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Public Views on Priority Groups for COVID-19 Vaccination: A Survey from Iran

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Abstract

Background: In the initial coronavirus disease 2019 (COVID-19) vaccination program, prioritizing population groups is inevitable due to limited supply. Currently, most of the allocation strategies are focused on individuals' characteristics.
Objectives: The present study aimed to assess the opinions of Iranian population in specifying high-priority individuals and groups for COVID-19 vaccination.
Methods: An online survey was conducted using some popular social media in Iran. The data was collected from Iranian population (878 individuals) aged 18 years and older during the COVID-19 pandemic (2 - 20 May 2020) to investigate their opinions towards vaccine allocation strategies at the family and society levels. In vaccine prioritizing within family three option and in vaccine prioritizing within society, seven population groups were introduced by the respondents in a random order, respectively. To analyze the data, mean rank and univariate analysis was used.
Results: Healthcare workers, high-risk patients, and the elderly were the first priority groups for a vaccination with a mean rank of 2.8, 2.8, and 3.8, respectively. The least priority group was policymakers and executive managers (mean rank = 5.75). At the family level, 64% of the respondents introduced one of the family members as the first priority for vaccination, followed by their children (29%) and themselves (7%). No significant relationship was observed between respondents' characteristics and their prioritization in vaccine prioritizing within society.
Conclusions: Although involving public preference in decision-making is a key factor for the success of policies, careful design and implementation of vaccination programs through considering risk-benefit assessment is strongly recommended.

Keywords: COVID-19 Vaccination, Priority Setting, Iran

1. Background

The world is in the midst of coronavirus disease 2019 (COVID-19) pandemic (1). The first COVID-19 vaccines were delivered in the last months of 2020, and planning for mass delivery was already well underway in early 2021 (2). The development of efficient vaccines is indubitably a scientific and public health milestone which will dramatically alter the course of the current pandemic and become a critical tool in the fight against COVID-19 (3, 4). Nevertheless, the supplies of the first series of authorized vaccine(s) will be limited in the short- and mid-term, thus raising another important challenge, i.e., how to best manage now that a vaccine is available (5). The decision to prioritize a population group in order to create earlier access to the vaccine is not easy at all, and scientific evidence, ethical considerations, and issues of deliverability in vaccine implementation need to be taken into consideration (1, 6).

For health policymakers at both national and international levels and also in light of ethical and scientific principles, different recommendations from advisory committees were proposed for prioritizing population groups (7). The World Health Organization (WHO) Strategic Advisory Group of Experts on Immunization (SAGE) provides a value framework for COVID-19 vaccine allocation among countries and prioritization within each country, particularly when the supply is insufficient. According to this framework, the first step is the identification of target populations (7). The majority of vaccine allocation strategies which are currently in the pipeline by policy institutions

(7-9) and experts (2, 10, 11) focus on individuals' characteristics (12). For instance, the UK Joint Committee on Vaccination and Immunization (JCVI) advised direct protection of individuals who are most at risk from coronavirus as the best option to prevent the disease in the first phase of COVID-19 vaccination (13).

Apart from policymakers' guidance and advice, a study in Belgium investigated the public preferences regarding the distribution of a scarce COVID-19 vaccine (14). Among eight alternative strategies for distributing COVID-19 vaccines, three were ranked the highest by 20% - 30% of the respondents, including essential workers, the chronically ill, and older people (14).

It is worth mentioning that the final vaccination strategy needs to be determined considering multiple factors, including the vaccine characteristics and its supply, the benefit-risk assessment of the target population, and the epidemiologic, clinical, and socioeconomic impacts of the pandemic (7). The most important phase after the policy formulation is policy implementation (7). For the success of this process, it is important that these policies be rendered sufficient levels of public support (14). In this regard, the existing evidence suggests that there is an association between public involvement in health policymaking and performance of health systems (15). In this way, active public participation in policymaking was emphasized in Health 2020, which would ensure that individuals and communities shape decisions affecting their health and well-being; furthermore, the process also creates supportive environments and resilient communities (7). However, the incorporating public opinions in decision making is a challenging issue, and evidence revealed that many countries fail to implement the policies (15). Therefore, in response to this problem, some guidelines and procedures to engage the public in priority setting were developed by countries such as Sweden, Norway, and England (15-17). We believe that priority setting on COVID-19 vaccination is one of such policies requiring public support to increase its success (15). Accordingly, at the national level, Iran's National Vaccination Framework approved in January 2021 outlined the vaccination phases, which were developed through considering scientific evidence, priorities in other countries, specialized committees' advice on disease burden, and also prevalence of high-risk diseases in the country (18).

