epidemiology, Dr. M V Govindaswamy Building, NIMHANS, Hosur Road, Bengaluru - 560 029, Karnataka, India. E-mail: drgauthamnimhans@gmail.com
Submitted: 16-Mar-2019, **Revised:** 17-Apr-2019, **Accepted:** 01-Aug-2019, **Published:** 09-Mar-2020

Nearly 70% of Indians (550 million) are <35 years of age.[1] It is a "young nation" as it is home to the largest youth population in the world. Youth is a very crucial period of life due to rapid physical, physiological, psychological, and behavioral changes. In general, though youth is considered as a healthy phase of life, major issues, such as academic and career, substance use and abuse, sexually transmitted infections, unplanned pregnancies, homicide, suicide, and motor vehicle crashes (including those caused by drinking and driving), either start or peak during these years.[2] Behavioral patterns during youth impact healthy and productive adult life. It also increases the risk of noncommunicable diseases.[3] Further, the youth are vulnerable to the influence of socioenvironmental factors such as family, peers, school, and neighborhood, impacting on their overall development including their health and well-being.[4,5]

Traditional Indian family system had provided the necessary support for all in the family. Dwindling traditional family systems, amidst globalization and technological revolution, have brought changes in individuals, family, and society. Particularly, support available within families and community is reduced. Hence, a need for support for youth is being felt as more relevant. As a result, professional help for resolving issues gained much importance in recent years, but affordability, availability, accessibility, and stigma limit reach to all youth in need of such support. Considering these realities, providing early support facilitates them to adopt healthy behaviors and, in turn, helps the adult population to have a better, productive future.[6] Support from either formal or informal systems help to empower the youth in this stage of metamorphosis. In this line, Yuva Spandana (YS) (meaning responding to youth), a youth mental health promotion program, was introduced by the Department of Youth Empowerment and Sports, Government of Karnataka, with the technical support from Centre for Public Health, Department of Epidemiology, National Institute of Mental Health and Neuro Sciences.

The program YS was implemented in line with Karnataka Youth Policy 2012, with an objective to help the youth to help themselves, by providing guidance in their respective districts ("Youth for Youth"). Yuva Parivarthakas (YPs; meaning change agents of youth) work in the districts as youth motivators and youth guidance providers. YPs in the program are between 21–35 years of age, have completed bachelors' degree, are residents of the local districts, and know the language of Kannada. They are selected through a systematic procedure. The youth are informed about training as YPs through local print and visual media mentioning required qualification and experience by the Department of District Youth Empowerment and Sports. A three-step interview process, namely group discussion, brief written test, and personal interview is conducted to select YPs.[7] At the macro level, the program aims to create alternative support systems within the existing system to deal effectively with the dynamic social system in India and to support the youth to avail timely help. Yuva Spandana Kendras (meaning youth response centers), established in district stadiums across Karnataka, provide such support and guidance to youth having any issues. The issues addressed under the program are education and academics, relationship, personality development, health and lifestyle, safety, gender, sex and sexuality issues.[7] To achieve the same, a 5-day structured training program is conducted to train some youth to serve as YPs. This paper evaluates the effectiveness of this training on domains of knowledge, attitude, and skills of the trainees. This training was expected to improve their knowledge about the activities and procedures related to the program and to develop appropriate attitude and skills to work with youth and community.

METHODOLOGY

We utilized a quasiexperimental study design to evaluate the changes in knowledge, practice, and attitude of trainees attending YS training between the year 2014 and 2017. The trainees were from all 30 districts of Karnataka.

About the training

The training program of YPs utilized 10 modules developed by an expert team, adopted and piloted for its feasibility.[7] It was a 5-day, in-house training program developed using a systematic, logical process in a scientific manner, utilizing stakeholder, and expert consultations. The training program consisted of didactic lectures, group work, role play, and other feasible adult learning methods. Trained resource persons from within team YS, faculty from within and outside the department of Epidemiology, NIMHANS delivered the sessions in a uniform manner. Aim of the training was to empower YPs with the necessary cognition, attitude, and skills to implement activities and services of YS in their respective districts. The detailed training program schedule is listed in Table 1.

Tool for assessment

A semistructured self-reporting questionnaire was developed and piloted for its usability. The tool was used to assess change in self-reported knowledge, attitude, and practice among YPs before and after training. The tool was developed by reviewing the literature and consulting experts in the field. Face validation

Table 1: Session information and timings for each topic covered under Yuva Spandana

Days	Topics	Duration (min)
Day 1	Youth and All about the Program "Yuva Spandana"	60
	Youth - Health and Life style issues	150
	Education and Academic issues	180
	Planning sensitization program for Youth group	105
Day 2	CMIS formats (sensitization and resource mapping)	60
	Relationship issues	150
	Gender, sex, and sexuality issues	120
	Training and supervision	120
	Planning sensitization program for parents and teacher groups	105
Day 3	CMIS formats (registration, visit and referral forms)	60
	Supporting and Guidance Skills	150
	Youth and safety issues	180
	Planning sensitization program for ASHA/Anganwadi workers	105
Day 4	Management Skills	90
	Personality Development and Emotional Regulation	180
	Sensitization demonstration in the field for field exposure	195
Day 5	CMIS formats online demonstration	210
	Feedback session, postassessment, and administration tasks in the afternoon	

CMIS – Computerized Management Information System, ASHA – Accredited Social Health Activist

of the tool was done by experts working in the field. The questionnaire contained 10 questions related to knowledge, attitude, and practice domains. Knowledge and attitude domains had three questions each, and practice domain had four questions. Each question in the tool was scored on a six-point rating scale from 0 to 5 (0 – "very poor," 1 – "poor," 2 – "average," 3 – "good," 4 – "very good," and 5 – "excellent"). The maximum total summary score for knowledge and attitude domains was 15 each. The total score for practice was 20. The overall possible total score for the interview schedule was between 0 and 50.

All 373 trainees who were trained in 11 training programs conducted under the program YS from 2014 to 2017 were considered for the assessment. The assessment was carried out at two level: pretraining and immediate post-training. All YPs were given the questionnaire on the first and the last days of training. YPs were made to sit next to each other with an arm stretch distance to avoid copying and duplication. They were asked to circle their responses to each question. All participants were provided 30 minutes to complete the task.

Statistical analysis

Descriptive statistics such as mean and percentage were calculated for understanding the disposition of the study population. Effectiveness of the training program was assessed by

1. Improvement in mean scores post-training compared with pretraining
2. Improvement in score grades post-training compared with pretraining.

Paired *t*-test was applied to test for significant change in mean knowledge, attitude, and practice scores of YPs before and after training and among different subgroups of age, sex, education, and domicile. The distribution was assessed for normality using the Shapiro–Wilk test. Scores obtained by YPs in knowledge, attitude, and practice assessment were expressed as the percentage of the maximum possible score in each domain (Score obtained/Maximum possible score*100). Based on these percentages, level of knowledge, attitude and practice were graded (score grades) as ≤25% (Grade-I), 26%–49% (Grade-II), 50%–74% (Grade-III), and 75% (Grade-IV). Significant proportion change in different score grades before and after training was assessed. The proportion of trainees who shifted from lower grades to higher score grades was assessed using McNemar's test of significance.

Ethical approval

Ethical approval for the study was obtained from the institutional ethics committee of National Institute of Mental Health and Neuro Sciences.

RESULTS

We utilized the data of all 373 YPs who were trained. The mean (±SD) age of YPs was 27.5 ± 3.3 years; the majority (63.8%) were males, had completed (53.4%) bachelor degree, and came from rural areas (77.7%).

A significant improvement in knowledge and attitude ($P < 0.001$) was observed after the training. Though an improvement in scores of practice domain was observed, it was not statistically significant. All the subgroups showed significant improvement in

knowledge ($P < 0.001$) and attitude ($P < 0.001$) after the training. With regard to practice, only postgraduates ($P < 0.04$) and rural ($P < 0.03$) YPs demonstrated significant improvement [Table 2].

Level of knowledge [Table 3]: All 17 YPs who had scored grades <25% in pretest assessment showed improved score grades after training. Nearly 47% of these 17 YPs improved their score grades from ≤25% to ≥75%. Similarly, 91% of all YPs in score Grades II and III showed an increase to the next grade. Nearly 71% of all YPs who were in Grade IV before training continued to remain in Grade IV. Overall, 53.3% (199) of all YPs showed an improvement in score grades after training, 36.1% continued to remain in the same score grades, whereas the remaining (10%) showed down-shift in score grades.

Level of attitude [Table 3]: Out of seven YPs who had score grades <25% in the pretest assessment, six YPs showed improved score grades after training. Five of these seven YPs improved their score grades from <25% to 50%–74%. Similarly, 34 YPs who had score grades <25% in pretest assessment showed improved score grades after training. More than 70% of all YPs with the score Grades II and III showed an increase to next grade. About 83% of YPs who were in Grade IV before training continued to remain in Grade IV. Overall, 40% (149) of all YPs showed an improvement in score grades after training, 50.6% (189) continued

Table 2: Pre- and post-training test scores of Yuva Parivarthakas attending training

Domains and subgroups	Pretraining (mean±SD)	Post-training (mean±SD)	"*t*" score	*P**
Knowledge	08.92±3.08	11.24±3.70	−13.21	<0.001
Attitude	10.75±2.72	12.44±2.43	−10.25	<0.001
Skills	15.79±3.24	16.22±3.04	−2.29	0.22
Age (year)				
21-25				
Knowledge	8.87±2.35	11.35±2.35	−13.00	<0.001
Attitude	10.66±2.66	12.45±2.31	−9.92	<0.001
Practice	15.73±3.24	16.11±2.93	−1.77	0.07
≥26				
Knowledge	9.11±3.11	10.79±2.39	−3.87	<0.001
Attitude	11.15±2.94	12.38±2.88	−3.17	<0.001
Practice	16.05±3.24	16.70±3.44	−1.62	0.10
Sex				
Male				
Knowledge	9.10±3.03	11.34±2.47	−9.73	<0.001
Attitude	10.66±2.81	12.37±2.44	−8.05	<0.001
Practice	15.63±3.41	16.04±3.19	−1.71	0.08
Female				
Knowledge	8.61±3.15	11.07±2.17	−9.24	<0.001
Attitude	10.91±2.54	12.56±2.42	−6.37	<0.001
Practice	16.08±2.90	16.54±2.75	−1.54	0.12
Education				
Bachelor degree				
Knowledge	8.48±3.19	11.17±2.54	−10.27	<0.001
Attitude	10.68±2.74	12.23±2.61	−6.63	<0.001
Practice	15.83±3.14	16.15±3.17	−1.23	0.22
Postgraduation				
Knowledge	9.43±2.88	11.33±2.16	−8.45	<0.001
Attitude	10.84±2.69	12.68±2.20	−8.00	<0.001
Practice	15.75±3.35	16.30±2.90	−2.04	0.043
Domicile				
Rural				
Knowledge	8.99±3.12	11.30±2.43	−11.76	<0.001
Attitude	10.70±2.73	12.38±2.56	−8.79	<0.001
Practice	15.82±3.10	16.26±3.08	−2.07	0.039
Urban				
Knowledge	8.66±2.91	11.06±2.14	−6.02	<0.001
Attitude	10.94±2.67	12.65±1.92	−5.35	<0.001
Practice	15.71±3.69	16.08±2.92	−0.97	0.33

