



Eighty-six percent of Sri Lankans Wish to Receive COVID-19 Vaccine: A Window of Opportunity for Rolling Out a Successful Vaccination Campaign

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Abstract

All countries look up to the COVID-19 vaccine as the panacea against the pandemic. COVID-19 vaccination campaigns have been rolled out globally, while Sri Lanka, too, is ready for its own. To assess the public opinion concerning the COVID-19 vaccination in Sri Lanka, we carried out an online survey from 17.12.2020 to 18.01.2021. Eighty-six percent (n = 1080) of the respondents reed to accept the vaccine. In the meantime, 9 % (n = 108) did not agree to receive the vaccine, while 5% (n = 62) had no idea. The protection given by the vaccine, trends in spreading the disease in the country, and the trust in the vaccine were reasons given for agreeing to get it. Reasons for not agreeing to get the vaccine were “being developed too fast”, the concern of side effects, and lack of trust in the vaccine. Ninety-one percent (n = 1120) of respondents agreed that other preventive measures such as handwashing, social distancing, and wearing face masks must be continued even with COVID-19 vaccination. The respondents prioritized frontline staff, elderly persons, and persons with chronic diseases for receiving the COVID-19 vaccine first. Transparent and accountable vaccine procurement, a robust health system with a well-performing Expanded Program of Immunization (EPI), and creative vaccine financing tools were seen as key strengths in the COVID-19 vaccination program. Besides, Sri Lanka, a health-literate and vaccine loving nation with an almost non-existent anti-vaccination movement, was also seen as a crucial contributor. While the current public opinion provides an ideal ground for a successful COVID-19 vaccination program, due to the inherent vulnerability of misinformation and outrages associated with adverse events following immunization, existing programs for surveillance of adverse events following immunization and surveillance risk communication strategy must be augmented. The window of opportunity of favorable public opinion must be utilized to roll out a successful COVID-19 vaccination campaign in Sri Lanka.

Keywords: COVID-19, Vaccine acceptance, Vaccine hesitancy, COVAX, Sri Lanka

1. Introduction

After a year in action, the COVID-19 pandemic has claimed 97,464,399 cases and 2,098,8094 deaths globally as per 24.01.2021(1). In Sri Lanka, 58,430 cases and 283 deaths have been reported by the above date (2). The COVID-19 vaccine has been seen as the panacea against this global pandemic with massive health and socio-economic costs (3). At times, the speed and the coverage of the COVID-19 vaccination has been reported as slow, even in the developed world (4).

Even though the development of a vaccine takes at least six years, a fast-track approach has been adopted as a means of ending this pandemic (5). Over 52 candidate vaccines have been explored across the globe while several of them have been ready to be widely administered to humans beyond their trials (6–9). Safety, efficacy, availability, affordability, and accessibility of vaccines are critical factors that need to be considered during a global vaccination programme (3). Innovative international vaccine financing tools such as the COVAX facility are being used to ensure the equitable distribution of vaccines across the world, trespassing the geopolitical and socio-economic boundaries (10).

Acceptance of a new vaccine such as COVID-19 mostly targeting the adult population amidst a pandemic with limited, sometimes conflicting data on its safety and efficacy demands a complex decision process by individuals. Understanding how the general public perceives the COVID-19 vaccine is critical to ensure its widespread acceptability. It has been argued that vaccine uptake could be influenced by thoughts and feelings, social processes, and practical issues (11).

A global survey of the potential acceptance of a COVID-19 vaccine has been conducted among 14,426 respondents across 19 countries (12). If the vaccine is generally available, 46.8% of the respondents completely agreed on accepting it. The proportion of respondents who somewhat agreed to get the vaccine was 24.7%. The percentage of respondents who were neutral or had no idea was 14.2%. The respondents who somewhat disagreed and completely disagreed were 6.1% and 8.1%, respectively. Further, 48.1% of the respondents said they would accept the vaccine if their employers recommended it. The acceptance rates varied from 90% in China to 55% in Russia.

A survey conducted among 991 adults in the USA in April 2020 showed that 57.6% would accept the vaccine when it becomes available. However, 10.8% of the respondents said that they would not get the vaccine, while 31.6% said that they did not know the answer yet (13). In contrast, in an online survey conducted in Sri Lanka in April 2020 among 3079 respondents, 53.3% strongly agreed to take the COVID-19 vaccine if available, while 30.7% said that they would agree to accept it (14). Only 12.9% said they had no idea if they would accept or not accept the vaccine. Further, this survey showed that only 1.9% of the respondents said that they would disagree, while only 0.7% said they would strongly disagree to accept the vaccine.

Sri Lanka is procuring the COVID-19 vaccine and roll out the vaccination program in early February 2021(15). In this backdrop, it is essential to understand the public opinion with the COVID-19 vaccination. Such understanding will assist the government, policymakers, and immunization program managers in designing appropriate risk communication campaigns to increase its acceptance and coverage. Hence, we carried out an online public opinion survey in Sri Lanka to elicit public opinion on the COVID-19 vaccination program.

2. Methodology

We carried out an online descriptive cross-sectional survey with the population aged 18 years and above as the target population.

We reviewed tools used to conduct public opinion surveys and research on acceptance of COVID-19 vaccination, as well as their results (12–14,16). Based on the above; we developed a survey questionnaire to cover the following areas:

1. Socio-demographic characteristics: Age, sex, and the district of residence
2. Willingness to accept COVID-19 vaccine if it is available.
3. Reasons for accepting or not-accepting the COVID-19 vaccine
4. Factors that would increase and decrease the likelihood of accepting or not accepting the vaccine
5. Vaccine eligibility

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6. Safety and efficacy of COVID-19 vaccine
7. Myths related to COVID-19 vaccine
8. Availability and access to COVID-19 vaccine
9. Need for continuing other preventive measures along with vaccination
10. Government commitment to provide the COVID-19 vaccine to Sri Lankans
11. Sources of information on COVID-19 vaccination
12. Factors associated with successful COVID-19 vaccination in Sri Lanka

Multiple choice questions with single or several responses were used to cover 1 – 11 areas. Open ended questions were used to capture area 12.

