

# COVID-19 perceptions and vaccine acceptance in the Maldives

MOHAMED AMIR<sup>1</sup>, AISHATH MUNEER<sup>1</sup>, SINWA ABDUL LATHEEF<sup>1</sup>, ABDULLA ZAEEM<sup>1</sup>, FATHIMATH ZOONA<sup>1</sup>, AHMED MAUROOF<sup>1</sup>, NILOOMA MOHAMED<sup>1</sup>, MOHAMED AKRAM<sup>1</sup>, FATHMATH NAZLA RAFEEQ<sup>2</sup>, AHMED FAISAL<sup>3</sup>, RAHEEMA ABDUL RAHEEM<sup>1</sup>,

<sup>1</sup>*The Maldives National University*

<sup>2</sup>*Health Protection Agency*

<sup>3</sup>*Indira Gandhi Memorial Hospital*

**ABSTRACT** *The aim of the study was to identify the perceptions regarding the COVID-19 epidemic and acceptance of COVID-19 vaccine. A cross-sectional study design was employed to collect the data for the study using an online questionnaire. Among 700 participants, 602 (86%) people agreed that they would get the vaccine if it became available. The reasons people gave for not agreeing to get the vaccines were that the vaccine might have side effects, it might be too expensive, and it might not be safe. Only 1.2% said that they did not want to vaccinate due to religious reasons. Vaccine acceptance was associated with age, employment status, and Influenza vaccination in the past 12 months. Although the perception towards the COVID-19 vaccine was good in general, there were some negative perceptions too. Hence, creating public awareness regarding the vaccines and the importance of vaccination is crucial.*

*Keywords: COVID-19 vaccine, acceptance, the Maldives, side-effects, religious views*

## Introduction

Coronavirus is a large family of viruses that are commonly found in different species of animals including camels, cats, cattle, bats and cobra (Liu, Kuo, & Shih, 2020). Some of these viruses are then passed on to humans and spread among the human populations. The World Health Organization received a report of an unknown infection causing pneumonia in Wuhan city of China on the 31st December 2019 (World Health Organisation, 2019). The novel coronavirus that was found in Wuhan was renamed by the international committee based on taxonomy of viruses and was regarded as a severe respiratory syndrome (SARS-CoV-2) that causes coronavirus disease 2019 (COVID-19) (Liu, Kuo, & Shih, 2020). COVID-19 is a single stranded positive RNA virus; which ended up spreading across all the continents. The virus mainly spreads from an infected person through droplets or small particles such as aureoles particles during coughing, sneezing, talking or breathing (CDC, 2019).

Even developed countries with advanced health facilities have faced disastrous and adverse conditions in terms of disease prevalence and mortality, which can be due to the large elderly population. The epidemic curve is still rising in some of the developed countries like the United States of America (USA), United Kingdom (UK) and Germany (Worldometer, 2020). Additionally, in some of the low and middle-income countries namely India, Portugal and Iran the curve is rising and it is a warning to low and middle-income countries. In addition, no significant treatment or 100% efficient vaccine against COVID-19 has been discovered till date which is a significant threat to the health care system globally. To flatten the epidemic curve, most of the countries have developed strict preventive measures such as closing international borders and strict control on international air travel. Other preventive measures taken by many countries include public lock-downs, domestic travel restrictions, obligatory quarantine rules, restricted public gathering, mass awareness on hand hygienic, social distancing and proper sanitation (ADRC, 2020)

The rate of COVID-19 infection has been increasing in Asian countries such as India, Iran, Bangladesh, Jordan, Malaysia and Sri Lanka. As of 11th November 2020, there are more than 14 million cases in Asia and more than 250,000 deaths. Meanwhile, more than 12 million recovered from the disease (Worldometer, 2020). Among this, India accounts for approximately 55% of cases. The Maldives crossed 12,000 cases with 41 deaths and more than 11,000 recoveries on 11th November 2020 (Worldometer, 2020). In the Maldives the very first case was reported on 7th March 2020, which was an imported case from an expatriate tourist. On 15th April 2020 the first case without any history of contact with a positive case was identified from a random sample taken in Male'. Hence this was the first reported case of community transmission in Male', the capital city of the Maldives. As was seen globally, to minimize the spread of infection, national and community level effective preventive measures and control practices had to be implemented in the Maldives. Improving awareness level of the public can also change negative perceptions towards COVID-19 and may change attitude towards COVID-19 prevention. Hence, for effective implementation, it was necessary to understand the level of community knowledge, perception on COVID-19 and its preventive measures. Further, it was necessary to identify how the community perceive preventive measures such as vaccination.

