Research Paper
Development of the Attitude & Practice Towards Social Distancing Questionnaire and Evaluation of Its Validity and Reliability During the COVID-19 Pandemic in Iran

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ABSTRACT

Background: Social distancing is an effective way to prevent the spread of COVID-19 and its new variants. This study aims to develop the Attitude & Practice towards Social Distancing (APSD) Questionnaire and evaluate its validity and reliability during the COVID-19 pandemic in Iran.

Materials and Methods: This mixed-method study, used Waltz's 4-step method to develop the APSD questionnaire. The initial items were formulated based on a semi-structured interview with the participants and social distancing guidelines. After confirming the face validity and content validity of the questionnaire, it was distributed among the participants online. Its internal consistency was assessed by calculating the Cronbach's alpha (α). The exploratory factor analysis and confirmatory factor analysis (CFA) were carried out in SPSS software, version 16 and AMOS version 24. Finally, the reliability was evaluated using the test-retest method.

Results: The preliminary draft with 33 items (15 for the attitude and 18 for the practice) were answered by 623 participants. After CFA, the final draft consisted of 7 items and three factors (CVR=0.77, CVI=0.92, α=0.73) for the attitude subscale, and 8 items and three factors for the practice subscale (CVR=1, CVI=0.98, α=0.76).

Conclusion: The 15-item APSD questionnaire is a valid and reliable tool to evaluate the status of social distancing during the COVID-19 pandemic in Iran.

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1. Introduction

The novel Coronavirus Disease (COVID-19) began in Wuhan, China in late 2019, and spread rapidly throughout the world with increasing infected cases [1, 2]. Different countries have adopted various solutions to control the COVID-19 pandemic, one of the important of which is social distancing [3]. The Centers for Disease Control and Prevention (CDC) defines social distancing as "keeping a safe space between yourself and other people who are not from your household" [4]. The World Health Organization indicates it as an effective strategy to protect against the infection, asking people to keep windows and doors open in closed areas and keep a safe distance from other people [5]. From the onset of this pandemic, the Ministry of Health and Medical Education (MHME) in Iran has taken a number of measures such as quarantine and social distancing, school closures, distance learning, and unnecessary business closures [6]. Previous studies have described several factors, including economic issues, place of residence, culture, knowledge and attitudes, social issues, population density, demographic factors as determinants of adherence to social distancing during the pandemic [7-14]. Since the observance of social distancing is not mandatory in in Iran, people are free to act based on their personal attitude and judgment [15].

In 2021, a study by Hills in London reported that 92% of people do not comply with the social distancing protocols, and half of them refuse to observe the protocols intentionally, which indicates the importance of raising public awareness in this field [16]. Alves reported the public perceptions of wearing masks as very unsatisfactory at the beginning of the pandemic, while masks was much less expensive than vaccines [17]. A study by Gupta showed that people's financial situation and attitudes may reduce their adherence to social distancing, while Li reported that people's attitudes was a key factor in their compliance with social distancing [11, 18]. Similarly, Yanti reported the knowledge and attitude as two significant factors affecting the public observance of social distancing, and found that social distancing was largely followed by people who had a positive attitude [8].

These studies suggest that measuring attitude is one of the most reliable methods to assess the current pandemic, evaluate the effectiveness of measures, and identify the ways to improve social distancing, which can be done by means of standard tools or questionnaires [19, 20]. The basis of any governmental actions for prevention and treatment is the public attitude, and there is need for a development of standard tools for future assessments against COVID-19 [21].

Given the emerging trend of COVID-19 and its new variants such as Delta and Omicron, there is need for a reliable tool to measure the people's attitudes before making policies and decide how to deal with other variants in the future [22]. By considering people's reactions to critical situations, their evidence-based decisions, the slow rate of vaccination, different attitudes towards vaccination [23], vulnerability of healthcare systems during the pandemic [24, 25], the need for more doses of vaccines, the role of social distancing as a practical way to prevent the spread of new variants, lack of a standard questionnaire for the assessment of public attitudes towards social distancing in small cities, the present study aims to develop the attitude & practice towards social distancing (APSD) questionnaire during the COVID-19 pandemic.