The questionnaire was developed using Google forms in English and translated into Sinhala and Tamil. We conducted an online public opinion survey from 17.12.2020 to 18.01.2021 using a snowballing sampling technique. We used email lists and Facebook to disseminate the survey. We also promoted the questionnaire through Facebook targeting Sri Lanka. The google sheets of responses were downloaded as excel sheets. The Sinhala and Tamil responses were translated into English. A combined excel sheet was developed amalgamating the questionnaires in the three languages. The excel sheet was imported into IBM SPSS Statistics Version 24 for analysis. The results were presented as frequencies and percentages. The responses to the three open-ended questions were examined using content analysis by identifying key themes and categorizing them through an iterative process.

3. Results:

Our survey reached out to an email list of over 500 and 43,807 Facebook users. The total number who responded to the survey was 1250. The distribution of respondents by age category is given in Table 1.

Table 1: Distribution of Background Characteristics

Description	Number	Percentage
Age		
Less than 19	1	0.1
20 - 29	223	20.0
30 - 39	407	36.5
40 - 49	223	20.0
50 - 59	153	13.7
60 - 69	87	7.8
70 and above	22	2.0
Total	1116	100
Gender		
Male	774	63.4
Female	428	35.1
Prefer not to say	18	1.5
Total	1220	100.0
Health District		
Colombo	422	34.3
Gampaha	240	19.5
Kandy	107	8.7
Kalutara	70	5.7
Kurunegala	54	4.4
Galle	50	4.1
Jaffna	49	4.0
Kegalle	34	2.8
Matara	26	2.1
Ratnapura	26	2.1
Ampara	20	1.6
Anuradhapura	20	1.6
Puttalam	16	1.3
Vavuniya	16	1.3
Hambantota	14	1.1
Matale	14	1.3
Badulla	14	1.0
Polonnaruwa	8	0.7
Batticaloa	7	0.6
Nuwara Eliya	6	0.5
Trincomalee	6	0.5
Moneragala	5	0.4
Kilinochchi	3	0.2
Mullaitivu	3	0.2
Kalmunai	0	0.0
Mannar	0	0.0
Total	1230	100.0

Most of the respondents belonged to the 30 – 39 age category, 36.5%, n = 407. An equal number of respondents were reported from the 20 –29 and 40 – 49 age groups, 20%, n = 223. In the meantime, most of the participants were male, 63.4%, n = 774. As per Table 1 and Figure 1, largest groups of respondents were from the Colombo Health District, 34.3%, n = 422.

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Gampaha, Kandy and Kalutara Health Districts reported the next highest number of respondents.

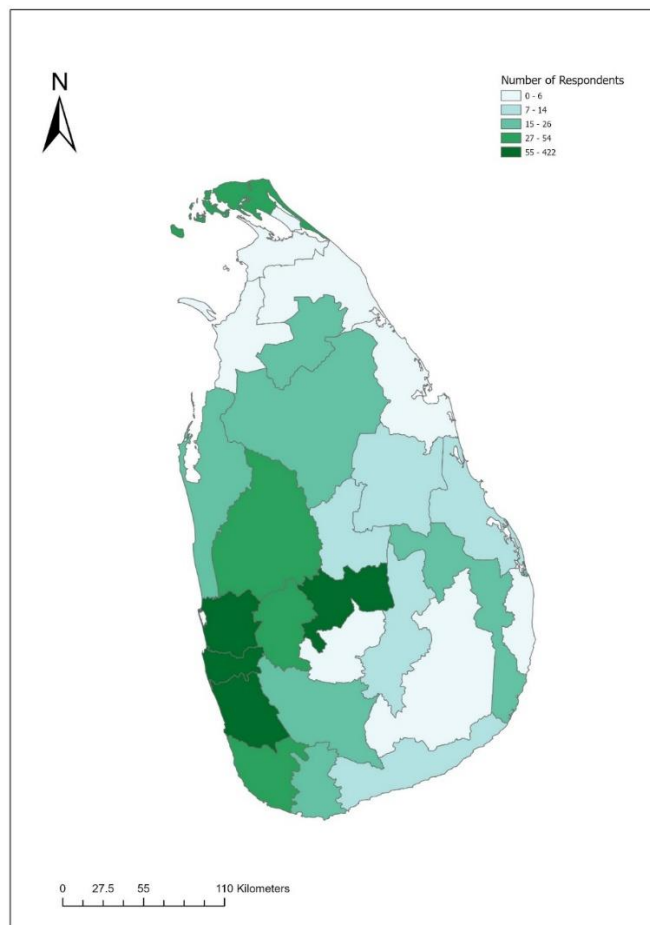


Figure 1 : Distribution of Respondents by District

The distribution of the respondents based on the willingness to accept COVID-19 vaccine is presented in Figure 2.

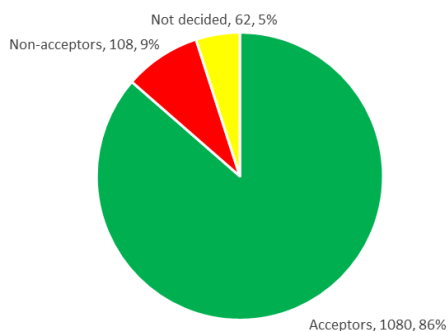


Figure 2 : Distribution of Respondents Based on the Willingness to Accept COVID-19 Vaccine in Sri Lanka

Many of the respondents belonged to the vaccine acceptor group, $n = 1080$, 86%. The non-acceptor group comprised of 9 % ($n = 108$) of the respondents. In the meantime, 5% ($n = 62$) had no idea about the above decision.

Table 2 shows the distribution of the detailed breakdown of the respondents' willingness to receive a COVID-19 vaccine if it is available.

Table 2 : Detailed Breakdown of the Willingness to Receive a COVID-19 Vaccine

Description	Number	Percentage
I would definitely accept the vaccine	760	60.8
I would probably accept the vaccine	320	25.6
No idea	62	5.0
I would probably not accept the vaccine	95	7.6
I would definitely not accept the vaccine	13	1.0
Total	1250	100.0

The majority of the respondents stated that they would definitely accept the vaccine, 60.8%, $n = 760$. Twenty-six percent of the respondents stated that they would probably receive the vaccine, $n = 320$. The vaccine hesitancy was reflected by those who said that they would probably not accept the vaccine and those who said that they would definitely not accept the vaccine. Only one percent ($n = 13$) of persons said that they would definitely not get the vaccine. However, ninety-five respondents (7.6%) said that they would probably not accept the vaccine. Five percent ($n = 62$) said that they did not have any idea in relation to receiving a COVID-19 vaccine.

The distribution of the respondents' reasons for agreeing to accept the COVID-19 vaccine is given in Table 3.