Thus, this study aimed to investigate the perception towards preventive measures, specifically vaccination, to curb COVID-19. This is the first of its kind of survey in the Maldives and it was envisaged that the findings of this study would contribute to the national efforts in preventing and controlling the COVID-19 epidemic.

### **Methodology**

A cross-sectional study was employed for the study. The study was carried out from 25th October to 10th September 2020. A structured electronic questionnaire was formulated that allowed to collect the socio-demographic characteristics as well as perceptions towards COVID-19 vaccines. The study was approved by the Research Ethics Committee of the Maldives National University.

The target population of the study were people aged between 18 and 65 years who live in the Maldives. Based on 95% confidence interval and 5% error a sample size of 384 was targeted for the study. The samples were further stratified into

6 regions (North, North Central, Central, South Central, South and Greater Male') of the Maldives. It was also ensured that samples were selected to include respondents from different atolls of the Maldives. All adults who were able to read and understand questionnaires in both Dhivehi and English language, were included. As there was a community transmission at the time of the survey in the Maldives, there were limitations in conducting a face-to-face data collection due to travel and social restriction. Invitations to participate in the study was sent to the participants through the health centres. The online questionnaires, were then distributed via Viber, Facebook messenger and other means of social media.

The data collection tool consisted of 16 questions that were divided into two major parts; part 1 with demographic characteristics and part 2 with questions that cover the perception towards COVID-19 vaccines. Analysis was done using Statistical Package for the Social Sciences (SPSS). Descriptive statistics (frequencies, percentages) were conducted for demographic characteristics, the frequency and percentage of COVID-19 vaccine acceptance and perceptions. Inferential statistics were carried out to find out the relationship between socio-demographic characteristics and perception towards acceptance of COVID-19 vaccine.

## **Results**

A total of 700 people responded to the survey. The majority of the respondents, 445 (63.6%) were female and 255 (36.4%) were males.

Most of the respondents, 364 (52.0%) were in the age group of 25-34 years. 159 people (22.7%) were between age group of 35-44 years, 127 people (18.1%) were between 18-21 years, 42 people (6.0%) were between age range of 45-54 years, 6 people (0.9%) were between age range of 55-64 while only 2 people (0.3%) were aged above 65 years old.

The majority of respondents, 382 (54.6%) have College/University Education while 181 (25.9%) have Secondary School Education. Most of the respondents, 673 (96.1%) were Maldivians while 22 (3.1%) Indians also participated. In addition, there was one participant each from Bangladesh, Nepal and Sri Lanka.

The findings revealed that majority of the respondents, 507 people (72.4%), were employed while 185 (26.4%) were unemployed. Also, the results showed there were 6 (0.9%) respondents who had retired from their jobs.

The level of awareness about the novel coronavirus/COVID-19 pandemic among the participants was high. Results showed that the majority of the respondents 680 (97.1%) who took part in this study were well aware about the epidemic. However, 13 (1.9%) participants agreed that they were not aware of the novel coronavirus while 4 (0.6%) participants said they don't know the answer to the question.

A Cronbach's alpha test was carried out to check the reliability of the scale variables and Cronbach's alpha value was 0.820 which shows a good internal consistency.

The knowledge level on COVID-19 among the participants showed that the majority of the respondents, 255 (36.4%) have adequate knowledge about the virus. Also, 195 (27.9%) participants agreed they have a lot of knowledge about COVID-19 while 176 (25.1%) said they have some knowledge about the virus. Some people (36, 5.1%) also agreed that they have very little knowledge while 33 (4.7%) said they have little knowledge about novel coronavirus/COVID-19. These

results imply that the majority of the participants have adequate knowledge about COVID-19.

Table 1  
*Status of Respondents Vaccinated Against the Influenza Virus in the Last 12 Months*

Have you been vaccinated against the influenza virus in the past 12 months?	Frequency	Percentage
Yes	196	29.0
No	422	62.4
Do not Know	58	8.6
Total	676	100.0
System missing	24	

Table 1 shows the status of influenza vaccination among the participants. The findings showed that the majority of the respondents, 422 (60.3%) said “No” to the question, “Have you been vaccinated against the influenza virus in the past 12 months” and 196 (28.0%) of the participants said they have been vaccinated against the influenza virus in the past 12 months.

Participant’s perceptions about getting the influenza vaccine regularly by each year shows that 256 (36.6%) participants agreed that they might get influenza vaccine regularly each year while 217 (31.0%) said they will get the vaccine. On the other hand, 226 (32.3%) participants said they will not get influenza vaccine regularly each year.

