



COVID-19 and Severe Mental Illness: Impact on patients and its relation with their awareness about COVID-19

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ABSTRACT

COVID-19 outbreak has promoted many public health measures in the general population. However, its impact on a vulnerable population with severe mental illness (SMI) is less addressed. Aim of this study was to determine the impact of COVID-19 to patients with SMI and identify its relation with their COVID-19 knowledge. A cross-sectional telephonic survey among 132 patients with SMI who were clinically stable before the COVID-19 pandemic was conducted. A 23 item interview proforma comprising of self-reported knowledge related to COVID-19 by patients and their illness and treatment status from their caregivers. Eleven patients were completely not aware of the ongoing COVID-19 pandemic. Three fourth of patients were not worried about getting COVID-19 and lacks adequate knowledge to identify symptoms. Two-third of patients lacked adequate knowledge of precautionary measures against COVID-19. One out of five patients lacked knowledge of the mode of transmission and stopped their psychiatric treatment. Thirty percent showed features of relapse of symptoms during this lockdown period. In multivariate regression analysis, patients from lower socioeconomic status, low literacy levels, with inadequate social support showed less knowledge related to COVID-19. Mental health services which target this vulnerable population during early disaster reduce the burden to the community.

1. Introduction

Ever since the novel corona virus disease (COVID-19) emerged from China during late 2019, it has spread all over the world rapidly leading to significant morbidity and mortality. COVID-19 has emerged as a public health crisis globally. The first case of COVID-19 in India was reported on 30th January 2020. As part of public health interventions aimed at reducing the transmission rate, the Government of India implemented a nationwide lockdown from March 25, 2020, and strict home confinement was enforced. (Ministry of Health and Family Welfare |GOI, 2020) Increased psychological stress related to the pandemic and unprecedented lockdown increased the risk of developing mental health problems due to separation from loved ones, the loss of freedom, uncertainty over disease status, boredom, insufficient food and household supplies, and inadequate information. (Ahmed et al., 2020; Rajkumar, 2020). This led to anger, confusion, and post-traumatic stress symptoms (Brooks et al., 2020). To address the mental health need of the population, the Government of India has implemented multiple measures like mental health helpline, revised telemedicine guidelines, empowered digital communication platform to disseminate mental health training and intervention in remote settings, strengthened District Mental Health Programme (DMHP) to deliver

community care and to ensure availability of psychotropic medications to prevent relapse in psychiatric patients and substance use. (Murty et al., 2020) Global attention has predominantly been focussed on the emotional disturbance in infected persons, front line health workers, and the general public (Neto et al., 2020; Spoorthy, 2020; Wang et al., 2020). However, concerns of patients with mental illness were left unaddressed. Previous studies had shown that pre-existing psychiatric illness is a risk factor for the development of post-traumatic stress disorder (PTSD), depression, anxiety, and illness exacerbation after a disaster. (Goldmann and Galea, 2014; Jeong et al., 2016) The current study is focused on the impact of the pandemic on severe mental illness (SMI). The definition provided by the National Institute of Mental Health for “severe mental illness (SMI) as a mental, behavioural, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities”. Schizophrenia, Schizoaffective disorder, Bipolar affective disorder, Major depressive disorder has been adopted in this study. (NIMH, 2017). A study on schizophrenia had reported that patients from developing countries had a better course and outcome than developed countries, perhaps due to social support. (Brekke and Barrio, 1997) During the lockdown, patients diagnosed as SMI who need regular medication and rehabilitation are deprived of their care

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<https://doi.org/10.1016/j.psychres.2020.113265>

Received 29 May 2020; Received in revised form 25 June 2020; Accepted 28 June 2020