Table 3 : Distribution of the Reasons for Agreeing to Accept the COVID-19 Vaccine

N = 1080

Description	No.	%
It can prevent me from getting COVID-19	725	67.1
COVID-19 is spreading fast in the country	413	38.2
I have trust in the vaccine	406	37.6
Health authorities have decided that vaccine is good	276	25.6
COVID-19 vaccine has been used even in developed countries	227	21.0
I do not need to be subjected to quarantine if I get in contact with a COVID-19 infected person	207	19.2
I do not want to go to a COVID-19 treatment center	200	18.5
It is good for me	137	12.7
It is safe	83	7.7

The most commonly stated reason for accepting the COVID-19 vaccine were “It can prevent me getting COVID-19” (n = 725, 67.1%), “COVID-19 is spreading fast in the country” (n = 413, 38.2%) and “I have trust in the vaccine” (n = 406, 37.6%). Around 25% of the acceptors said they would take the vaccine because the health authorities have decided that it is good for them, while another 21% said the vaccine had been used in developed countries. Around 19% of the acceptors said they would take the vaccine because they wanted to avoid going into a quarantine center or a treatment center. Twelve percent of the acceptors said that the vaccine was good for them, while only 7% said that the vaccine was safe.

Table 4 shows the distribution of factors that would reduce the likelihood of getting the COVID-19 vaccine among acceptors.

Table 4 : Distribution of Factors that would Reduce the Likelihood of Getting the COVID-19 Vaccine among Acceptors

N = 1080

Description	No.	%
If the vaccine is not effective	728	67.4
If the vaccine has serious side effects	668	61.9
If someone dies due to an adverse effect following vaccine	351	32.5
If many people experience minor side effects	327	30.3
If I have to wait in long queues to get the vaccines	301	27.9
If I have to pay for the vaccine	223	20.6
If I have to take the vaccine every year	129	11.9
If the vaccine is not available in the private sector	124	11.5
If I have to get more than one dose of the vaccine	70	6.5

Around 67% of the COVID-19 vaccine acceptors said that their likelihood of getting the vaccine would reduce “if the vaccine is not effective”. In the meantime, around 62% said that “if the vaccine has serious side effects”, their likelihood of getting the vaccine would reduce. Over 30% said their likelihood of getting it would reduce if a death occurs as an adverse event following immunization and even if many people experience minor side effects. Having to wait in a long queue was seen to reduce the likelihood of getting the vaccine among 28%, while having to pay for the vaccine would reduce the possibility of accepting the vaccine among 20% of the acceptors. Only less than 12% were negatively influenced by having to take the vaccine every year, vaccine not being available in the private sector, or having to get more than one dose of the vaccine.

Table 5 presents the reasons given by non-acceptors for their choice against COVID-19 vaccine.

Table 5 : Distribution of the Reasons for Disagreeing to Accept the COVID-19 Vaccine

N = 108		
Description	No.	%
This vaccine was developed so fast. Therefore, we do not know about it enough.	84	77.8
I am concerned about the side effects of COVID-19 vaccine.	81	75.0
I do not trust the vaccine	25	23.1
I do not think it is needed	12	11.1
This vaccine is not effective in preventing getting COVID-19.	10	9.3
I do not want to get used to vaccines.	9	8.3

Seventy-eight percent (n = 84) of the non-acceptors said that the COVID-19 vaccine being developed fast, hence not enough being known as the reason for their reason for non-acceptance. In the meantime, 75% (n = 81) said that they were concerned about the vaccine's side effects. Twenty-three percent (n = 25) said that they did not trust the vaccine, while 11 % (n = 12) and 9% (n = 10) stated that the vaccine was not needed and was not effective in preventing COVID-19 infection respectively. Only nine individuals (n = 8.3%) did not want to get the vaccine due to the fear of getting used to it. Table 6 summarizes the reasons stated by the non-acceptors that would increase their likelihood of getting the COVID-19 vaccine.

Table 6 : Distribution of Reasons that would Increase the Likelihood of Getting the COVID-19 Vaccine among Refusers

N = 108		
Description	No.	%
If I feel that the vaccine is effective later	88	81.5
If I get more information about the vaccine	41	38.0
If I feel the vaccine is safe later	27	25.0
If the government made it mandatory to take it	6	5.6
If It becomes mandatory at the workplace	5	4.6

Eighty-one percent of the non-acceptors (n = 88) said that they would accept the vaccine if they feel it to be effective later. Thirty-eight percent of the non-acceptors (n = 41) said that they might change their decision if they get more information about the vaccine, while 25% (n = 27) said that they would do so if they feel that the vaccine to be safe later. Few non-acceptors said that making the vaccine mandatory by the government (5.6%, n = 6) or at the workplace (4.6%, n = 5) would increase their likelihood of getting the COVID-19 vaccine. Table 7 shows the agreement on efficacy and safety of COVID-19 vaccine by the respondents.

Table 7 : Distribution of Agreement on Efficacy and Safety of COVID-19 Vaccine

Description	Number	Percentage
"I think the COVID-19 vaccine can prevent catching COVID-19 disease"		
Strongly agree	231	18.7
Agree	672	54.4
No idea	229	18.5
Disagree	74	6.0
Strongly disagree	29	2.3
Total	1235	100.0
"I think the COVID-19 vaccine is safe"		
Strongly agree	149	12.2
Agree	629	51.4
No idea	332	27.1
Disagree	89	7.3
Strongly disagree	24	2.0
Total	1223	100.0
"I think we are starting to use the vaccine before completely understanding its efficacy and safety."		
Strongly agree	219	17.7
Agree	537	43.5
No idea	199	16.1
Disagree	248	20.1
Strongly disagree	31	2.5
Total	1234	100.0

The majority of the respondents agreed with the statement, “I think the COVID-19 vaccine can prevent catching COVID-19 disease, 54.4%, n = 672. Almost around 18% of the respondents stated that they strongly agreed with the above statement (n = 231) or had no idea (n = 229). Six percent (n = 74) of the respondents stated that they disagreed, while 2.3 % (n = 29) said that they strongly disagreed with the above statement.

When asked about the agreement to the statement “I think the COVID-19 vaccine is safe”, most of the respondents said they would agree with it, 51.4%, n = 629. Twelve percent (n = 149) of the respondents stated that they strongly agreed with the above statement. Twenty-seven percent (n = 332) of the respondents said that they had no idea on the same statement. Seven percent (n = 89) and 2 % (n = 24) stated that they disagreed or strongly disagreed respectively with the above statement of the perceived safety of the COVID-19 vaccine.