**P for paired t-test*

Table 3: Change in knowledge, attitude and practice levels - pre- and post-training

Pretraining	Post-training				
	Grade I	Grade II	Grade III	Grade IV	Total
Knowledge levels					
Grade I	0	5 (29.5)*	4 (23.5)*	8 (47)*	17 (5)
Grade II	3 (3)¶	6 (6)	40 (39)*	53 (52)*	102 (27)
Grade III	2 (1)¶	10 (6)¶	71 (41)	89 (52)*	172 (46)
Grade IV	0¶	0¶	24 (29)¶	58 (71)	82 (22)
Total	5 (1)	21 (6)	139 (37)	208 (56)	373
Attitude levels					
Grade I	1 (14)	1 (14)*	5 (72)*	0 (0)*	7 (2)
Grade II	0¶	1 (3)	11 (31)*	23 (66)*	35 (9)
Grade III	3 (2)¶	2 (1)¶	42 (27)	109 (70)*	156 (42)
Grade IV	1 (0.5)¶	1 (0.5)¶	28 (16)¶	145 (83)	175 (47)
Total	5 (1.5)	5 (1.5)	86 (23)	277 (74)	373
Practice levels					
Grade I	0	0*	2 (100)*	0*	2 (0.5)
Grade II	0¶	2 (13)	6 (40)*	7 (47)*	15 (4)
Grade III	1 (1)¶	4 (5)¶	25 (30)	53 (64)*	83 (22.2)
Grade IV	1 (0.5)¶	1 (0.5)¶	44 (16)¶	227 (83)	273 (73.1)
Total	2 (0.5)	7 (1.9)	77 (20.6)	287 (76.9)	373

*Shows improvement from their pretest score categories and are an indication of effectiveness of the training. ¶Indicates otherwise

to remain in the same score grades and the rest (9%) showed downshift in score grades.

Level of practice [Table 3]: Two YPs who had score grades <25% in pretest assessment showed improved score grades after training. Both the YPs improved their score grades from ≤25% to 50%–74%. Similarly, 86.6% of all YPs in score Grades II and III showed an increase to next grade. Overall, 18.2% (68) of all YPs showed improvement in score grades after training, 68% (254) continued to remain in the same score grades and rest (13.6%) showed downshift in score grades.

DISCUSSION

Overall, our study showed that YPs obtained requisite improvement in knowledge and attitude related to youth issues after the training. However, there was no statistically significant improvement observed in the domain of practical skills.

Developed in-line with the Karnataka Youth Policy-2012, this unique program is probably the first state-level program that looks at delivering youth health promotion services by trained youth volunteers called YPs. The concept of YS is in-line with the concept of "homophily,"[8,9] which specifies that social contact occurs at a higher rate among similar individuals than among dissimilar individuals. This facilitates behavioral change or adoption among youth.[10,11] Thus, training youth as YPs is an appropriate investment towards youth empowerment. Their training is expected to directly and indirectly impact service delivery, client satisfaction, and overall success of the program. Hence, it is not only a crucial strategy of the program but also a challenging one, as it involves translation of a lay-volunteer to a semi-skilled service provider, with sufficient quality to meet the service needs of beneficiaries.

To achieve the same, the program utilized indigenous modules that were developed through a systematic and logical process. The process of developing modules involved stakeholders and expert workshops consisting of youth, parents, teachers, and professionals. Around 4,162 person-hours were expended to develop ten modules.[7,11] The detailed process of module development is available in a study conducted at NIMHANS.[10] Structure, content, and mode of training of all the 10 modules were finalized in the expert workshops as well. The training was customised to address cognitive (knowledge), affective (attitude), and psychomotor domains (practice).

Majority of the YPs selected and trained under the program were males. It is because of the ratio of 1:3, which was followed for female and male to recruit YPs.

Knowledge level among the majority of the trainees improved to better grades after the training. Many training programs for various purposes generally demonstrate an improvement in cognitive/knowledge capacities.[12] Our training was particularly successful in this aspect, as nearly 53.3% (n = 199) of trainees reported improved knowledge levels. At the same time, about 10% (n = 39) of our trainees showed downgradation in knowledge level after the training. Ideally, this should not happen. However, in real-life situations, these things are likely. These participants (whose grades got lower) were not selected to work as YPs in the field. It is very true that a small portion of trainees tend to remain same and may not improve post training. Attitude change is a key thing about behavior change, and it reduces knowledge, attitude, and practice gap. Our study revealed that about 40% of the trainees moved to better attitude grades, and the majority (50.6%) remained in the same grade post-training. A few trainees downshifted after the training. Improvement is lesser as compared with knowledge as attitudinal changes need some time to manifest, unlike knowledge, and as attitude change happens as a process. The finding was in consensus with a study, which showed no significant improvement on the aspect of emotional responses post-training.[12] Individuals undergo a process of receiving information, analyzing and synthesizing the same, and relate the same to their life events. Some even conduct a trial before they consider moulding their attitudes

and behavior.[13] In addition, our classroom-based assessment may not be reflective of the measurement of the actual attitude change. It is likely that the changes could be better observed in response to real-life situations or cues rather than as rational responses to the simulation events created for training.[14] The actual improvement could have been much higher, but it is a matter of speculation.

With regard to practical (psychomotor) skills, only 18.2% showed improvement post-training. Lack of improvement in practical skills of trainees implies that the schedule adopted for training was more knowledge and attitude oriented rather than focused on the practical skills required for an efficient delivery of YS activities in their respective districts. This demands the inclusion of sessions focusing on the practical skills required for the efficient delivery of YS activities in the districts. It might also be important to have a component of handholding and supervision for the trainees in the field. This is likely to ensure the quality of services delivered under the program. From this learning, a field training component to provide practical exposure to trainees focussed on improving their practical skills in delivering program activities has been subsequently included. An Objectively Structure Practical Examination (OSPE) method for evaluating improvement in psychomotor skills may be incorporated in the future in classroom training. As assessment of psychomotor domain was done immediately after training in a classroom setting, it does not exactly reflect skill acquisition by trainees. This is one limitation of this assessment. It has been planned to repeat follow-up assessment to measure skills acquired due to the training and experience.

Practical skills are expected to improve with handholding and support in the field, which is currently in-built into the program. A lesser improvement in practical skills may be due to the timing of the post-test assessment, which was done immediately after the classroom training. Results might have been better if this was conducted after a certain period of on-site training. We also observed that the trainees who had postgraduation or came from rural areas showed more improvement in their practical skills compared with other groups. This may be attributed to increased chances of being connected to real-life experience compared with urban areas as well as more years of experience in addressing the adversities faced personally. However, there are no data to support this argument.

The interview schedule utilized for the study had only 10 questions to explore all these three domains. Except for face validation, we have not done any systematic assessment on psychometric properties (testing) of the tool we developed. Only the major aspects were covered in the questionnaire. Hence, the results of this study need to be interpreted keeping in mind this limitation. Further, a few questions did not test attitude or skills; rather, they tested "knowledge" about attitude and skills. Another potential limitation of the study is the absence of a control group.

This is the first evaluation of a training module for a comprehensive mental health promotion model. The training module developed was based on a desk review and consultation of stakeholders, and experts. There was no experience previously of such community mental health promotion model in the country. This assessment does not provide information on expected frequency or contents of refresher training nor anyway helps us to measure the quality of their work in the field, after completion of the training. This requires a longitudinal and objective assessment of quantity and quality of work done by the trained YPs. The digitized management information system specifically developed for program YS is equipped to provide such information, thereby providing opportunities for such an analysis to be conducted in the near future.

CONCLUSION

The training program was effective in improving the requisite knowledge and attitude of YPs as lay counsellors to provide youth mental health promotion services in Karnataka under the program YS. It is recommended that future training programs need to be focused on creating opportunities to YPs in order to increase their practical skills to work with youth having issues. It is also recommended that the tools for assessing the effectiveness of the training program need to be strengthened, incorporating more measures covering psychomotor domain assessment.

Acknowledgements

The authors would like to express their sincere gratitude to the Department of Youth Empowerment and Sports, Government of Karnataka for the constant direction, support and funding for this program. The authors would also like to sincerely thank all the resource persons of training and trainees who attended.

Financial support and sponsorship

Department of Youth Empowerment and Sports, Government of Karnataka and Centre for Public Health, Department of Epidemiology, NIMHANS.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Registrar General of India. Census of India. New Delhi, India: Office of the Registrar General and Census Commissioner, India; 2011. Available from: https://www.censusindia.gov.in/Census_data_2001/Census_Data_online. [Last accessed on 2019 Mar 14].
2. Healthy People 2020: Adolescent. Available from: https://www.healthypeople.gov/2020/topics-objectives/topic/Adolescent-Health. [Retrieved 2015 Sep 23]. View in Article. 2012.
3. Qureshi NA, Van HD, Schmidt HG, Al-Habeeb TA, Magzoub ME. Effectiveness of a training programme for primary care physicians directed at the enhancement of their psychiatric knowledge in Saudi Arabia. Educ Health (Abingdon, England) 2006;19:52-60.
4. Mulye TP, Park MJ, Nelson CD, Adams SH, Irwin CE Jr, Brindis CD. Trends in adolescent and young adult health in the United States. J Adolesc Health 2009;45:8-24.
5. Commission on Behavioral and Social Sciences and Education. Losing Generations: Adolescents in High-Risk Settings. Washington, D.C.: National Academy Press; 1993.
6. McNeely C, Blanchard J. The Teen Years Explained: A Guide to Healthy Adolescent Development. Center for Adolescent Health at Johns Hopkins Bloomberg School of Public Health; 2010.
7. Banandur PS, Gopalkrishna G, Garady L, Banu H. Yuva Spandana. NIMHANS; 2017.
8. Lazarsfeld PF, Merton RK. Friendship as a social process: A substantive and methodological analysis. In: Berger M, Abel T, Page CH, editors. Freedom and Control in Modern Society. New York: Van Nostrand; 1954. p. 18-66.
9. Centola D. An experimental study of homophily in the adoption of health behavior. Science 2011;334:1269-73.
10. Aral S, Walker D. Identifying influential and susceptible members of social networks. Science 2012;337:337-42.
11. Chandankumar S. Performance Assessment of Yuva Spandana Project. NIMHANS; 2016.
12. Lowe K, Jones E, Allen D, Davies D, James W, Doyle T, *et al*. Staff training in positive behaviour support: Impact on attitudes and knowledge. JARID 2007;20:30-40.
13. Brooks I. Organisational Behaviour: Individuals, Groups and Organisation. Pearson Education; 2009.
14. McBrien JA, Foxen TH. Staff training in mental handicap. In: A Pyramid Model of Staff Training in Behavioural Methods: The EDY Project. In: Hogg J, Mittler P, editors. London: Croom Helm; 1987. p. 375-427

Psychiatry's Future: Biology, Psychology, Legislation, and "The Fierce Urgency of *Now*"

40 years ago, on 2 April 1979, *Time* magazine published a dramatic cover story titled "psychiatry's depression," arguing that psychiatry was experiencing a life-or-death identity crisis and needed to find new directions in order to survive.[1] The article documented recruitment difficulties into the profession, a dearth of real knowledge about mental illness, interminable debates about the effectiveness of established psychological therapies, and the emergence of any number of eye-catching pseudo-therapies in the 1960s and 1970s. There was a risqué (and lamentably difficult to forget) photograph of a group of naked people undergoing "rebirthing" at a workshop in California. The *Time* article also noted continued problems with psychiatric hospitals and standards of care but nonetheless concluded that new research in the neurosciences now positioned psychiatry—as ever—on the cusp of a brave new era.