Available online 29 June 2020

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due to decreased access to health care in psychiatric hospitals. (Lima et al., 2020). These patients are not only vulnerable to increased risk of contracting the infection easily but may transmit COVID-19 infection by not strictly following the safety measures. This was evident from the report from China where around 300 psychiatric inpatients were found COVID-19 positive during this pandemic (Xiang et al., 2020). This could be due to cognitive impairment posing a challenge to process the informational overload in times of crises (Guimond et al., 2019), little awareness of risk, and diminished efforts regarding personal protection (i.e. social distancing, frequent hand-washing, circulation restrictions, and home isolation), high rates of smoking, increased medical comorbidities like diabetes mellitus, systemic hypertension (Kavoor, 2020; Malhotra et al., 2013) and under-reporting of physical symptoms. (Sonoda et al., 2019). Moreover, there is a heightened risk of relapse of pre-existing mental illness because of high susceptibility to stress under confinement measures, exacerbation of loneliness and despair, leading to increased rumination and overall reduced ability to cope with stress, low self-esteem, and treatment non-compliance, than the general population in disaster settings (Horan et al., 2007; Jankowski and Hamblen, 2010). Online mental health service provides promising results in handling this vulnerable population during this pandemic. (Yao et al., 2020). In developing countries, like India, acceptance of tele-consultation is limited in patients with severe mental illness (Nagendrappa et al., 2020; Sreejith and Menon, 2019). However, studies have proved high concordance in rating between caregiver and persons with psychotic illness about the patient's functioning level and their substance use profile, which supports that reliable information can be obtained from their primary caregivers (Chand et al., 2014; Dickerson et al., 1997). Studies during these COVID-19 times support the view that patients and their caregivers are willing to participate in research and services through the telephonic interview (Padala et al., 2020). However, findings of previous studies on the impact of a natural and manmade disaster on persons with mental illness were inconclusive. A study on the impact of swine flu on patients with mental illness found that children and patients with neurotic and somatoform disorder expressed more concern regarding contracting the infection. (Page et al., 2011) A recent study by Hao et al confirmed the negative psychological impact on non-psychotic psychiatric illness patients during the COVID-19 pandemic lockdown. (Hao et al., 2020). The objective of our study was to determine the impact of COVID-19 on patients with severe mental illness with regard to their illness status, and treatment compliance based on their primary caregivers, and to study the association of demographic (age, gender, literacy level, socioeconomic status, social support) and psychological variables (psychiatric diagnosis, illness status) with patient's awareness about COVID-19 pandemic. Unlike the general population and other psychiatric illnesses, awareness level in this population might be influenced by their caregivers as they play a pivotal role in service delivery, recovery, and early identification of relapse. Our null hypothesis is that COVID-19 will not cause any psychological impact on patients with severe mental illness and their awareness level on COVID-19 will be similar to the general population. Their awareness level will not be influenced by their demographic and clinical variables.

2. Methods

2.1. Participants

This study used a cross-sectional telephonic-survey method (through phone calls) conducted in a tertiary general hospital, located in South India. Study participants included patients diagnosed with severe mental illness [SMI] (Schizophrenia, Schizoaffective disorder, Bipolar affective disorder, Major depressive disorder) based on ICD-10 classification and their primary caregivers. After obtaining Institute ethical committee approval, (AV/IEC/2020/054) study was carried out after one month of the nation-wide lockdown. Inclusion criteria for

patients were a) Patient diagnosed as SMI who sought treatment at this center between September 2019 to March 2020 b) either gender, age ranging between 18 and 55 years, c) with a minimum of one-year duration of illness, d) clinically stable for previous 3 months (clinical stability was defined as "no major changes in medication and no hospitalization in the 3 months preceding the study" based on clinical records). Inclusion criteria for caregivers were, a) aged 18 years and above, b) staying with the patient during the last year before the assessment. Based on clinical records patients with other comorbid axis-I psychiatric illnesses and caregivers with a history of psychiatric illness, with other family members having psychiatric or chronic physical illness during the telephonic interviews were excluded. Overall 210 eligible patients were contacted consecutively through telephone, by trained research interviewers according to the patient's gender. They were invited to answer a set of questions about COVID-19 after obtaining verbal informed consent. Additional informed consent from caregivers was obtained if the patient was unable to provide valid informed consent (based on the caregiver's response). Among them, the contact numbers of 56 patients were found to be wrong or not reachable. Missed patients were contacted after three days to ensure their participation. Around 17 participants were excluded from the study. Five participants refused to participate due to relapse of symptoms, stigma among caregivers, not willing to reveal their personal information through phone calls. The demographic and clinical profile of non-participants is comparable to study participants except for preponderance to age more than 40 years (24% versus 29%), with the diagnosis of major depressive disorder (11% versus 16%). Participant responses were recorded as verbatim and transcribed later. Our interview begins with the caregiver's assessment about the patient's current illness status for 10 min followed by the patient's assessment for another 10 min. Finally, 132 patients completed the study.