Majority of the participants (466, 66.6%) who took part in this study were not working in the healthcare, while 226 (32.3%) of the participants works in healthcare sector. The status of chronic illness among the respondents who took part in this study showed that the majority of the participants (613, 87.6%) did not have a chronic illness. Only 77 (11.0%) of the participants reported that they have a chronic illness.

The study showed that majority (528, 75.4%) of the respondents had never been tested for COVID-19 at the time of the survey. Likewise, 155 (22.1%) of the respondents have not been infected while 11 (1.6%) stated that they have tested positive for COVID-19. In addition, 2 (0.3%) have recovered from the virus and 1 (0.1%) have been tested but the result was pending or inconclusive. Therefore, these results showed that the majority of the participants had never been infected with COVID-19 at the time of the survey.

Majority of the respondents 312, 44.6%) said that immediate social networks got infected with novel coronavirus/COVID-19 while 282 (40.3%) of the respondents did not know anyone who got infected so far. Some respondents (101, 14.4%) stated that they had no clue whether their immediate social network have been infected with COVID-19.

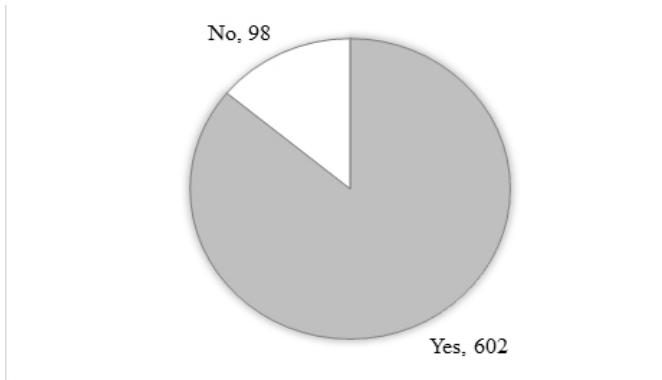


Figure 1. People who agreed to get COVID-19 vaccine if it becomes available

As shown in figure 1, 602 (86%) people agreed that they would get the vaccine if it became available. When the statement was disaggregated by gender, it showed that 37.2% males and 62.8% females agreed to get the vaccine. There was no statistically significant association between the gender of the participants and vaccine acceptance.

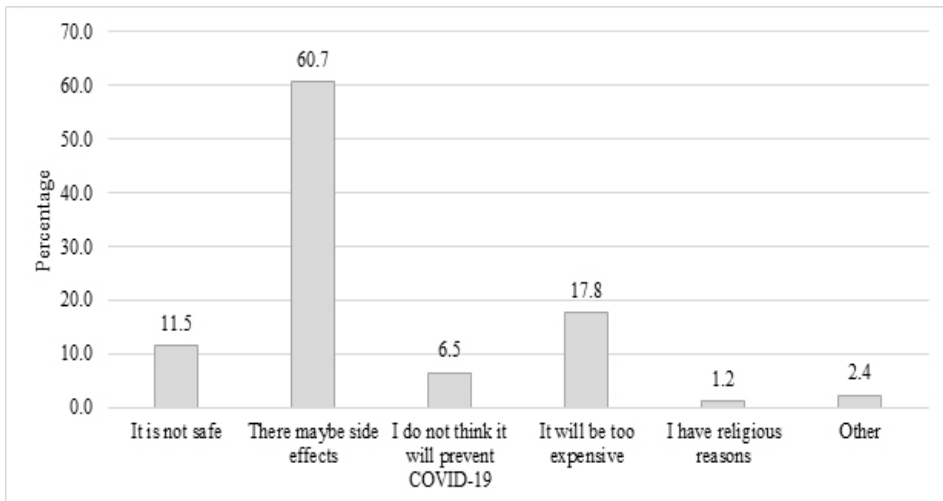


Figure 2. Reasons for not agreeing to get the vaccine

Figure 2 shows the reasons given for not agreeing to vaccinate by the 98 people who said that they will not vaccinate. Most of the people (66, 60.7%) think that the vaccine might have side effects. Some (19, 17.8%) people think that it will be too expensive and 12 (11.5%) people think it will not be safe. Only 2 (1.2%) people said that they do not want to vaccinate due to religious reasons.

Among the people who agreed to take the COVID-19 vaccine, people aged between 25 to 34 (53.2%) compared to other age categories were more likely to accept the COVID-19 vaccine. There was a statistically significant association ( $p < 0.05$ ) between the people who agreed to take the vaccine and age of the participants.

Amongst the people who agreed to take the COVID-19 vaccine, people who had college or university education (55.3%) compared with people whose education levels were lower than college or university education were significantly more likely to accept the vaccine. However, there was no statistically significant association between the people's perception on getting the COVID-19 vaccine and their level of education.