2. Materials and Methods

This mixed-method study conducted in Gerash, Fars Province, Iran in 2020. The Waltz 4-step method was employed to design the questionnaire [26]. A valid and reliable instrument is necessary based on the prevention protocols of COVID-19 to assess the current status of the public's compliance with the protocols [27].

In the first step, to obtain information about the concept of social distancing and develop the initial items, the researchers reviewed the articles and protocols of social distancing approved by the MHME.

In the second step, items were formulated using standard social distancing protocols introduced by the MHME and through semi-structured interviews of 10 people, 7 women and 3 men aged 18-40 years, using five questions related to social distancing such as the definition of social distancing, factors affecting social distancing, and reasons for not observing social distancing. Then, the answers were reviewed and verified according to the protocols of MHME. Finally, the final draft was prepared.

In the third step, to check the validity of the instrument, three measures of face validity, content validity, and construct validity were evaluated. Face validity was assessed qualitatively (meaningfulness, clarity, and comprehensibility of items) and quantitatively (the importance rated on a 5-point Likert scale ranging from highly important to not important) by 10 people aged over 18 years. Content validity was evaluated by calculating the Content Validity Ratio (CVR) and Content Validity Index (CVI). The questionnaire was submitted to ten experts who had a postgraduate degree in different medical fields. The CVI was assessed quali-

tatively (comprehensibility, arrangement, clarity, and meaningfulness of the items) and quantitatively (the importance rated on a 4-point Likert scale). The CVR was assessed quantitatively (the necessity rated on a 3-point Likert scale). Using Lawshe's table, a CVR >0.62 and a CVI >0.79 were obtained for each item.

In the final step, considering the size of the population (the total number of people aged above 18 years in Gerash county) which was 24,867, and using Cochran formula given a marginal of error of d=0.05, a confidence level of 98%, and a follow-up loss rate of 20% (considering 1 item for 10 people), the minimum sample size was determined 616. The samples were recruited using a random sampling method by sending invitations on social networks.

Data were collected using the APSD questionnaire made online in Epoll website. In total, 623 individuals completed the questionnaire. The inclusion criterion for participants were age >18 years, and the exclusion criterion was unwillingness to participate in the study. The questionnaire file accompanied by an informed consent form, a declare about the researchers' obligation to ensure the confidentiality of the respondents' information, and a demographic form.

The data of completed questionnaires were analyzed in software, version 16. To evaluate the reliability of the instrument, its internal consistency (Cronbach's alpha) was evaluated. Then the exploratory factor analysis (EFA) was employed to evaluate the factor structure of the questionnaire. Finally, to verify the factor structure, the confirmatory factor analysis (CFA) was used. The test-retest reliability of the questionnaire was also determined in a pilot study on 30 participants with a one-month interval to evaluate the stability of the measurements over time. The scores of the two tests were obtained and their correlation was assessed.

3. Results

The initial draft prepared in step 2 consisted of 36 items (16 related to attitude and 20 related to practice). The items related to the attitude subscale rated on a 3-point Likert scale (3=Agree, 2=not sure, 1=disagree), and the items related to the practice subscale answered by Yes=2 or No=1. In evaluation of face validity, the impact factors of all items were higher than 1.5. In measuring CVI and CVR of the items (n=36), one item from the attitude subscale and 2 items from the practice subscale were removed because they did not meet the score requirement. Therefore, their values for the attitude subscale with 15 items (CVR=0.77, CVI=0.88) and the practice subscale with 18 items (CVI=0.98, CVR=0.93) were calculated. The final items were entered into the Epoll website to be answered by 623 participants over 2 months. Of 623 participants, 66% were female, 86.5% were under 40 years of age, about 59% were married, about 90% had a degree above high school diploma, and 97.6% had a monthly income <10 million Tomans.