After 20 years, in 1999, Anthony W. Clare, Irish psychiatrist, author and presenter of *In The Psychiatrist's Chair* (BBC Radio 4, 1982–2001), wrote a somewhat similar editorial in the *Journal of Mental Health,* titled "Psychiatry's future: Psychological medicine or biological psychiatry?", touching on many of the same themes.[2] Clare noted current transitions in psychiatry that were suspiciously similar to those outlined in *Time* two decades earlier and wondered if psychiatry might actually lose its interest in the psychological and social aspects of mental illness and become a kind of reincarnated neuropsychiatry.

If this was the case, Clare was having none of it, as he pointed out that "functional" disorders (e.g., depression) were often treated with physical remedies (e.g., antidepressants, electro-convulsive therapy) and "physical" disorders (e.g., irritable bowel syndrome) were often treated with psychological therapies (e.g., cognitive behavior therapy). The split between psychological and biological aspects of medicine was, he argued, redundant in an era of neuroimaging and molecular genetics, advances in social and psychological psychiatry, and the relocation of psychiatry within general hospitals.

Clare remained worried, however, that, despite apparent advances in understanding and care, both patients and clinicians continued to wrestle with an apparent distinction between the biological and the psychological. These confusions affected the public understandings of psychiatry and mental illness in a distinctly negative way.

Despite these problems, many of which persist today, Clare advised against an excess of gloom and remained optimistic about the prospects for neuroscience, declaring in 1995 that "there has never been a more exciting or a more demanding time to be in psychiatry."[3]

But, then, this was *always* considered to be the case in psychiatry. Virtually, every moment in this discipline's history has been heralded as the start of a new era—a recurring rhetorical and cognitive trope of which Clare was only too aware. Indeed, if the history of psychiatry has any consistent theme (and it probably doesn't), it is the idea of therapeutic enthusiasm as new treatments are introduced with great excitement and then discarded in a sorry mix of tragedy and embarrassment (e.g., malaria therapy, insulin coma, lobotomy) and new fields of research emerge with great promise only to disappoint sharply or gradually transform into historical curiosities (e.g., phrenology).[4]

Nowhere is this endless cycle more apparent than in the field of biological research into the apparent causes of mental illness. In 1982, two of the world's leading and genuinely impressive psychosis researchers, Irving Gottesman and Daniel Hanson, described schizophrenia as an epigenetic puzzle and confidently predicted that it would be solved undoubtedly before the twentieth century ended.[5] There followed several decades of intensive and costly research into schizophrenia that yielded enormous amounts of scientific data but failed to uncover the definitive causes of the disorder and delivered virtually no demonstrable benefits for patients.

The turn-of-the-century deadline set by Gottesman and Hanson whistled past, and even today, almost two decades later, enormous genetics datasets (using data from over one million people) can identify no substantial genetic difference between schizophrenia, bipolar disorder, major depressive disorder, and attention-deficit hyperactivity disorder.[6] Interesting but old ideas, such as inflammation-causing

mental illness, are once again being presented as radical and new, and neuroimaging, despite vast numbers of eye-popping costly studies, remains essentially a research tool contributing virtually nothing to clinical psychiatry.[7]

Notwithstanding these disappointments and this circularity, of course, all of these research areas certainly hold significant promise for the future, but they are neither radical nor new, and they have conspicuously failed to deliver for patients to date. Most depressingly of all, even critics of psychiatry find themselves falling back on extremely tired arguments and highly selected evidence in an effort to present old criticisms as new and unexpected—and then propose arbitrary and seemingly random solutions that are backed by even less systematic evidence than the mainstream practices they purport to criticize.

All of this activity, rhetoric, and clamor are accompanied and possibly underpinned by increasing acceptance that the old questions, upon which much psychiatric research is based (e.g., "What is the cause of schizophrenia?"), were the wrong questions, to begin with. And if, as might be argued, this long-overdue reconsideration of key research questions and the final, welcome deconstruction of the concept of "schizophrenia," in particular,[8] reflects the legitimate intellectual evolution of this field, then it reflects an evolution that is too slow, too unwieldy, too costly, and too uncertain of itself to instill much confidence about the future. It also commands considerable opportunity cost in terms of research funds, researchers' time, and contributions by patients, families, and carers to research from which they personally will almost certainly never benefit.

The irony is that while research into the biology of mental illness remains severely lacking in coherence and coordination, there are—against all the scientific odds—treatments that work, including biological treatments: Antidepressants are convincingly better than placebo[9]; psychiatric medications, in general, are no less efficacious than their counterparts in general medicine and, in fact, treatment with an antidepressant is more effective in reducing relapse of depression (relative risk reduction: 58%) than aspirin is in reducing serious cardiovascular events (19%)[10]; there is ever-growing enthusiasm (and some evidence) for psychological therapies such as cognitive behavior therapy in multiple psychiatric conditions, and antipsychotics not only alleviate symptoms of psychosis but also actually reduce the risk of early death in schizophrenia.[11] So, while we do not understand the biological underpinnings of most mental illnesses, we still have treatments that help substantially and can even prolong life.

So, what next for psychiatry? 40 years on from *Time*'s sobering analysis of psychiatry's existential crisis and 20 years after Clare's comments about psychiatry's future (at least he believed it had one), what is the future of psychiatry today? Are we—as usual—on the brink of a brave new era of marvelous scientific advances that will rescue us from our terminal *ennui,* or is it time to call time on psychiatry's recurrent (and occasionally desperate) infatuation with shiny objects?

In the first instance, it is important not to throw the baby out with the bathwater because fields such as psychiatric genetics, neuroimaging, and studies of inflammation hold genuine promise for the future. But that future is ever-receding, and the principle of research justice requires that patients, families, and carers who contribute to research today should have at least the prospect of some benefit for their time and contribution. The ostensibly reasonable promise that their involvement will benefit others at some distant future date is starting to wear thin, especially if psychiatry continues to cling doggedly to unpromising research paradigms that are well past their sell-by dates. As a result, while research in psychiatric genetics, neuroimaging, inflammation, and so forth should certainly continue, it should be commissioned and conducted with a heightened awareness that sometimes there is no baby in the bathwater—only suds and bubbles. It is, perhaps, time to rebalance.

Objective, critical thought is vital. Too often, small sample sizes undermine the reliability of much-touted neuroscientific findings.[12] Selective outcome reporting and selective analysis of neuroimaging studies are particular issues: All that glitters is not gold, even in the utopian other-world of brain imaging.[13] Mindless forms of neuroscience often command a seductive appeal that they do not merit, especially when colored

images of "brain scans" accompany press releases and media reports about underpowered studies, fuelling a public discourse about neuroscience and psychiatry that is as bereft of truth as it is rich in rhetoric, and that does essentially nothing except instill false hope in people with mental illness, psychological problems, and various other forms of distress.[14]

The disappointing facts are that the treatment of, for example, schizophrenia remains in many ways the same today as when Clare wrote his paper in 1999; there has been virtually no neuroscientific advance with a significant impact on day-to-day mental health care since before the *Time* article in 1979; and, if anything, the over-zealous closure of psychiatric hospitals over the intervening decades has seen the experiences of many people with schizophrenia increasingly resemble those of their counterparts in the early 1800s, before the asylums were built, with increased rates of homelessness, imprisonment, and early death: Even today, men with schizophrenia die 15 years earlier, and women 12 years earlier, than the general population.[4,11] Antipsychotic treatment can reduce this elevated mortality, but, as the World Health Organization (WHO) points out, most of the people affected by mental, neurological, and substance use disorders—75% in many low-income countries—simply cannot access the treatment they need.[15]

And this, undoubtedly, is the key clinical, bioethical, political, and existential issue that psychiatry faces today: Gross and deadly inequity of access to effective care. How psychiatry responds to this situation should and will be the greatest single factor shaping psychiatry's future.

The current state of biological research suggests that solutions to this dilemma will not be forthcoming from that quarter any time soon, although they will likely appear in the future with better, cheaper, more scalable, or more targeted treatments or improved overall treatment paradigms. For now, however, solutions for today's patients and their families are far more likely to lie in the realms of mental health service delivery, law, and politics.

In this light, the most interesting development for the mentally ill for several decades occurred on 29 May 2018 when the Indian Mental Healthcare Act, 2017, was commenced.[16] The Indian legislation is highly innovative in that it provides a justiciable, legally binding right to mental health care to over 1.3 billion people, one-sixth of the planet's population.[17] More specifically, the Act states that "every person shall have a right to access mental health care and treatment from mental health services run or funded by the appropriate Government" (Section 18(1)). This is a highly ambitious provision by any standards.

