**ARTICLE DETAILS**

| TITLE (PROVISIONAL) | Sleep quality and patterns of West Balkan young adults during the third wave of COVID-19 pandemic: a cross-sectional study |
|---------------------|-------------------------------------------------------------------------------------------------------------------|
| AUTHORS             | Šljivo, Armin; Juginović, Alen; Ivanović, Katarina; Quraishi, Iman; Mulač, Ahmed; Kovačević, Zorana; Ivanović, Stefan; Vuković, Miro; Aranza, Ivan; Biloš, Valentina; Ljuhar, Kenan; Drašković, Doris; Ćetković, Asja; Abdulkhaliq, Arian; Dadić, Ilma; Begić, Edin; Mujičić, Ermina; Kulo Ćesić, Aida |

**VERSION 1 – REVIEW**

| REVIEWER            | Cristina Romero-Blanco                                           |
|---------------------|-------------------------------------------------------------------|
|                     | University of Castilla-La Mancha, Nursery                         |
| REVIEW RETURNED     | 01-Feb-2022                                                       |

**GENERAL COMMENTS**

Thank you for allowing me to review your research work. I find it very interesting to look into sleep patterns as a consequence of the COVID-19 pandemic. Please allow me to make a few comments. These comments might facilitate the understanding of your study for future readers.

- **Title:**
  As you say, your study was conducted during the third wave of the pandemic in the western Balkans. Perhaps you should specify in the title that the study was conducted at that time.

- **Introduction and objective of the study:**
  The introduction briefly explains the background and the importance of the topic to be addressed in a correct way. When you state the objectives of the study, you indicate that you want to compare your data with the situation before the pandemic. I think this is not correct. In any case, this could be a secondary objective. Only with the results of three questions in the questionnaire do you describe what the participants remember about their sleep pattern before the pandemic, but you cannot compare this with the results obtained using validated questionnaires in the third wave. The objective should be reworded by deleting the words "compared to prior the pandemic".

- **Methods**
  In the exclusion criteria you do not set any age limit above. Is this real? I find it strange that no one over the age of 40 answered a questionnaire launched on social networks. If your study was aimed at young adults, you should write the age limit in the exclusion criteria. The description of the questionnaire does not describe that you asked questions about sleep quality prior to the pandemic. Please review the statistical analysis section and rewrite it according to the data presented in tables and results. Results expressed in median and percentiles have not been presented. The analysis performed with respect to the age of participants
should be explained in more detail. In the results you comment on the age of the participants, but this analysis is not described in the methodological section nor is it shown in the results tables.

- Results
Three countries were assessed, were there differences in sleep patterns depending on the country? Perhaps this should be included in table 1
I think that the section "sleep patterns" focuses too much on the perception of the participants. Also, it is confusing because it starts by stating the sleep duration results reported in the PSQI and compares them to the pre-pandemic perception data.

- Tables
In table 1 it would be interesting to show the results of the bivariate analysis that has been carried out. It would also be interesting to include in the variable "Covid-19 related info" the data of the participants "covid-19 negative".
Table 3 does not seem very relevant to me. It would be more interesting to show the data of the PSQI items and compare those who have obtained a poorer quality of sleep with those who report better quality of sleep. This would allow us to see if any of the items have more weight than the others.
In table 4 you should indicate what you mean by "PSQI positive cases".

- Discussion
In the study (reference number 5) where you wrote "Dilara Y", you should say "Yuksel".
The Chinese study you compare your results with does not have similar methodology, they just used the same sleep quality scale. You should modify this sentence.
You have found worse sleep quality in older participants; however, the age limit of your sample was 40 years.
"Our findings that older individuals have poorer sleep quality than younger ones can also be explained by a more severe clinical manifestation of disease in elderly."
I think this sentence is inappropriate to comment on your results. Your population is not elderly and the reference you refer to does not address the issue you raise.

- Limitations
If your study was aimed at young adults, it does not make sense to write that because of the way you collected the data you did not get data from older people.
Perhaps you should also point out that the sample of men was much smaller than that of women and this may have conditioned the results obtained in terms of gender.

I hope these comments can help you. And that future readers will be able to understand your research work.

REVIEWER
Haitham Jahrami
Arabian Gulf University

REVIEW RETURNED 05-Mar-2022

GENERAL COMMENTS
dear authors,
thank you so much for the paper.
introductory - out of date. at least 4 systematic reviews and meta-analyses were missed that were critical.
Almoradi Z, Broström A, Tsang HWH, Griffiths MD, Haghayegh S, Ohayon MM, Lin CY, Pakpour AH. Sleep problems during COVID-19 pandemic and its' association to psychological distress: A systematic review and meta-analysis. EClinicalMedicine. 2021 Jun;36:100916.
VERION 1 – AUTHOR RESPONSE

Reviewer: 1
Dr. Cristina Romero-Blanco, University of Castilla-La Mancha

Comments to the Author:
Thank you for allowing me to review your research work. I find it very interesting to look into sleep patterns as a consequence of the COVID-19 pandemic.
Please allow me to make a few comments. These comments might facilitate the understanding of
your study for future readers.
- Title:
As you say, your study was conducted during the third wave of the pandemic in the western Balkans.
Perhaps you should specify in the title that the study was conducted at that time.

