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Relationship Between COVID-19 Associated Anxiety Levels with Gender, Physical Activity, Quality of Sleep and Life in Post COVID Young Adults

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Abstract: ***Background: COVID-19 related restrictions can instigate a vicious cycle of reduced physical activity, abnormal sleep patterns, and decline in mental health of the people. Objective: The study aims to find out whether there is any relationship between COVID induced anxiety symptoms with sleeping disturbances, decreased physical performance, quality of life and to find its gender associated differences so that proper treatment can be given to the effected individuals which will help them to cope up with this problematic situation. Methodology: A total of 35 post-COVID adults aged between 18-30 years participated in this study. Participants were asked to fill the COVID-19 anxiety scale (CAS) to assess post-COVID anxiety, Pittsburgh Sleep Quality Index to assess the subjective sleep quality, International Physical Activity Questionnaire to measure of physical activity, World Health Organisation Quality of Life-BREF(WHO-BREF) Short version to assess quality of life of the subjects. Results: Results showed strong negative correlation of CAS with IPAQ (p=0.00, r=-0.623) and WHO-QOL (p=0.00, r=-0.75) and a strong positive correlation between CAS and PSQI (p=0.00, r=0.70) with the post-COVID women being more health anxious compared to post-COVID men. Conclusion: The findings of this study indicate that post COVID anxiety has a relationship with physical activity, quality of sleep and quality of life.***

Keywords: COVID-19, anxiety, physical activity, sleep, mental health.

1. Introduction

The novel coronavirus illness of 2019 (2019-nCoV) is a major public health emergency and the biggest atypical pneumonia outbreak since the severe acute respiratory syndrome (SARS) epidemic of 2003.[1] COVID-19 not only causes a threat to human health, but it also has a permanent psychological impact on human society.[2] Quarantine is a depressing and nervous experience because of being separated from family and fear of getting sick.[3]

Restrictions caused by the pandemic may have started a vicious cycle in which people's physical activity levels dropped, their sleep patterns changed, and their mental health deteriorated. Anxiety and other stress-related symptoms, as well as a number of other signs of poor mental health, may be triggered by lockdown.[4,5]

The World Health Organization (WHO) has identified positive mental health as state of well-being, both emotional and psychological, where the individual recognizes his or her potentials, adapts to the natural pressures of life, leads productive and supportive work and meets the demands of daily life.[6] In addition to the absence of mental diseases, having good mental health also entails engaging in active behaviours like maintaining general health and contributing positively to the community. One of the most prevalent psychological symptoms during the pandemic is health anxiety, which is defined as worrying and feeling anxious due to a perceived threat to one's health. A continuum of health anxiety results from a lack of knowledge about health issues.[7,8]

When dealing with stressful events, such those experienced during the COVID-19 pandemic, sleep becomes especially important. Sleep quality (SQ) is regarded as a fundamental sleep factor that affects a person's daily welfare.[9] It could be viewed as a semi-objective measure of sleep satisfaction. Stress induces poor sleep quality, while insomnia enhances the impression of stress. Stress and sleep issues, particularly insomnia, are related to one another.[10] Mishra R et.al in his study states that, Physical activity and sleep quality have declined throughout the epidemic, perhaps as a result of the pandemic's forced (lockdown) or voluntary (social isolation) social isolation.[11] Changes in living habits, confinement at home due to travel bans imposed by the government, and increased stress, anxiety, and sadness brought on by the COVID-19 epidemic may all have detrimental effects on sleep.[12]

Engagement in physical exercise could be impacted by a decline in health-promoting behaviours brought on by preventive public health policies such social isolation and the closing of leisure centres, city parks, and playgrounds.[13] Nienhuis CP et al conducted a study which states that the ability to engage in physical activity can mediate the stress response and promote well-being. Every session of physical activity has been shown to positively impact symptoms of depression and anxiety, and therefore can serve as an acute coping mechanism with additional positive benefits on physical health.[14] Magnus L in his study found that individuals with higher physical activity at baseline generally have a significant reduced risk of depression at follow-up, or reduced risk of developing depression during the follow-up

period, than people with low level of activity.[15] Thus Numerous studies have linked physical activity to better mental health, and more research is now demonstrating that physical activity can actually improve adults' mental health.

