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Adherence to Self-isolation measures by older adults during coronavirus disease 2019 (COVID-19) epidemic: A phone survey in Iran

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Abstract

Background: Older adults are at higher risk for severe illness and death associated with coronavirus disease 2019 (COVID-19). As Iran was affected by COVID-19 pandemic, the elderly population soon were told to self-isolate for a very long time. We aimed to identify the coverage, efficacy, and integrity of self-isolation and its predictors in the Iranian older adults (≥60 years) from February 19 to 19 March 2020.

Methods: Quota sampling was performed to recruit respondents from 16 cities that were selected based on their population size (4, 7, and 5 cities for localities with ≤500 000, 500 000-1 000 000, and ≥1 000 000 populations) and geographical direction (West = 4 cities; North, East, South, Center = 3 each). At least 30 respondents per locality were selected. Phone interviews of 558 respondents (out of 560; response rate = 99.6%) were performed by local trained interviewers using a validated interview form. Association between age, sex, and living condition (with family vs alone) was assessed with Pearson Chi Square and logistic regression analyses.

Results: Complete self-isolation was reported by 61% of the respondents. In 72%, self-isolation led to 80%-100% contact reduction. Self-isolation was broken by 26% of the respondents. Females had better self-isolation behaviors (OR adjusted: 2.3, 95% CI: 1.5, 3.3) and higher contact reduction rates (p: 0.067). They kept the integrity of self-isolation better (OR adjusted: 1.8; 95% CI: 1.2, 2.7). Those aged older than 80 years were 2.3-folds more likely to completely self-isolate than younger elderly (95% CI adjusted: 1.2, 4.3). Living alone did not significantly predict self-isolation features in the elderly.

Conclusion: About one third of the interviewed Iranian older adults did not adhere to important self-isolation measures, with males and younger ages showing lower adherence. With the relaxation of social distancing measures, protection measures of the elderly should be strengthened. Given that prolonged self-isolation adversely affects physical and mental health status of the elderly, it is highly recommended to think of creative and gender-specific methods that best tailor the needs of this population in Iran.

Keywords: Aged, COVID-19, Quarantine, Isolation, Iran

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↑What is "already known" in this topic:
COVID-19 patients' risk increases by age. A high proportion of severe COVID-19 cases and associated deaths in Iran belongs to the adults aged 60. No vaccine is available yet and self-isolation and physical (social) distancing are proposed as the main prevention and control measures, especially in vulnerable populations, such as elderly. The elderly have certain psychological, medical and basic needs which make it difficult to adhere to self-isolation measures. The empirical evidence about the adherence of the elderly to self-isolation measures is lacking in Iran.

→What this article adds:
Our results showed about one-third of older adults in Iran do not completely adhere to self-isolation measures or have not maintained the integrity of self-isolation. In 70% of the elderly, self-isolation resulted in 80%-100% contact reduction. Others reported <80% contact reduction. Males and younger ages showed lower adherence and those living alone had a higher chance of breaking self-isolation.

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Introduction

As of July 5, 2020, Corona virus disease 2019 (COVID-19) has been confirmed in more than 11 million people worldwide, more than 500 000 of whom had died due to complications of the disease (1). An unknown proportion of infected cases remain asymptomatic or undetected; therefore, the true prevalence and case/infection fatality rate remains controversial (2). The novel coronavirus has resulted in an ongoing outbreak of viral pneumonia in Iran since February 19, 2020. By July 5, 2020, the number of laboratory-confirmed cases detected by Iran's surveillance system has reached 240 400 cases with 11 571 deaths and over 201 210 recovered cases. Soon after the onset of the epidemic, the virus was detected in all provinces of Iran (3-5).

Accumulating evidence suggests that COVID-19 patients' risk increases by age. Studies in Wuhan, China, reported that COVID-19 mortality increases by 3.5 folds in COVID-19 patients of 70-79 years-old rather than younger adults (5, 6). This value increases up to 7 folds for patients over 80 years (1, 3, 5). The same pattern has been reported in other countries as well (7-9). This might (partly) be explained by higher rate of comorbid chronic medical conditions in older adults. Evidence suggests that certain comorbidities increase COVID-19 patients' risk (2, 5, 6, 10, 11). A recent meta-analysis on 6 studies (including 1558 COVID-19 patients) revealed an increased risk for COVID-19 patients with hypertension, diabetes, COPD, cardiovascular disease, or cerebrovascular disease (12).