Dear Madam, the following point has been added to the title.

- Introduction and objective of the study:
The introduction briefly explains the background and the importance of the topic to be addressed in a
correct way.
When you state the objectives of the study, you indicate that you want to compare your data with the
situation before the pandemic. I think this is not correct. In any case, this could be a secondary
objective. Only with the results of three questions in the questionnaire you describe what the
participants remember about their sleep pattern before the pandemic, but you cannot compare this
with the results obtained using validated questionnaires in the third wave. The objective should
be reworded by deleting the words "compared to prior the pandemic".

Dear Madam, the following point has been deleted from the Objectives part of the Introduction.

- Methods
In the exclusion criteria you do not set any age limit above. Is this real? I find it strange that no one
over the age of 40 answered a questionnaire launched on social networks. If your study was aimed at
young adults, you should write the age limit in the exclusion criteria.

Dear Madam, we have added the over age limit, thus limiting our research to age group 18-40. Also
we had only 4 subjects above 40 years. According to our national data, the digital literacy is also very
low, with older adults using only WhatsApp and Viber for calls.
The description of the questionnaire does not describe that you asked questions about sleep quality
prior to the pandemic.

Dear Madam, the specific point was added to the Methods section.

Please review the statistical analysis section and rewrite it according to the data presented in tables
and results.

Results expressed in median and percentiles have not been presented.

Dear Madam, yes there have been data presented as median and percentiles as follows: “The mean
sleeping duration during the COVID-19 pandemic was 7.71±2.14 (minimum–maximum range 1–13)
hours with a median sleep latency of 20 minutes (10.0, 30.0).”

Subjects with poor sleep quality were significantly older [25 (23–36) vs 24 (22–26) years; U=63409.0;
p<0.001] compared to those with good sleep quality

The analysis performed with respect to the age of participants should be explained in more detail. In
the results you comment on the age of the participants, but this analysis is not described in the
methodological section nor is it shown in the results tables.

We used the Mann Whitney U test to test differences between variables. The explanations has been
added to the Statistical analysis.
- Results

Three countries were assessed, were there differences in sleep patterns depending on the country? Perhaps this should be included in table 1.

We have conducted the analysis between countries but there was not statistical difference between sleep quality and insomnia. Furthermore, due to specific political issues addressing differences between mentioned countries may further divide national groups and this research didn't aim to do these things. We ask the reviewers to please adopt this point.

I think that the section "sleep patterns" focuses too much on the perception of the participants. Also, it is confusing because it starts by stating the sleep duration results reported in the PSQI and compares them to the pre-pandemic perception data.

The mentioned sentence has been moved to the sleep quality section. We have rephrased the title to patterns and perceptions to make it more precise.

- Tables

In table 1 it would be interesting to show the results of the bivariate analysis that has been carried out. It would also be interesting to include in the variable "Covid-19 related info" the data of the participants "covid-19 negative".

We have conducted again the analysis and added points were statistical difference was found. The COVID-19 negative participants have been added and test between groups. COVID-19 positive were more insomniac and had poor sleep quality.

Table 3 does not seem very relevant to me. It would be more interesting to show the data of the PSQI items and compare those who have obtained a poorer quality of sleep with those who report better quality of sleep. This would allow us to see if any of the items have more weight than the others.

Dear Madam, regarding the table, we would like to leave it in this form if possible, as it presents not only sleep problems, but also what was observed by roommates, partners and concisely presents these info.

In table 4 you should indicate what you mean by "PSQI positive cases".

We have added the explanation.

- Discussion

In the study (reference number 5) where you wrote "Dilara Y", you should say "Yuksel".

This point has been corrected.

The Chinese study you compare your results with does not have similar methodology, they just used the same sleep quality scale. You should modify this sentence.

The mentioned sentence has been modified.

You have found worse sleep quality in older participants; however, the age limit of your sample was 40 years.

"Our findings that older individuals have poorer sleep quality than younger ones can also be explained by a more severe clinical manifestation of disease in elderly."
I think this sentence is inappropriate to comment on your results. Your population is not elderly and the reference you refer to does not address the issue you raise.

The mentioned sentence has been removed.

- Limitations
If your study was aimed at young adults, it does not make sense to write that because of the way you collected the data you did not get data from older people. We have removed the sentence regarding the elderly.
Perhaps you should also point out that the sample of men was much smaller than that of women and this may have conditioned the results obtained in terms of gender.
This point has been added to the limitations section.

