Perception, Working Experience and Psychiatric Morbidity among Information Technology Professionals during COVID-19 Lockdown: A Cross-sectional Survey

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ABSTRACT

Introduction: In the year 2020, the functioning of the world changed in a big way. For a large part of the year, the world stayed locked indoor, due to the novel Coronavirus Disease -2019 (COVID-19). The need for Information Technology (IT) has reached a new height, and this is certain to persist. Though the IT professionals were mostly working indoors in 'work from home' mode, work pressure and boredom increased according to few studies. Work from home also has different set of employees' expectations and organisational responsibilities.

Aim: To assess the psychiatric morbidity working experience and related perspectives of the new normal, as perceived by IT professionals.

Materials and Methods: This cross-sectional survey was conducted in Institute of Post Graduate Medical Education and Research (IPGME&R), Kolkata, West Bengal, India, between May 2020 and August 2020. A Google form-based survey was done which aimed to reach throughout the country. Consent was included as the first question of the form. An ethical clearance was taken from Institutional Ethical Committee of IPGME&R, Kolkata in convenience sampling of IT professionals. For the survey, a semistructured questionnaire was developed and Brief Resilience Coping Scale (BRCS), Ten Items Personality Inventory (TIPI), and K6 psychiatric morbidity screener were used to measure the psychiatric morbidity. Snow ball sampling methods was used to get the sample through free sharing of google forms over the internet. Relevant statistical tests were used to analyse the data, where p<0.05 had been considered significant.

Results: Total 72 IT professionals responded to the survey but only 71 were included due lack of informed consent. About 20 (28.2%) showed a high risk of losing their job as per their perception and 35 (49.29%) were highly worried about having COVID-19, while 44 (61.9%) were highly worried about bringing the infection home. 78.9% (n=71) showed screener positive psychiatric morbidity. Psychiatric morbidity was only dependent on "emotional stability" as a personality trait and "risk of Job loss" by regression analysis. Total 67 people were working from home, 37 (55.22%) felt the family time had increased, 28 (41.79%) felt family was happier due to work from home.

Conclusion: This study showed the psychiatric morbidity of IT professionals was quite high and it was not related to their resilience level and own perception of morbidity. Psychiatric morbidity was determined by emotional stability, and the threat of losing jobs. It also shed light on disease perception and state of work perception of IT professionals. Though work from home mode may compromise the work quality slightly but it was good for the families and personal stress levels of the employees.

Keywords: Coronavirus disease 2019, Employment, Mental well-being, Pandemic, Stress, Work from home

INTRODUCTION

The COVID-19 is the most determining event of the year 2020, and probably of the last century. A large part of the world was under lockdown during this time. The world has progressed at a virtual level in the year 2020. Thus, computers and associated services and the internet have become the most important driving force of the world in 2020. It has also given rise to new realisations and perspectives to people and society and a probable change in habits [1]. The IT professionals have worked as silent warriors during this time and the world should be thankful to them [2].

One development has been the concept of work from home. This concept had been used before as a work option for an emergency to give flexibility to the employees. But this is the first time such a forced experiment on a large scale throughout the world had been conducted. On the one hand, it allowed companies to explore the pros and cons of administrative and output perspectives, on the other hand, employees' expectations and requirements had to be explored and addressed [3-6]. It may change the working of the post COVID-19 era in the IT industry [3,7,8]. Some studies had already examined the scenario from an industrial point of view and the International Labour Organisation have already published guidelines for employers [9].

Numerous studies have confirmed that in this pandemic mental health was one of the most affected areas [10,11]. The healthcare workers directly risked their lives [12,13]. The people, in general, might have lost their jobs and risked their well-being along with their near and dear ones [14]. The IT professionals lost their routine and continuous work, boredom was also stressful due to the new compulsions of their jobs [15]. Hence psychological morbidity, disease and job perception needed to be explored especially as the situation was somewhat different from the general population. Though there are many studies on healthcare workers', psychological wellbeing and predictors of stress [16,17], resilience is an important concept in mental health literature. It is defined as the ability of the person to perform adequately in a difficult and stressful situation [18,19]. In some studies, it had been conceptualized as a trait factor, where studies have shown more resilience in a person result in less anxiety and psychiatric morbidity and vice versa [19-21]. In some other literature, resilience has been conceptualised as a dynamic construct, which can change with age, context and multiple other environmental factors [18,22-

