Self-isolation of Healthcare Workers during COVID-19 Pandemic in a Tertiary Care Center – Association between their Sleep Quality, Anxiety Status and Social Capital

Avik Kumar Layek¹, Nilanjana Ghosh², Jagadish Biswas³, Spandan Bhaduri⁴

¹Tutor, Department of Psychiatry, North Bengal Medical College, Sushruta Nagar, Tiknikata, Dist- Darjeeling,
²Assistant Professor, Department of PSM, North Bengal Medical College, Sushruta Nagar, Tiknikata, Dist-Darjeeling,
³Assistant Professor, Department of FMT, North Bengal Medical College, Sushruta Nagar, Tiknikata, Dist- Darjeeling,
⁴Professor, Department of General Medicine, North Bengal Medical College, Sushruta Nagar, Tiknikata, Dist- Darjeeling

Abstract

With the rapid spread of COVID-19 since its inception a year back, the frontline healthcare workers, who underwent isolation and quarantine following possible exposure, faced multiple psychiatric problems like deterioration of sleep quality and anxiety manifestations. Different demographic variables were found to be associated with their occurrence, as well as inter-relation between them were found to be common. We tried to examine the role of social support system as well to the appearance of such problems in the present study. After getting the ethical clearance, willing healthcare workers during their isolation and quarantine were presented questionnaires consisting of Socio-demographic proforma, Self-rating Anxiety Scale (SAS), Personal Social Capital Scale 16 (PSCS) and Pittsburgh Sleep Quality Index (PSQI). Data taken were analysed with independent t test and Fishers exact chi square test, Pearson’s correlation analysis and linear regression analysis. Majority of the subjects were married Hindu female from urban background, mostly doctor and nurse by profession. Independent T test revealed significant association between gender and anxiety status as well as between marital status and sleep quality. Positive correlation between the PSCS scores and the SAS scores (r=0.652, P<0.01) and negative correlations between the PSCS and PSQI scores and between the SAS and PSQI score were found albeit being statistically insignificant. Significant association was found between the SAS score and social bridging component of PSCS (Fishers exact chi sq. value 0.54 and p = 0.003). Anxiety score was significantly affected when the socio-demographic factors like gender, religion, marital status and scores of sleep quality (PSQI) and social capital (PSCS) were considered together as seen in the linear regression analysis.

Key words: Healthcare workers, Anxiety, Sleep quality, Social capital, COVID-19.

Introduction

The novel coronavirus disease (COVID-19) has been proliferating extensively across the globe since its commencement in Wuhan city and adjacent area of China in December 2019¹,². World Health Organization declared this a pandemic by 11th March, 2020³. Till now around 106 million people have been affected globally with around 2.3 million deaths and a massive hit to the structure of economy and health sectors of varied number of sovereign states⁴. The situation in India has been dire as well with nearly 10 million cases and the number of COVID-19 related mortalities nearing 155 thousands as of now⁵. The stretched medical facilities as well as the resources are on the verge of having a toll at the individual level.
The Healthcare workers, in spite of being the vanguard, are unable to avert the psychological impacts of these pandemics as we have seen in this one and the previous epidemics like the SARS outbreak in the East Asia and the MERS outbreak in the Middle East. Among the HCWs, personnel involved in direct crisis intervention viz. those in isolation wards, fever clinics, the Intensive Care Unit (ICU) and other related departments are more vulnerable to others. Excess workload, scarce personal protective equipment, media sensation, perceived scarcity of support system can be attributed as possible precipitants of certain impacts. Higher chance of getting infected is another contributor to this cause as well.

A fear of role reversal as in becoming a patient may harbor stigma, coping problem, botheration and a sense of separation among the medical staff. Because of the high transmission rate, the absolute mortality owing to COVID-19 is much more than that caused by Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) combined despite having a low mortality rate (2%).

As per studies done throughout the world, psychiatric disorders like anxiety, depression, acute stress reaction and posttraumatic stress disorder have been seen to be common in the survivors of acute infectious diseases, such as SARS. Based on the essence, studies were done to assess the psychological impact of cohabiting this disease among the healthcare workers. Indian studies also dug into the physical and psychological effects of outbreaks of serious infectious diseases on the medical staff, particularly when associated with increased workload and the stress associated with the risk of infection of such a magnitude.

Regarding different psychological abnormalities sleep quality is a key indicator. It can keep optimal immune activity to combat infection along with improving functionality regarding patient care. Different socio-cultural factors can influence sleep and psychological wellbeing. One such factor is the social support ie the care and support one can perceive to get from other people. It has established role to enhance psychological health and sleep function.

As felt by the medical staff, anxiety is one of the chief negative emotion during infectious disease epidemic. Lack of effective vaccine and definitive treatment protocol barring symptomatic one has made COVID-19 pandemic a distinct stressor to impact people of both high and low anxiety traits in the early stages. Many studies showed that heightened anxiety state and perceived stress impact sleep quality to a great extent.