I hope these comments can help you. And that future readers will be able to understand your research work.

Reviewer: 2
Dr. Haitham Jahrami, Arabian Gulf University
Comments to the Author:
dear authors,
thank you so much for the paper.
introduction - out of date. at least 4 systematic reviews and meta-analyses were missed that were critical.
Alimoradi Z, Broström A, Tsang HWH, Griffiths MD, Haghayegh S, Ohayon MM, Lin CY, Pakpour AH. Sleep problems during COVID-19 pandemic and its’ association to psychological distress: A systematic review and meta-analysis. EClinicalMedicine. 2021 Jun;36:100916. doi: 10.1016/j.eclinm.2021.100916. Epub 2021 Jun 10. PMID: 34131640; PMCID: PMC8192091.
Alimoradi Z, Gozal D, Tsang HWH, Lin CY, Broström A, Ohayon MM, Pakpour AH. Gender-specific estimates of sleep problems during the COVID-19 pandemic: Systematic review and meta-analysis. J Sleep Res. 2022 Feb;31(1):e13432. doi: 10.1111/jsr.13432. Epub 2021 Jul 9. PMID: 34245055; PMCID: PMC8420603.
Jahrami H, BaHammam AS, Bragazzi NL, Saif Z, Faris M, Vitiello MV. Sleep problems during the COVID-19 pandemic by population: a systematic review and meta-analysis. J Clin Sleep Med. 2021 Feb 1;17(2):299-313. doi: 10.5664/jcsm.8930. PMID: 33108269; PMCID: PMC7853219.
Jahrami HA, Alhaj OA, Humood AM, Alenezi AF, Fekih-Romdhane F, AlRasheed MM, Saif ZQ, Bragazzi NL, Pandi-Perumal SR, BaHammam AS, Vitiello MV. Sleep disturbances during the COVID-19 pandemic: A systematic review, meta-analysis, and meta-regression. Sleep Med Rev. 2022 Jan 22;62:101591. doi: 10.1016/j.smrv.2022.101591. Epub ahead of print. PMID: 35131664; PMCID: PMC8782754.

Dear Sir, all the mentioned papers have been added to the paper. We would like to mentioned the 2 studies in Your list weren't published at the time of submission of our paper, so that is the only reason why they weren't included in our study.

methods
the use of PSQI and ISI is inaccurate.
i am aware of dispute regarding PSQI cut-off but most recent paper by developers suggest that poor sleep quality is PSQI ≥ 5 no > 5. see
Cole JC, Motivala SJ, Buysse DJ, Oxman MN, Levin MJ, Irwin MR. Validation of a 3-factor scoring model for the Pittsburgh sleep quality index in older adults. Sleep. 2006 Jan;29(1):112-6. doi: 10.1093/sleep/29.1.112. PMID: 16453989.

Dear reviewer, we have rechecked everything and have to report that we made a lapsus calami regarding the PSQI. The statistics is done according to the PSQI≥5, not >5, so that these number are correct. SPSS included all cases that were ≥5.

Major issue is with ISI there is lack of clarity between insomnia and subclinical insomnia -- Total score categories: 0–7 = No clinically significant insomnia 8–14 = Subthreshold insomnia 15–21 = Clinical insomnia (moderate severity) 22–28 = Clinical insomnia (severe)

Our statistics included all cases which had any form of insomnia. If needed we can divide in Table 1. the cases to subthreshold and clinical insomnia.

In the results authors mentioned that Of all subjects, 574 (54.2%) subjects had a score of more than 7 on ISI questionnaire with 409 (71.2%) having subthreshold insomnia and 165 (28.8%). The mathematics does not add up here please use scoring correctly. If 54.2% had ISI > 7 it means that 45.8% have no insomnia symptoms.

Results suggest that 100% i.e., 409 (71.2%) having subthreshold insomnia and 165 (28.8%) had disturbances.

Dear reviewer, the mentioned insomnia percentages are percentages divided by total number of those who had any forms of insomnia (more than 7 on ISI)

409/574=0.712 and 165/574=0.288

Because it was confusing we corrected it and divided it with the total number of participants.

Results

need to be redone

Discussion

need to be rewritten in light of new results.

VERSION 2 – REVIEW

| REVIEWER         | Cristina Romero-Blanco                  |
|------------------|-----------------------------------------|
| University of Castilla-La Mancha, Nursery |                           |
| REVIEW RETURNED  | 15-Apr-2022                             |
| GENERAL COMMENTS | Thank you for the new version of your manuscript. |

| REVIEWER         | Haitham Jahrami                           |
|------------------|------------------------------------------|
| Arabian Gulf University |                                      |
| REVIEW RETURNED  | 11-Apr-2022                              |
| GENERAL COMMENTS | thank you for the revision               |