Stressing population mental health and taking pre-emptive measures to reduce any negative consequences it may have during the COVID-19 pandemic are essential. Designing psychological therapies to enhance mental health during epidemics is therefore important. With this background, the present study was designed with the aim of finding out whether there is any relationship between COVID induced anxiety symptoms with sleeping disturbances, physical activity, quality of life and to find its gender associated differences so that proper support and treatment can be given to the affected individuals which can help them to cope up with this problematic situation.

2. Materials and Methods

A correlation study was carried out in a period of 12 months from April 2021 to March 2022. The study was done in patients recovered from COVID-19 in Mangalore, South India. After seeking permission, subjects who were diagnosed to be COVID positive and then tested negative within a period of 4 weeks to three months were screened for the inclusion and exclusion criteria of the study. A sample size of thirty-five was estimated. Purposive sampling method was used to include the participants in this study. Ethical clearance was obtained from the Institutional Ethics Committee. Subjects of both gender were included. Subjects with presence of any chronic illness which may restrict them from performing the test, those who were under treatment for psychiatric illness, with the presence of cognitive or locomotor impairment before the infection, with a history of hypertension or hypotension were excluded from the study. The subjects participating in the study were given patient information sheet containing the study details, the informed consent were obtained from the subjects prior to the study.

Procedure:
Subjects fulfilling the inclusion criteria were enrolled for the study. A brief introduction about the procedure was explained to all subjects. An initial examination including demographic data was carried out prior to the study. Participants were asked to fill the self-reported questionnaires and data were analysed. Each participant was investigated in a single session.

3. Outcome Measures

Post-COVID associated anxiety: The post- COVID anxiety levels were assessed using the Corona Virus Anxiety Scale (CAS) is a self-report mental health screener of dysfunctional anxiety associated with the coronavirus crisis. Each item of the CAS is rated on a 5-point scale, from 0 (not at all) to 4 (nearly every day), based on experiences over the past two weeks. A CAS total score ≥ 9 indicates probable dysfunctional coronavirus-related anxiety. Elevated scores on a particular item or a high total scale score (≥ 9) may indicate problematic symptoms for the individual that might warrant further assessment and/or treatment.[16]

Sleep quality: Sleep quality was assessed using Pittsburgh Sleep Quality Index. It is a self-reported questionnaire that evaluates subjective sleep quality and different aspects of sleep. Includes sleep quality, latency, duration, sleep disturbance, use of sleep medications and daytime dysfunctions. Total score is between 0 to 21 and the score greater than 5 indicate sleep disturbance.[17]

Physical activity: International Physical Activity Questionnaire was used to assess physical activity. It is a 27-item self-reported measure of physical activity for use with individuals aged 18 to 65 years old. Overall score calculated using responses to all questions.[18]

Quality of life: World Health Organisation Quality of Life-BREF(WHO-BREF) Short version was used to assess quality of life of the participants. It was developed by WHO and consists of 27 items. Physical, psychological, social and environmental context scores are calculated for all items. Scale has no cut off score, highest score yields higher levels of quality of life.[19]

Statistical Methods
The collected data was summarized using the descriptive statistics such as mean and standard deviation. To find out the relationship between COVID-19 associated anxiety levels with gender, physical activity, quality of sleep and life, Pearson correlation coefficient was used, p value <0.05 was considered as significant. The data was analysed using Microsoft Excel and SPSS version 23.0.

