RESEARCH ARTICLE

Mental health, sleep quality and quality of life in individuals with and without multiple health conditions during home quarantine in India due to the COVID-19 pandemic: a cross-sectional study

[version 3; peer review: 1 approved, 2 approved with reservations, 1 not approved]
Ramesh Chandra Patra¹, Biswajit Kanungo¹, Parul Bawa¹

¹Department of Physiotherapy, Lovely Professional University, Jalandhar, Punjab, 144001, India

Abstract

Background

Since the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic and the global spread had created several challenges for the general public and the healthcare workers across the world, the primary aim of this study was to assess the psychological stress, sleep quality, and health-related quality of life (QoL) of individuals with multiple health issues during home quarantine caused by the COVID-19 pandemic.

Methods

The study was conducted between 28th March to 30th April 2020. We recruited 50 individuals who have a history of chronic health issues, and 50 individuals with no health issues for this cross-sectional study. Three questionnaires were used to evaluate the mental health [depression anxiety stress scale (DASS-21)], sleep quality [Pittsburgh sleep quality index (PSQI)], and QoL [short form of health-related questionnaire (SF-36)] of the participants. Statistical analysis was carried out with Student’s t-test, using SPSS software v16.

Results

Open Peer Review

Approval Status

|   | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
|   |   |   |   |   |

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(revision)
29 Jul 2024

version 2
(revision)
30 Jun 2022

version 1
17 Jul 2020

1. Shyamal Koley, Guru Nanak Dev University, Amritsar, India
2. Kanwar Hamza Shuja, National Institute of Psychology (NIP), Quaid-I-Azam University (New Campus), Islamabad, Pakistan
3. Uzma Zaidi, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia
4. Isabell Wagenhäuser, University
Baseline demographic characteristics were homogenous for both groups of participants. Intergroup analysis revealed statistically significant differences in mental health (p<0.001), sleep quality (p<0.001), and QoL (p<0.001) between the two groups. The results showed high levels of depression, anxiety and stress; poor sleep quality and low health-related QoL in Group A as compared to Group B.

**Conclusion**

Our findings indicate that individuals with chronic health issues exhibit higher mental health problems, lower quality of sleep and have a lower health-related QoL. More research is required and also government should plan on taking care of those patients.

**Keywords**
COVID-19, Mental Health, Sleep Quality, Quality of Life

This article is included in the Emerging Diseases and Outbreaks gateway.

This article is included in the Coronavirus collection.
We obtained approval for the study from the Institutional Research Ethics Committee of the Lovely Professional University (LPU), Phagwara, India (LPU/IEC/2020/26/03). All the participants were informed about the data collection procedure, and a written consent form was obtained from all the participants before the study started.

Study design and setting
This study was an observational cross-sectional study. The study took place at the Department of Physiotherapy, LPU. The study was conducted from 28th March to 30th April 2020. Full lockdown in India was initiated from 28th March to 31st May 2020. From 31st May, the lockdown was extended until 30th June for certain containment zones.

Participant recruitment
A total of 100 participants were recruited for the study as per their medical history. A total of 50 individuals suffering from chronic health issues (Group A; as identified from their clinical records) and 50 individuals with no chronic health issues (Group B) were recruited.

Sample size calculation
Sample size was calculated using G power software 3.1. The estimated sample size calculated for the study was 51 (95% confidence interval, power of the study was 80% where the effect size was considered as 0.5).

Individuals undergoing physio treatment at the Department of Physiotherapy, LPU (even though lockdown was going on, essential services, such as physio appointments, were continuing) were recruited for the study.

Individuals were contacted via phone to ask if they would like to take part in the study. As they were supposed to take physiotherapy services from our Organization, so before starting the treatment session, they were requested to sign the consent form, fill the questionnaire and were informed about the study procedure.

Group A inclusion criteria: Individuals clinically pre-diagnosed with hypertension, diabetics, and chronic musculoskeletal conditions were included in this group.

Group B inclusion criteria: Individuals with no chronic health issues were included in this group.

Groups A and B exclusion criteria: Individuals with history of any malignancy, recent fracture or trauma, osteoporosis, inflammatory arthritis, and/or cauda equine syndrome were excluded from this study.

Outcome measures
Mental health. Depression, anxiety, and stress scale (DASS-21) was used to assess depression, anxiety, and stress. The participants were asked to utilize a four-point severity/frequency scale to show the level of depression, anxiety, and stress they were experiencing in the past week.
Sleep quality. Sleep quality was evaluated through the Pittsburgh Sleep Quality Index (PSQI)\(^1\). This index asked participants to answer questions about their sleep habits in the past month. Participants that scored more than 5 were defined as having a low sleep quality.