2.2. Assessments

A 23 item questionnaire was designed after focused group discussion comprising of authors (mental health professionals), specialists from microbiology and community medicine and based on themes identified in the literature related to disaster and mental health (Bromet, 1982; Jankowski and Hamblen, 2010; Person and Fuller, 2007; Taylor and Jenkins, 2004; Wolf et al., 2020). Content validation was done by two independent psychiatrists. The questionnaire elicited issues like awareness about symptoms of COVID-19, need for quarantine, precautions and prevention methods, mode of spread, perceived social support and perceived verbal and physical aggression (from the patient), the current status of illness, the impact of COVID-19 on their mental status, medication compliance, psychiatric consultation, biological functions (from caregivers). [The questionnaire is available for the authors on request]. Initial pilot study on 10 subjects and their primary caregivers was conducted to know the feasibility and comprehensibility of the items of the questionnaire. Participants age varied from 21 to 52 years, 60% were males, from lower socioeconomic status, educated less than graduate-level and main diagnoses were schizophrenia (40%), schizoaffective disorder (10%), bipolar affective disorder (40%), and major depressive disorder (10%). This was comparable to the participants in the main study. Cronbach's alpha reliability coefficient was 0.66, which was considered satisfactory for this study. Patients who were included in the pilot phase were not included in the main study. Knowledge of COVID-19 was assessed by asking open-ended questions to participants with regard to awareness of COVID-19, need for quarantine, awareness on the number of symptoms, precautions, mode of spread. A scoring system was applied to assess the knowledge of each subject; one point was given for each correct answer. No point was given for an incorrect answer and "don't know" answer. The score could range from 0 to 14.

2.3. Procedure

Information obtained from the patients was verified with their primary caregivers. Patients with inadequate knowledge regarding COVID-19 during the interview were provided the information needed to improve awareness of good health practices for COVID-19 and those who needed active psychiatric intervention were referred to their treating psychiatrist for tele-consultation (through telephonic and Whatsapp video call). Face to face intervention in form of out-patient based supportive psychotherapy and administering parenteral antipsychotic medications under strict infection control precautions was limited to patients with active suicidal behavior, or severe aggression or those who requested such care after tele-consultation. For patients who had stopped the medication, an online prescription was provided after consultation or referral to the local District mental health program staff.

2.4. Statistical analysis

Descriptive statistics (mean, standard deviation (SD), frequency distribution) were computed for all demographic and clinical variables. Association between these variables and COVID-19 knowledge were analyzed using independent *t*-test, analysis of variance, and Pearson's correlation coefficient. (Akoglu, 2018) A multivariable linear regression analysis was performed to estimate the least squares means (with 95% Confidence Interval) with the outcome variable of the knowledge level of COVID-19. The role of certain variables included which were reported to be of relevance after discussion between investigators like the effects of age (Page et al., 2011), gender (Bawazir et al., 2018), education, living with a spouse (Erfani et al., 2020), socioeconomic status, comorbid medical illness (Wolf et al., 2020), psychiatric illness group (DeLisi et al., 2004), poor compliance status, relapse status (Person and Fuller, 2007), level of social support (Bromet, 1982) and experiencing verbal and physical aggression from others (Banerjee, 2020), and participants level of awareness. A priori power analysis could not be attempted. The prevalence of moderate/severe concern for swine flu among psychiatric patients was taken as 41% from literature (Page et al., 2011). The same proportion was assumed for COVID-19 due to a lack of supporting study. An expected prevalence of moderate/severe concern about COVID-19 in the psychiatric patients was assumed as 60.0%. With alpha error 0.05, the post-hoc power analysis was done for the existing sample size 132 and the power was 99.4% for this study. Data entry and statistical analysis were performed using the Statistical Program for Social Sciences (IBM SPSS Corp, SPSS Statistics ver. 16, USA).

3. Results

3.1. Demographic profile

The mean age of the participants was 33.9 years (SD=10.9). The Majority of the respondents were females (52.3%), hailed from lower socioeconomic status (60.6%), and were educated up to the tenth grade (52.3%). The diagnoses were schizophrenia (59.1%), bipolar affective disorder (25%), major depressive disorder (12.1%), and schizoaffective disorder (3.8%). Common medical co-morbidity observed were diabetes mellitus (9.1%), systemic hypertension (9.1%), hypothyroidism (5.3%), seizure disorder (1.5%), and coronary artery disease (0.8%). The mean age of the caregivers was 45.4 years (SD=11.8) who were predominantly parents (43.9%), spouse (35.6%), siblings (15.9%), and children (4.5%).