26]. This concept requires us to develop and train resilience in people [25,27]. Studies showed that sleep, age, and professional training impact the resilience in a person, which in turn influence the psychiatric morbidity in a particular situation like COVID-19 pandemic [25,27].
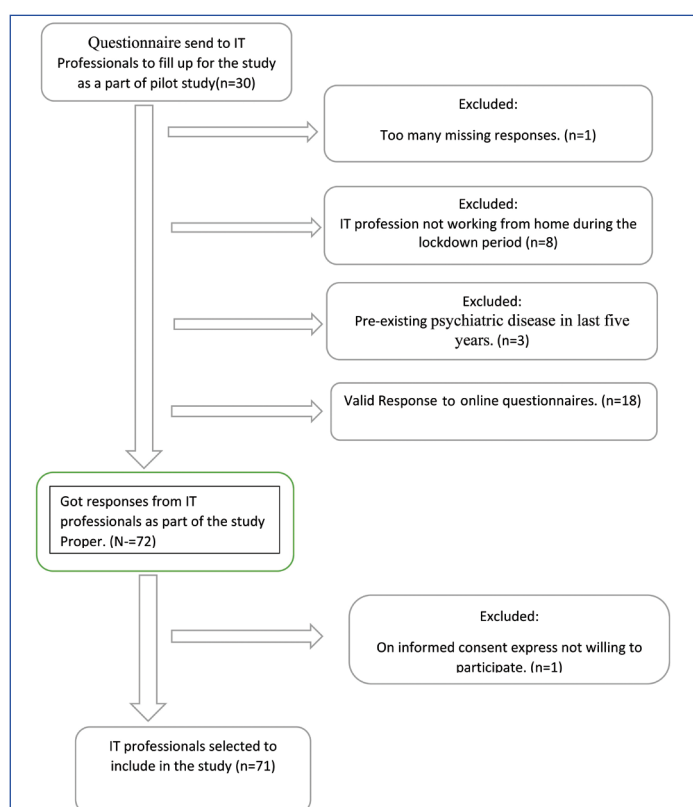
Personality factors also can be instrumental in modifying the stress response in a person. The presence of certain factors makes a person more vulnerable to stress in a particular situation [28]. From the mental health point of view, it is necessary to assess an IT professional's perspective and mental health in the lockdown, while they were on 'work from home' mode. It is necessary to identify possible socio-demographic or psychological determinants for predicting the adjustment and morbidity in this new scenario. Therefore, this study was done to estimate psychiatric morbidity of IT professionals and to assess their perspective about 'work from home' as a new work culture.

MATERIALS AND METHODS

A google form-based survey was conducted in this cross-sectional study, between May 2020 to August 2020 through convenience sampling from IT professionals. The study protocol was approved by the Institutional Ethics Committee (vide reference no IPGME&R/IEC/2021/105). Data was collected purely from IT professionals who resided in different major cities of India namely Kolkata, Chennai, Hyderabad, Delhi NCR, Mumbai, Pune, and Bangalore during the lockdown period. All study subjects gave their consent to get enrolled in this study.

Inclusion criteria: IT professionals/persons who were working for more than two years in the computer and internet-related service industry and worked for an average duration of 40 hours or more in a week.

Exclusion criteria: Individuals who filled up the questionnaire form but did not fulfil the inclusion criteria of the study sample were excluded from the study. Individuals who had a history of a psychiatric disease diagnosed in the last five years or a history of psychiatric disease in parents were also excluded from the study [Table/Fig-1].

[Table/Fig-1]: Flowchart of case recruitment.

Sample size calculation: The sample size had been calculated from pilot study results through Epi-info software taking a 5% error and 95% confidence interval.

Questionnaire

- A semistructured questionnaire was developed for this survey including socio-demographic data, perceptions about the disease as well as the lockdown. The main instrument for collecting data was an online questionnaire using Google Forms (https://forms.gle/u9aFAbQN5MRcDBsh7). Form in word format was also used to collect responses via email.

- Brief Resilience Coping Scale is a very short 4-item, free to use, resilience scale to measure how a person can perform in the face of adversity. Persons scoring 4-13 were designated as low resilient copers, 14-16 as medium resilient copers, 17-20 as high resilient copers, who adjust to adverse conditions well [29].

