Does willingness to be vaccinated against SARS-CoV-2 depend solely on income?

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Dear Editor,

We read with interest the article by Ramezani-Doroh et al, on a cross-sectional study of the influence of income inequality on the willingness to receive the SARS-CoV-2 vaccine (*1*). The authors reported that fewer participants from the low-income group than from the high-income group (33.5% vs. 49.1%) were willing to be vaccinated. Female gender, older family members and witnessing COVID-19-related deaths among relatives were the main factors that influenced the willingness to be vaccinated. In contrast, employment, previous COVID-19 infection, and a bachelor's degree had the most significant opposite effects on inequality in willingness to be vaccinated. The study is impressive, however, some points should be noted.

The first point is that the study design was based on an electronic questionnaire and electronic questionnaires have several disadvantages. They can suffer from high non-response bias; those who decide to participate may differ significantly from those who do not, which can lead to some bias in the results. Online surveys may have higher dropout rates due to factors such as survey length, unclear questions or missing response options. Other disadvantages include the possibility of survey fraud, the difficulty of reaching certain population groups, and the challenge of interpreting the nuances of responses in the absence of an interviewer (*2*).

The second point is that several factors that have been shown to influence willingness were not included in the analysis. Willingness may also depend on the availability of certain vaccine brands, for example (*3*). Some studies have shown that living without a partner, smoking, regular medication use, a high number of previously discontinued disease-modifying therapies, and dissatisfaction with the pandemic measures negatively influenced the willingness to receive SARS-CoV-2 vaccine (*3*). Other studies found that a higher level of education and the belief that SARS-CoV-2 vaccine would protect against infection, as well as the absence of chronic diseases, were associated with increased willingness (*4*).

The third point is that current medication and history of previous vaccinations were not included in the analysis. Patients who have had bad experiences with current or previous medication or previous vaccinations are less likely to consent to SARS-CoV-2 vaccination than patients who have not experienced the side effects of a medication or vaccine.

The fourth point is that it is unclear whether vaccine recipients in Islamic Republic of Iran had to pay for foreign or domestic vaccines themselves, or whether SARS-CoV-2 vaccine was funded by government health authorities regardless of the vaccine brand. Free access and free administration of the SARS-CoV-2 vaccine certainly promote willingness to vaccinate. This information is needed.

The fifth point is the discrepancy between the objectives stated in the abstract (investigation of the dependence of willingness to undergo SARS-CoV-2 vaccination on income in Iran) and the information in the methodology section, according to which only vaccinated individuals from the Hamadan Region were considered. This discrepancy could be eliminated.

In summary, we can say that willingness to be vaccinated depends not only on a person's income, but also on numerous other factors.

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Authors' response to the letter to the editor titled "Does willingness to be vaccinated against SARS-CoV-2 depend solely on income?"

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Dear Editor,

We sincerely thank the authors of the letter to the editor for their interest in our study and we greatly appreciate the opportunity to clarify several points regarding our study design, methodology and findings.

Study design and online questionnaire

As noted, we used a cross-sectional design for our study and used an online questionnaire to collect the data. In-person data collection was not possible because of the COVID-19 restrictions in Hamadan at the time of the study. We acknowledge the limitations of online questionnaires and these were explicitly mentioned in the discussion and limitations sections.

Consideration of additional factors influencing willingness to vaccinate

Our study was conducted in February–March 2021 when COVID-19 vaccines had not yet been distributed to the general population and access to specific vaccine brands was extremely limited in Islamic Republic of Iran. Therefore, brand-related preferences could not have meaningfully shaped the willingness of individuals at that time. However, we incorporated trust in the effectiveness of foreign vaccines as a proxy for attitudes toward vaccine brands.

Several of the factors mentioned in the comment were already included in our analysis. For example, marital status was one of our covariates, capturing whether participants lived with a partner or not, and underlying chronic disease was considered, which can serve as an approximate indicator of regular medication use or ongoing treatments.

Our primary objective was to examine income-related inequality in the willingness to vaccinate and its determinants. Therefore, we focused on key demographic, socioeconomic and health-related variables, including age, sex, education, employment, prior COVID-19 infection, presence of elderly family members, history of COVID-19-related deaths among relatives, chronic disease, and trust in the effectiveness of foreign vaccines.

In the low-income group, participants with a bachelor's degree and the employed were significantly more willing to vaccinate, as were individuals with relatives who had been previously infected with COVID-19. Knowledge about the COVID-19 vaccine increased the willingness to vaccinate. In contrast, chronic disease and trust in foreign vaccines did not show statistical significance. In the high-income group, female participants, individuals with relatives who had been infected or deceased due to COVID-19, and those with higher vaccine knowledge and greater trust in foreign vaccines were more likely to express the willingness to vaccinate. Taken together, these findings demonstrate that our study adequately accounted for major sociodemographic and health-related determinants of willingness to vaccinate, within the contextual limitations of the study period.

Current medications and previous vaccination history

We appreciate the authors' thoughtful observation regarding the potential influence of previous medication and vaccination experiences on willingness to vaccinate. Although we acknowledge that such experiences can shape the attitude of individuals toward future vaccination (*1*), these factors were not directly included in our analysis. The primary objective of our study was to examine income-related inequalities in willingness to vaccinate and not to construct a comprehensive behavioural model. However, our study incorporated several psychological and behavioural determinants, including knowledge about COVID-19, knowledge about the COVID-19 vaccine and adherence to preventive COVID-19 measures, which may indirectly reflect the orientation of participants towards preventive health behaviours and their general trust in medical and public health interventions.

It is important to note that vaccine hesitancy is a multifactorial construct, influenced not only by previous experiences with medications or vaccines but also by broader social, cognitive and contextual factors (*1,2*). Within the scope and objectives of our research, we believe that the variables included in our model adequately captured the main dimensions of vaccination willingness relevant to our analytical focus.

Cost and access to vaccination in Islamic Republic of Iran

It is important to note that at the time of our study, COVID-19 vaccines had not yet been distributed to the general population in Islamic Republic of Iran (*3*). Consequently, participant responses reflected their intention to vaccinate and not actual access or payment behaviours. We agree that cost and free access are important determinants of vaccine uptake when distribution begins. However, these factors were not applicable within the temporal context of our survey. It is worth noting that previous research has shown that even when vaccines are provided for free, a considerable proportion of individuals may still refuse vaccination (*4,5*). Therefore, willingness to vaccinate cannot be explained solely by financial or accessibility factors.

Scope and generalizability of findings

As clearly stated in the abstract and methods sections, our study was conducted in Hamadan City and we acknowledge that limiting the sample to a single urban centre may limit the generalisability of the findings to the broader Iranian population. However, our work represents one of the first empirical efforts to explore income-related inequality in the willingness to vaccinate in Islamic Republic of Iran. The study provides background information for understanding how socioeconomic disparities shape vaccination attitudes. We explicitly acknowledged this limitation in the limitations section, emphasizing that future research should include larger and more diverse populations. We highlighted the need for multicentre and longitudinal studies to confirm and build on our findings.

Conclusion

Although income was identified as a key determinant of the willingness to vaccinate, we agree that vaccination decisions are influenced by a complex interplay of social, psychological and contextual factors. Our analysis contributes valuable evidence on the socioeconomic dimension of the willingness to vaccinate and identifies vulnerable subgroups that may benefit from targeted health communication and other interventions.

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