2. Objectives

Hence, this study aimed to provide information on public preference regarding COVID-19 vaccination through eliciting public opinion towards the highest priorities for initial vaccination at family and society levels.

3. Methods

The present study aimed to assess the opinions of Iranian population in specifying high-priority individuals and groups for COVID-19 vaccination. To this end, the survey was conducted via an online questionnaire, whose link was posted on popular and widely used social media in Iran including Telegram and WhatsApp. The data was collected from Iranian people aged over 18 who had access to Internet in the period of 2 - 20 May 2020. Random sampling method was used to send the link to the survey questionnaire. However, since the respondents were asked to participate in the study voluntarily and, if they wished, to send the link to their acquaintances, the link of the questionnaire was rotated using the snowball method.

The primary questionnaire was presented to a panel of four health economists in academic setting to assess the face validity and content validity of the questionnaire.

The survey included two main parts including:

Demographic and socioeconomic data (age, education, gender, work in the health sector, monthly income, family size, the number of people above 60 and under 10 years in the family, history of chronic diseases, and the exposure risk of family members);

Two closed-ended questions to elicit sample opinions regarding the COVID-19 vaccines allocation. The first question was about the participants' opinions regarding prioritizing vaccine allocation to their family, as follows:

"If there is a limited supply of vaccines and only one person in your family could be vaccinated, who is your first priority?"

There were three options: myself, one of my family members (spouse, father, mother, sister, or brother), or my child.

The other question elicited the respondents' opinions on prioritizing the population in society for COVID-19 vaccination:

"If the government decides to provide the COVID-19 vaccine for free, and if the vaccine is expensive and limited in number, prioritization should be given due to limited resources. In your opinion, which groups should have the highest priority for vaccination?

The options presented to respondents in random order included the following seven population groups: healthcare workers including doctors, nurses, etc.; high-risk patients such as individuals with chronic diseases; the elderly; children; disadvantaged individuals (individuals living in a low economic, sanitation, and hygiene level); essential workers outside the health sector (i.e. individuals working in personnel needed sectors to maintain essential services and products); and key policymakers and executive managers.

The survey was anonymous, and respondents participated voluntarily. The participants could respond using a personal computer/laptop, tablet, or smartphone, and the data were collected when no COVID-19 vaccine had been introduced throughout the world. The data analysis was conducted using SPSS software version 25 with the descriptive statistics summarized as percentages, means, and mean rank. A univariate regression was used to determine the relationships among the survey questions on priority setting within society and family and key variables including respondents' virus exposure risk, family members' virus exposure risk, history of chronic diseases, having family members aged above 60 and/or under 10 years old. The P-values ≤ 0.05 were considered as statistically significant.

4. Results

The survey results on most prioritized individuals at the initial COVID-19 vaccination phase were presented in three sections, including sample characteristics, vaccine prioritizing within families and affecting factors, and vaccine prioritizing in society and affecting factors.

4.1. Sample Characteristics

Table 1 shows the sample characteristics. In total, 878 individuals aged 18 - 78 (mean age: 34 years) completed the survey. Approximately 70% of respondents had a university degree. Moreover, 12% of the respondents and 50% of the family members had a history of chronic diseases. Furthermore, 40% had a child under 10 years old, and almost 10% reported having aged family members.