While Indian mental health services, like those in many other countries, are substantially under-resourced and this commitment to a "right" to mental healthcare would present an enormous challenge in any jurisdiction, the Indian initiative is nonetheless a bold and exciting one, clearly reflecting the "vital role" that the WHO accords to law in advancing the "right to health."[18] It is, of course, impossible to know at this early stage precisely to what extent the Indian legislation will achieve its aims or even whether it might have some paradoxical negative effects, but the new legislation is, at least, an innovative and imaginative development in a field that is largely bereft of them, and it points to an important new direction for the future of psychiatry: The assertive use of law to improve clinical care.[19]

Most of all, the new Indian legislation, through its focus on *today's* patients, reflects what American civil rights leader Martin Luther King called "the fierce urgency of *now*,"[20] balancing the future prospects offered by biological research with an assertive focus on the patients of *today*, as opposed to the patients of some ever-receding future that is full of eternal promise, eternally unfulfilled.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

Brendan D. Kelly

Department of Psychiatry, Trinity College Dublin, Trinity Centre for Health Sciences, Tallaght University Hospital, Tallaght, Dublin, Ireland

Address for correspondence: Prof. Brendan D. Kelly
Department of Psychiatry, Trinity College Dublin, Trinity Centre for Health Sciences, Tallaght University Hospital, Dublin - D24 NR0A, Ireland.
E-mail: brendan.kelly@tcd.ie

Submitted: 21-Nov-2019
Accepted: 15-Jan-2020
Published: 09-Mar-2020

REFERENCES

1. Leo J. Psychiatry's depression. Time 1979; April 02.
2. Clare AW. Psychiatry's future: Psychological medicine or biological psychiatry? J Ment Health 1999;8:109-11.
3. Clare AW. 250th Anniversary Commemorative Medical Meeting. Dublin: St Patrick's Hospital; 1995.
4. Kelly BD. Hearing Voices: The History of Psychiatry in Ireland. Dublin: Irish Academic Press; 2016.
5. Gottesman II, Hanson DR. Preface. In: Gottesman II, Shields

J, editors. Schizophrenia: The Epigenetic Puzzle. Cambridge: Cambridge University Press; 1982. p. xi-xiii.
6. Brainstorm Consortium, Anttila V, Bulik-Sullivan B, Finucane HK, Walters RK, Bras J, *et al*. Analysis of shared heritability in common disorders of the brain. Science 2018;360. pii: eaap8757.
7. Mayberg HS. Neuroimaging and psychiatry: The long road from bench to bedside. Hastings Cent Rep 2014;44:S31-6.
8. Murray RM. Mistakes I have made in my research career. Schizophr Bull 2017;43:253-6.
9. Cipriani A, Furukawa TA, Salanti G, Chaimani A, Atkinson LZ, Ogawa Y, *et al.* Comparative efficacy and acceptability of 21 antidepressant drugs for the acute treatment of adults with major depressive disorder: A systematic review and network meta-analysis. Lancet 2018;391:1357-66.
10. Leucht S, Hierl S, Kissling W, Dold M, Davis JM. Putting the efficacy of psychiatric and general medicine medication into perspective: Review of meta-analyses. Br J Psychiatry 2012;200:97-106.
11. Crump C, Winkleby MA, Sundquist K, Sundquist J. Comorbidities and mortality in persons with schizophrenia: A Swedish national cohort study. Am J Psychiatry 2013;170:324-33.
12. Button KS, Ioannidis JPA, Mokrysz C, Nosek BA, Flint J, Robinson ES, *et al.* Power failure: Why small sample size undermines the reliability of neuroscience. Nat Rev Neurosci 2013;14:365-76.
13. Ioannidis JPA. Excess significance bias in the literature on brain volume abnormalities. Arch Gen Psychiatry 2011;68:773-80.
14. Legrenzi P, Umiltà C. Neuromania: On the Limits of Brain Science. Oxford: Oxford University Press; 2011.
15. World Health Organization. WHO Mental Health Gap Action Programme (mhGAP). Geneva: World Health Organization; 2019.
16. Duffy RM, Kelly BD. India's mental healthcare act, 2017: Content, context, controversy. Int J Law and Psychiatry 2019;62:169-78.
17. Duffy RM, Kelly BD. The right to mental healthcare: India moves forward. Br J Psychiatry 2019;214:59-60.
18. World Health Organization. Advancing the Right to Health: The Vital Role of Law. Geneva: World Health Organization; 2017.
19. Duffy RM, Gulati G, Paralikar V, Kasar N, Goyal N, Desousa A, *et al*. A focus group study of Indian psychiatrists' views on electroconvulsive therapy under India's mental healthcare act 2017: 'The ground reality is different'. Indian J Psychol Med 2019;41:507-15.
20. King ML. I have a dream. In: MacArthur D, editor. The Penguin Book of Twentieth-Century Speeches. 2nd revised ed. London: Penguin Books Ltd.; 1999. p. 327-32.

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_492_19	

How to cite this article: Kelly BD. Psychiatry's future: Biology, psychology, legislation, and "The fierce urgency of *Now*". Indian J Psychol Med 2020;42:189-92.

Clinical Hypnotherapy in Grief Resolution - A Case Report

Aarzoo Gupta, Ajeet Sidana

ABSTRACT

Grief is one's reaction to any loss, and the coping mechanisms during grief either deplete or become maladaptive. One of the common ways to cope with grief is alcohol or substance intake. The course and resolution of grief vary depending upon many factors. Hypnotherapy has been useful and effective in addressing grief reactions as well as associated manifestation, such as sleep problems, depressive features, or post-traumatic stress disorder. It might be a good choice of treatment while dealing with patients having underlying issues or maladaptive coping mechanisms. This is a single case study design hypothesized to indicate maladaptive coping of increased alcohol consumption to deal with the death of a young son. The case had been treated as alcohol dependent syndrome with multiple hospitalizations without addressing underlying grief. The treatment approach was changed, and grief was addressed using hypnotherapy. Clinical hypnotherapy helped address grief and facilitated the index case to accept the loss. This resulted in minimizing hospitalizations, abstinence and improved day-to-day functioning along with the use of adaptive mechanisms to cope with the loss. Clinical hypnotherapy is an effective intervention to deal with underlying conflicts or issues that may not be addressed directly in a therapy setting.

Key words: *Alcohol dependence, clinical hypnotherapy, grief*

Grief is one's reaction to any loss. As per the International Classification of Mental and Behavioural Disorders, grief reaction is included under adjustment disorders (F43.2) but diagnosed as a prolonged depressive reaction (F43.21) if grief lasts longer than 6 months.[1] An individual going through grief reaction can fluctuate among the various stages of grief.[2,3] The manifestation of grief is commonly in the form of depressive features, with or without suicidality. The coping mechanisms either deplete or become maladaptive during grief. One of the common ways to cope with grief is alcohol or substance intake.[4] The course and resolution of grief vary depending upon many factors.[2,3] Cognitive behaviour therapy (CBT)[5] and some other recommended techniques are helpful in loss-oriented processes namely; Gestalt empty chair, guided imagery, writing letters, poetry, or a journal, and

Access this article online	
Website: www.ijpm.info	**Quick Response Code**
DOI: 10.4103/IJPSYM.IJPSYM_476_19	

How to cite this article: Gupta A, Sidana A. Clinical hypnotherapy in grief resolution - A case report. Indian J Psychol Med 2020;42:193-7.

Department of Psychiatry, Government Medical College and Hospital, Sector 32, Chandigarh, India

Address for correspondence: Dr. Aarzoo Gupta
Department of Psychiatry, Government Medical College and Hospital, Sector 32, Chandigarh, India.
E-mail: aarzoo_gupta9@yahoo.com

Submitted: 07-Nov-2019, **Revised:** 30-Dec-2019, **Accepted:** 01-Feb-2020, **Published:** 09-Mar-2020

making art.[2] But all those techniques operate at the cognitive or behavioural level. Hypnotherapy is a form of intervention where communication with the mind is established through suggestions delivered directly or indirectly with the use of metaphors in an altered state of consciousness.[6,7] It has been useful and effective in addressing grief reactions in children as well as adults.[8] It is recommended therapy for addictive behaviours,[7] but its role in grief resolution has not been explored in the Indian setting. Also, individuals with associated manifestations, such as sleep problems, depressive features, or post-traumatic stress disorder (PTSD), have benefitted from the use of hypnotherapy.[9]

CASE DESCRIPTION

Mr R is a 47-year-old, diploma holder, married male hailing from an urban Hindu family of middle socio-economic status, running a real estate and construction business. Premorbidly, he was meticulous in work, having a calm and self-regulated temperament, and a member of many social and charity organizations where he often volunteered in altruistic activities. There was an occasional use of alcohol after returning from work, which helped him get sleep. He presented in out-patient department of Psychiatry for the first time in April 2012 with features of low mood, suicidal ideation, anger outbursts, disturbed sleep and poor appetite. The symptoms were precipitated by the death of his son who committed suicide in January 2012 due to failure in the 10th class exams. The reason for consultation was daily consumption of one bottle of Indian made foreign liquor (IMFL) for the last 4-5 days. His mental status examination revealed feelings of sadness, loneliness, worthlessness, and helplessness reflected in cognitions such as "He should have cremated me, but I had to cremate him", "I see no purpose in living or earning money, whom do I have to do it for?", and "I have no one; I don't want to live".

Treatment was initiated and he had 14 hospitalisations, of 10-19 days with an average of 9 days in-patient stay, in a span of 4 years. These hospitalisations had been triggered by the anniversary, examination, and festival dates. The symptom at the time of hospitalisation had been intoxicated state and binge drinking. He had attempted to commit suicide once by overdosing the prescribed medicines, but then he himself walked into the emergency services of the hospital. He had been compliant to pharmacotherapy, except for rare irregularity in follow-up.

He was advised psychotherapy at first psychiatry consultation from a psychologist to address grief. He reported that he felt extremely uncomfortable talking about the issues in therapy as it brought back memories, and after the session, his crying spells and alcohol intake persisted with intensity for about a week. Consequently, he dropped-out of psychotherapy by end of 2012.

In addition, he started having a dispute over property with his brother, who insisted the patient to write his share in the brother's name, as the patient had no heir. There had been a marital conflict with his wife, who, after the death of their son, wanted a second child, but the patient was not ready as he had been mourning. Consequently, within 3-4 months, she moved to Canada to live with her parents. The couple had been in contact via telephone. Each time, the wife insisted him to join her in Canada, while he asked her to come back to India. She refused, saying that she had no reason to return to India and did not want to be in an environment that reminded her of their son. The couple could not come to a consensus on this, and the process of filing divorce was never initiated.

FORMULATION

Hypothesising the problem

His first reaction to the loss involved shock, crying, preoccupation with thoughts of the deceased, and lack of muscular power, lasting from a few hours to 10 days. Once the rituals and other arrangements were over, while confronting the loss, he started experiencing persistent yearning, crying, feelings of helplessness, and difficulty doing day-to-day-activities. There had been symptoms of depression (depressed mood, feeling tired and weak, loss of appetite, difficulty in sleep, weight loss, and restlessness). This resulted in staying aloof and social withdrawal. There was incomplete grieving as he was stuck and had not been able to resolve it. Overall, the psychodynamic formulation of the case revealed that his underlying feeling was sadness, and the defence used by the patient was 'acting out,' where he was behaviourally indulging into alcohol consumption. The depressive symptoms and worry about the future were manifestations of unresolved grief.[10]

Defining problems and goals of therapy

The problems defined were unresolved grief, increased alcohol intake as a way of coping, interpersonal conflicts, and inadequate social support. The outcomes of the therapy targeted were grief resolution, resumption of routine functioning, and encouraging the use of alternative coping mechanisms and social participation. The index case had been stuck at the emotional level since 2012 and had been resistant to talk about the loss in awareness, leaving no room for CBT for grief resolution. Therefore, hypnotherapy was chosen to address his emotional block in a state of subconsciousness or trance. Clinical hypnotherapy

could be delivered indirectly using metaphors, and the technique of future progression could be used without mention of the past of the patient.[7] In addition, the formulation revealed that resolving the conflict is necessary to manage manifested symptoms.

Hypnotherapy was initiated in the month of June 2016 during the in-patient stay. The challenge was resistance arising out of past experience in psychotherapy. Grief resolution was taken as the first goal, as the history revealed unless the grief was resolved, other outcomes in psychotherapy could not be expected.