4. Results

Table 1: Descriptive statistics of outcome measures:

	Median	Range
CAS	5.0	(0-13)
IPAQ	855.0	(226-1730)
PSQI	7.0	(3-16)
WHO-QOL Bref	20.0	(14-27)

*CAS: Corona virus Anxiety Scale, IPAQ: International Physical Activity Questionnaire, PSQI: Pittsburgh Sleep Quality Index, WHO-QOL Bref: World Health Organisation Quality of Life-BREF

Table 2: CAS comparison between male and female subjects.

	Frequency	%	Median	Range	U value	p value
Female	17	48.6	8	(4-13)	34.0	0.00
Male	18	51.4	1	(0-11)		

Table 3: Pearson correlation of components

Correlation	r value	p value
CAS and IPAQ	-0.62	0.00
CAS and PSQI	0.70	0.00
CAS and WHO- QOL BREF	-0.75	0.00

*CAS: Corona virus Anxiety Scale, IPAQ: International Physical Activity Questionnaire, PSQI: Pittsburgh Sleep Quality Index, WHO-QOL Bref: World Health Organisation Quality of Life-BREF

Karl Pearson correlation coefficient calculated between the parameters demonstrated that there is a strong negative correlation of CAS with IPAQ (p=0.00, r=-0.623) and WHO-

QOL (p=0.00, r=-0.75) and a strong positive correlation between CAS and PSQI (p=0.00, r=0.70).

5. Discussion

Millions of people around the world have been put in danger by the Coronavirus Disease 2019 (COVID-19), which is brought on by a new type of coronavirus called SARS-CoV-2.[20] Pandemics, including COVID-19, have been shown to have major effects on mental health resulting in anxiety, depression and high stress levels.[21] This correlation study was designed to find the association between COVID-19 associated anxiety levels with gender, physical activity, quality of sleep and quality of life in post COVID young adults and was carried out on 35 post COVID participants with the age group of 18 to 30 years. This study also intended to differentiate the frequency of anxiety between men and women.

The Corona Virus Anxiety Scale (CAS) was used to find out the dysfunctional anxiety associated with the coronavirus crisis. Subjective sleep quality was measured using the Pittsburgh Sleep Quality Index, physical activity using International Physical Activity Questionnaire and quality of life of subjects using World Health Organisation Quality of Life-BREF(WHO-BREF). On assessing correlations between variables, a significant negative correlation was found between anxiety and physical activity, quality of sleep and quality of life.

COVID-19 was initially reported by China in late 2019 and had spread to 13 countries by January 24. Since the observations and test results are changing quickly and there is a high mortality rate, its effects have not yet been determined. In addition to posing a risk to human life and health, COVID-19 has a permanent psychological influence on human communities. For instance, a total quarantine and travel restrictions that prevent residents from leaving the house, fear of contracting the illness, worry about losing a loved one, and, more crucially, depression after losing friends and relatives are some examples.[2] Being an infectious, deadly, and unpredictable, COVID 19 results in individual or mass hysteria and fear. Under these stressful circumstances, people display a variety of psychological and behavioural reactions that are influenced by public perception, the media, and the outbreak's consequences on mobility restrictions and shortages of daily necessities. Some people may also experience psychological crises of varying degrees, especially those who were personally influenced by the pandemic. [3]

In a cross-sectional study, Wang et al evaluated psychological impacts, depression, stress and anxiety at the beginning of the COVID-19 outbreak where 1210 participants from 194 cities in China answered an online questionnaire. The author showed that 53.8% of these people experienced severe psychological impacts of the outbreak.[21] Studies conducted during prior SARS and Zika virus pandemics have demonstrated the importance of educating all medical practitioners about the survivors' mental health.[22] Mattia Bellan et al in their cohort study, found that a significant proportion of survivors of COVID-19 experienced respiratory or functional impairment 4 months after hospital discharge, with clinically relevant psychological consequences.[23]