Cronbach's alpha was used to determine the internal consistency of the APSD questionnaire. Two items from the attitude subscale and one item from the practice subscale were removed because they had been answered similarly by all participants. The remaining 13 items in the attitude subscale had a Cronbach's Alpha of α=0.720 and 17 items in the practice subscale had a Cronbach's Alpha of α=0.78, indicating that the attitude and practice subscales had desirable internal consistency and the items could be used for EFA which was carried out to evaluate the construct validity. The Kaiser-Meyer-Olkin (KMO) value was obtained 0.789 for the attitude subscale and 0.864 for the practice subscale. The results of the Bartlett's test of sphericity for attitude and practice subscales were 1284 and 1774, respectively, both of which were significant (P<0.01). Hence, the null hypothesis was rejected, indicating that

Table 1. Results of fitness indices for the model based on CFA

Subscales	Pclose	RMSEA	CFI	TLI	IFI	CMIN/DF	CMIN	NFI
Attitude	0.649	0.043	0.985	0.972	0.985	2.157	23.727	0.973
Practice	0.800	0.039	0.983	0.964	0.984	1.959	33.302	0.967
Acceptable range	0.05<	0.08> good; 0.08-0.1 moderate; >0.1 poor	>0.90	>0.90	>0.90	Good<3 Acceptable<5		>0.90

RMSEA: Root mean square error of approximation; CFI: Comparative fit index; TLI: Toker Lewis index; IFI: Incremental fit index; CMIN/DF: Minimum discrepancy function/degree of freedom; NFI: Normed fit index.
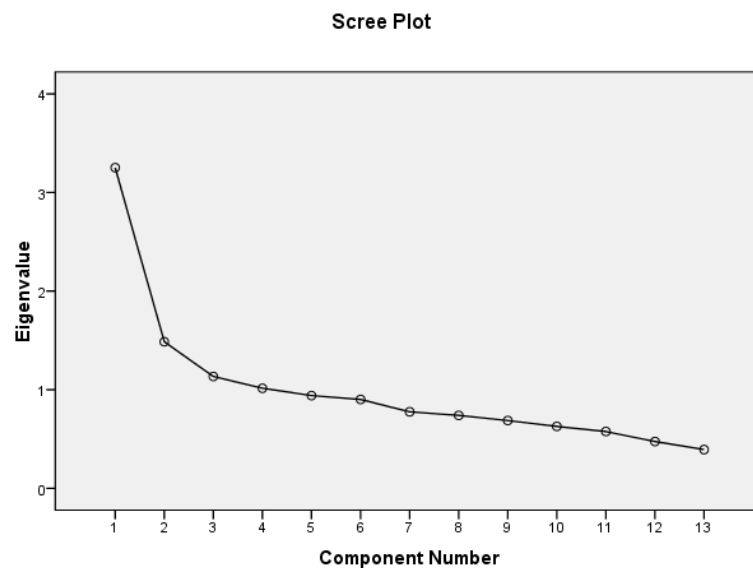
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Table 2. Results of EFA for the attitude subscale

Factors	Items	Definitions	Factor Load			
1	A1	I believe that smoking (cigarette, hookah) reduces the risk of COVID-19.	0.828			
	A2	I believe that drug use (opium, etc.) reduces the risk of COVID-19.	0.827			
	A3	I believe that the consumption of alcohol reduces the risk of COVID-19.	0.708			
2	A4	I do not believe that all people are needed to observe social distancing		0.607		
	A5	I believe that the conditions of my job prevent me from observing social distancing		0.578		
	A6	In my opinion, it is not necessary to observe social distancing in parties and gatherings		0.621		
3	A7	I believe that I will not get COVID-19.			0.681	
	A8	I do not believe that COVID-19 can pose a serious risk to my health			0.669	
	A9	In my opinion, masks and gloves can be used several times.			0.536	
4	A10	I believe that social distancing (not shaking hands and keeping the distance from others) reduces the risk of COVID-19.				0.724
	A11	I believe that wearing a mask reduces the risk of getting infection.				0.585
	A12	I believe that buying unpackaged food increases the risk of COVID-19.				0.540
		Eigenvalue	2.113	1.720	1.540	1.513
		Explained variance (%)	16.257	13.232	11.844	11.642

Items A1 to A9 have reverse scoring.

the observed correlation matrix of items was not an identity matrix. On the one hand, there was a strong correlation between the items of each factor, while no correlation was found between the items of two factors. In overall, EFA results showed the good fit of model to data (Table 1). Using principal component analysis and Varimax rotation, 4 factors and 12 items were extracted from the attitude domain (Table 2 and Appendix 1) and 4 factors and 14 items from the practice domain (Table 3 and Appendix 2).