According to the study, 71% of the participants were employed. People who were employed (73.3%), compared with unemployed and retired were more likely to accept the vaccine. There was statistically significant association between the people's perception on getting the COVID-19 vaccine and their employment.

People who did not take influenza vaccine (61.3%) compared with the people who had taken the vaccine were more likely to accept the COVID-19 vaccine. Chi-square test shows there is a statistically significant association between the people's perception on getting the COVID-19 vaccine and vaccination of influenza in the past 12 months

## Discussion

Vaccination is one of the major public health inventions which started in the 21st century (Al-Mohaithef & 2020). Vaccination played a huge role in reduction and elimination of some communicable diseases in areas where those diseases were prevalent over centuries. However, the acceptance of vaccines varies hugely over social class, race, ethnicity, socio economic status, education level, perception and area (Kreps et al., 2020). This study is first of its kind in the Maldives, regarding COVID-19 vaccine acceptance and perception.

From the 700 participants of our study, 602 (86%) of the people agreed, 24(3.43%) participants disagreed, 15 (2.14%) people said they did not know and 5% have not responded to the question when asked whether they would get the vaccine if it becomes available. This level of COVID-19 vaccine acceptance is promising since a higher perception towards vaccines and acceptance of vaccines is related to higher vaccine coverage which will help to reach the projected estimates required to achieve COVID-19 herd-immunity. To achieve herd immunity from COVID -19 between 55% and 82% of the population has to be vaccinated (Schaffer Deroo et al., 2020). According to the World Health Organization, the percentage of people to be vaccinated to achieve herd immunity varies with each disease. As COVID-19 is a novel disease more studies are needed to determine the percentage of the population who needs to be vaccinated to achieve herd immunity (WHO, 2020). This includes research on how long the immunity of COVID-19 lasts by vaccinating and how effective the vaccine will be (Homes et al., 2020).

Since COVID-19 is a novel disease, limited studies are available regarding acceptance of COVID-19 vaccine. A web-based study conducted in Saudi Arabia reported that 64.7% of the participants are ready to up take the COVID -19 vaccine (Al-Mohaithef & Padhi, 2020). A similar study conducted in the USA reported that 67% of the participants would accept COVID-19 vaccine (Malik et al., 2020). A global survey, conducted in 19 countries among 13,426 randomly selected participants reported that 71.5% responded that they would receive COVID-19 vaccine if it were proven safe and effective (Lazarus et al., 2020).

Our study was designed to analyze the determining factors of COVID-19



vaccine acceptance. Only two factors had a significant correlation with the acceptance of COVID-19 vaccine. Vaccine acceptance was associated with age (0.05) employment status (0.041) and Influenza vaccination in the past 12 months (0.032). No significant relation was found with COVID-19 vaccine acceptance with gender (0.294) and Education (0.07).

Some studies have reported that older people are more likely to take COVID-19 vaccine (Lazarus, et al., 2020). However, our study did not have a similar correlation. The correlation might not have been visible because the overall vaccine acceptance is high among the survey population. Some studies also found that those with higher income are more likely to take COVID-19 vaccine (Lazarus, et al., 2020). Our study also found that people who are employed are more likely (0.041) to receive COVID-19 vaccine. Since employment and income are related the significance might be related. However, further studies are needed to confirm the correlation.

It is reported that participants who have received Influenza vaccination in the past 12 months (0.032) are more likely to accept COVID-19 vaccine. Since many of the participants are health care workers, it was found that health care workers are more supportive for vaccination than that of non-health care workers (Harapan et al., 2020). Some studies also reported that people who receive routine vaccines are more likely to accept new vaccines (Lazarus, Adam, & Kimball, 2020).

The survey showed that 2.14% of the respondents did not know whether they would get the COVID-19 vaccine if it becomes available and 5% of the participants did not respond to the question. Since COVID-19 is a novel disease, and no approved vaccine was available at the point of the survey in September 2020, the real the real intention might vary over time among the studied population when the vaccine is available. Furthermore, since the study was conducted by using a web-based platform, it may lead to bias in reporting the responses of the participants.

Although education level is not significant with acceptance of vaccine, some studies have concluded that people who has low education qualification are more prone to vaccine refusal (Pugliese, Heyerdahl, & Chilengi, 2018). A study conducted in Zambia in 2018 also concludes that education level has great influence on vaccine acceptance (Chanda , 2018). Thus, it is important to create public awareness on importance of vaccine on controlling an epidemic.

## **Conclusions**

To conclude, this research showed that 86% of respondents would accept a vaccine for COVID-19 even though there were demographic variations in acceptance rates that need to be addressed carefully. To increase acceptance, policymakers and stakeholders should concentrate on evidence-based vaccine-acceptance strategies to effectively control the pandemic and prevent morbidity and mortality.