MANAGEMENT

Dealing with resistance

Thematic Apperception Test (TAT)[11] was done to get introduced to the patient as well as to have an objective assessment of the hypothesised problems. The assessment (TAT) was completed in three sessions as he often felt strained and was not able to sit for long. The verbal communication was minimal between the patient and the therapist, but the patient was seen daily to establish rapport. The TAT stories were complete, revealing identification of loss, interpersonal and intrapersonal conflicts, and feeling of isolation. TAT revealed a conflict between the needs for affiliation and rejection, suggesting that he wanted affection of the loved one and had to separate himself from the subject of affection.

Simultaneously, guided imagery was initiated from the first session, and he was made to practice daily. At the termination of the guided imagery session, feedback was taken from him. He reported feeling calm momentarily. The session was terminated using suggestive statements, creating a sense of hope for a positive outcome in clinical hypnotherapy (CH). He started reporting calmness after an 8-9 minutes session of guided imagery.

Finally, the consent for CH was sought on the 5th day, by addressing his concerns related to the treatment approach. He was explained how CH might be beneficial in letting go the emotional baggage that he had been carrying for the last four years as projected in the TAT findings. He was also explained how it is going to be similar to guided imagery, where he does not have to engage in dialogue(s) with the therapist. He agreed, and audio recording was used for guided imagery to make him adapt to listening to the audio-recording and prepare him for self-hypnosis practice in the future. The audio recorded file was transferred to his mobile phone. He continued the guided imagery session using the file.

Hypnotherapy sessions

On the 7th day, the patient was prepared in the morning for a hypnotherapy session to be audio recorded so that he could use the audio-recording for daily self-practice. A 90-minute session was delivered and audio recorded in a quiet and comfortable place. A hypnotic session has stages of light, medium, and deep hypnosis, and lastly, dehypnotize by making the patient aware of surroundings through sensory inputs, terminating the communication with the sub-conscious.[6,7] The audio session began with the guided imagery, aiming to enhance internal focus and defocus from external stimuli. This induces a state of trance where guardedness and reluctance become weaker, resulting in increased receptivity to the verbal suggestions communicated indirectly. The light hypnotic stage comprises of the head to toe body scan using self-guided relaxation,[12] followed by visual imagery involving the five senses.[7] By now, the patient is assumed to have entered into deep trance. The same is validated using ideomotor signalling, where a gesture, such as raising the right index finger for 'yes' and left index finger for 'no', is decided to be indicated by the patient when in the trance state so that the hypnotic stage is not interrupted. This later guided the therapist to know whether the patient wants to discontinue at any point. It is now that the patient is ready for direct or indirect verbal suggestions. The technique used was future progression and visual imagery along with metaphors such as sun, road, stones, and house. The suggestions were a mixture of direct and non-direct statements. In the second and third hypnotic stages, through imagery, he was made to walk through hills, receiving new energy from sun, to jump over and kick stones or to avoid stones like problems or challenges of life, moving forward on the path of life, to cross a bridge and empty the baggage of past into a river, and to enter his house full of darkness – as he enters, he brings light and life to it. Finally, the post-hypnotic suggestion was linked with sun rays and water, filling him with light to beat the darkness of past and move towards sense of optimism. He was dehypnotised with deep breathing. The audio recording was stopped, and he was advised to listen to the audio-recording every day in the form of self-hypnosis.

The feedback was taken, and he reported to be comfortable during the session and later while practicing self-hypnosis. He was discharged and continued to follow-up on an out-patient basis. The psychotherapy sessions were kept brief, and comprised of enquiring about the experiences of the patient while practicing self-hypnosis sessions as well as post-session. He started opening up gradually, he appeared euthymic, and intake of alcohol decreased significantly in follow-up sessions.

Relapse in management

He had one relapse to alcohol use after four months from the onset of therapy and had to be hospitalised. He approached emergency services of the hospital in an intoxicated state, which was similar to previous hospitalisations. During the psychotherapy sessions, it came forth that the first change he experiences is sleep disturbance, followed by a headache. The headache was becoming extremely severe to tolerate, leading to alcohol intake to numb the pain. The same was communicated to the Psychiatrist, and pharmacotherapy aimed primarily at sleep rather than alcohol intake or depressive symptoms was initiated. He was instructed to approach the emergency services in the early stages of sleep disturbance than seeking help at a later stage after the severity has increased. It was during this hospitalisation, after having established rapport, that the patient was psycho-educated about the cycle of grief given by Kubler and Ross, his symptoms, causing impairment in functioning. Also, the parents were included in the psychotherapy sessions, making them aware of the despair and pain experienced by the patient and his coping.

Termination and outcome of therapy

The next one year of psychotherapy comprised of the practice of self-hypnosis. Supportive therapy was used as an adjunct to achieve social participation and improve functioning.[13] His improved functioning made him use resources like family, spirituality, and altruism, instead of alcohol consumption, to cope with grief. After six months of intervention, decision making was done regarding occupation. He finished his pending financial transactions. He explored options for occupation and finally decided to do volunteer and charity work. He assertively conveyed his terms to his brother regarding property share and procured all documentary evidence to avoid legal disputes in the future. His divorce got through, and he did not suffer regular altercation. Both partners amicably settled and signed the papers.

A total of 40 sessions were taken in a span of 2 years – the distribution of these sessions was 10 daily sessions at the time of initiation of therapy, followed by 8 weekly sessions for a period of 2 months. Then, a spacing was introduced in the sessions, and four sessions every fortnight were taken. There were three booster sessions of once a month follow-up. The termination was introduced as he had been asymptomatic and functioning adequately. There was a minor turbulence when his father died, but he did not slip into any relapse and resumed routine tasks. He was now maintaining well through festivals and anniversary dates; and participated in the *shraad* (annual death ceremony ritual) of his son for the first time in the last 6 years since his death. Currently, he has been maintaining well, and the session is taken once in 3 months. The targeted treatment goals have been achieved.

DISCUSSION

The index case underwent 40 sessions in total. The outcome measures were grief resolution, symptom reduction in terms of decreased alcohol intake and decreased hospitalizations, and improved level of functioning. The use of objective outcome measures (assessment tools) was avoided, keeping in view the resistance in the patient to engage in therapy. The process of assessment and management has been explained to go parallel. It was in the index case that the assessment format was hypothesized [Table 1][2] using the file records, and the aim was to seek consent to initiate psychotherapy for grief resolution. The grief was addressed and not the resulting behavior or dysfunction. It has also been observed in the clinical setting that patients often get uneasy with repetitive clinical interviews or if clinicians are often changed. Keeping in view the chronicity of bereavement and avoidance in the index case to talk about the deceased person,[2,14] clinical hypnotherapy was planned. Clinical hypnotherapy has its roots in the psychodynamic school of psychology. This implies that his conscious mind could understand that his son had died, and he had to move on.[6] But his sub-conscious mind was not ready to accept the death of his son. These dilemmas were resolved through the use of clinical hypnotherapy,

Table 1: Case formulation using BASIC SID[2]

BASIC SID	Domains	Description for Index case
Behavior	Suicidal risk Aggressive behavior Disregard of rules	History of attempt While intoxicated Abusive and violent behavior towards the mother
Affect	Lack of awareness of own feelings Depressed mood	Not able to attribute alcohol intake to grief Sadness due to past loss
Sensation	Painful muscular tension Obsessive mental images	Intermittent headaches Of rituals and ceremonies
Imagery	Flashbacks	Of body, rituals and time spent with son
Cognition	Poor problem-solving skills	Maladaptive coping through binge drinking
Spiritual	Excessive guilt Lack of meaning and purpose in life Ambivalence over religious faith	Incapable of saving son Loneliness Stopped religious activities
Interpersonal	Social isolation Socially unacceptable behavior Marital conflict	Not interacting with parents or others Abusive and aggressive when intoxicated Ongoing divorce with wife
Drug and biological	Alcohol abuse Overweight and physically unfit	Chronic No physical activity and sedentary lifestyle

that is, communication with the subconscious or unconscious mind. It was used as an indirect approach using metaphors.

Later, supportive therapy was used as an adjunct; the techniques used were guidance, tension control, externalization of interest, prestige suggestion, and persuasion.[13] Supportive therapy was aimed at environmental manipulation and regaining the equilibrium. All other related issues and his deep fears were brought up in the session by the patient after six months of psychotherapy. This probably was after the grief resolved, his premorbid-self resurfaced, and he could talk to the therapist without any barriers.[3]

The index patient showed motivation to seek help, as is evident from his compliance to pharmacotherapy as well as psychotherapy. His one suicide attempt was seen as a sign of frustration and disappointment because his persistence in seeking help reflects optimism and willingness to get better. Therefore, this was brought up into discussion after six months of ongoing therapy sessions. Caution was taken in dealing with the index case, to avoid any therapy variables leading to drop-out. To this, he answered that he never wanted to die as he felt a sense of responsibility towards his aged parents. The assets in his personality were his social relations, association with social groups, persuasion of interests, premorbid calm and relaxed mood and his responsible attitude towards work.

CONCLUSION

Clinical hypnotherapy can be a useful and effective intervention in prolonged grief reaction. It can be used to address issues of unresolved grief in those individuals who develop any psychiatric disorder in response to prolonged grief reaction or in those who show complete avoidance to talk about the deceased.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. World Health Organization. The ICD 10 Classification of Mental and Behavioural Disorder: Clinical Descriptions and Diagnostic Guidelines: Tenth Revision, 2nd ed. World Health Organization; 2004.
2. Ingram BL. Clinical case formulations: Matching the integrative treatment plan to the client. New Jersey: John Wiley and Sons; 2006. p. 36.
3. Rosner R, Pfoh G, Kotoučová M. Treatment of complicated grief. Eur J Psychotraumatol 2011;2. doi: 10.3402/ejpt.v2i0.7995.
4. Pilling J, Thege BK, Demetrovics Z, Kopp MS. Alcohol use in the first three years of bereavement: A national representative survey. Subst Abuse Treat Prev Policy 2012;7:3-7.
5. Kosminsky P. CBT for grief: Clearing cognitive obstacles to healing from loss. J Ration Emot Cogn Behav Ther 2017;35:26-37.
6. Axelrad AD, Brown D, Wain HJ. Hypnosis. In: Kaplan and Sadock's Comprehensive Textbook of Psychiatry. 9th ed. Philadelphia: Lippincott Williams and Wilkins Publishers; 2009. p. 2805-32.
7. Kroger WS. Clinical and Experimental Hypnosis: In Medicine, Dentistry and Psychology. Philadelphia: J. B. Lippincott Company; 1963.
8. Manthorpe D. The management of unresolved grief. Aust J Clin Exp Hypn 1990;18:35-43.
9. Sawni A, Breuner CC. Clinical hypnosis, an effective mind–body modality for adolescents with behavioral and physical complaints. Children (Basel) 2017;4:19-30.
10. Leiper R, Psychodynamic formulation. In: Johnson L, Dallas R, editors. Formulation in Psychology and Psychotherapy. 1st ed. New York: Routledge; 2006. p. 47-71.
11. Choudhary U. Indian Modification of the Thematic Apperception Test. New Delhi: Prasad Psycho Corporation; 1960.
12. Malhotra S, Chakrabarti S, Gupta A, Mehta A, Shah R, Kumar V, *et al*. A self-guided relaxation module for telepsychiatric services: Development, usefulness, and feasibility. Int J Psychiatry Med 2013;46:325-37.
13. Wolberg LR. The Technique of Psychotherapy. 4th ed. New York: Grune & Stratton; 1988.
14. Shear K, Monk T, Houck P, Melhem N, Frank E, Reynolds C, *et al*. An attachment-based model of complicated grief including the role of avoidance. Eur Arch Psychiatry Clin Neurosci 2007;257:453-61.