Figure 1. Scree plot of the eigenvalues for each factor extracted from the attitude domain

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Table 3. Results of EFA for the practice subscale

Factors	Items	Definitions	Factor Load			
1	P1	After physical contact with people or objects, I wash my hands for at least 20 seconds with soap and water	0.564			
	P2	In public places (bus, taxi, parks), I use gloves or paper towels to touch surfaces	0.538			
	P3	I do not touch my face without disinfecting my hands	0.622			
	P4	I disinfect my mobile phone when I get home.	0.637			
	P5	I do not touch raw foods in stores; I use gloves to pick up them	0.675			
2	P6	In public transport vehicles, I try to leave the windows open		0.572		
	P7	In public transport vehicles, I keep a safe distance from other passengers		0.583		
	P8	I avoid shaking hands and kissing in crowded places		0.593		
	P9	I avoid eating in crowded places		0.555		
3	P10	I disinfect public playground equipment before my child wants to play			0.625	
	P11	I use my own praying rug, Mohr, veil, and prayer books when attending mosques			0.567	
	P12	I do not use cash when shopping			0.671	
4	P13	I keep my mask at home after returning from public places.				0.626
	P14	At the gas stations, I refill the gas tank of my car myself.				0.750
		Eigenvalue	2.970	1.901	1.535	1.349
		Explained variance (%)	17.470	11.184	9.027	7.935

Items P13 and P14 have reverse scoring.
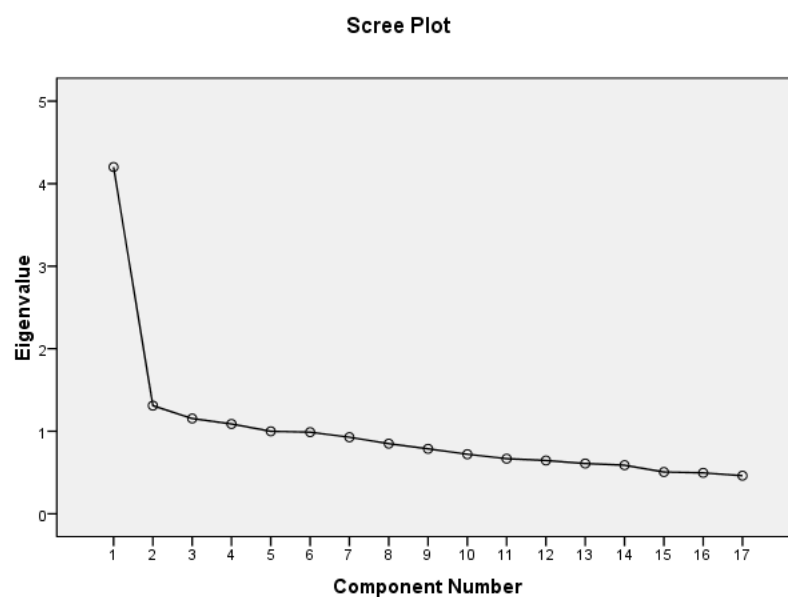
Figure 2. Scree plot of the eigenvalues for each factor extracted from the practice domain

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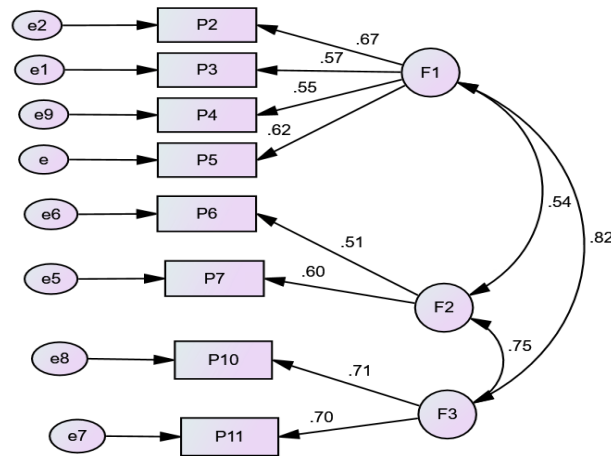
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Figure 3. The CFA model for the practice subscale and the path coefficients