When inquired about the statement “I think we are starting to use the vaccine before completely understanding its efficacy and safety”, around 44% (n=537) of the respondents agreed, and 20.1% (n= 248) disagreed. Further, around 18% (n= 219) of the respondents strongly agreed and 16.1% (n= 199) of the respondents had no idea about the statement. Only less than three percent (n= 31) of the respondents strongly disagreed with the statement. The distribution of agreement on myths about COVID-19 vaccination is shown in Table 8.

Table 8 : Distribution of Agreement on Myths about COVID-19 Vaccination

Description	Number	Percentage
“COVID-19 vaccine implants a microchip inside the recipient.”		
Strongly agree	26	2.1
Agree	43	3.5
No idea	438	35.5
Disagree	287	23.2
Strongly disagree	441	35.7
Total	1235	100.0
"The COVID-19 vaccine will alter your DNA."		
Strongly agree	18	1.5
Agree	60	4.9
No idea	563	45.6
Disagree	316	25.6
Strongly disagree	277	22.4
Total	1234	100.0
"After getting the COVID-19 vaccines, you will get the COVID-19 disease"		
Strongly agree	16	1.3
Agree	111	9.0
No idea	379	30.9
Disagree	502	40.9
Strongly disagree	220	17.9
Total	1228	100.0
" Our immune systems are better than vaccines"		
Strongly agree	107	8.7
Agree	302	24.5
No idea	235	19.1
Disagree	482	39.2
Strongly disagree	105	8.5
Total	1231	100

Largest group among the respondents (35.5%, n= 438) had no idea about the statement “COVID-19 vaccine implants a microchip inside the recipient”. In the meantime, 23.2% (n= 287) of the respondents disagreed with the statement, while 35.7% (n = 441) strongly

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disagreed with the statement. Only 2.1% (n= 26) of the respondents strongly agreed about the statement on implanting a microchip, while another 3.5% (n= 43) agreed about it.

Out of 1234 respondents, around 46% (n = 563) had no idea about the statement "The COVID-19 vaccine will alter your DNA". Around 25% (n = 316) disagreed, while around 22% (n = 277) strongly disagreed with the statement. Only a few agreed (4.9%, n = 60) and strongly agreed (1.5%, n = 18) with the idea of the COVID-19 vaccine altering the recipient DNA.

When inquired from the participants if they believed that they would get the COVID-19 disease after receiving the COVID-19 vaccine, around 41% (n= 502) disagreed, while around 18% (n = 220) strongly disagreed with it. However, around 31% (n= 379) indicated that they did not have any idea on the above statement. Nevertheless, sixteen persons (n = 1.3%) strongly agreed and 111 persons (n = 9.0%) agreed that after getting COVID-19 vaccine, one could get the COVID-19 disease.

Many of the respondents disagreed (39.2%, n = 482) or strongly disagreed (8.5%, n = 105) with the statement "Our immune system is better than the vaccine". The percentage of respondents who agreed that their immune system to be better than the COVID-19 vaccine was 24.5% (n = 302), while around another 9% (n = 107) strongly agreed with it. Around 19% of the respondents (n= 235) had no idea about the statement.

Table 9 shows the distribution of agreement with accessibility to COVID-19 vaccination in Sri Lanka.

Table 9 : Distribution of Agreement on Accessibility to COVID-19 Vaccination

Description	Number	Percentage
"An adequate number of Sri Lankans will receive COVID-19 vaccine to stop the disease spread"		
Strongly agree	117	9.5
Agree	484	39.4
No idea	347	28.3
Disagree	227	18.5
Strongly disagree	53	4.3
Total	1228	100
"Everyone who wants the vaccine will have quick and easy access to it in Sri Lanka".		
Strongly agree	129	10.5
Agree	258	21.0
No idea	340	27.7
Disagree	406	33.1
Strongly disagree	93	7.6
Total	1226	100
"Government of Sri Lanka is doing enough to provide the COVID-19 vaccine to the public"		
Strongly agree	52	4.2
Agree	198	16.1
No idea	377	30.7
Disagree	340	27.7
Strongly disagree	261	21.3
Total	1228	100

When inquired if an adequate number of Sri Lankans would receive the COVID-19 vaccination to stop the disease spread, around 39% (n = 484) of the respondents agreed, while around 9% (n = 117) strongly agreed with it. However, 28% (n = 347) had no idea about the statement. In the meantime, around 18% (n = 227) disagreed while around 4% (n = 53) strongly disagreed with it.

Amongst the 1226 respondents who marked their opinion on the statement about everybody who wants the vaccine having quick and easy access to it in Sri

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Lanka, the largest group (33.1%, n = 406) disagreed with it while around 8% (n = 93) strongly disagreed with it. However, around 10% strongly agreed with the statement, while 21% (n = 258) agreed with it.

The majority of the respondents had no idea on the statement "Government of Sri Lanka is doing enough to provide the COVID-19 vaccine to the public" 33.7%, n = 377. However, around 28% (n = 340) and around 21% (n = 261) disagreed and strongly disagreed with the statement respectively. The percentage of respondents who strongly agreed was around 4% (n = 52), while the percentage who agreed was around 16%, n = 198.

The distribution of agreement on the usefulness of other preventive measures is summarized in Table 10.

Table 10 : Distribution of Agreement on the Usefulness of Other Preventive Measures

Description	No.	%
"Other preventive measures such as handwashing, social distancing, and wearing face masks must be continued even with COVID-19 vaccination."		
Strongly agree	705	57.6
Agree	415	33.9
No idea	32	2.6
Disagree	51	4.2
Strongly disagree	20	1.6
Total	1223	100.0
"If one takes herbal remedies, there is no need to take the vaccine."		
Strongly agree	43	3.5
Agree	77	6.3
No idea	329	26.8
Disagree	402	32.7
Strongly disagree	377	30.7
Total	1228	100.0

The majority of the respondents (57.6%, n = 705) agreed that preventive measures such as handwashing, social distancing, and wearing face masks should be continued even with the vaccination, while around 34% (n = 415) agreed with the same. Meanwhile, around 3%

(n = 32) said that they had no idea about the above statement. Only around 4% (n = 51) and around 2% (n = 20) of respondents stated that they disagreed or strongly disagreed with the need to adherence to other preventive measures.