Considering that there is still no vaccine available, self-isolation and physical (social) distancing are proposed as the main control measures, especially in vulnerable populations (2, 9, 13). While these measures would potentially be efficient, they may have outsized impact on older adults. Restrictions on typical day-to-day activities, such as limited contact with loved ones and limited social activities, can be an important source of stress, anxiety, and feeling of uncertainty in this population. Under the quarantine situation, older adults would also face difficulty in affording their basic needs, and in receiving their medical and palliative care services. Considering these complications, shielding the elderly would be challenging in practice (14). Depending on the level of stress experienced by older adults, they may relax self-isolation rules. In the worst-case scenario, breaking the isolation may happen leading to the reestablishment of the transmission chain (15, 16).

Given the existing challenges for the elderly to meet shielding requirements, it is important to monitor how effective this population has acted in this regard so far. Therefore, this study aims to identify the coverage, efficacy, and continuity of shielding behavior and their predictors in a sample of Iranian older adults. The results would guide policymakers to design tailored interventions.

Methods

A telephone survey was conducted on 560 Iranian adults aged over 60 years. Participants were selected from a list of older adults who had landline or mobile phone and did not have restrictions for telephone interviews. This information was obtained from the national integrated health portal (ie, SIB portal) in the Ministry of Health and Medical Education of Iran (MoHME). Quota sampling was performed to recruit respondents from 16 cities. The cities were selected with respect to their population size (≤ 500 000 pop = 4 cities; 500,000 to 1 million pop= 7 cities; ≥ 1 million pop= 5 cities) and geographical location (North = 3 cities; East= 3; West= 4; South= 3; Central= 3 cities). In each locality, at least 30 respondents were randomly selected.

Telephone interviews were performed by local trained interviewers using a validated interview form. The interviewer first obtained verbal informed consent. The interview form consisted of 4 parts, including: (a) basic information, eg, age (year), gender (F/M), and living condition (alone, with relatives, other); (b) shielding coverage since the onset of the epidemic in Iran (Feb19) to May 6, 2020 (complete, partial, and no coverage); (c) shielding efficacy in the defined period, which means the percent reduction in the number of contacts (100%, 80%-100%, 50-80%, and <50%); and (e) shielding continuity in the defined period (yes/no). To develop the interview form, the first draft was developed by the research team based on the study objective and the target population, which were the elderly populations (adults over 60 years). The initial drafts were then checked by 3 experts in the field of geriatric health for its validity and completeness and modifications were made accordingly. The revised form was then initially applied by interviewers and revised based on their feedback. The final version of the interview form was used in this study.

Statistical analysis

Data were described as mean and standard deviation for quantitative variables and number and percent for categorical variables. Also, the 95% confidence interval for the proportions was computed using exact score using the Clopper-Pearson method (17). Associations of self-isolation coverage, efficacy, and integrity with age, gender, and living condition were assessed by Chi Square and Fisher's exact tests. Binary logistic regression was used to evaluate the crude and adjusted (pure) effect of age, gender, and living condition (independent variables) on the self-isolation coverage as well as the self-isolation integrity of the elderly (the dependent variables). In the adjusted models, the odds ratios were adjusted for all the above-mentioned independent variables (age, gender, and living condition), given that their association with the dependent variable was statistically significant (at 0.2 levels (18)) in the bivariate analysis. Statistical tests were considered as significant at 0.05 levels and as marginally significant at 0.05-0.1 levels. Data were analyzed in SPSS software (version 18).

Ethical statement

This study was approved by the ethics committee of

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Shahroud University of Medical Sciences (Ethical code: IR.SHMU.REC.1399.049). Participants were informed about study objectives, assured about the confidentiality of their information, and gave their verbal informed consent.

Results

Data from 558 respondents were finally analyzed in this study (response rate=99.6%). The mean age of the participants was 69.9 (SD=7.4) years. Of them, 56.2% were in the young elderly stage. Also, 54.4% were female and 85% were living with at least one family member. Shielding coverage was complete in 61.2% of the respondents. Also, in 90.1% of respondents, shielding behavior reduced the number of social contacts by 50%. Continuity of shielding behavior during the defined period (Feb 19 to May 6) was reported by 74% of the respondents (Table 1).

Our results showed a significant association between self-isolation coverage and respondents' gender ($p<0.0001$) in a way that females tended to have better self-isolation coverage than males. Females were 2 times more probable to adhere to "complete isolation" than males (OR $_{\text{complete vs. partial}}$: 2.2, 95% CI: 1.5, 3.1). This association was not changed after adjustment for the confounding effect of age and living conditions in the logistic regression model (Adjusted OR $_{\text{complete vs. partial}}$: 2.3, 95% CI: 1.5, 3.3). Chance of partial vs no isolation coverage was not significantly different between males and females