- Ten Item Personality Inventory (TIPI) is a 10-item personality assessment questionnaire; its questions and norms are available in the public domain. It has direct and reverse score questions, one item each, for each of five subscales, that is extraversion, agreeableness, conscientiousness, emotional stability, openness to experiences, etc, then it can be checked with male and female norm scores, to get the status of these qualities in such human being across the normative society [30].

- K6 screening scale: It is a psychiatric morbidity screener. If it is scored on a 1-5 scale then the cut-off is 18/19 (i.e., 18 = no morbidity, 19 = with psychiatric morbidity). It is also free to use and short, which is suitable for such online surveys [31].

Since there is no previous reference and this was a new experience for the entire world, it would be worth qualitatively assessing the perception of the IT professionals in managing lockdown stress or their perspective about 'work fro home', with some open-ended questions such as- pros and cons of work from home or any modification they would suggest to the current work from home structure, being explored as part of the study. A team of experts from diverse fields, including people working in the IT sector, psychologists, sociology and anthropology expert along with psychiatrists was formed to get suggestions about likely questions which would give valid and reliable information in this regard. A final questionnaire was formed taking into consideration the suggestions and arriving at a consensus and the questionnaire was validated by a pilot study on 30 participants. The questionnaire showed high internal consistency (chronbach's ∞=0.82).

The questionnaire was uploaded in a google form and shared over the internet on social media platforms with a request to send it to related individuals, specifically targeting IT professionals. This google form had an inbuilt consent question, which could be negated and that would take the participant out of the form, without any problem. The google form should take 20-30 minutes to complete which was also informed beforehand in the appeal. To ensure that some questions were not missed inadvertently by the participants, all questions were made compulsory except the qualitative questions after gaining experience from a pilot study.

Decision Tree

Classification tree analysis was done to detect potential interactions on a multilevel basis. Classification trees can be used to predict the membership of individuals in classes of a categorical variable (called the target variable), based on measurements of predictor variables. They are highly flexible since they can be used with a mixture of variable types in the same analysis (continuous, ordinal, or nominal), and do not require stringent theoretical or distributional assumptions of more traditional methods. It provides a method to screen large

sets of potential predictor variables for an outcome variable to determine those that are the most important. The main distinction between more conventional methods such as logistic regression and classification trees is the treatment of interactions in the models. Most conventional methods assume that disease predictors act independently and, while interactions can be modelled, they are usually omitted to reduce complexity and the overall number of predictors in the model. In contrast, classification tree analysis assumes that interactions are the rule rather than the exception and, by using a method of recursive partitioning, facilitates interactions readily, allowing this analysis to model multilevel interactions that would be laborious, if not impractical, using traditional regression analyses [32,33].

Network Analysis

Health research focuses on the human being, his environment and his social capital. Thus, univariate analyses may not explain the phenomenon under investigation because they capture the isolated action of each variable regarding the outcome under study.

With network analysis, it is possible to visually explore relationships that occur simultaneously between multiple variables. Networks are graphical structures composed of nodes and circular elements that represent variables [34]. Nodes connect through lines called edges. Networks can be classified as unweighted and weighted. In unweighted networks, edges represent only the relationship between nodes, and in weighted networks, the magnitude of the relationships is shown. That is, the thicker the connection between nodes, the stronger the relationship between them. In addition, the edges may vary in colour depending on the direction of the relationship (positive or negative).

STATISTICAL ANALYSIS

The statistical programs by default defined that the green or blue colour represents a positive relationship, and the red, as a negative relationship. The authors used JASP SOFTWARE to perform network analysis [35]. The Statistical Package for the Social Sciences (SPSS) software version 26 was used for descriptive and decision tree analysis. A p-value of ≤0.05 was considered to be significant. Study variables were simply summarised in the form of frequency for categorical variables and mean for numerical variables.