When inquired about taking herbal remedies instead of vaccine, largest number of respondents (30.7%, n = 377) strongly disagreed with it, while around 33% (n = 402) disagreed. Around 27% of the respondents (n = 329) said that they had no idea about the statement. Only around three percent (n = 43) and six percent (n = 77) strongly agreed and agreed that herbal remedies could replace vaccination.

The respondents were inquired about whom they would prioritize to receive the COVID-19 vaccine if they ever had the chance to allocate a limited stock of COVID-19 vaccines. The results are shown in Table 11.

Table 11 : Distribution of Choice of First Priority Recipient of COVID-19 Vaccine by Respondents

N = 110

Description	No.	%
Frontline staff (health staff, security forces, police and others who work with COVID-19 patients)	57	51.8
Elderly persons	28	25.4
Persons with chronic illnesses	21	19.1
Adolescents	2	1.8
Children	2	1.8
Total	110	100.0

Only 110 respondents opted to answer this question on the prioritization of COVID-19 vaccine. Out of those who responded, around 52% (n = 57) said that the frontline staff should be given priority, while around 25% (n = 28) noted that the elderly should be prioritized. Nineteen percent (n = 21) said that persons with the chronic disease must be given priority. The source of information on COVID-19 vaccination as reported by the respondents is presented in Table 12.

Table 12: Source of Information on COVID-19 Vaccination

N= 1230		
Description	No.	%
Most trusted source of information		
A trusted person	116	9.4
Internet	841	68.4
Mobile Alert	35	2.8
News Papers	26	2.1
Radio	14	1.1
Television	198	16.1
Total	1230	100
Most trusted person to receive information from		
Army Officer	4	0.3
Family doctor	100	8.2
Hospital Doctor	159	13.1
Hospital Nurse	4	0.3
Journalist	4	0.3
Medical Officer of Health (MOH)	410	33.8
Officer from Government Information Department	15	1.2
Police Officer	1	0.1
Politician	1	0.1
Public Health Inspector (PHI)	63	5.2
Public Health Midwife (PHM)	4	0.3
Religious Leader	3	0.2
Representative from Non-Governmental Organization	3	0.2
Representative from UNICEF	9	0.7
Representative from World Health Organization (WHO)	433	35.7
Total	1213	100.0

Internet was the most trusted source of information about the COVID-19 vaccine, indicated by around 68% (n = 841) of respondents. Television was identified as a trusted source by nearly sixteen percent, n = 198. The next most trusted source was a trusted person (9.4%, n =116), mobile alerts (2.1%, n = 35) and newspapers

(2.1%, n = 26) respectively. The radio was the most trusted source only of a small minority, 1.1%, n = 14.

Among the trusted persons, a representative from the World Health Organization (WHO) scored the highest (35.7%, n = 433) followed by the Medical Officer of Health (MOH), 33.8%, n= 410. Hospital doctor, family doctor and Public Health Inspector (PHI) were the third (13.1%, n = 159), fourth (8.2%, n = 100) and fifth (5.2%, n = 63) in the order of being the most trusted persons respectively.

The answers given by the respondents to the open-ended questions on the factors associated with successful COVID-19 vaccination program in Sri Lanka, as well as their recommendations, were summarized into the conceptual framework in Figure 3.

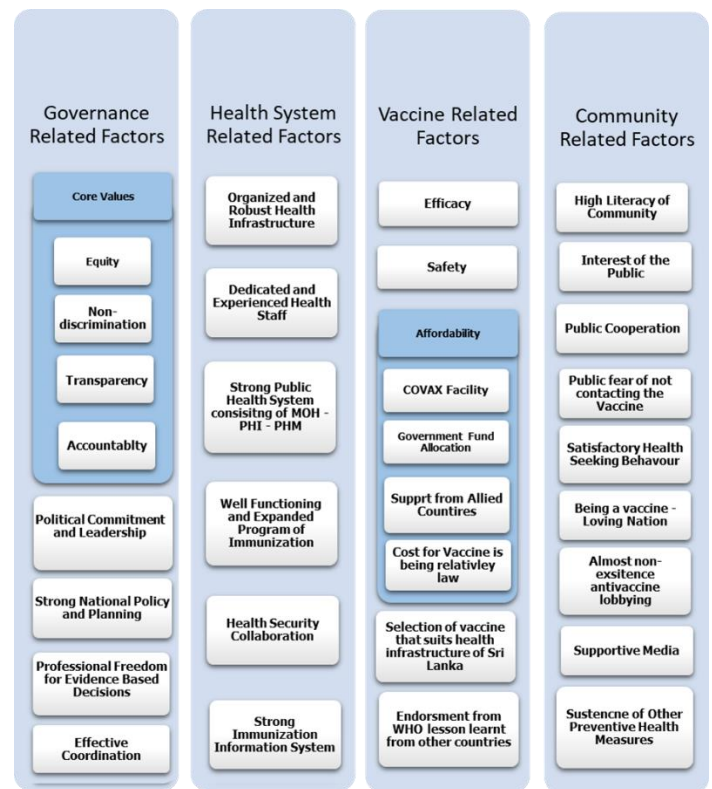


Figure 3 : Factors Associated with Successful COVID-19 Vaccination in Sri Lanka

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The factors associated with successful COVID-19 vaccination in Sri Lanka were categorized into four groups, namely the governance-related factors, health system-related factors, vaccine-related factors, and community-related factors.

Under the governance-related factors, firstly, the respondents pointed out four core values: equity, non-discrimination, accountability and transparency. The need to distribute the vaccine in an equitable manner, using a rational and needs-based approach, was highlighted. Giving due priority to high-risk groups was also reiterated. In addition, it was emphasized that all who need the vaccine should be served without any discrimination. The need to maintain transparency and accountability in the process of COVID-19 vaccination from vaccine selection, procurement, distribution, administration and post-vaccination surveillance was indicated. For example, the respondents warned against breaches of transparency and accountability in vaccine procurement which in turn could lead to the downfall of the entire program, as one responded stated:

“Poor quality products coming through incompetent suppliers and politically-influenced businessmen who target profit other than the good quality product could undermine the COVID-19 vaccination program.”

The need to have strong political commitment and leadership in relation to the COVID-19 vaccination program was recognized as a key requirement. Furthermore, sound national policy and planning was stated as critical prerequisites. The need to give the professionals the freedom to take an evidence-based decision at all steps of the COVID-19 vaccination process was also reiterated. Effective and efficient coordination mechanism was seen as a must at all stages.