Table 1. Study participants' descriptive characteristics

Variables	Number	Frequency	95% CI
Sex			
Male	251	45.6	39.1, 51.8
Female	300	54.4	48.5, 60.0
Age Group			
60-69	311	56.2	50.2, 61.5
70-79	171	30.9	23.6, 37.8
≥ 80	71	12.8	5.9, 22.7
Living Condition			
With Family Members	465	85.0	81.3, 88.1
Alone	72	13.2	5.8, 22.4
Others	10	1.8	0.2, 0.5
Self-Isolation Coverage[1]			
Complete Isolation	338	61.2	55.5, 66.1
Partial Isolation	196	35.4	28.5, 42.3
No Isolation	19	3.4	0.1, 26.0
Self-Isolation Efficacy[2]			
100%	169	31.7	24.4, 38.9
80-100 %	221	41.5	34.6, 47.9
50% - 80%	90	16.9	9.6, 25.9
≤50%	57	9.9	2.9,19.2
Self-Isolation Integrity[3]			
Yes	393	74.0	69.1, 78.0
No	138	26.0	18.3, 33.4

[1] Self-Isolation coverage assesses the completeness of self-isolation of elderly between 19 Feb and 19 May 2020. [2] Self-isolation efficacy is measured by percent reduction in the number of contacts due to self-isolation. [3] Self-isolation integrity is assessed to check if the elderly have broken home isolation during the defined period.

Table 2. Association between the respondents' self-isolation coverage[1] and their sex, age, and living condition

					Dependent variable			
	Complete	Partial	No-Coverage		Complete/Partial Coverage		Partial/No-Coverage	
Independent Variables	n (%)	n (%)	n (%)	p	Crude OR (95% CI)	Adjusted OR (95% CI)[4]	Crude OR (95% CI)	Adjusted OR (95% CI)[4]
Sex								
Male	126 (49.8)	113 (44.7)	14 (5.5)	<0.000 1[2]	1	1	1	1
Female	212 (69.5)	88 (28.9)	5 (1.6)		2.2 (1.5, 3.1)	2.3 (1.5, 3.3)	2.2 (0.8, 6.3)	1.8 (0.6, 5.3)
Age Group								
60-69	182 (57.2)	128 (40.3)	8 (2.5)	0.027[2]	1	1	1	1
70-79	108 (63.2)	57 (33.3)	6 (3.5)		1.3 (0.9, 2.0)	1.3 (0.8, 1.9)	0.6 (0.2, 2.3)	0.6 (0.2, 2.0)
≥80	50 (70.4)	16 (22.5)	5 (7.0)		2.2 (1.2, 4.0)	2.3 (1.2, 4.3)	0.2 (0.1, 0.9)	0.2 (0.1, 0.7)
Living Condition								
Alone	52 (69.3)	22 (29.3)	1 (1.3)	0.232[3]	1	1	1	1
With family members	281 (60.0)	169 (36.1)	18 (3.9)		0.7 (0.4, 1.2)	1.0 (0.6, 1.8)	0.4 (0.1, 3.3)	0.4 (0.1, 3.6)

[1] Self-Isolation Coverage assesses the completeness of self-isolation of elderly between 19 Feb and 19 May 2020. [2] P values are generated using Chi Square test. [3] P values are generated using Fisher's Exact Test. [4] The odds ratio for each variable is adjusted for potential confounding effect of the other variables measured in this study, i.e., age, sex, and living condition.

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either in the crude logistic model (OR $_{\text{partial vs. no-coverage}}$: 2.2, 95% CI: 0.8, 6.3) or after adjustment for the confounding effect of age and living condition (Adjusted OR $_{\text{partial vs. no-coverage}}$: 1.8, 95% CI: 0.6, 5.3; Table 2).

We found a positive association between age group and complete vs partial self-isolation in a way that higher age groups showed more probability to completely self-isolate themselves. These associations, however, were only statistically significant for participants older than 80 years when compared to those younger than 70 years (OR $_{\text{complete vs. partial}}$: 2.2, 95% CI: 1.2, 4.0). These associations did not change after adjustment for the effect of sex and living condition (Table 2).

Self-isolation completeness was slightly lower in those who were living with their family members rather than those living alone. However, this association was not statistically significant either in the crude or adjusted models (Table 2).

Percent reduction in the number of contacts (known as "self-isolation efficacy") was slightly higher in females than in males. This association was marginally significant (p=0.067). In all age groups, most of respondents declared 80%-100% contact reduction, with no significant difference between the 3 age groups in this respect (p=0.383). There was also no significant difference between older adults' living condition and contact reduction rate (p=0.314; Table 3).

The chance of continuing self-isolation was 1.5 folds higher in females than in males (OR: 1.6, 95% CI: 1.1, 2.4). Adjustment for the effect of age and living condition, slightly increased this chance (OR: 1.8, 95% CI: 1.2, 2.7; Table 4).

Participants in older age groups were also more likely to keep the integrity of self-isolation rather than younger age groups. This association, however, was statistically significant, either in crude or adjusted models, for participants older than 80 years when compared to those younger than 70 years (OR $_{\text{crude}}$: 2.6, 95% CI: 1.9, 3.1; OR $_{\text{adjusted:}}$ 2.4, 95% CI: 1.1, 5.2; Table 4).