RESULTS

A total of 72 people responded, 71 had valid answers. One person did not consent and aborted the form. Hence, 71 valid answers were included. Among them, male were 66 (92.9%) and females were 5 (7.1%) [Table/Fig-2]. Out of 71, 36 subjects were working from 2-5 years and 24 were from 5-10 years. 41 (57.74%) had

Demographic profiles	Categories	n (%)
Age group (years)	21-30	21 (29.57)
	31-40	19 (26.76)
	41-50	29 (40.84)
	51-60	2 (2.81)
Sex	Male	66 (92.95)
	Female	5 (7.05)
Working place	Multinational Company	54 (76.05)
	Other Private company	17 (23.94)
City	Kolkata	42 (59.15)
	Bangalore	10 (14.08)
	Mumbai and Pune	9 (12.67)
	Chennai, Delhi NCR and Hyderabad	10 (14.08)

[Table/Fig-2]: Socio-demographic parameters of the study population (N=71).

fear of losing jobs. Out of 71, 67 (94.4%) had worked from home during the pandemic [Table/Fig-3]. Around 37 (55.22%) subjects were said that their families were getting more time from then than before and they were happier than before 28 (41.79%). Their opinion on work from home suggested that work from home was Inferior to office-based work 27 (40.27%) [Table/Fig-4]. Total 66 (98.5%) felt work from home was a good option for emergencies

Question-naire	Categories of responses		n (%)	
Job position	Financial director/manager/related area		13(18.30)	
	Front office		2 (2.81)	
	Sales		9 (12.67)	
	Core IT technical work		41 (57.74)	
	Other: (Human resource manager/related area, Food and beverages, logistics)		6 (8.45)	
Years of service	2- 5 years (junior workers)		36 (50.70)	
	5-10 years (middle-level seniority)		24 (33.80)	
	more than 10 years (senior workforce)		11 (15. 49)	
Job instability	Not worried	Low risk of Losing Job	29 (40.84)	51 (71.8)
	Slightly worried		22 (30.98)	
	Very much at risk	High risk of losing job	19 (26.76)	20 (28.2)
	Lost the job		1 (1.40)	
Are you working from home?	Yes		67 (94.36)	
	No		4 (5.64)	

[Table/Fig-3]: Professional profiles of IT Professionals (N=71).

Questionnaire	Categories of responses	n (%)
Family time in WFH	More than before	37 (55.22)
	Less than before	14 (20.89)
	Same as before	11 (16,41)
	Not appropriate	5 (7.46)
How is your family	Family is happier than before	28 (41.79)
	Family is more stressed	20 (29.98)
	No change in family happiness	16 (23.88)
	Not applicable	3 (4.47)
How are you, yourself	I'm happier and less stressed than before	11 (16.41)
	I'm more stressed than before	17 (25.37)
	No change in my stress levels	35 (52.23)
	Not applicable	4 (5.97)
How is the quality of work during WFH	I feel I can work better and output has improved while working from home	21 (31.34)
	Work quality has suffered in WFM	24 (35.82)
	Work quality is as before, not much change	19 (28.35)
	Not Applicable	3 (4.47)
Your opinion about this mode of work	Better than office-based work	19 (28.35)
	As good as office-based work	17 (25.37)
	Inferior to office-based work	27 (40.27)
	Not Applicable	4 (5.97)
What is your opinion about WFH	It has come to stay. near future, this is the type of job option	17 (25.37)
	It is OK for such emergencies, but in regular work, not a valid option	17 (25.37)
	Can be an option for some time of the other, but not regularly	18 (26.86)
	Some modification is needed but if done can be a very useful option	14 (20.89)
	Not applicable	1 (1.89)

[Table/Fig-4]: Pros and Cons of Work From Home (WFH) from an employees perspective (N=67).
Responses include IT professionals working from home only