3.2. Awareness about COVID-19 among patients

Eleven patients (8.3%) were not aware of the ongoing COVID-19 situation and twelve patients (9.1%) not aware of the need for quarantine in India. Eight patients (6.1%) reported that they were aware of

someone in the surrounding who screened positive for COVID-19. None of the patients were tested or reported positive for COVID-19 during this study. Notably, only one-fourth of patients were aware of three or more symptoms (28%) and precautions (36%). Thirty patients (22.7%) were not aware of the mode of spread of COVID-19. The majority of our patients (73.5%) did not report any fear or worries related to contracting COVID-19 infection. The major source of COVID-19 related information was through television news (65.2%), friends and family (10.6%), social media like Facebook, Twitter (9.1%), Whatsapp (8.3%), government official website (3.8%), and newspapers (2.3%).

3.3. Treatment compliance during the lockdown

Around eighty percent of patients missed their appointments with their treating mental health professionals in the previous month, but seventeen patients (12.8%) could contact mental health professionals either directly or through tele-consultation. Twenty-nine patients (22%) stopped their psychiatric medication due to the non-availability of medication and mental health professionals, lack of transportation, due to strict legal enforcement of lockdown, patients becoming uncooperative due to relapse of psychiatric symptoms, and fear of COVID-19. Around three fourth of patients (78%) procured their medication using their previous prescriptions. Another twenty-four patients (18.2%) stopped their medications for their general medical illness. (Table 1)

3.4. Psychological status of the patients

Impairment was noted in sleep (37.9%), food intake (23%), and personal care (20%). Thirty-nine patients (29.5%) showed re-emergence of previous psychiatric symptoms. Nineteen patients (14.4%) expressed suicidal ideas during this period, and among them, seven patients (5.3%) reported an increase in suicidal ideas. Patients who showed features of relapse expressed significantly more suicidal ideas as compared to those without relapse ($p < 0.001$). Thirty-seven patients (28%) expressed feelings of physical aggression toward their caregivers. Eighty-four patients (63.6%) reported that they were experiencing verbal and physical aggression from others. Forty caregivers (30.3%) reported an increase in the burden of taking care of patients in addition to the burden related to other reasons, like the lockdown. In particular, caregivers living with the patient with symptoms of relapse experienced significantly more burden ($p < 0.001$). Nine patients (6.8%) reported an increase in substance use (nicotine, alcohol, caffeine) during this lockdown period. Sixty patients (45.5%) perceived inadequate social support during this period. Eighty-three caregivers (62.9%) reported that they were facing financial difficulties during this lockdown period. (Table 1)

3.5. Clinical correlates of awareness level in patients with SMI

In univariate analysis younger age (weak correlation, $r = -0.21$, $p = 0.01$), greater educational attainment ($p < 0.001$), higher socioeconomic status ($p < 0.001$), and increased levels of perceived social support ($p < 0.001$) were associated with significantly higher knowledge scores in the participants. Similarly, patients who consulted mental health professionals over the last one month ($p < 0.01$), less perceived caregiver burden related to the mental illness of patient ($p < 0.05$), with less perceived financial difficulties ($p < 0.01$) during lockdown had better knowledge about COVID-19. (Table 2)

Multivariate linear regression analysis revealed that patients from lower socioeconomic status ($P < 0.01$), with lower education levels (high school or lesser) ($P < 0.05$), who perceived low social support ($P < 0.05$) were associated with lower knowledge levels about COVID-19. (Table 3)

Covariates included were age, gender, living with a spouse, perceived social support, education level, socioeconomic status,

Table 1
Patient's clinical status and treatment compliance during the lockdown as per caregivers.