Table 1. Characteristics of Respondents

Characteristics	No. (%)
Total	878 (100)
Gender	
Female	676 (77)
Male	195 (22)
Missing	7 (1)
Age	
Range	18-78
Mean ± SD	34 ± 9.4
Education	
Elementary	34 (4)
Diploma	223 (25)
University degree	613 (70)
Missing	8 (1)
Income level	
No income	145 (17)
Less than US $118	201 (23)
Between US $118- 294	318 (36)
Between US $294 - 588	119 (13)
More than US $588	29 (3)
Missing	66 (8)
Family size	
1 - 2	186 (21)
3 - 5	629 (72)
> 6	57 (7)
History of chronic disease	
Themselves	49 (6)
Family members	362 (41)
Both	48 (6)
None	419 (47)
Having a family member	
> 60 years old	90 (10)
< 10 years old	350 (40)

4.2. Vaccine Prioritizing Within the Family

As is shown in Table 2, only 7% of the respondents indicated themselves as the first priority. For 64% of the respondents, a family member was the first priority for vaccination while one's child held the second rank (29%).

The key variables, including household size, having a family member aged above 60 and/or a child under 10

Table 2. Respondents' Views on the First Priority for Vaccination within the Family

Priority	Frequency	Relative Frequency, %
Myself	58	7
A family member	518	64
My child	235	29
Total	811	100

years old, and family members' exposure risk were investigated with respect to the priorities in the family. Table 3 shows the results of univariate analysis of priorities within the family. As shown, having a family member aged over 60 years and the respondents' exposure risk were significantly associated with choosing another family member as the first priority.

4.3. Vaccine Prioritizing Within the Society

As Table 4 shows and according to the mean rank, healthcare workers and high-risk patients comprised the first priorities with the mean rank of 2.8, followed by older people with a mean rank of 3.8.

The least priority belonged to individuals working as policymakers and executive mangers.

In the univariate analysis, the key variables including coronavirus risk, respondents and family members' virus exposure risk, history of chronic diseases, and having a family member aged above 60 and/or a child under 10 years were investigated with respect to the first three priorities. No significant relationship was observed among these variables and the respondents' priorities (Table 5).

5. Discussion

In response to the COVID-19 crisis, there was a rapid surge in vaccine development. As a result, some vaccines have been approved and authorized for emergency or limited use, and vaccination has thus been initiated. However, the current vaccine supply is constrained with vaccine prioritization, while increasing public health outcomes is a critical policy challenge (2).

To this end, the present study evaluated Iran's public opinion on vaccine prioritization within family and society levels in the limited supply phase. Accordingly, the respondents ranked seven population groups from the most to least priority. The mean rank for the groups showed that healthcare professionals, patients with high risk of infection, and older people were identified as the most prioritized groups for vaccination, respectively (mean rank 2.8, 2.8, and 3.8, respectively). Policymakers and executives had the least priority (mean rank: 5.8). Moreover, the respondents ranked themselves as the least priority compared to other family members or children; this indicates the high degree of altruistic values within the Iranian culture.

Based on Emanuel et al. (19), allocation of resources in pandemics converge on four fundamental values: maximizing the benefits produced by scarce resources, treating people equally, promoting and rewarding instrumental value (benefit to others), and giving priority to the worst-off (sickest first; youngest first); these values could be revised depending on the type of the scarce resources and context at issue (20). The results of this study are in line with promoting and rewarding instrumental value and prioritizing the worst-off criteria for fair allocation of scarce medical resources.

In line with the results, Dooling (2020) raised that in the first level of COVID-19, vaccination priority must be allocated to healthcare employees, people who have high health risks, old people, and essential workers to provide services to people (21). In contrast, Bubar et al. (22) claimed that to reduce the cumulative infection, priority should be given for adults aged between 20 and 49 years, and to reduce the mortality rate, priority should be given for adults over the age of 60 years.

Regarding the factors influencing the public opinion, no significant relationship was seen among the respondents' characteristics and their priorities in the society. For prioritizing vaccine within family members, having a family member aged above 60 years and respondents' exposure risk are significantly associated with choosing another family member.

The finding on this priority setting may assist health policymakers to set priority groups for initial vaccination; however, it should be noted that public preference is a rather complementary evidence, since the health outcome and side effects of vaccines may not be included in their ranking. The vaccination program should carefully incorporate the public opinions in design and implementation. One essential step is conducting a risk-benefit assessment by estimating the potential risk of morbidity and mortality due to vaccination compared to its potential benefits (23). Priority groups for vaccination may change over time based on post-authorization vaccine safety monitoring. For instance, the current COVID-19 vaccines have been authorized only for emergency use during this public health emergency; but there are, of course, disadvantages due to inadequate information on vaccine safety among vaccinated individuals, including serious clinically adverse events, deaths, and hospitalizations. As an example, older individuals in Norway were the first to be vaccinated in large populations (24). Due to the 23 deaths of these vaccinated patients, the COVID-19 vaccination guide was updated by the Norwegian Institute of Public Health, and more detailed advice on evaluating the benefits of vaccination vis-a-vis its risks of potential side effects was included.