Heavy emphasis was made by the respondents on health system-related factors that would contribute to the success of the COVID-19 vaccination program in Sri Lanka. The availability of organized and robust health infrastructure, with a multi-tiered hospital network with a referral mechanism was seen as a strong contributor. Having dedicated and experienced health staff, both within the curative and preventive health sector, from national level to field level, was seen as a vital asset to the COVID-19 vaccination program's

success. In addition, the time-tested public health system comprising of health units manned by the MOH, PHI, and Public Health Midwives (PHM) was seen as a critical aspect of a successful COVID-19 vaccination program.

The possibility of using the existing health unit system for COVID-19 vaccination was highlighted:

“Public health staff in the respective MOH divisions have the required experience to handle the situation. The government needs to define the criteria and registration process to avoid recipients being duplicated. It has to be implemented through MOH divisions. Voter's registers can be used in respective areas to select people for the initial doses of vaccination.”

A well-functioning Expanded Program of Immunization (EPI) with a strong information system was stated as a key strength that Sri Lanka could capitalize on for a successful COVID-19 immunization program.

Some respondents proposed to get the private health sector on board for the COVID-19 vaccination:

“The government should take all the initiatives and thoroughly supervise the mechanism of vaccination and let all the registered private hospitals to give vaccine while the government hospitals do the same.”

However, others were against the involvement of the private sector in the COVID-19 vaccination process, indicating their drive for profit to be a detrimental factor.

Moreover, having the active contribution of the security sector for the rolling out of the COVID-19 vaccination program was also seen as a positive factor by some. In contrast, others saw the engagement of the security sector, as well as politicians as unfavorable factors.

“Establish a separate (non-military) panel of individuals to handle the public relations and communication aspects of the COVID-19 vaccination program. The decision to bring down the vaccine should remain with the health authorities, namely the Director-General of

*Health Services and the Epidemiology Unit.
Politicians and army should refrain from
participating in the decisions on vaccination.”*

Under the vaccine-related factors, the many ideas expressed by the respondents revolved around the need to have a vaccine with high efficacy and safety. Some respondents expressed their misunderstanding of the vaccination program to be a part of a trial in the vaccine development process.

*“We don’t want to be used as subjects for trials.
Give us the confidence that this vaccine is effective
for more than 6 months, unlike the flu vaccine.”*

Under the affordability, the COVAX facility was seen as a promising factor for the success of the COVID-19 vaccination program. The respondents praised the government efforts to self-fund the vaccines, as well as seeking the assistance of allied countries to get additional vaccines as a means to expand the affordability of the vaccine. The need to select vaccines that would suit the health infrastructure was stated by the respondents, referring to the vaccines which could be transported and stored at temperatures that are used in the EPI. Endorsement of the WHO for the vaccines was seen as a marker of the success of the COVID-19 vaccination program.

The respondents, themselves representing the community, pointed out several community-related factors that would contribute to the success of the COVID-19 vaccination program. The high levels of literacy, interest, cooperation and volunteering among the public were seen as positive factors. Besides, the public fear of contracting the vaccine was also seen as a plus point towards the success of the vaccination program. Further, the positive health-seeking behavior of the people was seen as a contributory factor. The respondents stated that Sri Lanka being a vaccine-loving nation with almost non-existent antivaccine lobbying to be a definite blessing for the successful rolling out of the COVID-19 vaccination program.

*“People of Sri Lanka are not as antivax as in
some western countries. As long as the media
doesn’t twist their brains, the compliance should
be high. The main issue is how proactive the
government would be in delivering the vaccine.”*

The decisive role played by supportive media in framing public opinion in relation to COVID-19 vaccine acceptance has been clearly shown in the above quote. In addition, the respondents also highlighted the need for the sustenance of other preventive measures such as maintaining one-meter distance, avoidance of crowds, hand washing, use of face masks, as well as strict adherence to the quarantine law.

4. Discussion

COVID-19 vaccine has been the ultimate solution that the world has been looking up to since the onset of the pandemic (3). A fast-track approach of the development process has allowed several vaccines being available to be administered widely across the globe (5). Many innovative international vaccine financing tools such as COVAX facility are being explored as means to ensure the affordability of the COVID-19 vaccine. Ensuring the COVID-19 vaccine access worldwide is not an option, but a must if the world is to overcome this cross-border crisis fast (10). When the COVID-19 vaccine is available, are people ready to receive it? This has been the focus of this public opinion survey with a focus on Sri Lanka.

At the onset, it should be noted that Sri Lanka has a strong health sector that provides free health care services, both preventive and curative (17). It is hailed as a country with high health indicators with low per capita health expenditure (18,19). In addition, Sri Lanka has continued to have high immunization coverage. For example, the immunization coverage for all vaccines of the EPI has been above 90%, while the percentage of pregnant mothers protected for Tetanus out of reported deliveries was to be 99.5% in 2018 (17).

The major finding of this online public opinion survey is that 86% of the respondents agreeing to accept the COVID-19 vaccine if it is available. Further, sixty percent (n = 760) said that they would definitely accept the COVID-19 vaccine, while 25.6% said that they would probably accept it. Only 9% of the respondents said that they would not accept the vaccine if it is available. When comparing the COVID-19 acceptance rates in 19 countries, it has been shown that countries had a wide spectrum of acceptance ranging from 90% in China to 55% in Russia (12). Sri Lanka seems to be

at the higher end of the COVID-19 vaccine acceptance rate. These findings were similar to those of an online public opinion survey conducted in Sri Lanka in April 2020, which reported a COVID-19 vaccine acceptance rate of 84%, totaling those who strongly agreed and agreed to accept it. A similar rise of vaccine acceptance has been observed, for example, in the USA, sandwiched between a drop (20,21).

Vaccine hesitancy has been observed as a key challenge for COVID-19 vaccination elsewhere (22,23). However, it does not seem to be a major obstacle in Sri Lanka, as per the findings of the current survey. The respondents stated not having a strong anti-vaccination movement as a protective factor against vaccine hesitancy in Sri Lanka.

Complex psychological processes operate in deciding on accepting or not accepting behaviors such as immunization. When inquired from the acceptors, the most commonly stated reasons for accepting the COVID-19 vaccine were “It can prevent me getting COVID-19” ($n = 725$, 67.1%), “COVID-19 is spreading fast in the country” ($n = 413$, 38.2%) and “I have trust in the vaccine” ($n = 406$, 37.6%). On the other hand, when inquired from the non-acceptors about the factors that would increase their probability of accepting a vaccine in the future, proof of efficacy (81.5%, $n = 88$), availability of more information (38.0%, $n = 41$), and proof of safety (25.0%, $n = 27$) were given as the reasons.