Quality of life. Health-related QoL was assessed using the MOS 36-item short-form health survey (SF-36)\(^1\). The 36 items reflect eight health-related aspects that participants are asked to score, where 100 is defined as perfect health less, and any score less than 100 is defined as poor health.

Statistical analysis
Baseline characteristics of categorical variables were evaluated using the Chi-square test. Quantitative variables were evaluated using Student’s t-test, and quantitative variables without normal distribution were measured using the Mann-Whitney U test. Intergroup outcome measures were evaluated through an unpaired t-test. All analyses were carried out on SPSS software v16.

Results
A total of 110 participants were selected for primary assessment; 10 individuals were excluded as they did not fulfill the inclusion criteria. In total, 50 participants with chronic health issues and 50 without health issues were evaluated for the study.

Demographic characteristics are shown in Table 1. There was no statistical difference between groups for demographic characteristics.

Table 2 presents Groups A and B scores for the three outcome measures (mental health, sleep quality, and health-related QoL). For all DASS-21 items (mental health), Group A scored higher than Group B, showing higher levels of depression, anxiety, and stress in Group A individuals.

| Table 1. Demographic characteristics of all patients. |
|---------------------------------|------------------|------------------|
|                                | Group A (n=50)   | Group B (n=50)   |
| Age (years, mean)              | 53.44            | 52.76            |
| Weight (kg, mean)              | 65.87            | 66.45            |
| Height (cm, mean)              | 163.33           | 165.33           |
| Gender (%)                     |                  |                  |
| Female                         | 70               | 50               |
| Male                           | 30               | 50               |
| Body mass index (kg/m\(^2\), mean) | 24.15          | 23.51           |
| Smoking history (%)            |                  |                  |
| No                             | 82               | 75               |
| Yes                            | 18               | 25               |
| Marital status (%)             |                  |                  |
| Married                        | 90               | 85               |
| Not married                    | 10               | 15               |
| Education history (%)          |                  |                  |
| School level                   | 20               | 10               |
| Undergraduate                  | 60               | 40               |
| Postgraduate                   | 20               | 50               |
| Socioeconomic status           |                  |                  |
| Poor                           | 0                | 0                |
| Average                        | 60               | 50               |
| High                           | 40               | 50               |

Group A, individuals with chronic health issues; Group B, individuals without chronic health issues. Socioeconomic status was calculated as follows: Poor, below Rs 15000/month; average, Rs 15000-100000/month; high, above Rs 100000/month.
Similarly, for PSQI, Group A scored higher than Group B, showing poorer sleep quality for Group A individuals. For all SF-26 items, Group A scored lower than Group B, revealing lower health-related QoL in Group A individuals. Unpaired t-tests showed statistically significant differences between the groups for all variables ($p = 0.001$).

### Discussion

Since the WHO declared the COVID-19 outbreak a global pandemic, many individuals, even those who have not been infected by the virus, are required to follow government rules where it was mandatory to stay at home. In this cross-sectional study, we sought to identify the correlation between chronic health issues and depression, anxiety, stress, quality of sleep and QoL in a population-based study in India during lockdown due to COVID-19. Our findings showed that poor mental health, low sleep quality, and low health-related QoL were higher in individuals with chronic health issues compared with individuals without chronic health issues at the time of home quarantine in India.

Current evidence reveals that COVID-19 causes fear among the Indian population as they are at home quarantined due to lockdown, which can impact wellbeing, increasing depression, anxiety, stress, reducing sleep quality, and decreasing sleep QoL\(^{15,16}\).

Considering that the lockdown is likely to last for weeks, there is an urgent need to monitor the psycho-physiological wellbeing of the population and to collect research data to develop evidence-based strategies to reduce the negative psychological effects of these unprecedented changes in individuals’ everyday lives\(^{17,18}\), especially in those with chronic health conditions.

This study has some potential limitations: participants were recruited in only one area of India, we had a small sample size, and the only subjective outcome was considered for the study.

### Limitations

There are inherent limitations to this study. A major limitation of this study was the small sample size. Another limitation of the study was the involvement of only a single medical center. Additional studies from multiple centers’ are warranted.

### Recommendations

The present study substantiates that individuals with chronic illness have increased levels of depression, anxiety, stress, reduced sleep quality, and QoL compared with individuals without chronic illness during the quarantine period in India. Therefore, it is recommended that these individuals be constantly monitored for their psychological wellbeing during quarantine. To further substantiate the research, large comprehensive multi-centric studies should be conducted.