In Iran, although the vaccination of the elderly has not yet begun, according to Iran's National vaccination frame-

Table 3. Factors Affecting the First Priority Individual within the Respondent's Family

Priority	Myself (%)	A Family Member (%)	My Child (%)	P-Value
Household size				0.836
1 - 2	11 (6.4)	54 (31.6)	106 (62.0)	
3	15 (6.0)	67 (27.0)	166 (66.9)	
4	21 (8.70	71 (29.5)	149 (61.8)	
> 5	11 (7.7)	41 (28.7)	91 (63.6)	
Having a family member aged above 60 years				< 0.001
No	39 (6.8)	200 (34.9)	334 (58.3)	
Yes	19 (8.0)	35 (14.7)	184 (77.3)	
Having a child under 10 years				0.076
No	40 (8.2)	128 (26.4)	317 (65.4)	
Yes	17 (5.3)	104 (32.5)	199 (62.2)	
Respondents' virus exposure risk				0.012
Low	18 (8.7)	61 (29.6)	127 (61.7)	
Moderate	16 (4.6)	115 (32.8)	220 (62.7)	
Sever	22 (9.3)	59 (24.9)	156 (65.8)	
Exposure to COVID-19	2 (11.8)	0 (0.0)	15 (88.2)	
Family members' virus exposure risk				0.185
Low	13 (7.0)	52 (28.0)	121 (65.1)	
Moderate	26 (8.1)	109 (34.0)	186 (57.9)	
Sever	17 (6.3)	66 (24.4)	188 (69.4)	
Exposure to and dead of COVID-19	2 (6.5)	8 (25.8)	21 (67.7)	

Table 4. Respondents' Views Regarding Priority Groups within the Society

Priority	Population Group						
	Healthcare Workers	High-Risk Patients	Older People	Children	Disadvantaged Individuals	Essential Workers	Key Policymakers and Executives
1	276	234	93	118	74	38	39
2	187	241	141	103	92	63	45
3	121	145	183	155	121	110	37
4	113	85	154	140	173	143	64
5	83	70	124	128	206	170	91
6	61	52	95	140	147	268	109
7	31	45	82	88	59	80	487
Total	872	872	872	872	872	872	872
Mean rank	2.8	2.8	3.8	3.9	4.2	4.7	5.7

work, vaccination of older people is in the second phase (age groups: 80 - 85, 75 - 80, 70 - 75, 65 - 70). This indicated the congruence of the policymaker perspective and public opinion. Older people are the priority; however, considering Norway's experience, it seems the risk-benefit assessment is highly crucial.

In total, in the case of contrast between public opinions and health-policy makers toward high priorities for COVID-19 vaccination, informing the public about the potential risks and benefits and also the government limita-

tions is strongly recommended. This mutual communication among public and policymakers could guarantee public advocacy in the vaccination program.

5.1. Limitations

The current study was conducted before vaccine discovery. It is possible that the side effects of vaccines may affect the prioritizing groups for vaccination. The second limitation is that the current study may not be a representative of all population groups since not all individuals (e.g., illiterate individuals, disadvantaged people, some elderly people, etc.) have access to mobiles, laptops, and the Internet. Therefore, different data collection strategies should be implemented to ensure that all population groups are included.

5.2. Conclusions

This study revealed the public opinion of Iranian population regarding priority groups for vaccination when the vaccine supply is limited. Healthcare workers, patients with high risk of infection, and older people were the most prioritized groups for vaccination. Within family, another family member or children were introduced as the first priority. Involving public preference in decision-making was considered as a key factor in policy success. Nonetheless, careful design and implementation of a vaccination program and informing public on potential risks and benefits related to their priorities are strongly recommended.