Letters to Editor

Gender Differences in Auditory P300 Event-Related Potential in Indian Population

Sir,

Identification of biomarkers in mental illnesses is an important step toward developing reliable diagnostic tests, identifying people at risk, predicting the course and prognosis of illnesses, and developing an etiopathophysiologically valid psychiatric classification system. Event-related potentials (ERP) are voltage fluctuations in the electroencephalogram (EEG) that are time-locked to internal or external events (e.g., stimuli, response, decision).[1] ERPs have been used to study the neural basis of cognitive functions and the pathophysiological basis of psychiatric and neurologic diseases.[2] Recent evidence suggests that the P300 ERP component has great potential as an actionable biomarker in schizophrenia as it can help in diagnosis, differential diagnosis, predicting disease risk, predicting treatment response, and in new treatment development.[3] But, its use in real-world settings is limited by the lack of normative data in different populations and limitations in technical expertise.

A recent multisite study of the Consortium on the Genetics of Schizophrenia demonstrated that P300 measures could be reliably obtained from settings without EEG-specialized laboratories, extensive technical training, or onsite expertise in EEG assessment and analysis; a relatively simple, two-channel EEG system yielded 91% usable P300 data in less than 30 min across multiple sites. Furthermore, demographic factors, especially age, sex, and race, are important variables that affect P300 values.[4]

Age-related normative data for P300 in the Indian population has been published before.[5] However, gender differences in P300 have not been investigated in the Indian population. This study aimed to compare the latency and amplitude of P300 in males and females in the 20–25 years age group of the Indian population. This age group was selected as P300 waveforms have well-established adult form by this age, and this age group also represents the peak age of the onset of schizophrenia.[6,7]

This study was carried out at the Centre for Cognitive Neurosciences in a tertiary teaching hospital in India. The study was approved by the institute ethics committee. The sample consisted of auditory P300 ERP of healthy control participants from previous studies done at the department. A list was made of all previous studies, from 1999 to 2009, conducted at the department measuring P300. Only those studies in which the same auditory oddball paradigm was used were included. Healthy control participants in the age range of 20–25 years were selected from these studies.

P300 recordings of healthy control participants were analyzed for amplitude and latency. P300 amplitude was measured as the peak amplitude relative to a pre-stimulus baseline between 250 and 500 ms post-stimulus, and the P300 latency was measured relative to the stimulus onset and defined as the time period between stimulus onset and peak amplitude. In all these studies, P300 was recorded by an auditory oddball paradigm in which two types of tones were presented to the participants through a headphone; a frequent tone at 40 dB and a rarer louder target tone at 55 dB. Participants were instructed to recognize the rarer type of tone and press a button with the dominant hand each time they heard it. EEG filters were set at a high cutoff of 100 Hz and a low cutoff of 0.1 Hz. The frequency of the target tone was 2 kHz and its presentation probability was 20%, whereas the frequency of the frequent tone was 1 kHz, and the presentation probability was 80%. Signal averaging was done using EB Neuro Galileo NT (Firenze, Italy). Trials with significant artifacts, including eye blinks, eye movements, muscle artifacts, and skin potentials, were excluded manually before generating averaged ERP waveforms.

Data obtained were analyzed using the SPSS 17 version. Shapiro-Wilk's test showed that most of the variables were not normally distributed. Mann-Whitney U test was used to compare age, amplitude, and latency in the three central electrodes (frontal [Fz], central [Cz], and parietal [Pz]) across gender. The significance level was kept at $P < 0.05$ (two-tailed). There was no statistical difference in the age across the genders ($U = 95.5$, $P = 0.15$).

The amplitude and latency in Fz, Cz, and Pz electrodes were calculated in 34 participants—13 males and 21 females. Reliable data for Fz electrodes was found only in 12 males and 20 females. P300 latency in Fz, Cz,

Table 1: Age and P300 amplitude (in microvolts (μV)) and latency (in milliseconds) across frontal (Fz), central (Cz), and parietal (Pz) locations

	Males (*n*=13)*		Females (*n*=21)*		U	*P*	η^2
	Mean±SD	Median (range)	Mean±SD	Median (range)			
Fz Latency	344.11±23.49	346.88 (331.25-374.22)	360.45±15.55	364.45 (280.47-393.75)	73	0.07	0.105
Cz Latency	337.41±24.82	339.06 (303.91-372.27)	350.5±13.41	356.64 (286.33-376.17)	85	0.07	0.098
Pz Latency	331.25±28.13	329.3 (294.14-372.27)	347.25±21.16	346.88 (292.19-389.84)	71	0.02	0.159
Fz Amplitude	6.27±5.67	4.265 (1.6-21.7)	7.82±3.9	7.67 (0.79-17.4)	82	0.15	0.068
Cz Amplitude	8.93±5.85	6.81 (2.75-21.8)	11.12±4.6	10.7 (4.85-25.1)	92.5	0.12	0.072
Pz Amplitude	11.34±5.56	9.18 (4.23-21.4)	14.57±6.16	13.5 (5.48-32.6)	95	0.15	0.064

*Males *n*=12 and *Females *n*=20 for Fz amplitude and latency

and Pz electrodes showed a clear trend toward higher values in females in comparison to males, but no such difference was seen in amplitude [Table 1].

Previous studies regarding the influence of gender on P300 have shown mixed results. While earlier studies found no effect of gender on latency or amplitude, later studies showed a larger P300 amplitude in females.[8,9] Studies have also shown that P300 latencies vary as a function of age and gender. Segalowitz and Barnes (1993) reported larger P300 amplitudes in females in a young adolescent group, while in the older adolescent group (17 years), males showed larger amplitudes.[10] A recent systematic review exploring gender effects on auditory P300 revealed interesting findings.[11] 13 out of 31 studies reported larger P300 amplitudes in females. Only one study out of 24 studies reported longer P300 latencies in females, and all other studies found no gender-related effect on P300 latencies.[11] The study by Melynyte *et al.*, which found longer latencies in females, included only young female subjects (age range: 18–29 years), which is comparable to our sample.[12] More studies are needed in this specific age group with more sample size to test the consistency of this finding. Gender differences in P300 have been attributed to variations in processing strategies, anatomical differences such as larger corpus callosum in females, different neuronal maturity rates, and hemispheric asymmetry between males and females.[13]

Keeping in mind that our study sample was small, results from our study and previous studies suggest the need for gender-based P300 normative data for it to be clinically useful.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

N. A. Uvais, S. Haque Nizamie[1,2], Basudeb Das[2], Mohammad Z. U. H. Katshu[3], V. S. Sreeraj[4]

Department of Psychiatry, Iqraa International Hospital and Research Centre, Calicut, Kerala, [1]Centre for Cognitive Neurosciences, [2]Central Institute of Psychiatry, Kanke, Ranchi, Jharkhand, [4]Department of Psychiatry, National Institute of Mental Health and Neurosciences, Bengaluru, Karnataka, India, [3]Department of Psychiatry, University of Nottingham, Nottingham, England

Address for correspondence: Dr. N. A. Uvais
Department of Psychiatry, Iqraa International Hospital and Research Centre, Calicut - 673 009, Kerala, India.
E-mail: druvaisna@gmail.com

Submitted: 04-Aug-2019
Revised: 20-Sep-2019
Accepted: 14-Dec-2019
Published: 09-Mar-2020

REFERENCES

1. Chiappa K. Evoked Potentials in Clinical Medicine. New York: Lippincott Raven; 1997.
2. Polich J. P300 in clinical applications: Meaning, method, and measurement. Am J EEG Technol 1991;31:3.
3. Luck SJ, Mathalon DH, O'Donnell BF, Hämäläinen MS, Spencer KM, Javitt DC, *et al*. A roadmap for the development and validation of ERP biomarkers in schizophrenia research. Biol Psych 2011;70:28-34.
4. Turetsky BI, Dress EM, Braff DL, Calkins ME, Green MF, Greenwood TA, *et al*. The utility of P300 as a schizophrenia endophenotype and predictive biomarker: Clinical and socio-demographic modulators in COGS-2. Schiz Res 2015;163:53-62.
5. Uvais NA, Nizamie SH, Das B, Praharaj SK, Ul Haq Katshu MZ. Auditory P300 event-related potential: Normative data in the Indian population. Neurol India 2018;66:176-80.
6. Barajas J. The effects of age on human P3 latency. Acta Otolarangol Suppl 1990;476:157-60.
7. Buchwald J. Comparison of plasticity in sensory and cognitive processing systems. Clin Perinat 1990;17:57-66.
8. Polich J. Normal variation of P300 from auditory stimuli. Electroencephal Clin Neurophysiol 1986;65:236-40.
9. Niwa S, Hayashida S. N1 and P300 in healthy volunteers. Environ Res 1993;62:283-8.
10. Segalowitz S, Barnes K. The reliability of ERP components

in the auditory oddball paradigm. Psychophysiology 1993;30:451-9.
11. Melynyte S, Wang GY, Griskova-Bulanova I. Gender effects on auditory P300: A systematic review. Int J Psychophysiol 2018;133:55-65.
12. Melynyte S, Ruksenas O, Griskova-Bulanova I. Sex differences in equiprobable auditory Go/NoGo task: Effects on N2 and P3. Exp Brain Res 2017;235:1565-74.
13. Witelson S, Kigar D. Sylvian Fissura morphology and asymmetry in men and women: Bilateral differences in relation to handedness in men. J Comp Neurol 1992;323:326-40.

Access this article online

Website: www.ijpm.info

Quick Response Code

DOI: 10.4103/IJPSYM.IJPSYM_329_19

How to cite this article: Uvais NA, Nizamie SH, Das B, Katshu MZ, Sreeraj VS. Gender differences in auditory P300 event-related potential in Indian population. Indian J Psychol Med 2020;42:198-200.