These findings are comparable with the responses given to questions on the agreement to the safety and efficacy of the COVID-19 vaccines. For example, the majority of the respondents agreed with the statement, “I think the COVID-19 vaccine can prevent catching COVID-19, 54.4%, $n = 672$. Almost around 18% of the respondents stated that they strongly agreed with the above statement, $n = 231$. Besides, when inquired about the agreement to the statement “I think the COVID-19 vaccine is safe”, most of the respondents said that they would agree with it, 51.4%, $n = 629$. Another twelve percent ($n = 149$) of the respondents stated that they strongly agreed with the above statement.

These results could be compared with the reasons given for accepting the COVID-19 vaccine in the USA, where the most important attribute for the respondent choice was efficacy (24). For example, increasing vaccine

efficacy marked a rise in the probability of choosing a vaccine (Efficacy increase from 50% to 70% resulted in an increase in probability coefficient by 0.07; 95% CI, 0.06-0.09; Efficacy increase from 50% to 90% resulted in a rise of probability coefficient by 0.16; 95% CI, 0.15-0.18). Further, an online survey in Turkey found that 37.8% of the acceptors of the COVID-19 vaccine agreed that vaccination would be important to protect against COVID-19 disease (25).

When inquired the reasons given for not accepting the vaccine, little knowledge due its rapid development process (77.8%, $n = 84$), being concerned about side effects (75.0%, $n = 81$) and lack of trust (23.1%, $n = 25$) were given as the reasons. It should be noted that when inquired about the statement “I think we are starting to use the vaccine before completely understanding its efficacy and safety,” around 44% ($n=537$) respondents agreed. In comparison, around 18% ($n = 219$) strongly agreed with the statement. When a similar question was asked from Americans in 2020, 77% said that it would be at least somewhat likely that a vaccine for COVID-19 will be approved and used in the U.S. before fully understanding its safety and efficacy (26).

Parallely, when inquired from vaccine acceptors about reasons that would reduce the likelihood of accepting the vaccine subsequently, getting to know that the vaccine is not effective (67.4%, $n = 728$), vaccine having serious side effects (61.9%, $n = 668$) and if a death occurs as an adverse event of vaccination (32.5%, $n = 351$) were given as the commonest reasons.

These findings are comparable with a similar study in the USA, where low incidence of major side effects was associated with a higher probability of accepting the vaccine (coefficient, 0.07; 95% CI, 0.05-0.08) (24). Similarly, the KFF COVID-19 Vaccine Monitor reported the main reasons for vaccine hesitancy as worries about possible side effects (59%), lack of trust in the government to ensure the vaccines’ safety and effectiveness (55%), concerns that the vaccine is too new (53%), and concerns over the role of politics in the development process (51%). Another study by PEW Research Center in the USA stated that among around 50% of the Americans who said they would not get a COVID-19 vaccine in September, 2020, 76% were concerned about side effects as a major reason why they

would definitely or probably not get it (26). Comparatively, in a survey in Turkey, fear of side effects was stated as a reason for not accepting the vaccine by 27.7 % (n = 210) (25).

Many myths around COVID-19 vaccination have been circulating during the last year, which would have some implications on vaccine acceptance. One such rumor, which has been fact-checked to be false, is the fact the Bill Gates is will implant a microchip using the COVID-19 vaccine (27). Twenty-eight percent of Americans believed this to be true (28). We inquired about the same from our survey respondents from Sri Lanka. The largest group of respondents (35.5%, n = 438) had no idea about the statement “COVID-19 vaccine implants a microchip inside the recipient”. In the meantime, around 23% (n= 287) of the respondents disagreed with the statement, while around 36% (n = 441) strongly disagreed with it. Only 2.1% (n= 26) of the respondents strongly agreed about the statement on implanting a microchip while another 3.5% (n= 43) agreed about it.

A widespread claim that has gone viral on the Internet has been was the COVID-19 vaccine would alter the DNA of the recipient, which has been checked to be false (29). Out of 1234 respondents in the current survey, the largest group of 46% (n = 563) had no idea about the statement “the COVID-19 vaccine will alter your DNA”. Meanwhile, approximately 25% (n= 316) disagreed, while around 22% (n= 277) strongly disagreed with the statement.

Another myth around COVID-19 vaccination is that vaccinations cause the disease that they are meant to prevent (30). When inquired from the participants if they believed that they would get the COVID-19 disease after receiving the COVID-19 vaccine, 40.9% (n= 502) disagreed, while 17.9% (n = 220) strongly disagreed with it.

There is also a myth that natural immunity is better than vaccine acquired immunity (30). In the current survey, many of the respondents disagreed (39.2%, n = 482) or strongly disagreed (8.5%, n = 105) with the statement “Our immune system is better than the vaccine”.

The current survey provided important information about the public opinion on the accessibility and affordability of COVID-19 vaccine. For example, around 39% (n = 484) of the respondents agreed, while

around 9% (n = 117) strongly agreed that an adequate number of Sri Lankans would receive the COVID-19 vaccination to stop the disease spread. In contrast, only around 10% strongly agreed while 21% (n = 258) agreed that everybody who wants the vaccine having quick and easy access to it in Sri Lanka. Such negative attitude was expressed when only 4% (n = 52) strongly agreed while was around 16% (n = 198) agreed that the government of Sri Lanka was doing enough to provide the COVID-119 vaccine to the public. Despite the fact that the above conflicting opinion is prevailing among the public, the government of Sri Lanka has, however, expressed its high-level commitment towards COVID-19 vaccination. An eight-member special Presidential Task Force for National Deployment and Vaccination Plan for COVID-19 vaccines has been appointed to ensure early rolling out of the program in Sri Lanka (31,32).

Vaccination should not be thought as a means for relaxing other preventive measures in relation to COVID-19 (33). Interestingly, the majority of the respondents (57.6%, n= 705) agreed that preventative measures such as handwashing, social distancing, and wearing face masks should be continued even with the vaccine, while around 34% (n= 415) agreed with the same. It should be noted that adherence to such preventive measures has been emphasized in the health guidance issued by the Ministry of Health, Sri Lanka as well (34).