and also often in regular times but was not good for regular workflow [Table/Fig-4]. While assessing the perception of the pandemic, among the participants, 69% consider IT professionals as COVID-19 front-liners. Regarding the solution to the pandemic, most of the IT professionals i.e., 42 (59.15%) felt that only vaccination can stop the pandemic [Table/Fig-5]. Out of 71, 67 (94.4%) had worked from home during the pandemic.
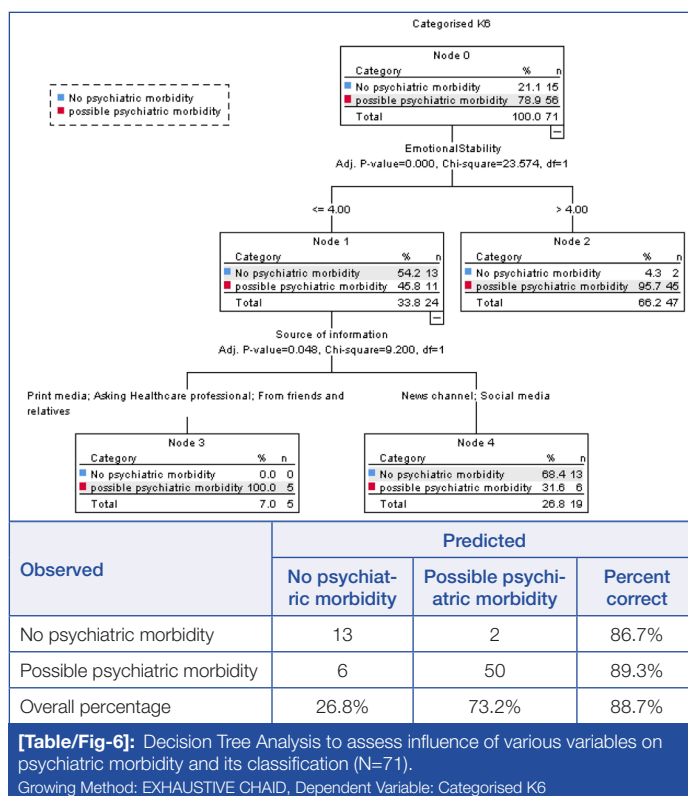
Questionnaire	Categories of responses	n (%)
Worried about contracting the disease	Mildly worried	18 (25.35)
	Moderately worried	18 (25.35)
	Severely worried	35 (49.29)
Worried about contracting the disease to family members	Mildly worried	14 (19.71)
	Moderately worried	13 (18.30)
	Severely worried	44 (61.9)
What will happen if you test positive	Nothing- I would be fine	10 (14.08)
	I would be sick but would come out	41 (57.74)
	I would be very sick and may get admitted to ITU	7 (9.85)
	Don't know	13 (18.30)
Source of information	Print media	10 (14.08)
	News channel	33 (46.47)
	Social media	23 (32.39)
	From friends and relatives	2 (2.81)
	Asking Healthcare professional	3 (4.22)
Will you welcome covid warrior at home	Certainly not	2 (2.81)
	May allow continuing	11 (15.49)
	Allow him to stay	23 (32.39)
	Feel proud for having such a neighbour	35 (49.29)
How the pandemic will end?	Re imposition of Lockdown	2 (2.81)
	Vaccination	42 (59.15)
	Acquiring herd immunity through person-to-person infection	7 (9.85)
	The invention of new Medicines	9 (12.67)
	By God's Blessings.	1 (1.40)
	Everybody will be affected by COVID one day or the other, but it is not a very serious infection	10 (14.08)
Where you want to get treatment if you contract COVID	Own house	58 (81.69)
	Govt. hospital	1 (1.40)
	Private hospital	4 (5.63)
	Govt Quarantine Centre	3 (4.22)
	Hotel	5 (7.04)
Social media time compared to before	Increased	30 (42.25)
	Decreased	13 (18.3)
	No change	24 (33.8)
	Not applicable	4 (5.63)
Do you consider IT professionals as COVID front-liners	Yes	49 (69.01)
	No	4 (5.63)
	May be	18 (25.35)
The most important immediate problem you feel due to pandemic	Occupational instability	20 (28.16)
	Sickness in the family	22 (30.98)
	Obligatory change in lifestyle	18 (25.35)
	Uncertainty of children's education/future	8 (11.26)
	others (anything other than those mentioned here)	3 (4.22)
Own state of mental health/wellbeing compared to before pandemic	Better	16 (22.53)
	Worse	33 (46.47)
	Same as before	22 (30.98)

[Table/Fig-5]: Pandemic-related perceptions and awareness and how pandemic has impacted day to day lives (N=71).

The basic analysis had shown that 15 (21.1%) of the study subjects had a low resilience score, 33 (46.5%) had a medium resilient score and the rest 23 (32.4%) had a high level of resilience. The K6 Screener positive psychiatric morbidity was 56 (78.9%).