| Items in Questionnaires | Categories | n (%) |
|--|--|-----------|
| Patient missed appointments during the lockdown | Yes | 106(80.3) |
| | No | 26(19.7) |
| Mode of consultation in last month | Direct | 2(1.5) |
| | Phone call | 13(9.8) |
| | Message | 2(1.5) |
| | Not consulted | 115(87.1) |
| Patient missed psychiatric medication during the lockdown | Yes | 29(22) |
| | No | 103(78) |
| Reason for non-compliance | Non-availability of medications | 8(6.1) |
| | Non-availability of professionals | 5(3.8) |
| | Lack of transportation | 3(2.3) |
| | Fear of COVID-19 | 1(0.8) |
| | Due to strict legal enforcement of lockdown | 7(5.3) |
| | Relapse of the symptoms | 5(3.8) |
| Patient compliant with medication | Took medication with the previous prescription | 103(78) |
| Patients missed medication for comorbid medical illness | Yes | 24(18.2) |
| | No | 24(18.2) |
| | Not applicable | 84(63.6) |
| Personal care | Good | 105(79.5) |
| | Bad | 21(15.9) |
| | Worse | 06(4.5) |
| Sleep | Good | 82(62.1) |
| | Disturbed but manageable | 35(26.5) |
| | Disturbed but unmanageable | 15(11.4) |
| Food pattern | Yes, regular | 101(76.5) |
| | Yes, irregular | 24(18.2) |
| | Food intake reduced | 7(5.3) |
| Reemerging symptoms during the lockdown | Yes | 39(29.5) |
| | No | 93(70.5) |
| Suicidal ideas during the lockdown | No | 113(85.6) |
| | Yes same like past | 12(9.1) |
| | Yes more than past | 7(5.3) |
| Violence/aggression towards caregiver during the lockdown | Yes | 37(28) |
| | No | 95(72) |
| Taking substances or illegal drugs during the lockdown | Yes | 9(6.8) |
| | No | 123(93.2) |
| Experiencing financial difficulties | Yes, a lot | 68(51.5) |
| | Yes, little bit | 15(11.4) |
| | No | 49(37.1) |
| Caregiver's perceived burden increased during the lockdown | Yes | 40(30.3) |
| | No | 92(69.7) |

psychiatric illness category, co-morbid medical illness, poor treatment compliance, features of relapse, perceived verbal and physical aggression from others

4. Discussion

This study demonstrates that nearly three fourth of patients with SMI did not have adequate knowledge about symptoms (72%) and precautionary measures (64%) about COVID-19. Among them, around eleven patients (8.3%) were completely unaware of the ongoing COVID-19 pandemic and one out of five patients was not aware of the mode of transmission of COVID-19. An online-based survey from India exploring the knowledge, attitude, and anxiety among the general population in India during COVID-19 reported all participants were aware of COVID-19, and more than 4/5th of the participants acknowledged the need for hand washing (97%) need for quarantine if symptomatic

(96%), social distancing (98%) (Roy et al., 2020). A similar higher level of awareness among the general public was also noted in other countries like Saudi Arabia [clinical knowledge-90.7%] (Bawazir et al., 2018), Nepal [knowledge-60.0–98.7%] (Hussain et al., 2020), China [knowledge-90%], Kenya [knowledge-63%] (Austrian et al., 2020). However study from the United States among patients with vulnerable populations like chronic medical conditions reported less awareness [knowledge-71.7%, practice-69.8%] than the general population (Wolf et al., 2020). The possible reasons for low awareness in these patients with SMI were not addressed here, but could be due to social deprivation, negative symptoms, cognitive impairment, and decreased access to media, poor personal care, and relapse of psychiatric symptoms.

Interestingly 73% SMI patients did not report any anxiety/fear of contracting COVID-19 which is contrary to the general population where the majority of them reported significant fear of contracting COVID-19 which varied from 25 to 72% (Roy et al., 2020; Wolf et al., 2020). The exact reasons for this are not known but may be due to their lack of awareness about the impact of COVID-19, and reflecting that at times 'ignorance is bliss'.

Patients from lower socioeconomic status and lower education levels had low awareness about COVID-19 which may be due to limited access to the internet, media, online health information, decreased access to health care, and increased financial burden. Our study results are in concurrence with previous studies (Wolf et al., 2020; Zhong et al., 2020)

Unlike other reports, our study noted that patients with SMI who were experiencing inadequate social support during lockdown showed low awareness of COVID-19. Caregivers burden was found to be significantly high in this group which manifests in the form of poor social support, high negative expressed emotions (Nirmala et al., 2011), domestic violence towards patients (Afe et al., 2016) thereby increasing the risk of relapse (Altman et al., 2006). Financial strain, social isolation, low emotional support, negative social interactions, and psychological distress increase the burden of the caregiver during such a situation (Shultz et al., 2013). The reaction of psychiatric patients following a three-mile island nuclear accident showed that patients with perceived poor social support were associated with higher distress levels (Bromet, 1982). Hence specific programs addressing caregiver's psychological stress during such situations will indirectly improve awareness in patients.

