

Title: Multi-dimensional potential factors associated with COVID-19 vaccine booster acceptance among the Bangladeshi people: a cross-sectional study

Methods

Study design

This cross-sectional study used an anonymous, multi-items, closed-ended bilingual questionnaire to rationalize the study outlined objectives. Paper based questionnaire was deployed and data were collected through face to face interview among randomly visited people. The permission to conduct this study has been obtained from the “Ethical Review Committee” (IRC), Faculty of Biological Science and Technology, Jashore University of Science and Technology, Bangladesh. The detail research protocol was reviewed and evaluated by the IRC before the study began. Data were collected randomly and analyzed anonymously while no clinical intervention was applied to the subjects. The IRC thus approved the study as exempt. There was no external funding for the study.

Setting and participants

Bangladeshi people of age 18 years and above were the participants for this analysis. To confirm the study reliability and rationalize the research objectives, we have collected the data from eight divisions in Bangladesh. No financial or in-kind reward was offered to participants who completed the survey interview. Among 704 face-to-face visited participants, 13.8% declined to provide informed consent.

Participants’ inclusion and exclusion criteria

The eligibility criteria for the participants were following: (i) to understand and agree to the study objectives, and provide anonymous data on COVID-19 booster vaccination, (ii) 18 years and above aged (iii) received 1st dose vaccine or 2nd dose received 2nd dose COVID-19 vaccine. The exclusion criteria are as follows: (i) below 18 years aged ii) not agreed to give consent, and (iii) not vaccinated by primer dose yet.

This study however did not harm the individual’s and the individual was free to refuse participation at any time.

Measures and survey instrument development

The theoretical concept of COVID-19 vaccine acceptance and hesitancy has been conceptualized from the recent reviews on topics.^{18, 31} Key items of the questionnaire were adopted from the

theoretical analysis of the recent studies on COVID-19 booster doses.^{22-25,32-38} Moreover, in-field consultation was conducted in formulating and rationalizing the questionnaire items. The questionnaire was developed in Bengali (native) language and translated into English language, and 15 minutes need to complete the questionnaire. Each item of questionnaire was content and face validated using a panel of public health experts that ensures the relevance and clarity of the instrument. To validate the legitimacy and relevance of the instrument, pilot testing (n=20) was undertaken before disseminating the final version questionnaire. The outcomes of the piloted research were precluded from the final analysis.

The survey instrument assessed (1) socio-demographic characteristics of the respondents; (2) intention to uptake COVID-19 booster dose, and (3) factors influencing COVID-19 booster acceptance and hesitancy.

Study variables

As the response variable of the study, we measured willingness to uptake a booster vaccine and the responses were measured as a binary variable (1=Yes, 0=No). The socio-demographic characteristics of the respondents were also noted. In analyzing the data in a binary regression model, we investigated the impacts of several socio-psychological and vaccine-related factors on the outcome response variable dichotomized into 1=Yes and 0=No.

Study size

The following SurveyMonkey formula was used to calculate the least required sample size with a confidence interval of 95% (z score of 1.96) and a 5% margin of error.

$$\text{Sample size} = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \frac{z^2 \times p(1-p)}{e^2 N}}$$

Where N = population size, p=sample probability, e = margin of error (percentage in decimal form), z = z-score.

In general, the least required 500 data are recommended to conduct binominal regression analysis in observation studies with large sample size that characterize the parameters. Another formula is $n=100+50i$ where i stand for number of independent variables included in the

analysis.^{39,40} We pre-tested data samples (n=20) as a pilot study to examine the clarity of the instruments as well as to determine the average time spanned in completing the survey.

Statistical analysis

For analyzing socio-demographic characteristics, descriptive statistics utilized weighted frequencies and percentage of the variables. A non-parametric data analytical tool called binary logistic regression was employed to explore the pattern of association between explanatory variables and response variable. All the key assumptions related to binary regression analysis were examined to adjust the model suitability. Accordingly, model summary and goodness of model fit were examined. All assumptions for binary analysis were evaluated. Raw data were inserted into the Microsoft excel (version 10) and imported to Statistical Package of Social Science (SPSS) software version 25 (RRID: SCR_016479) for statistical analysis. $p < 0.05$ was considered the significant cut-point value. Face to face data collection denied the acceptance of incomplete survey response, thus, no missing data received.