In the present study, a significant negative correlation was found between anxiety with physical activity, quality of sleep and quality of life. The negative correlation we found between anxiety and sleep quality is consistent with the results of the study done by Yazan A et al which reported significant association between increased levels of anxiety and depression with an increase in poor sleep health outcomes among Jordanians during lockdown in response to the COVID-19 pandemic.[5] Anxiety affects sleep in a way that results in less deep, slow-wave sleep and more nocturnal arousal. These two effects work together to diminish non-REM sleep, which may then lead to a reduction in REM sleep latency.[24] Alterations in one's circadian cycle are another possible mechanism by which anxiety and sleep problems interact. The maintenance of a person's sleep-wake cycle depends on their circadian rhythm, and depression has been shown to interfere with this pattern.[25]

A significant negative correlation was found between anxiety and physical activity. Movement restrictions can have a significant psychological impact. S Fendla et al. reported that people who are more physically active have a lower level of anxiety than people who are insufficiently active during the COVID-19 period.[26] The capacity to exercise can ameliorate the effects of stress and enhance wellbeing. For instance, it has been demonstrated that physical activity has a good impact on symptoms of anxiety and depression at every session, making it a useful short-term coping strategy with extra benefits for physical health.[27]Although it is currently advised for patients recovering from COVID-19 to encourage patients to return to performing daily activities and to begin low/moderate-intensity exercise at home, Humphreys et al. have described that patients experienced a lack of clear and consistent advice with regard to PA..[28] In addition, several people refrain from physical activity after suffering a relapse of symptoms after physical activity or after seeing others relapse after physical activity. Media reports of sudden deaths during physical activity in post COVID patients also is a reason for people to fear and avoid physical activity after COVID-19.

A significant negative correlation was found between anxiety and quality of life in post COVID adults who participated in this study. The interplay of protective factors, such as more social support and higher income, and disturbing factors, such as poor physical and mental health, determines quality of life. Anxiety can lead to physical discomfort and poor social interaction, which can reduce life quality.[29] These finding agree with those of a study done by Beatriz et al on 251 participants to assess the impact of COVID-19 on health-related quality of life 3 months after hospital discharge, which showed that persistent clinical and mental health problems were faced by the participants, with significant impact on patients HRQoL.[30]

In the present study, women had a higher CAS score when compared to men. Examining the hereditary aspects of anxiety can help to understand why women are more susceptible to anxiety. It has been demonstrated that genetic factors have a relationship with anxiety sensitivity and other

general vulnerability traits like neuroticism. Genetic variables considerably influenced women's individual variability in neuroticism more than men's, according to research by Lake et al..[31] According to a recent review by Kajantie et al., gender disparities exist among adults when it comes to the autonomic nerve system's response to acute stress. Women exhibit lower hypothalamic-pituitary-adrenal axis (HPAA) and autonomic reactivity than males do.[32] The results of the present study were also corroborated by a study by Brunes A et al., which discovered that women were less likely than males to experience anxiety symptoms and that women with higher scores in moderate-vigorous physical activity experienced lower levels of anxiety symptoms.[33]

However, some studies done on COVID survivors have shown that there are no severe mental health issues in persons with COVID when compared to those without. According to a research by Wang R et al, there was no discernible difference between the mental health of undergraduates who were quarantined and those who weren't.[34] Further research is required for providing evidence for the relationships of these factors. The novel findings of this study is that the COVID 19 anxiety is related with physical activity, quality of sleep and life in post-COVID adults, with women being more anxious than men. No doubt, researchers across the globe are rigorously searching for the genetics of the coronavirus, its epidemiological features and clinical manifestations but the impact of COVID19 pandemic on the psychology of people is a neglected facet and should be brought to the attention of stakeholders for timely intervention.

6. Limitation

The main limitation of the study was the relatively small sample size. The cross-sectional design of the study prevented establishment of a cause – and – effect relationship between the variables. Further studies may include a larger sample and longitudinal designs and has to use more sophisticated tools for outcome measurements.

7. Conclusion

In conclusion, the study showed that there is a significant relation between COVID-19 related anxiety levels with physical activity, quality of sleep and quality of life in post COVID young adults.

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