Figure 1 and 2 shows the scree plots of the eigenvalues for the factors extracted from the attitude and practice domains, both had descending trend from the first to the last items. In both subscales, 4 factors had eigenvalues above 1, indicating that 13 items of the attitude subscale and 17 items of the practice scale can be reduced to 4. Thus, to determine the number of factors from the scree plots, a line with Y=1 can be drawn and the factors above this line be considered as main factors. To determine the CFA model's goodness of fit, the obtained results from the fit indices were compared to their acceptable ranges. As can be seen in Table 3, the values of CMIN/DF, RMSEA and other indices for

attitude and practice domains were within the acceptable range. The CFA results confirmed 3 factors in the attitude subscale and 3 factors in the practice subscale. As shown in Figure 1 and Figure 2, the factor loading on the desired factors was significant at a level of 0.01. In the factor analysis, the minimum factor load was considered to be 0.50. The final CFA models of practice and attitude subscales are shown in Figure 3 and Figure 4, respectively.

In the last step, to evaluate the reliability of the APSD questionnaire using the test-retest method, the Spearman's correlation coefficient (Spearman's rho) was used. The results for the attitude subscale revealed a
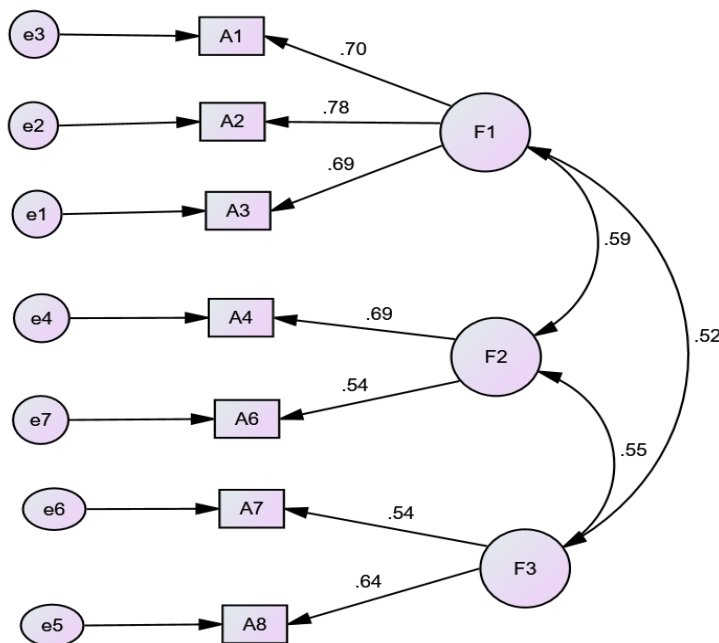

Figure 4. The CFA model for the attitude subscale and the path coefficients

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positive and significant relationship between the scores obtained from the two stages (r=0.47, P=0.013). For the practice subscale, the Spearman correlation coefficient also showed a positive and significant relationship between the scores from the two stages (r= 0.42, P= 0.025). Therefore, the test-retest reliability of the APSD questionnaire was confirmed.

The final draft of APSD questionnaire consisted of 7 items for the attitude subscale (CVR=0.77, CVI=0.92, α=0.73) and 8 items related to practice (CVR=1, CVI=0.98, α=0.76). For interpreting the scores of the questionnaire, gaining at least 70% of the total score (scores 17-21) in the attitude subscale is considered as a positive attitude, while a score of 7-16 indicates a negative attitude. For the practice subscale, obtaining at least 50% of the score (12-16) indicates good practice, while a score of 8-11 shows poor practice.

4. Discussion

The aim of this study was to develop a standard tool for evaluating the attitudes and practice towards social distancing during the COVID-19 pandemic. From the beginning of the pandemic, social distancing has been considered to be an effective method to reduce the spread of COVID-19. Most attitude and practice studies on COVID-19 in Iran have used a researcher-made questionnaire which was not subjected to factor analysis without addressing social distancing, culture, religion, or demographic factors [28-32].