From a theoretical point of view, psychiatric morbidity can depend on participant personality factors, the ability to cope, maturity and age, sex etc. as they are demographic factors. The [Table/Fig-6] shows decision tree analysis to assess the influence of variables on psychiatric morbidity. In this model also, only "emotional stability" (p=0.001) significantly predicted the psychiatric morbidity. Interestingly 'sources of information about the disease' was also shown to be a strong predictor of psychiatric morbidity if the emotional stability was less (<=4) as per the TIPI.
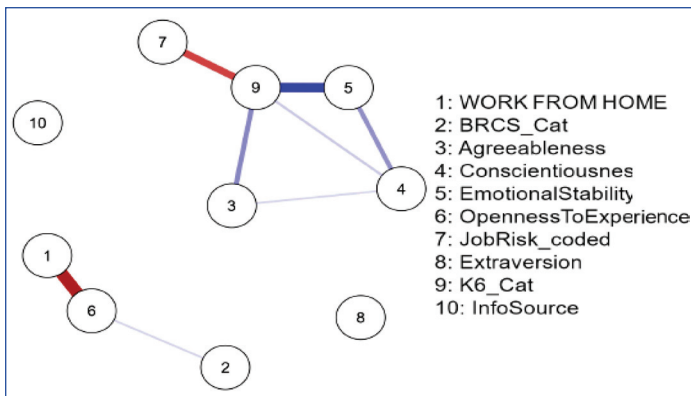
Using Network Analysis, K6 Cat (i.e. Psychiatric morbidity Yes/ No according to K6 Screener) shows a relationship between job risk codes and emotional stability. The K6 category has a high level of betweenness (betweenness means the measures of centrality. It is measured by the number of times a node lies on the shortest path between other nodes or the parameters to measure), so it acts as a bridge connection between the nodes or the objects those are measured by analysis. Details of the network analysis are given in the supplementary file [Table/Fig-7].

Observed	Predicted		
	No psychiatric morbidity	Possible psychiatric morbidity	Percent correct
No psychiatric morbidity	13	2	86.7%
Possible psychiatric morbidity	6	50	89.3%
Overall percentage	26.8%	73.2%	88.7%

[Table/Fig-6]: Decision Tree Analysis to assess influence of various variables on psychiatric morbidity and its classification (N=71).
Growing Method: EXHAUSTIVE CHAID, Dependent Variable: Categorised K6

DISCUSSION

As there were a dearth of relevant literature, the findings of this study were difficult to corroborate and compare. But the descriptive utility of the study was immense, as it explores uncharted territory, as work from home is probably the new normal that is going to stay.

In this study psychiatric morbidity was found to be 78.9%. To the best of the authors knowledge, there is no study exclusively with information technology professionals who mainly worked from home. But there are multiple studies conducted on the general population and front line workers like healthcare professionals, these studies had shown a varied prevalence of stress from 6.0% to 81.9% across studies [13,36]. Healthcare professionals had a higher percentage of psychiatric morbidity than general populations [16]. Here, IT professionals had less risk of job loss and less life risk than the general population and healthcare personnel. But they had a higher percentage of psychiatric

[Table/Fig-7]: Network analysis of study variables.
Explanations of the abbreviated forms of the variables:
1. WORK FROM HOME
2. BRCS_ Cat: Brief Resilient Coping scale categorised into three ordinal variables low, medium, and high resilient copers.
3. Agreeableness : Character trait
4. Conscientiousness: Character trait
5. Emotional Stability : Character trait
6. Openness to experience: Character Trait
7. JobRisk_Coded : Job Risk which is expressed as coded in high moderate and low
8. Extraversion: character trait
9. K6_cat: K6 screener categorised
10. Info Source: Sources of information about pandemic

morbidity as per this study (78.9% of K6 positive morbidity). Though an online study of Indian general population found the percentage of the population having a poor psychological well-being is around 71.7% and 74.1% reported moderate levels of stress [37]. Another Indian study found only 26.7% had no psychiatric illness [38]. Hence this study had a similar prevalence of psychiatric morbidity that is found in online surveys in India. The use of different scales might also be an issue. Most of the studies used specific scales for anxiety, depression, Post Traumatic Stress Disorder (PTSD), Obsessive Compulsive Disorder (OCD) etc but this study used the psychiatric screener K6 [39,40].