Footnotes

Authors' Contribution: LZ, STH, and NM participated in the conception and design of the study. Both JA and ZM had contributed to the acquired data and performed data analysis. LZ, NM, and JA drafted the manuscript. AR, LZ, and KBL revised the manuscript critically for important intellectual content. All authors read and approved the final manuscript.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approval: The study was approved by the Ethical Committee of Iran University of Medical Sciences (ethical code: IR.IUMS.REC.1399.078).

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Table 5. Factors Affecting the Respondents' First Three Priority Groups

Priority	Healthcare Workers, No. (%)			P-Value	High-Risk Patients, No. (%)			P-Value	Elderly, No. (%)			P-Value
	High	Moderate	Low		High	Moderate	Low		High	Moderate	Low	
COVID-19 risk				0.112				0.78				0.234
Low	22 (66.7)	11 (33.3)	0 (0.0)		21 (63.6)	8 (24.2)	8 (12.1)		7 (21.2)	18 (54.5)	8 (24.2)	
Moderate	109 (54.2)	76 (37.8)	16 (8.0)		111 (55.2)	69 (34.3)	21 (10.4)		56 (27.9)	95 (47.3)	50 (24.9)	
High	330 (51.9)	230 (36.2)	76 (11.9)		342 (53.8)	222 (34.9)	72 (11.3)		171 (26.9)	348 (54.7)	117 (18.4)	
Respondents' virus exposure risk				0.458				0.245				0.545
Low	131 (56.7)	77 (33.3)	23 (10.0)		129 (55.8)	84 (36.4)	18 (7.8)		57 (24.7)	133 (57.6)	41 (17.7)	
Moderate	189 (51.2)	135 (36.6)	45 (12.2)		207 (56.1)	95 ((35.2)	42 (11.4)		103 (27.9)	186 (50.4)	80 (21.7)	
High	141 (52.2)	105 (38.69)	24 (8.9)		138 (51.1)	95 (35.2)	37 (13.7)		74 (27.4)	142 (52.6)	54 (20.0)	
Family members' virus risk exposure				0.704				0.478				0.271
Low	114 (55.3)	73 (35.4)	19 (9.20)		114 (55.3)	73 (35.4)	19 (9.2)		53 (25.7)	108 (52.4)	45 (21.8)	
Moderate	186 (54.4)	119 (34.8)	37 (10.8)		190 (55.6)	118 (34.5)	34 (9.9)		82 (24.0)	186 (54.4)	74 (21.6)	
High	160 (50.0)	124 (38.8)	36 (11.3)		168 (52.5)	108 (33.8)	44 (13.8)		99 (30.9)	165 (51.6)	56 (17.5)	
Having a family member aged over 60 years				0.359				0.915				0.94
No	313 (51.3)	233 (38.2)	64 (10.5)		334 (54.8)	207 (33.69)	69 (11.3)		163 (26.7)	325 (53.3)	122 (20.0)	
Yes	142 (55.9)	84 (33.1)	28 (11.0)		136 (53.5)	90 (35.4)	28 (11.0)		70 (27.6)	132 (52.0)	52 (20.5)	
Having a child under 10 years				0.37				0.519				
No	283 (54.6)	185 (35.7)	50 (9.7)		286 (55.2)	179 (34.6)	53 (10.2)		149 (28.8)	275 (53.1)	94 (18.1)	0.133
Yes	175 (50.6)	129 (37.3)	42 (12.1)		184 (53.2)	118 (34.1)	44 (12.7)		83 (24.0)	184 (53.2)	79 (22.8)	
History of chronic diseases				0.503				0.456				
Self	63 (59.4)	33 (31.1)	10 (9.4)		64 (60.4)	31 (29.2)	11 (10.4)		22 (20.8)	66 (62.3)	18 (17.0)	0.131
Family	200 (50.1)	154 (38.6)	45 (11.3)		219 (54.9)	141 (35.3)	39 (9.8)		105 (26.3)	203 (50.9)	91 (22.8)	
No	198 (54.2)	130 (35.6)	37 (10.1)		191 (52.3)	127 (34.78)	47 (12.9)		107 (29.3)	192 (52.6)	66 (18.1)	