These variables of anxiety, sleep quality, and social support and their interactions among the healthcare workers during isolation and quarantine following COVID-19 exposure are analyzed in the current study.

Methodology

It was a descriptive study with cross sectional design done among the health care workers who went for isolation/ quarantine from different set ups like COVID-19 screening OPD and isolation wards of North Bengal Medical College, the largest rural tertiary care hospital in Darjeeling district located in the corridor connecting the North-East India with the rest. The study subjects were taken by complete enumeration. The quarantined health care workers during the data collection period of 6 months from April 2020 to October 2020 were included in the study. Permission was taken from the Quarantine Committee and Institutional Ethics Committee of NBMC&H.

Health care workers including doctors and nursing staffs who were in self-isolation and quarantine during COVID-19 pandemic following exposure were taken into the study. Those who were willing and had no documented prior mental illness or were not on any medications for anxiety and depression were included. Complete data from 80 participants could be collected as per the stipulated time and criteria.

The subjects were corresponded the self-reported questionnaires with maintenance of strict anonymity through email and phones. Demographic and social data from the study participants including age, gender, education, marital status were collected in a semistructured proforma. Individual social support was assessed by Personal Social Capital Scale 16 (PSCI 16). Similarly, anxiety and sleep quality were assessed by Self-rating Anxiety Scale (SAS) and Pittsburgh Sleep Quality Index (PSQI) respectively. Data was collected after briefly pre-sensitizing them about the
purpose and benefits of study. Queries were addressed and confidentiality ensured.

**Result**

A total of 80 subjects were studied among whom 6 were kept in Institutional quarantine, 2 were in Isolation and all others were in self-isolation. Majority of study subjects were females (57.2%), Hindus(65%), married (73.2%) and from urban background (78.7%). They belonged to age range of 24 to 41 years with mean age 25.7 ± 4.6 years. All were literate and majority were doctors and nursing staffs. Everyone was employed and free from any co-morbid conditions in past barring 7 people who were taking medicines for hypertension.

Different socio-demographic parameters were compared with the anxiety, sleep and social capital scores to yield for any association. Independent T test revealed significant association between gender and anxiety status among study subjects (Table 1). Marital status and sleep disorder states were also found to be significantly associated with p = 0.000 (Table 2).

<table>
<thead>
<tr>
<th>Table 1: Association between Gender distribution and Anxiety states among study subjects (n=80)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Levene’s test for equality of variances</strong></td>
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<tr>
<td>F</td>
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<tr>
<td>Anxiety var.</td>
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</table>

EVA – Equal variances assumed, EVNA - Equal variances assumed

<table>
<thead>
<tr>
<th>Table 2: Association between Marital Status and Sleep Quality among study subjects (n=80)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Levene’s test for equality of variances</strong></td>
</tr>
<tr>
<td>F</td>
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<tr>
<td>Sleep quality</td>
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</tbody>
</table>
EVA – Equal variances assumed, EVNA - Equal variances assumed

The levels of anxiety, sleep quality and social support among the study participants were measured using the Self-Rating Anxiety Scale (SAS), the Pittsburgh Sleep Quality Index (PSQI), and the Personal Social Capital Scale (PSCS) respectively. Results clearly indicated status of quarantined health care workers regarding the various scales aimed to help formulate operationally feasible remedial measures in accordance. Pearson’s correlation analysis was used to identify the correlations between the results from the responses of the medical staff. There was a significant positive correlation between the PSCS scores and the SAS scores (r=0.652, P<0.01). Negative correlations between the PSCS scores and the PSQI scores and between the SAS score and PSQI score were found, though these were not statistically significant. Table 3 summarizes these results.

Table 3: Pearson’s correlation analysis showing relationships between the Personal Social Capital Scale (PSCS), the Self-Rating Anxiety Scale (SAS), and the Pittsburgh Sleep Quality Index (PSQI) of the quarantined healthcare workers during COVID-19

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>St Dev</th>
<th>SSRS</th>
<th>SAS</th>
<th>PSQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSRS</td>
<td>35.2</td>
<td>6.1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAS</td>
<td>38.6</td>
<td>7.4</td>
<td>0.652**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>PSQI</td>
<td>8.9</td>
<td>3.0</td>
<td>-0.048</td>
<td>-0.120</td>
<td>1</td>
</tr>
</tbody>
</table>

** P<0.01. The data shown represent the scores of the questionnaires

Results need to be interpreted keeping in mind the small sample size and inadequacy of reporting due to ambiguity in understanding question clarity as face to face interview was not possible.

Clustering between SAS and PSCS scores were seen to be fair (Figure 1). Significant association was found between the SAS score (a cut off mark 36 is taken) and social bridging component of PSCS (Fishers exact chi sq. value 0.54 and p = 0.003) whereas no significant association was found with PSCS bonding component (cut off mark 15 for each components respectively).
**Figure 1: Clustering between SAS and PSCS scores**

However on applying multiple linear regression to see interplay of factors with the outcome, it was seen that anxiety score was significantly affected when the socio-demographic factors like gender, religion, marital status and scores of sleep quality (PSQI) and social support (PSCS) were considered together (Table 4).