One study from Israel which used the same scale found psychiatric morbidity at 11.5% among dentists [41]. Another study from Japanese office employees found the K6 median score of the population to be 9 (taking score range 1-5), whereas in this study it came to 24 [15]. It could be because of sample bias, as the study sample is small, but it also raises the possibility of a separate norm score of the scale in the Indian population.

A rapid review of COVID-19 studies on mental health from Switzerland revealed exposure to COVID-19 infection had been a determinant of mental health problem [13]. Whereas another study revealed patients with severe mental illness, not specifically due to COVID-19, significantly differ from their healthy counterparts in many personality traits. Symptomatic participant scored higher in neuroticism, and lower in extraversion and conscientiousness when compared with healthy controls [28]. Another systematic review revealed that mental distress related risk factors included gender, age group (≤40 years), unemployment, chronic/psychiatric illnesses, and effect of social media concerning COVID-19 [30]. Another large online survey from China revealed being female, and being at risk of contact with COVID-19 patients were the most common risk factors for mental health problems during COVID-19 [36]. Female gender had been found to be determinant in few other studies also [40,42,43]. Another cross sectional online survey in adults of China revealed, high prevalence of mental health problems, which positively associated with frequently social media exposure during the COVID-19 outbreak [44]. In this study, job loss was never a prominent issue. But a change of nature of job along with lifestyle changes could be important considerations. The sample consisted of a small number of females to consider a different sub-group. The group is also

biased with relatively higher education and urban residence. Hence sex, residence and education could not be a predictor in this sample. But similar to other studies, personality factors and sources of information was a predictor of psychiatric morbidity.

A meta-analysis focusing on relationship of resilience and mental health observed negative correlation of trait resilience to negative indicators of mental health and positive correlation with positive indicators [19]. A cross sectional observational study from Indonesia with healthcare workers in COVID-19 also showed significant relationship between both, state and trait anxiety and resilience (p<0.05) [21]. Another online survey with healthcare workers in Italy suggested stress and burnout were predicted by low resilience along with lower age, female gender, greater exposure to COVID-19 [45]. A review done in the year 2007 also examined resilience as a trait and its relation with occurrence of PTSD. It observed resilience as not a simple "flip side" of risk [46]. But this study has shown resilient coping was very poorly correlated with screener positive psychiatric morbidity. Though previous data during pandemics showed a similar result [26].

The COVID-19 pandemic probably provided the largest opportunity to experiment with working from home as a mode of work. It was a good option for families as flexibility of work and family time was increased. The family was also happy according to the participants. But the job stress was largely similar for most of the participants. On one side they saved time and energy by avoiding travelling, but connectivity and equipments issue took away more time. Face to face discussions were also useful to get across communication properly and also human touch makes the work easier. Another problem was lack of fixed office hours, which some participants wanted to modify in the work culture of WFH along with that some of them also wished for more virtual rendezvous. They also preferred that company should arrange for a stable high-speed internet connection at their home as this was one of the biggest obstacles they faced. This observation was in line with other studies done on the impact of work from home in pre COVID-19 era [47].

Regarding quality of work, the group was undecided. Almost equal number of participants voted for improvement as well as worsening of work quality, but the larger section opined that there was no change. Most of them felt that WFH would prevail in future as well, but for intermittent use as an alternative and not entirely as a mainstay for work.

Limitation(s)

This study had a small sample size with convenient snowball sampling through the internet that lead to occurrence of information bias, which is common in such internet based surveys. The smaller number of responses may suggest that the quality of responses was adequate. The participants were motivated to answer and opine. It was an anonymous survey, hence did not target forced completion under external coercion and pressure. Hence, for such uncharted territory, a genuine response of such detailed quality is invaluable. However, a more large-scale study with extensive Strength Weakness Opportunities and Threats (SWOT) analysis and employee satisfaction analysis would be needed.

CONCLUSION(S)

Psychiatric morbidity is quite high in IT professionals of India, but interestingly it was not related to their resilience level and own perception of morbidity. Psychiatric morbidity was only determined by the emotional stability and the threat of job loss for the employee during the pandemic. Working from home was good for families. Though work quality may suffer, stress levels of employees themselves would reduce. The new way of working was tested

during the lockdown in the IT industries and that may be adopted in near future in this industry. In this perspective, the psychological morbidity of the employees has great importance. The study has focused on the need for future large-scale studies to take care of the well-being of IT professionals.

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