### Conclusion

The WHO has recommended that individuals with physical and mental disabilities need to take extra care during isolation/quarantine for COVID-19\(^{19}\). This is supported by the results of this study, which revealed an increased level

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| Table 2. Comparison of outcome measures for Group A and Group B. |
|---------------------------------------------------------------|
| **Outcome measures** | **Group A (mean±sd)** | **Group B (mean±sd)** | **F-value** | **P value** |
|---------------------------------|---------------------|---------------------|-------------|-------------|
| Mental health (DASS-21)         | Depression          | 11.28±2.32          | 5.23±1.23   | 0.89        | 0.001       |
|                                 | Anxiety             | 11.14±4.74          | 3.76±2.79   | 0.95        | 0.001       |
|                                 | Stress              | 18.58±3.44          | 4.34±1.88   | 0.51        | 0.001       |
| PSQI                            | Sleep Quality       | 9.44±2.74           | 5.24±2.82   | 0.81        | 0.001       |
| Quality of life (SF-36)*         | PF                  | 45.21±8.53          | 90.44±12.786| 0.55        | 0.001       |
|                                 | RL-PH               | 25.50±16.83         | 63.51±10.73 | 0.56        | 0.001       |
|                                 | RL-EH               | 32.52±22.23         | 79.46±11.52 | 0.69        | 0.001       |
|                                 | ENG                 | 30.50±7.72          | 84.43±8.92  | 0.85        | 0.001       |
|                                 | EWB                 | 42.88±8.76          | 83.96±9.32  | 0.71        | 0.001       |
|                                 | BP                  | 40.00±9.37          | 80.28±13.45 | 0.85        | 0.001       |
|                                 | GH                  | 35.52±9.49          | 73.80±12.72 | 0.61        | 0.001       |

Sd: standard deviation, PF: physical functioning, RL-PH: role of limitation-physical health, RL-EH: role of limitation-emotional health, EN: energy, EWB: emotional well-being, BP: Body pain, GH: general health, DASS=Depression Anxiety Stress Scale, PSQI= Pittsburgh Sleep Quality Index, *Social life (SL) domain was not considered for this study.

Group A is individuals with chronic health issues; Group B is individuals without chronic health issues.
of depression, anxiety, stress, and reduced sleep quality. QoL has been shown in individuals suffering from a chronic illness compared with those without chronic illness during the quarantine period in India.

Data availability

Underlying data

Figshare: Mental Health, Sleep Quality and Quality of Life in Subjects with Multiple Health Conditions during Home Quarantine for COVID-19 Pandemic Attack: A Comparison with Healthy Subjects, https://doi.org/10.6084/m9.figshare.12612833v3.

This project contains the following underlying data:
- Group A data
- Group B data

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

Acknowledgments

The author would like to express heartfelt thanks to all the participants who were participated in this study.

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At the beginning of the COVID-19 pandemic in India, the work presented examines the psychological effects of the lockdown on people with chronic illnesses in a controlled study compared to healthy people.

- Since the lockdown conditions were very different from country to country, it would be good to better define what lockdown meant in India in the introduction.
- Please add a clear definition of the inclusion criteria in the methods.
- Table 1: Are groups A and B comparable? If there are differences, this must be interpreted and taken into account statistically. Please compare the items statistically and add p-values.
- The results of the study are extremely brief and incomplete.
- Even if the groups are relatively comparable, statistical consideration of the various factors must be added -> what factors influence the occurrence of sleep disorders, depression, etc. (regression analysis)?
- Please add to the Limitations that unbalanced gender ratio, only short period at the beginning of the pandemic. It is unclear what the situation will be in a second lockdown, e.g. in winter 2020/21, etc.
- Please also discuss whether there is also literature on whether COVID-19 vaccination or infection can cause depression / sleep disorders and whether the lockdown is worth it in terms of mental risk. (e.g. Wagenhäuser I, et al., 2024 [Ref 1] or Athanasiou N, et al., 2023 [Ref 2])

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Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Epidemiology, immunology and diagnostics of acute respiratory infections

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 16 August 2024

https://doi.org/10.5256/f1000research.169415.r308385

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Uzma Zaidi
Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia

The authors conducted the study on the initial stage of COVID-19; therefore, the significance is undeniable. Moreover, the exploration of psychological or psychologically related factors of QoL and sleep, besides health conditions is a very valuable aspect. The result allows for the recommendation of more comprehensive policymaking for people who are suffering from multiple health conditions. The authors have improved the quality of the manuscript by responding aptly to the comments of reviewers. However, some improvement or explanation is still required for the methodology, statistical analysis, and results section.