The majority of the general population and health care workers reported that they got information related to COVID-19 through social media (Abdelhafiz et al., 2020; Zhou et al., 2020). However, patients with SMI reported television as a primary source of information due to decreased gadgets and internet usage and accessibility in this population in developing countries. Hence awareness programs specifically using this media can deliver health promotion to them.

Studies regarding the impact of disaster-induced psychological stress in patients with psychiatric illness are inconclusive. However, few studies observed that psychiatric patients are more resilient to this type of stress compared to healthy controls, while other studies reported them as vulnerable (Taylor and Jenkins, 2004). One study reported that patients in schizophrenia spectrum disorder showed worsening of symptoms than patients with affective disorder. (DeLisi et al., 2004). Our study did not find any significant difference between the groups.

A study conducted by Hao et al. among non-psychotic psychiatric illness patients during COVID-19 pandemic concluded that psychiatric patients were at high risk of experiencing a higher level of PTSD, depression, anxiety, stress, and insomnia, anger, irritability and suicidal ideation in comparison to healthy controls which is in support of our study findings. (Hao et al., 2020) Possibly the previous studies included all psychiatric diagnostic groups, compared with non-psychiatric populations. The scales used were not specific to focus their positive and negative symptoms, assessments were done far from disaster event, disasters of different categories, with fewer participants of SMI patients.

Table 2Comparison of the level of knowledge according to socio-demographic and illness variables ($n = 132$).

| Variable | n | Mean | Standard deviation | F/t (df) | p-value |
|--|-----|-------|--------------------|--------------|---------------------------|
| Mean age | 132 | 33.97 | 10.41 | – 0.210 | 0.015 ^a |
| Education level | | | | | |
| High school and below | 69 | 5.60 | 2.56 | 18.598 | < 0.001 ^c |
| University and college | 17 | 7.23 | 2.92 | | |
| Graduate and above | 46 | 8.67 | 2.68 | | |
| Socioeconomic status | | | | | |
| Low | 108 | 6.31 | 2.70 | – 5.086(130) | < 0.001 ^{***, b} |
| High | 24 | 9.45 | 2.90 | | |
| Social support level | | | | | |
| Excellent | 37 | 8.91 | 2.57 | 10.552 | < 0.001 ^{***c} |
| Good | 35 | 6.68 | 2.43 | | |
| Medium | 48 | 5.72 | 3.05 | | |
| Poor | 12 | 5.83 | 2.32 | | |
| Fear of COVID-19 infection | | | | | |
| Yes | 35 | 5.97 | 3.08 | – 2.142(130) | 0.034 ^{*, b} |
| No | 97 | 7.21 | 2.89 | | |
| Features of relapse | | | | | |
| Present | 39 | 6.17 | 2.75 | – 1.775(130) | 0.078 ^b |
| Absent | 93 | 7.18 | 3.04 | | |
| Appointment missed in the last month | | | | | |
| Yes | 106 | 6.66 | 2.94 | – 1.769(130) | 0.079 ^b |
| No | 26 | 7.80 | 3.05 | | |
| Consultation with the mental health team in last month | | | | | |
| Yes | 17 | 9.11 | 2.99 | 3.432(130) | 0.001 ^{***, b} |
| No | 115 | 6.55 | 2.85 | | |
| Expressing suicidal ideas in the last one month | | | | | |
| Yes | 19 | 5.73 | 2.70 | 1.829(130) | 0.07 ^b |
| No | 113 | 7.07 | 3 | | |
| Patient experiencing verbal and physical aggression from others | | | | | |
| More | 49 | 6.30 | 2.43 | 1.856(122) | 0.06 ^b |
| Less | 83 | 7.22 | 3.23 | | |
| Caregiver burden worsened | | | | | |
| Yes | 40 | 6.07 | 2.70 | – 2.083(130) | 0.039 ^{*, b} |
| No | 92 | 7.23 | 3.05 | | |
| Experiencing financial difficulties | | | | | |
| Yes strongly agree | 68 | 6.22 | 2.79 | 5.384 | 0.006 ^c |
| Yes little bit | 15 | 6.40 | 2.09 | | |
| No | 49 | 7.95 | 3.21 | | |

^a Weak strength in Pearson Correlation.^b Independent *t*-test.^c ANOVA test.* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.**Table 3**Association of various factors with awareness level using linear regression analysis ($n = 132$).