Relationship between Matrix Metalloproteinase-9 and Lifetime History of Suicidal Behavior in Remitted Patients with Bipolar I Disorder: A Cross-Sectional Pilot Study

To the editor,

Bipolar disorder (BD) is a chronic recurring mood disorder with a lifetime prevalence of 1.06%.[1] BD is associated with comorbid substance use, medical illnesses, suicidal behaviors, and biorhythm irregularities, leading to increased morbidity and mortality.[2,3]

Suicidality is one of the preventable causes of mortality in BD. The prevalence rates of suicide attempts (25–50%) and suicidal deaths (8–19%) are higher among BD-I patients than the general population.[4] There are various biopsychosocial risk factors for suicidality in BD.[5]

Neurotrophins such as brain-derived neurotrophic factor (BDNF) and matrix metalloproteinase-9 (MMP-9) are actively researched as biomarkers in BD. BDNF is biologically activated by MMP-9, leading to effective neuronal growth and synaptic plasticity.[6] Studies reveal that suicidality and BD are independently associated with raised MMP-9 levels.[7,8]

The present study aimed to evaluate the relationship between MMP-9 levels and lifetime history of suicide attempt in remitted BD-I patients.

MATERIALS AND METHODS

The study was cross-sectional in design, and the participants were recruited by purposive sampling in a tertiary-cum-teaching hospital in southern India. Patients with BD-I (n = 150) were enrolled into the parent study, which analyzed the course and outcome of BD-I among Indian patients.[9] A subset of patients (n = 60) from the parent study was studied for neurotrophic markers (MMP-9) and cognitive functions in another unpublished research. Those patients with data on illness course, suicidality, and neurotrophic markers were included in the present pilot study.

Patients aged 18–65 years, with BD-I diagnosis as per Structured Clinical Interview for DSM-IV-TR Axis-I Disorders (SCID-I),[10] with illness duration of minimum 3 years, and currently in clinical remission as defined by Hamilton Depression Rating Scale (HDRS) score <8 and Young Mania Rating Scale (YMRS) score <7 were included.[11,12] Patients with active substance use in the past 12 weeks or having medical/neurological illnesses were excluded.

Sociodemographic data were collected using a semi-structured proforma. The illness course was systematically charted in the National Institute of Mental Health – Life Chart Methodology (Retrospective) chart.[13] The severity of lifetime suicide behavior was assessed using the Columbia Suicide Severity Rating Scale (C-SSRS).[14] Serum MMP-9 levels were assessed using the enzyme-linked immunoassay method. Informed consent was obtained from all the participants, and the Institute Ethics Committee approved the study protocol.[9]

Non-parametric tests were chosen for this sample due to the non-uniform distribution of MMP-9 values. After appropriate descriptive analyses, Mann–Whitney *U* test was used for comparison for dichotomous variables and Kendall's τ *b* was used for non-parametric correlation with the continuous data. No sensitivity analysis was performed. Statistical analyses were conducted using SPSS 19 (IBM Corp, Armonk, NY), and $P < 0.05$ was considered significant.

RESULTS

Remitted BD-I patients ($n = 25$) were recruited. The mean age was 34.0 years (range 22–56 years), with 60% being females. The participants were mainly home-makers, and were educated above 10th grade. A major proportion (92%) belonged to the lower socioeconomic status. The mean duration of BD was 12.1 years (range 3–24 years), with a mean of 5 episodes (range 2–13). Eleven participants (44%) had unipolar mania. The lifetime history of a suicide attempt was noted in 20% ($n = 5$) of the participants.

In the present study, only 6 out of 25 subjects (24%) had MMP-9 levels within the standard normal range (11.4-59.4 ng/ml), with the remainder having less than normal levels. The mean MMP-9 level in the entire sample was 9.09 ± 11.58 ng/ml. The levels of MMP-9 were higher in patients with a lifetime history of a suicide attempt when compared to those without (20.25 ± 169.49 ng/ml vs. 6.29 ± 8.24 ng/ml, Mann–Whitney $U = 14.000$, $P = 0.014$). MMP-9 levels negatively correlated with the age of the participants (Kendall's $\tau\ b = -0.264$, $P = 0.068$) and the duration of BD (Kendall's τ b = -0.279, $P = 0.057$), with a trend toward significance [Table 1].

Table 1: Relationship of MMP-9 with clinical variables

Variable	Relationship with MMP-9 levels† Test statistic (*P*)
Age‡	-0.264 (0.068)
Gender§	75.0 (1.000)
Duration of BD-I‡	-0.279 (0.057)
Number of episodes‡	0.042 (0.776)
Only manic polarity‡	74.0 (0.893)
Past history of suicide attempt§	14.0 (0.012)*

†Relationship assessed using Kendall τ b (for continuous data‡) or Mann Whitney U (dichotomous data§), *$P<0.05$. BD-Bipolar Disorder-type I, MMP-Matrix Metalloproteinase

DISCUSSION

The prevalence rate of suicide attempts in the study population was comparable to those observed in a previously reported study[15] A preponderance of T-allele versus C-allele of 1562C/T of the MMP-9 gene was found in BD patients compared to control subjects, leading to pro-inflammatory changes.[16,17] Considering the neuroinflammatory hypothesis of BD, increased MMP-9 levels could be considered a marker of an inflammatory state.

In the current study, elevated MMP-9 levels were associated with a lifetime history of suicide attempt in BD, suggesting the role of a state marker for suicidality.[9] However, the evidence remains inconclusive on the nature of the association of MMP-9 with the illness phase (acute/remission). While some studies reported elevated MMP-9 during the remission phase,[17] some other studies have revealed increased MMP-9 during both acute and remission phases of depression.[18,19] Variation of MMP-9 levels with age, as noted in previous studies, could not be replicated in the present study, probably due to the low sample size.[18]

Despite being one of the first Indian studies exploring the role of MMP-9 in suicidality, the study has the following limitations:

- The present study is a pilot study with a small sample size, and a minuscule proportion with the variable of interest (i.e., suicidal attempts in the past) would have influenced the negative association between MMP-9 and clinical characteristics
- Lack of a control group precludes an interpretation of MMP-9 levels as a marker of suicidality in BD-I
- The retrospective study design had inherent recall bias.

Nevertheless, the present study emphasizes the need to assess newer markers such as MMP-9 in suicidality observed in BD. Future studies with a large sample size and a control group will help elucidate the role of biomarkers in suicidality associated with BD.

Financial support and sponsorship
Intramural research grant was utilized to purchase biomedical kits (No. JIP/Res/Intra-MD-MS/first/04/2014).

Conflicts of interest

There are no conflicts of interest.

Vigneshvar Chandrasekaran, Karthick Subramanian[1], Shivanand Kattimani[2], Hanumanthappa Nandheesha[3], Siddharth Sarkar[4], Venkatalakshmi Penchilaiya[5]

Department of Psychiatry, Sree Lakshmi Narayana Institute of Medical Sciences, [1]Department of Psychiatry, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth (Deemed-to-be University), Departments of [2]Psychiatry and [3]Biochemistry, JIPMER, Puducherry, [4]Department of Psychiatry and NDDTC, All India Institute of Medical Sciences, New Delhi, [5]Panimalar Medical College Hospital and Research Institute, Chennai, Tamil Nadu, India

Address for correspondence: Dr. Karthick Subramanian Department of Psychiatry, Mahatma Gandhi Medical College and Research Institute (MGMCRI), Sri Balaji Vidyapeeth (Deemed-to-be University), Pondicherry - 607 402, India.
E-mail: drkarthick.psy@gmail.com

Submitted: 30-Jul-2019
Revised: 28-Aug-2019
Accepted: 27-Jan-2020
Published: 09-Mar-2020

REFERENCES

1. Merikangas KR, Jin R, He J-P, Kessler RC, Lee S, Sampson NA, *et al*. Prevalence and correlates of bipolar spectrum disorder in the world mental health survey initiative. Arch Gen Psychiatry 2011;68:241-51.
2. Latalova K, Kamaradova D, Prasko J. Suicide in bipolar disorder: A review. Psychiatr Danub 2014;26:108-14.
3. Gonzalez R. The relationship between bipolar disorder and biological rhythms. J Clin Psychiatry 2014;75:e323-31.
4. Marangell LB, Bauer MS, Dennehy EB, Wisniewski SR, Allen MH, Miklowitz DJ, *et al*. Prospective predictors of suicide and suicide attempts in 1,556 patients with bipolar disorders followed for up to 2 years. Bipolar Disord 2006;8:566-75.
5. Galfalvy H, Oquendo MA, Carballo JJ, Sher L, Grunebaum MF, Burke A, *et al*. Clinical predictors of suicidal acts after major depression in bipolar disorder: A prospective study. Bipolar Disord 2006;8:586-95.
6. Kuzniewska B, Rejmak E, Malik AR, Jaworski J, Kaczmarek L, Kalita K. Brain-derived neurotrophic factor induces matrix metalloproteinase 9 expression in neurons via the serum response factor/c-Fos pathway. Mol Cell Biol 2013;33:2149-62.
7. Rosenblat JD, McIntyre RS. Bipolar disorder and inflammation. Psychiatr Clin North Am 2016;39:125-37.
8. Ventorp F, Barzilay R, Erhardt S, Samuelsson M, Träskman-Bendz L, Janelidze S, *et al*. The CD44 ligand hyaluronic acid is elevated in the cerebrospinal fluid of suicide attempters and is associated with increased blood-brain barrier permeability. J Affect Disord 2016;193:349-54.
9. Karthick S, Kattimani S, Rajkumar RP, Bharadwaj B, Sarkar S. Long term course of bipolar I disorder in India: Using retrospective life chart method. J Affect Disord 2015;173:255-60.
10. First MB, Spitzer RL, Gibbon M, Williams JBW. Struct Clin Interview DSM-IV-TR Axis Disord Res Version Patient Ed-IP. New York: Biometrics Research, New York State Psychiatric Institute; 2002.
11. Young RC, Biggs JT, Ziegler VE, Meyer DA. A rating scale for mania: Reliability, validity and sensitivity. Br J Psychiatry J Ment Sci 1978;133:429-35.
12. Hamilton M. A rating scale for depression. J Neurol Neurosurg Psychiatry 1960;23:56-62.
13. Roy-Byrne P, Post RM, Uhde TW, Porcu T, Davis D, The longitudinal course of recurrent affective illness: Life chart data from research patients at the NIMH. Acta Psychiatr Scand Suppl 1985;317:1-34.
14. Posner K, Brown GK, Stanley B, Brent DA, Yershova KV, Oquendo MA, *et al*. The Columbia–suicide severity rating scale: Initial validity and internal consistency findings from three multisite studies with adolescents and adults. Am J Psychiatry 2011;168:1266-77.
15. Kattimani S, Subramanian K, Sarkar S, Rajkumar RP, Balasubramanian S. History of Lifetime suicide attempt in bipolar I disorder: Its correlates and effect on illness course. Int J Psychiatry Clin Pract 2017;21:118-24.
16. Rempe RG, Hartz AM, Bauer B. Matrix metalloproteinases in the brain and blood–brain barrier: Versatile breakers and makers. J Cereb Blood Flow Metab 2016;36:1481-507.
17. Domenici E, Willé DR, Tozzi F, Prokopenko I, Miller S, McKeown A, *et al*. Plasma protein biomarkers for depression and schizophrenia by multi analyte profiling of case-control collections. PLoS One [Internet] 2010;5:e9166.
18. Rybakowski JK, Remlinger-Molenda A, Czech-Kucharska A, Wojcicka M, Michalak M, Losy J. Increased serum matrix metalloproteinase-9 (MMP-9) levels in young patients during bipolar depression. J Affect Disord 2013;146:286-9.
19. Bobińska K, Szemraj J, Czarny P, Gałecki P. Role of MMP-2, MMP-7, MMP-9 and TIMP-2 in the development of recurrent depressive disorder. J Affect Disord 2016;205:119-29.