Abstract:
The conclusion needs some improvement.
“Our findings indicate that individuals with chronic health ..... More research is required and also
the government should plan on taking care of those patients.”

**Suggestion:** “Our findings indicate that individuals with chronic health issues exhibit higher mental health problems, lower quality of sleep, and have a lower health-related QoL during the COVID-19 pandemic. More research is required and also the government should plan policies for patients with multiple health conditions.”

**Methods:**

**Outcome measure:**
Please correct and update the description of the scoring method for MOS 36-item health-related survey. Therefore, the replication of the method will be authentic and easy.

“The 36 items reflect .........., where 100 is defined as perfect health less, and any score less than 100 is defined as poor health.”

**Suggestion:** I am sharing the description along with the citation.

The scoring is from 0-100. Higher scores indicate better health status, whereas a low score presents poor health. The mean score of 50 has been considered as a cutoff score for all scales.[1]

**Statistical Analysis:**

**Suggestion:** In Table 1 add a column presenting the calculation of Chi-square to present statistical difference.

**Results:**

**Suggestion:** As researchers, it is wise to report the results in a more precise manner. According to the standardized scoring categories of DASS, mean scores of anxiety and stress of group A fall at an extremely severe level, whereas depression scores are falling in the range of severe levels. The relevant categories of DASS can be discussed in the result description for group B. It will strengthen the study findings. As in the normal population mean score of depression and anxiety is falling within the mild level. For more details check scoring categories: https://www.healthfocuspsychology.com.au/tools/dass-21/

**Discussion:**

**Suggestion:** There is another very interesting result related to QoL that needs to be discussed. The highest mean score in group A is in the physical functioning (PF) domain. As all the participants were receiving physiotherapy that could be one of the reasons. Authors can address it better. The lowest mean in both of the groups can be seen in the Role of the limitation-physical health (RL-PH) domain.

**References**

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**Is the work clearly and accurately presented and does it cite the current literature?**

Yes

**Is the study design appropriate and is the work technically sound?**

Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Clinical Psychology, Health Psychology, Personality Psychology, Mental Illness, Neuropsychology, Organizational Behavior

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.
the government should plan on taking care of those patients."

**Suggestion:** “Our findings indicate that individuals with chronic health ...... More research is required and also the government should plan policies for patients with multiple health conditions.”

**Methods:**

**Outcome measure:**
Please correct and update the description of the scoring method for MOS 36-item health-related survey. Therefore, the replication of the method will be authentic and easy.

“The 36 items reflect ........, where 100 is defined as perfect health less, and any score less than 100 is defined as poor health.”

**Suggestion:** I am sharing the description along with the citation. The scoring is from 0-100. Higher scores indicate better health status, whereas a low score presents poor health. The mean score of 50 has been considered as a cutoff score for all scales.

**Statistical Analysis:**

**Suggestion:** In Table 1 add a column presenting the calculation of Chi-square.

Add a source for socioeconomic slabs in the footnote of Table 1.

Authors are reporting that “Quantitative variables were evaluated using Student's t-test, and quantitative variables without normal distribution were measured using the Mann-Whitney U test.” However, table 2 does not present the student t-test and Mann-Whitney U test explicitly.

**Suggestion:** Provide an SD column for both groups, remove the difference column, and add a column for 't' or 'U' before the P value.

**Results:**

**Suggestion:** As researchers, it is wise to report the results in a more precise manner. According to the standardized scoring categories of DASS, mean scores of anxiety and stress of group A fall at an extremely severe level, whereas depression scores are falling in the range of severity levels.

The relevant categories of DASS can be discussed in the result description for group B. It will strengthen the study findings. As in the normal population mean score of depression and anxiety is falling within the mild level. For more details, check scoring categories.

**Discussion:**

**Suggestion:** There is another very interesting result related QoL that needs to be discussed. The highest mean score in group A is in the physical functioning (PF) domain. As all the participants were receiving physiotherapy that could be one of the reasons. Authors can address it better. The lowest mean in both of the groups can be seen in the Role of the limitation-physical health (RL-PH) domain.
References
1. Ware JE: SF-36 health survey update. Spine (Phila Pa 1976). 2000; 25 (24): 3130-9 PubMed Abstract
   | Publisher Full Text

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Clinical Psychology, Health Psychology, Personality Psychology, Mental Illness, Neuropsychology, Organizational Behavior

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Version 1

Reviewer Report 08 April 2021
https://doi.org/10.5256/f1000research.26834.r82045

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Kanwar Hamza Shuja
1 National Institute of Psychology (NIP), Quaid-I-Azam University (New Campus), Islamabad, Pakistan
Firstly thank you for giving me the chance for reviewing the article. It’s a well written article though there are places where some sentences needs to be rewritten and checked for grammar. However, my biggest concern with this article is regarding its sample size. My first question is how did authors come up with a sample size of 50? Did they selected it themselves or what was the reason behind it or did they used sampling size calculator. Because a sample of 50 is too low for concluding this study.