It is expected that the COVID-19 pandemic will continue to impose immense morbidity and mortality pressures while significantly affecting populations and economies worldwide. This study also indicates a high vaccine acceptance; therefore, the government must be prepared to ensure large-scale, equal access and delivery of the COVID-19 vaccine if and when a safe and effective vaccine becomes available. This would include adequate capacity for the health system as

well as initiatives to improve confidence and adoption of the vaccine by those who supply it.

Public concern regarding the safety of vaccines has also been identified as a major barrier to decision-making on vaccinations, particularly for new ones. Governments and public health agencies must be prepared to address these concerns by improving vaccine awareness so that the public will accept immunization when appropriate. Anti-vaccination activists have already started their anti-vaccine campaign in multiple countries against the need for a vaccine, with some denying the existence of COVID-19 itself.

Since the study was conducted during the COVID-19 pandemic and no vaccine was approved during the time of study, further studies are needed to determine the changes in perception towards COVID-19 vaccine acceptance.

### References

- ADRC. (2020). COVID-19 Response and counter measures in Sri Lanka. Retrieved from [https://www.adrc.asia/publications/disaster\\_report/pdf/covid19/LKA\\_eng.pdf](https://www.adrc.asia/publications/disaster_report/pdf/covid19/LKA_eng.pdf)
- Al-Mohaithef, M., & Padhi, B. K. (2020). Determinants of COVID-19 vaccine acceptance in Saudi Arabia: A web-based national survey. *Journal of multidisciplinary healthcare*, 13, 1657–1663. <https://doi.org/10.2147/JMDH.S276771>
- Centres for Disease Control and Prevention. (2019). COVID-19. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/faq.html#:~:text=A%20person%20may%20get%20COVID,main%20way%20the%20virus%20spreads.>
- Harapan, H., Wagner, A. L., Yufika, A., Winardi, W., Anwar, S., Gan, A. K., . . . Sofyan, H. (2020). Acceptance of a COVID-19 vaccine in Southeast Asia: A cross-sectional study in Indonesia. *Front Public Health*, 24-28.
- Homes, M. G., Armin, N., Fulicate, J. D., Sharma, N., Beltimo, H., & Roger, J. V. (2020). Achieving herd immunity from COVID-19 pandemic. *Journal of Medicine*, 33-37.
- Kreps, S., Prasa, S., Brownstein, J. S., Hswen, Y., Garibald, B. T., Zhang, B., & Krine, D. L. (2020). Factors Associated With US Adults' Likelihood of Accepting COVID-19 Vaccination. *JAMA Network*, 65-67.
- Lazarus, J. V., Adam, S., & Kimball, S. (2020). A global survey of potential acceptance of a COVID-19 vaccine. *Nature Medicine*, 123-128.
- Liu, Y. C., Kuo, R. L., & Shih, S. R. (2020). The first documented coronavirus pandemic in history. *Biomedical journal*.
- Malik, A. A., Fadden, S. A., Elharake, J., & Omer, S. (2020). Determinants of COVID-19 vaccine acceptance in the US. *E Clinical Medicine*, 8-57.
- National Bureau of Statistics. (2017). *Statistical Pocketbook of Maldives 2017*. Male': Ministry of Finance & Treasury.



Pugliese-Garcia, M., Heyerdahl, L. W., Mwamba, C., Nkwemu, S., Chilengi, R., Demolis, R., Guillermet, E., & Sharma, A. (2018). Factors influencing vaccine acceptance and hesitancy in three informal settlements in Lusaka, Zambia. *Vaccine*, 36(37), 5617–5624.

Schaffer DeRoo, S., Pudalov, N. J., & Fu, L. Y. (2020). Planning for a COVID-19 vaccination program. *JAMA*, 323(24), 2458–2459. <https://doi.org/10.1001/jama.2020.8711>

WHO. (2019). *World Health Organization. COVID-2019 situation report*. WHO.

WHO. (2020, October 15). *Coronavirus disease (COVID-19): Herd immunity, lockdowns and COVID-19*. Retrieved from World Health Organization: <https://www.who.int/news-room/q-a-detail/herd-immunity-lockdowns-and-covid-19>

WHO. (2020). *WHO Timeline - COVID-19*. Retrieved from WHO: <https://www.who.int/news/item/27-04-2020-who-timeline---covid-19>

Worldometer. (2020). *Coronavirus (COVID-19) Vaccinations*. Retrieved from Worldometer: <https://ourworldindata.org/coronavirus>