

# Review of: "Medical students' disease status of COVID-19: A multicenter study"

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The authors present a study on COVID-19 vaccination among medical students in Pakistan. This topic has merit, in part because medical students will serve as ambassadors of the medical-scientific community to the public and play a direct role in influencing patient perceptions about vaccination. This study also assesses re-infection with COVID-19, a topic that has become more prescient in both the later and post-pandemic stages. The authors also examine a relatively understudied population- namely, healthcare profession students in Pakistan. While this article has merit, there are multiple issues that should be resolved, including ambiguity regarding methodology.

## Introduction

- "Khyber Pakhtunkhwa being Pakistan's third-most-populated province"- Please provide the population for this region
- "A study conducted in Jordan showed..."- What is the age range or level of schooling of the participants in this study?  
The authors note that a subset of these students were indeed health professions students, but it is unclear if this includes students of any age or education level, or more specifically those studying for professional degrees.
- Several instances of grammar and spelling that should be corrected, including proper capitalization of "COVID-19", use of the abbreviation "KP" before defining it, etc.

## Methodology

- "All undergraduate students of MBBS and BDS of various medical colleges of KP who filled the proforma and were ready to disclose their information were included"- How were these students contacted for participation in the study?  
When were the invitations to participate sent to the students? How many students across how many schools were contacted? During what time was the study open? Were there any additional inclusion or exclusion criteria?
- A copy of the questionnaire should be included in the appendix
- "as well as by hand"- Please elaborate on this. Who distributed the proforma by hand? Were students approached directly or were these flyers made available at a booth/clinic/office for interested students to obtain and fill out?
- Were any measures taken to prevent multiple submissions from the same participant? Some survey programs will provide unique URLs for each email that expire once the survey is completed; I am not aware of any options to do so for Google Forms.

## Results

- “Peshawar district (25%) and from Khyber Medical College (41%)”- Please include the number of participants for each percentage.
- Question 5- Does this refer to students who were tested regardless of the result (i.e. students who tested either positive or negative for COVID-19)?
- Question 7- It seems odd that 216 respondents would say they had no symptoms and yet only 190 would report that they were positive for COVID-19.
- Question 9- Does this refer to isolation after testing positive, isolation upon having symptoms (regardless of positivity), isolation while awaiting test results, or isolation without symptoms in order to avoid contracting the virus?
- Question 11- Does this refer to seeking the services of a medical provider or sub-specialist consultation in the hospital? I recognize that "consultation" may have different meanings across healthcare systems, and so at least some of this understanding may be due to personal ignorance. Nevertheless, I think this should be clarified for readers.
- Question 12- Again, if only 190 students tested positive, how could 376 be given a treatment plan? Furthermore, what exactly does "treatment plan" refer to in this instance? Finishing a course of dexamethasone and an antiviral (unlikely to be prescribed to young, otherwise healthy patients with mild COVID-19 illness)? Instructions for self-isolation? Recommendations for hydration and symptom control?
- Question 13- I assume that this must mean that the participant was vaccinated at the time of the survey. However, given that the preceding questions refer to experience with COVID-19 illness, this could also be interpreted as vaccination at the time the participants developed COVID-19.
- Question 15- Wouldn't all of the participants in the following categories also be included in this one? As in, if it has been 7 months since a participant had COVID-19, wouldn't this place them in the "4-10" and ">1 or not diagnosed" category? I suspect the authors may have meant "<1" instead of ">1". However, I'm not sure how this is written in the actual questionnaire.
- Also, in reference to “months passed after Covid”, I assume this means COVID-19 infection, although given that the preceding questions involve vaccination, it's somewhat unclear which of these this question is referring to.
- Figure 3- Please include the number of participants used to create this figure (e.g., "n").
- Figure 4- This is an interesting figure as it focuses specifically on symptoms experienced during a participant's second bout of COVID-19. However, the fact that this figure involves only 19 participants (compared to 190 in the preceding figure) limits its comparability. Furthermore, the number of participants should be included here so the reader is informed about the significant difference between group sizes between Figures 3 and 4.

## Discussion

- “About 72.1% of all of the students reported symptom onset either within one month before the conduction of the survey or not at all.”- It's not clear how this was calculated. I suspect the authors used the months since COVID-19 illness and the time the survey was completed to determine this. It's also not clear what utility this statement provides; I suspect the authors may be trying to highlight how few students had symptoms within the study time period. If so, the wording "within one month before the conduction of the survey" is a bit confusing.

- “June 2021 to March 2022”- This should be included in the methods section. Also, such a lengthy timeframe for this survey could be problematic. For example, pandemic conditions likely changed drastically during this time period (including various waves of COVID-19 variants). It's also unclear from the methods if the survey was distributed at all 16 institutes at the same time and for the same period of time. Other factors such as seasonality may have influenced vaccination rates. The authors need to note this as a limitation of the study and explain how their survey timeframe spanning 3/4 of a year could complicate some of their results.
- “RT-PCR is the preferred test”- The fact that RT-PCR was observed to be used more frequently in this study does not prove that it is the preferred test in Pakistan. This may be consistent with practices in Pakistan, but the authors need to provide a reference in that case.
- “healthcare setups”- What are "healthcare setups"? Clinics? Hospitals? Does frequently visiting these settings refer to patients or employees or both?
- “Individuals who frequently visit...”- The statements made in this paragraph may be factually correct, although their placement within the paragraph doesn't provide a logical flow of ideas. The paragraph begins by talking about the risk of spreading COVID-19 in individuals who frequent healthcare settings, then talks about healthcare trainee hesitancy, then talks about female healthcare student hesitancy, then compares hesitancy across health profession trainees, and concludes with a statistic about pro-vaccine behavior among medical students. It's unclear what the unifying idea is supposed to be or what the authors are trying to prove with these studies.
- “youngsters”- Children? Adolescents? Pediatric patients in general? Young adults?
- Similar trends can be seen in our study as clinical students are at higher risk (relative risk 1.31) of acquiring infection as compared to preclinical students.”- This sentence seems to suggest that the high risk of clinical students compared to pre-clinical students is due to under-utilization of PPE. However, nothing in the data suggests that this was the case.
- "or links between various aspects that weren't explored"- Actually, the authors cannot report any links between frequencies and processes that weren't explored. The way this sentence is worded suggests the opposite.

Overall, this article has merit. However, the authors need to clarify several instances of ambiguity in their methodology and be cautious in the interpretation of their results. Nevertheless, I hope to see future work from these authors and hope they continue to examine this topic.