Access this article online

Website: www.ijpm.info

Quick Response Code

DOI: 10.4103/IJPSYM.IJPSYM_320_19

How to cite this article: Chandrasekaran V, Subramanian K, Kattimani S, Nandheesha H, Sarkar S, Penchilaiya V. Relationship between matrix metalloproteinase-9 and lifetime history of suicidal behavior in remitted patients with bipolar I disorder: A cross-sectional pilot study. Indian J Psychol Med 2020;42:200-2.

Comments on "Nomophobia: A Mixed-Methods Study on Prevalence, Associated Factors, and Perception among College Students in Puducherry, India"

Dear Sir,
We have read the wonderful study on nomophobia, conducted from Puducherry, India, published in your journal, with great interest.[1] We congratulate the authors on the successful completion of a study on a topic that is pertinent in the current times and also is going to dictate how we are going to conceptualize evolving disorders in psychiatry.

However, we wish to raise a few points which we feel are worth pondering. The authors in the study have used the Nomophobia Questionnaire.[2] It is a 20-item Likert scale with scores ranging from 20 to 140. As has been mentioned by the authors, *"The scores below 20 are considered as the absence of nomophobia, 21 to 60 as mild, 61 to 100 as moderate, and 101 to 140 as severe nomophobia."*. Evidently, a score below 20 on this scale is impossible. So practically what this means is that only if someone scores 20 (i.e., someone rates every item of the scale as "strongly disagree"), then only he/she will be considered as not having nomophobia. Any score 21 onwards means the subject has at least mild nomophobia. Even when we look into the results of the current study, only 9 out of 774 (i.e., 1.16%) have no nomophobia. This seems absurd and raises the obvious question of whether we are labeling a normal behavior. We also feel that though the Nomophobia Questionnaire is validated, the utility of this scale in clinical and research scenario is questionable.

Another point we want to make is that the authors have left out subjects who were not using smartphones. We feel that this exclusion has led to a bias in this study. Most definitions, including the one that has been quoted in the manuscript, define nomophobia as "*discomfort, anxiety, nervousness, or anguish caused by being out of contact with a mobile phone*." Thus, the exclusion of non-smart-phone users from the study has probably inflated the prevalence of nomophobia in this study.

Finally, while going through the results of the regression analysis, we found that the purpose of maximum usage included "Texting" and "Social Networking." We feel that these two reasons are very overlapping, and the division of these two purposes could be very difficult. We feel that this is important because this could have led to the effect of collinearity.

To conclude, we would like to congratulate the authors again on the publication of this study. However, there were certain methodological and conceptual aspects in this study that should be kept in mind while interpreting the results of the study.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

Arghya Pal, Arvinder P. S. Aulakh

Department of Psychiatry, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India

Address for correspondence: Dr. Arghya Pal
Department of Psychiatry, Himalayan Institute of Medical Sciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India.
E-mail: drarghyamb@gmail.com

Submitted: 09-Jan-2020
Accepted: 15-Jan-2020
Published: 09-Mar-2020

REFERENCES

1. Jilisha G, Venkatachalam J, Menon V, Olickal J. Nomophobia:

A mixed-methods study on prevalence, associated factors, and perception among college students in Puducherry, India. Indian J Psychol Med 2019;41:541-8.
2. Yildirim C, Correia AP. Exploring the dimensions of nomophobia: Development and validation of a self-reported questionnaire. Comput Human Behav 2015;49:130-7.

Access this article online

Website: www.ijpm.info

DOI: 10.4103/IJPSYM.IJPSYM_15_20

Quick Response Code

How to cite this article: Pal A, Aulakh AP. Comments on "nomophobia: A mixed-methods study on prevalence, associated factors, and perception among college students in Puducherry, India". Indian J Psychol Med 2020;42:203-4.

Reverse Causation, Physical Inactivity, and Dementia

Chittaranjan Andrade

ABSTRACT

One variable may influence another as cause and effect. However, in situations in which a cause-effect relationship is scientifically plausible, reverse causation may also be possible. As an example, physical inactivity may predispose to dementia through cardiometabolic and other mechanisms. However, physical inactivity may also be a result of an ongoing dementia prodrome in which patients are physically slowed down during the years preceding the dementia diagnosis. This article examines reverse causation and how it was studied in a recent individual participant data meta-analysis of physical inactivity as a risk factor for dementia. This article also shows that other interpretations are possible when a finding suggests reverse causation.

Key words: *Alzheimer's disease, cause and effect, dementia, physical activity, physical inactivity, reverse causation*

A hypothesis describes an expected relationship between two variables. One of these is usually considered to be the independent variable, and the other, the dependent variable. This implies causality, or that one variable is responsible for the other. 'Physical inactivity predisposes to dementia' is an example of a hypothesis that states a cause-effect relationship. It implies that physical activity is a modifiable risk factor for dementia.[1]

Cause and effect

Studies in the field of physical activity and dementia are not randomized controlled trials; rather, they are observational in nature, making it hard to be certain about cause and effect. Thus, it is possible that physical inactivity, through the mediating effect of cardiometabolic disease, is a risk factor for dementia. However, it is also possible that cardiometabolic disease, arising from genetic and other risk factors, predisposes to both physical inactivity and dementia. Therefore, the relationship between inactivity and dementia can be indirect, and not cause and effect in either direction. Finally, it is possible that physical inactivity is merely a marker for dementia risk that arises as a part of the dementia prodrome. That is, people develop physical slowing (in addition to mental slowing) as part of a subclinical disease process that culminates in a diagnosis of dementia. This last possibility illustrates *reverse causation* – that is, instead of physical inactivity predisposing to dementia, the dementia predisposes

Access this article online	
Website: www.ijpm.info	Quick Response Code
DOI: 10.4103/IJPSYM.IJPSYM_45_20	

How to cite this article: Andrade C. Reverse causation, physical inactivity, and dementia. Indian J Psychol Med 2020;42:205-6.

Psychopharmacology Unit, Department of Clinical Psychopharmacology and Neurotoxicology, National Institute of Mental Health and Neurosciences, Bangalore, Karnataka, India

Address for correspondence: Dr. Chittaranjan Andrade
Psychopharmacology Unit, Department of Clinical Psychopharmacology and Neurotoxicology, National Institute of Mental Health and Neurosciences, Bangalore - 560 029, Karnataka, India. E-mail: andradec@gmail.com
Submitted: 03-Feb-2020, **Accepted:** 03-Feb-2020, **Published:** 09-Mar-2020

to the physical inactivity in the years immediately preceding the diagnosis.

Meta-analysis: Physical inactivity and dementia

Kivimaki *et al*.[2] described a meta-analysis that examined reverse causation in the context of physical inactivity and dementia diagnosis. The authors identified 19 prospective observational cohort studies with individual participant data. The pooled sample included 404,840 subjects, all of whom were free from dementia at the baseline. The mean age of the sample was 45.5 years. The sample was 57.7% female. During 6 million person-years of follow-up, there were 2044 cases of new-onset all-cause dementia. These included 1602 cases of Alzheimer's disease in 5.2 million person-years of follow-up.

Physical inactivity was defined as no activity, or as very little activity that was of at least moderate intensity; as an example, as <30 minutes of brisk walking (or more vigorous exercise) per week. Inactive and active persons were compared in analyses that adjusted for age, sex, ethnicity, education, socioeconomic status, body-mass index, smoking, and alcohol intake.

Physical inactivity was expectedly associated with increased risk of new-onset diabetes mellitus (Hazard Ratio [HR], 1.42; 95% confidence interval [CI], 1.25-1.61), coronary heart disease (HR, 1.24; 95% CI, 1.13-1.36), and stroke (HR, 1.16; 95% CI, 1.05-1.27). Again expectedly, physical inactivity during the 10 years before dementia diagnosis was associated with an increased risk of new-onset all-cause dementia (HR, 1.40; 95% CI, 1.23-1.71) and Alzheimer's disease (HR, 1.36; 95% CI, 1.12-1.65). Strikingly, physical inactivity in the period >10 years before dementia diagnosis was not associated with an increased risk of new-onset all-cause dementia (HR, 1.01; 95% CI, 0.89-1.14) or Alzheimer's disease (HR, 0.96; 95% CI, 0.85-1.08).

Interpretation and misinterpretation

The meta-analysis[2] found that physical inactivity was associated with new-onset dementia diagnosis in middle-aged adults during the 10 years after activity assessment, *but not earlier to 10 years*. These findings are consistent with the reverse causation hypothesis, which suggests that people may be physically slowed down during the years immediately preceding dementia onset and that this slowing may form a part of the dementia prodrome rather than be a predisposing factor to the development of dementia. In other words, in this study, the authors concluded that dementia may have been responsible for the prior physical inactivity instead of the inactivity contributing to the risk of dementia.

In championing the reverse causation hypothesis, the authors[2] did not consider the possibility that a 10-year period of physical inactivity could suffice to compound the effects of other risk factors for dementia. They also did not consider that, during the time period >10 years prior to dementia diagnosis, subjects would have been younger and cardiometabolic disease might not yet have set in; so, in inactive subjects who later increased their activity levels, prior physical inactivity might not have had an impact on neurodegenerative risks. This is pertinent because when subjects are younger and when the time to an event is longer, there is a greater possibility that, during the interval, inactive subjects may become active and vice versa, weakening the statistical relationship between physical inactivity and dementia risk.

Disappointingly, the authors asserted in their visual abstract that "a physically active lifestyle was associated with reduced risk of diabetes, coronary heart disease, and stroke but not dementia or Alzheimer's disease." This, therefore, is an example of how data can be correctly interpreted to support a reverse causation hypothesis but misinterpreted as confirmation of the hypothesis. *The issue is important because it could discourage inactive persons from increasing their activity levels.*

Summary

In observational studies, a significant relationship between variables can describe cause and effect, reverse causation, or an indirect relationship arising from other (known or unknown) causal variables. Special analyses are needed when reverse causation is suspected. Be that as may, the results should not be interpreted to drive only one conclusion when other interpretations are possible.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. World Health Organization. Risk reduction of cognitive decline and dementia. WHO Guidelines. Geneva: World Health Organization; 2019.
2. Kivimaki M, Singh-Manoux A, Pentti J, Sabia S, Nyberg ST, Alfredsson L, *et al*. IPD-Work consortium. Physical inactivity, cardiometabolic disease, and risk of dementia: An individual-participant meta-analysis. BMJ 2019;365:l1495.