The APSD questionnaire was developed according to Waltz's methodology. Waltz believes that both quantitative and qualitative methods should be used to reject or confirm hypotheses, and that the combination of these two approaches (which was used to develop the APSD questionnaire) provides a better understanding of research problems [26]. The initial items of the questionnaire were formulated based on the results of a semi-structured interview with participants. Semi-structured interviews, which are suitable when the target group consists of a large community, have widely been employed in studies [33]. In this study, the knowledge domain was excluded from the factor analysis because it had poor reliability. The reliability is a prerequisite of validity [34, 35]. The number of items in the knowledge questionnaire, response time, the overlap of items, the ambiguity of items, heterogeneity of the respondents, lack of access to the researchers to answer the questions, and the poor coverage of the scales at the community can explain the poor reliability of the knowledge domain [36].

Individuals' attitudes show their values, beliefs, and perspectives in life, which can sometimes lead people away from what is accepted by the society or law [37]. However, during a pandemic, observance of social distancing is a necessity enforced by the law. In the APSD questionnaire, the items addressed the people's attitudes towards social distancing and personal beliefs about how to prevent COVID-19. Al Nasser asked 4 questions to examine people's attitudes towards COVID-19 in a web-based survey when attending the Hajj ceremony and observance of personal protection protocols. In this survey, they only measured the reliability of the used instrument [38]. Lee et al. used items about perceived sensitivity and predictive behaviors to explore the respondents' attitudes [21], but their findings were not consistent with the results of the present study. The confirmation of items addressing the role of alcohol, tobacco, and drug use in the attitude subscale can be explained by the fact that several people in southern Iran were poisoned after consuming methanol [39], which could have made the participants more sensitive about these questions. Moreover, it seems that, due to the emerging infection trend of COVID-19, people tend to accept and implement different strategies without a logical reason to deal with the pandemic [40]. People's perceptions about the usefulness of social distancing, the existence of COVID-19, and the seriousness of the infection were other issues addressed by the items in the attitude subscale the APSD questionnaire. Bok et al. reported that many people believed that COVID-19 was a hoax and that the numbers of the infected cases were fabricated, and others claimed it was a ruse for sociopolitical reasons [41].

The practice subscale of the APSD questionnaire had 8 items assessing the personal hygiene, touching surfaces in crowded places, and the use of public transportation. Gebretsadik examined people's compliance with prevention protocols during the COVID-19 pandemic using items assessing the presence in crowded places, washing hands, etc. [42], which are consistent with the items included in the questionnaire in our study. A study by Araban et al. conducted in the central region of Iran used a 7-item practice subscale [43] whose items were similar to the items used in the APSD questionnaire. The 8-item practice subscale developed by Heydari et al. with a Cronbach's alpha of 0.7 [44] is also consistent with the subscale developed in the present study. One of the items in the practice subscale addressed the use of personal prayer objects in mosques, due to its importance for the Muslim communities in Iran. Since all the participants in the present study stated that they were wearing a mask, the item related to the use of masks was removed.

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5. Conclusion

The 15-item APSD questionnaire is a valid and reliable tool to evaluate the public's adherence to social distancing during the COVID-19 pandemic in Iran.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of Gerash University of Medical Sciences (Code: IR.GERUMS.REC.1399.017).

Funding

This study received financial support from the Gerash University of Medical Sciences.

Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

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Appendix

Appendix 1. The attitude subscale items of the APSD questionnaire

Row	Items
1	I believe that smoking (cigarette, hookah) reduces the risk of COVID-19.
2	I believe that drug use (opium, etc.) reduces the risk of COVID-19.
3	I believe that the consumption of alcohol reduces the risk of COVID-19.
4	I do not believe that all people are needed to observe social distancing.
5	In my opinion, it is not necessary to observe social distancing in parties and gatherings.
6	I believe that I will not get COVID-19.
7	I do not believe that COVID-19 can pose a serious risk to my health

Appendix 2. The practice subscale items of the APSD questionnaire

Row	Items
1	In public places (bus, taxi, parks), I use gloves or paper towels to touch surfaces
2	I do not touch my face without disinfecting my hands
3	I disinfect my mobile phone when I get home.
4	I do not touch raw foods in stores; I use gloves to pick up them
5	In public transport vehicles, I try to leave the windows open.
6	In public transport vehicles, I keep a safe distance from other passengers.
7	I disinfect public playground equipment before my child wants to play
8	I use my own praying rug, Mohr, veil, and prayer books when attending mosques

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