A herbal remedy claiming to cure COVID-19 has been on the spotlight in Sri Lanka in the recent past as an alternative preventive strategy (35). We inquired about such herbal remedies as an alternative preventive method other than COVID-19 vaccination in the survey. Out of the 1228 respondents, around 33% (n= 402) disagreed with the statement "If one takes herbal remedies, there is no need to take the vaccine.", and around 31% strongly disagreed, n= 377. However, only around three percent (n = 43) and six percent (n = 77) strongly agreed and agreed that herbal remedies could replace vaccination.

The candidates for prioritization for receiving the vaccine has been outlined in the technical guidance by WHO (3). However, we wanted to find out how the general public would perceive prioritization. Out of the 110 respondents who answered the question on

prioritization, the top three priority groups were frontline staff (51.5, $n = 57$), elderly (25.4%, $n = 28$), and persons with chronic diseases (19%, $n = 21$). These findings were similar to those from an experiment in Belgium where around 20-30% of respondents prioritized essential workers, the chronically ill, and older people as the three groups to receive the vaccine (36).

When inquiring about the most trusted source of information on COVID-19 vaccination, the While the Internet proved to be the most trusted source of information by around 68% of the respondents ($n = 841$), a health worker had been the trusted person to receive information on COVID-19 vaccines. Amongst the health workers, around thirty-six percent ($n=433$) trusted a WHO representative to receive COVID-19 vaccine information. This is a quite unique finding since, for COVID-19 vaccine information, the public trusted an international organization representative than a government health staff. MOH was rated second as the trusted person as indicated by 33.8%, $n = 410$. Hospital doctor, family doctor and PHI were the third, fourth and fifth places, receiving 13.2% ($n= 159$), 8.1% ($n= 100$) and 5.2% ($n= 63$) respectively. In another online survey conducted in Sri Lanka in 2020, health officer was seen as the most trusted source of information on COVID-19 Cases and Deaths in Sri Lanka, 69%, $n = 117$ (37). Similar health worker preference as the trusted source has been observed in the USA as well. The highest confidence was reported in healthcare professionals ($n = 502$; 75%), their own physician ($n = 471$; 70%), CDC ($n = 430$; 64%), state health departments ($n = 419$; 62%), and local health departments ($n = 411$; 61%), while 144 participants (21%) in this USA study reported social media as a reliable source of COVID-19 information (38).

The conceptual framework on factors associated successful COVID-19 vaccination in Sri Lanka provided a birds-eye view of ecosystem of the COVID-19 vaccine introduction in Sri Lanka. It was interesting to note that the public perceived the need for adhering to core values such as equity, transparency, accountability, and non-discrimination for the COVID-19 vaccination program to be successful. While the high political commitment and leadership were praised, the need to provide the professionals the freedom to make evidence-based decisions in relation to COVID-19

vaccination was highlighted. Further, some respondents clearly, and quite openly warned the government to ensure the transparency and accountability of the vaccine procurement process since they perceived any manipulation based on financial benefit would be detrimental to the success of the vaccination program.

A recurrent theme was the strength of the health system that the general public had trust in. Different aspects of the health system, both curative and preventive, organized and robust health infrastructure, strong public health system with a health unit system penetrating up to the grassroots level under the leadership of the MOH and participation of the Public Health Midwife and Public Health Inspector were seen as positive factors. The respondents also praised the successful EPI well as the immunization information system thereof, to be proud of, which could assure the success of the COVID-19 vaccination campaign.

When it comes to health security cooperation, the ideas were polarized as to the security sector is an asset vs. being a liability. Some respondents expressed their confidence in the security sector to augment the efforts of the health sector during the vaccination campaign, while the others demanded the security sector to leave the health sector to do the vaccination campaign without interference.

Under the vaccine-related factors, the discourse was heavily revolving around the efficacy, safety, and affordability of the vaccine. Some myths the community had on the vaccine were revealed, for example, the vaccination program to be a part of a trial which needed to be dispelled. The efforts taken by the government to vaccinate the public through means such as the COVAX facility, bilateral negotiations, and government funding were much appreciated by the public.

On community-related factors, the public reported a high level of resilience and confidence in supporting the government for the successful implementation of the vaccination program by being health conscious and literate. In addition, Sri Lanka being a vaccine-loving nation and the lack of a strong antivaccine campaign were highlighted as key factors that could guarantee the success of the vaccination program. Another encouraging finding was the need to adhere to the

health guidance, which was highlighted by the public while and after the vaccination program.

This public opinion survey has some limitations as well. During this online survey, the sample of respondents was drawn using the snowballing technique. Thus, we acknowledge the limitation of the survey finding to reflect the opinion of a biased sample of Sri Lankans who are online, computer literate, using a computer or smart mobile device. How biased this sample could be understood to some extent by looking at the age, gender, and district distribution of the current sample, in comparison with the computer literacy statistics of Sri Lanka (39). However, given the prevailing health guidance and mobility restrictions, the research team is of the opinion that studying a biased sample has done better than not doing a survey at all.

Even though we reached out to an email list of over 500 and 43, 807 Facebook users, only 1250 could be enrolled for the survey. Some respondents did not answer all the questions in the survey. Therefore, during the analysis, we had to use the number who responded to a particular question as the denominator, rather than the total number of enrolled respondents.

5. Conclusions

The findings of paint a very positive picture for rolling out the COVID-19 vaccination campaign, with 86% of the population being ready to accept the vaccine. However, this should not be a reason for complacency. Firstly, even though those who say they do not want to have the COVID-19 vaccination are a minority, they always have the ability to “infect” the rest of the community. Secondly, the public willingness to receive the COVID-19 vaccine is vulnerable especially any real or perceived breaches of efficacy and safety of the vaccines. In this backdrop, it is essential to implement stringent measures, to prevent and monitor any actual or perceived adverse events following immunizations in relation to COVID-19 vaccination. The need for an effective risk communication strategy on COVID-19 prevention, of which communication-related to the vaccination is also a part, cannot be overemphasized. What is already known and yet to be known on the COVID-19 disease, vaccine, and its adverse effects, and the need to adhere to other preventive measures should

be communicated, using the most trusted communication channels and persons, using plain language to the general public.

6. Recommendations

It is recommended that the government of Sri Lanka, along with the health sector, its local and international counterparts in vaccine procurement and dissemination, and the community, should capitalize on the favorable public opinion in relation to vaccination to successfully roll out a successful COVID-19 vaccination campaign.

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