Secondly, again with the sample but this time inclusion criteria for the group B was not set by the authors. Having no inclusion criteria could lead to potentially adding participants who may also be medically ill, or were these participants were inquired prior during recruitment if they are medically sound. And if they were asked that would have become their inclusion criteria. But unfortunately, I was unable to find any such thing in demographic information.

Third the instruments used are for measuring psychological variables in general. What I mean by this is that nowhere was I able to find anything where the participants were asked their thoughts on Covid-19 or its effect on them. Now depression, stress or anxiety could be potentially due to multiple factors same with the reasons for disturbed quality of life or sleep. The authors should have added some questions in demographic which could help the participants and the readers to know that the findings here are actually due to Covid-19 and not due to any external factor.

Fourth it would would be nice if the authors can add limitations and recommendations heading before conclusion.

Thank you and good luck.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Public Health, Criminal Psychology, Clinical Psychology.
I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 16 Jun 2022

Ramesh Patra

First, we would like to thank the honourable reviewers and editor for their constructive criticisms and suggestive comments, which were of great help in improving the quality and clarity of the current manuscript. We have read each reviewer's comments carefully and, accordingly, made utmost efforts to address each comment point-by-point. We much appreciate the reviewer's time, effort, and detailed explanations. We believe that the revised version of our manuscript is now more focused, scientific, understandable, and better arranged. All changes are highlighted with red color.

Reviewer Comment:

Query 1:
Firstly thank you for giving me the chance for reviewing the article. It's a well written article though there are places where some sentences needs to be rewritten and checked for grammar.
Response:
Thank you for your valuable comments. We have modified the text with proper grammar usage as per your suggestions.

Query 2:
However, my biggest concern with this article is regarding its sample size. My first question is how did authors come up with a sample size of 50? Did they selected it themselves or what was the reason behind it or did they used sampling size calculator. Because a sample of 50 is too low for concluding this study.
Response:
The total sample taken was 100. We have calculated the sample size using G power software 3.1 which was found to be around 51 (95% confidence interval, power of the study was 80% where the effect size was considered as 0.5). The sample size calculation has been added in the revised manuscript under the method section.

Query 3:
Secondly, again with the sample but this time inclusion criteria for the group B was not set by the authors. Having no inclusion criteria could lead to potentially adding participants who may also be medically ill, or were these participants inquired prior during recruitment if they are medically sound. And if they were asked that would have become their inclusion criteria. But unfortunately, I was unable to find any such thing in demographic information.
Response:
As suggested, we have included the inclusion criteria for Group B.

Query 4:
Third, the instruments used, are for measuring psychological variables in general. What I mean by this is that nowhere was I able to find anything where the participants were asked their thoughts on Covid-19 or its effect on them. Now depression, stress or anxiety could be potentially due to multiple factors same with the reasons for disturbed quality of life or sleep. The authors should have added some questions in demographic which could help the participants and the readers to know that the findings here are actually due to Covid-19 and not due to any external factor.

Response:

We have used the following tools to measure all the three measure outcomes.

1. DASS-21 tool was used to measure the mental health.
2. PSQI was used to measure sleep quality.
3. MOS-36 was used to measure the health-related QoL.

We have mentioned the tools in the methodology section and also given references.

Query 5:

Fourth it would be nice if the authors can add limitations and recommendations heading before conclusion.

Response: We have included the limitations and recommendations as per your suggestions.

**Competing Interests:** No competing interests were disclosed.
the literature cited in the article was justified. It was quite difficult to collect the samples in the time of Lockdown prevailed then nationwide. Still the work would be considered as technically sound. In such type of study, the controls are not necessarily required, pre- and post-conditions may work. The methods and analyses were sound with proper replicability. Though the sample size was small (n=100), statistical analyses (using Chi-square test, Student’s t-test and Man-Whitney U test) were appropriate. The conclusion drawn in the study was adequately supported by the results. Small sample size was one of the limitations of the study.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Kinanthropometry, Biomechanics, Public Health & Lectinology.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 13 Nov 2020

Ramesh Patra

Thank You so much for your Valuable response and comments.

**Competing Interests:** No competing interests were disclosed.
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