| Variables | B | Awareness level Risk Ratio 95% CI | t value | P-value |
|--|---------|-----------------------------------|---------|---------|
| Education level | | | | |
| Lower education level | – 1.422 | (– 2.552– (– 0.293)) | – 2.494 | 0.014* |
| Higher education level (above high school education) | | | | |
| Socio economic status | | | | |
| High | 2.168 | (0.854–3.482) | 3.267 | 0.001** |
| Low | | | | |
| Perceived social support | | | | |
| Inadequate | – 1.224 | (– 2.220– (– 0.228)) | – 2.432 | 0.016* |
| Adequate | | | | |

* $P < 0.05$.** $P < 0.01$.

Around thirty percent of patients who were stable before lockdown had a relapse. The reason could be high susceptibility to stress in closed confinement (Altman et al., 2006), major life events (Sam et al., 2018), poor access to mental health care and poor treatment compliance (Zhang et al., 2015), disturbed biological rhythm (Karatsoreos, 2014),

and increased caregiver burden (Nirmala et al., 2011). Patients who consulted mental health professionals during this lockdown showed high awareness indicating that regular psychiatric treatment has a direct relation in improving their awareness. Such pandemics can cause a new onset of psychiatric symptoms related to COVID-19 or exacerbation of pre-existing psychopathology in patients with SMI (Fischer et al., 2020). As the relapse in this population translates to poor hygiene, inability to practice social distancing or other preventive strategies, delay in reporting or seeking medical attention, suicidal behavior, aggression, increased substance use, poor compliance for their psychiatric and comorbid medical illness will have a significant social impact during this pandemic. (Gunnell et al., 2020).

Tele-medicine provides new opportunities to address the mental health needs of the patient with SMI with regard to creating awareness and treatment implementation (Krzyszczanek et al., 2017; Nagendrappa et al., 2020). A comparative review from India by Naskar et al. concluded that tele-psychiatry is an effective tool in creating awareness and for intervention even in a psychotic group of patients (Naskar et al., 2017). During this pandemic, tele-psychiatric consultation provided satisfactory results and high acceptance among these patients in many countries. (Fagioli et al., 2020; Kavoor et al., 2020; Li et al., 2020).

Few countries have implemented a specific program to address this

setback by implementing a program like 'Mental Health Home Hospitalization Care' in Spain (Garriga et al., 2020), 'Notice on Strengthening the Treatment and Management of Patients with Severe Mental Disorders during the Outbreak of the New Coronary Pneumonia' in China (Li et al., 2020) and 'Programs of assertive community treatment' (PACT) in United States (Bojdani et al., 2020).

Based on our result we would recommend 1) urgent need of creating awareness program on COVID-19 pandemic which targets this vulnerable population focusing on patients from lower socioeconomic status, lower literacy level and poor social support involving their primary caregivers 2) it is essential to provide continued psychiatric intervention using tele-psychiatric platform and empowers their social support using community mental health services during the pandemic 3) a standard protocol on the management of patients with SMI during an infectious disaster should be put forth in the future.

To the best of our knowledge, this is the first study that focussed on the impact of COVID-19 and awareness in patients with SMI. Involving both patients and their caregivers, and the inclusion of clinically stable patients adds value to this study.

Cross-sectional study, lack of priori sample size calculation, involving relatively small sample size, relying on observation by caregivers, without a control group, telephonic interview without face to face interaction, lack of structured assessments are limitations of our study.

Evidence from our study disproves the null hypothesis and highlights that patients with SMI significantly lack knowledge on COVID-19 in comparison to the general population and it also emphasized the importance of continued care of this vulnerable population as a significant proportion of the patient showed features of relapse.

Source(s) of support

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Presentation at a meeting

None

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CRediT authorship contribution statement

Partheeban Muruganandam: Conceptualization, Formal analysis, Investigation, Methodology, Writing - original draft, Supervision. **Srinivasan Neelamegam:** Data curation, Formal analysis, Writing - original draft. **Vikas Menon:** Conceptualization, Methodology, Supervision, Validation. **Johndinesh Alexander:** Writing - original draft. **Santosh K Chaturvedi:** Conceptualization, Supervision, Validation.

Declaration of Competing Interest

The authors declare that they have no conflicts of interest.

Acknowledgement

None

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2020.113265](https://doi.org/10.1016/j.psychres.2020.113265).

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