### Table 4: Linear regression results of association of SAS with other factors

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.794a</td>
<td>.630</td>
<td>.604</td>
<td>4.79052</td>
<td>R Square Change F Change df1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.630</td>
</tr>
</tbody>
</table>

- **Model Summary**
  - Predictors: (Constant - SAS), PSCS, PSQI, Gender, Marital status, Religion

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B Std. Error Beta</td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound Upper Bound</td>
</tr>
<tr>
<td>1</td>
<td>(Constant) 16.597 6.010 -.207 2.762 .007 4.611 28.582</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender -3.134 1.255 -.207 -2.497 .015 -5.637 -.631</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Religion -4.038 1.195 -.311 -3.379 .001 -6.421 -1.655</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Marital status 1.529 1.653 .082 .925 .358 -1.767 4.825</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSQI score -.081 .237 -.030 -.341 .734 -.553 .391</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>PSCS score .883 .102 .708 8.631 .000 .679 1.087</td>
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</tbody>
</table>

- **Discussion**

Characteristic demographic finding of a younger population consisting of mainly females is found in most of the prior studies in this topic\cite{15-17,27}. Being in the frontline, eagerness to participate and gender difference especially in the nursing staffs can be cited as possible reason for this finding. Also in our study it was found that the women HCW were more commonly associated with subjective anxiety symptoms. Occupational exhaustion, domestic labor inequality, dilemma regarding family responsibility can attribute to such distribution\cite{31}. The same pattern was seen in this study when sleep quality was found to be significantly associated with marital status. Our study corroborates to contemporary Chinese study\cite{32} that no significant association was found between isolated HCW of different departments or designation in contrast to few other studies\cite{6,33}.

The findings from this study showed that the sleep quality of the medical staff was low with a mean PSQI score of 8.583. There were several factors that may have resulted in reduced sleep quality in the medical staff. Workload, apprehension about the uncertain situation, irregular duty hours can all lead to such lowering\cite{27}. The findings from this study showed that social support of the medical staff did not directly affect their sleep quality, but it might have influence this by altering subjective anxiety level. Social support can help medical staff reduce anxiety levels, as friends or family members provide social and emotional support and share empathy. Social
interactions reduce negative emotions such as anxiety and can improve mood\textsuperscript{[15,27]}. When medical staff have a wide social network, social support can help to reduce stress by reducing the perception of the threat of stressful events and the physiological response and inappropriate behavior that can result from stress\textsuperscript{[6,32]}. Our study corroborates to the information in having significant association on PSCS bridging score (Inter-familial) over anxiety, than that of PSCS bonding score (Intra-familial). Social support contributes to improving self-efficacy, leading to more understanding, respect, encouragement, courage, and a sense of professional achievement\textsuperscript{[27]}. Anxiety affects sleep quality because anxious people often find it difficult to fall asleep and may wake up frequently during sleep. Also, the combination of anxiety with sleep disorders may make it difficult to fall asleep. The fact that stress is closely related to sleep quality has been confirmed by a previous study. Increased stress can increase the levels of vigilance regarding the environment, which will reduce sleep quality\textsuperscript{[1,19]}. This is corroborated in our study applying multiple regression to see interplay of factors with the outcomes combining anxiety, sleep quality and social factors. Even though all medical staff experience pressure at work, people who have high social capital and therefore low anxiety levels are able to control their emotions better and try to sleep regularly after work. Anxiety has been shown to increase sensitivity because it reduces positive behaviors and initiative\textsuperscript{[27]}.

**Conclusion**

The study concludes that anxiety and sleep disorders are commonly encountered in health care workers who are in quarantine for COVID 19 pandemic. High anxiety states and low anxiety states, the two major subgroups identified as operating on anxiety scale is significantly associated with social support system, more interfamily than intrafamily emphasizing need for physical distancing rather than social distancing. As anxiety scales are positively correlated with social support hence need to stay connected is reiterated even during COVID times mainly though social media or other technological innovations. Moreover anxiety states as outcome is seen to significantly vary when interplay of all factors of social support, sleep disorders are considered together as is case in daily life. Hence it can be concluded that all quarantined health care workers were suffering from interplay of anxiety, sleep and social support disturbances during these COVID times which in turn was causing their functionality level to alter.

**Limitations-** The study could not be conducted face to face due to the prevalent situation and hence bias and guarded response may have been possible. Sample size could have been increased but increased workload was a restraint. Scales were preformed with little areas of customization and tool validation as COVID 19 is a new term for one and all.

**Conflict of Interest-** Nil

**Funding –** Self funded

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**Ethical Clearance –** Ethical clearance taken from the Ethics committee of North Bengal Medical College Hospital.

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