Our results showed after adjustment for the effect of age and sex, participants who lived with their family member(s) were 1.2 times more likely to keep the integrity of self-isolation rather than those living alone. This association, however, was not statistically significant (OR $_{\text{adjusted:}}$ 1.2, 95% CI: 0.6, 2.1; Table 4).

Discussion

COVID-19 has shown the ability to overwhelm vulnerable populations, including older adults. The COVID-19 epidemic has also caused rapid changes in health care delivery and restrictions on routine community activities, both of which disproportionately impact the life and well-being of older adults. The increase in the COVID-19 CFR with increase in age is well documented in the literature. Empirical data suggest a CFR of 15% to up to 21.9% for those aged 80 and older (3). Given the higher risk of COVID-19 complications and mortality in the elderly population, protecting the elderly are among principal preventive efforts that should be started soon and should continue over the course of the epidemic. Thus, monitoring the adherence to self-isolation measures and developing interventions accordingly are of high importance.

Table 3. Association between the respondents' self-isolation efficacy[1] and their sex, age, and living condition

	Self-Isolation Efficacy				
Variables	100% n (%)	80-100 % n (%)	50- 80% n (%)	<50% n (%)	p[2]
Sex					
Male	67 (28.4)	95 (40.3)	51 (21.6)	23 (9.7)	0.067
Female	102 (34.6)	135 (42.4)	39 (13.2)	29 (9.8)	
Age Group					
60-69	98 (32.5)	127 (42.1)	53 (17.5)	24 (7.9)	0.383
70-79	54 (32.7)	62 (37.6)	26 (15.8)	23 (13.9)	
+80	17 (25.8)	32 (48.5)	11 (16.7)	6 (9.1)	
Living condition					
With Family Members	146 (32.8)	177 (39.8)	78 (17.5)	44 (9.9)	0.314
Alone	20 (27.4)	37 (50.7)	8 (11.0)	8 (11.0)	

[1] Self-isolation efficacy is measured by percent reduction in the number of contacts due to self-isolation. [2] p-values are generated using Chi Square test.

Table 4. Association between the respondents' self-isolation integrity[1] and their sex, age, and living condition

	Self-Isolation Integrity[1]							
	Yes	No	Crude Model			Adjusted Model[2]		
Independent Variables	n (%)	n (%)	OR	95% CI	p	OR	95% CI	p
Sex								
Male	161 (67.9)	76 (32.1)	1	-	-	1	-	-
Female	232 (77.6)	67 (22.4)	1.6	1.1, 2.4	0.012	1.8	1.2, 2.7	0.007
Age Group								
60-69	219 (71.1)	89 (28.9)	1			1		
70-79	119 (72.5)	45 (27.4)	1.1	0.7, 1.6	0.738	0.9	0.6, 1.4	0.709
+80	57 (86.4)	9 (13.6)	2.6	1.9, 3.1	0.013	2.4	1.1, 5.2	0.023
Living condition								
Alone	57 (77.0)	17 (23.0)	1	-	-	1	-	-
With Family Members	334 (74.7)	113 (25.3)	0.9	0.5, 1.6	0.671	1.2	0.6, 2.1	0.643

[1] Self-isolation integrity is assessed to check if the elderly have broken home isolation between 19 Feb and 19 May 2020. [2] The odds ratio for each variable is adjusted for potential confounding effect of the other variables measured in this study, i.e., age, sex, and living condition.

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Our results showed more than half (61%) of the respondents fully isolated themselves. Also, most of participants (72%) had decreased their social contacts to up to 80%. Also, in the majority of respondents (74%), the shielding behavior continued over the defined period.

Elderly with female sex and higher age were more probable to isolate themselves. Being a housekeeper is a typical life style of the majority of elder women in Iran. It has been repeatedly reported that females have better adherence to health-related recommendations, which may partly justify the higher incidence of COVID-19 in men than in women (19, 20). Studies also show higher susceptibility of the male gender to COVID-19 infection (21). Therefore, developing gender-specific interventions is highly important to increase cocooning behavior, adherence, and continuity in elder males (22, 23).

Percent of the elderly whose contacts reduced up to 100% decreased in those aged over 80 years. Increase in the cocooning behavior is justifiable as the age increases because older ages are much more associated with comorbidities and general vulnerability to harms and diseases. Comorbidities and disabilities associated with aging can also induce movement restrictions, which fuels cocooning. On the other hand, frail elderlies require more care and support of other people for their basic and health needs, which can justify the lower frequency of contact reduction in the elderly aged over 80 years.

Frequency of 100% contact reduction in those elderly who live alone was slightly lower than that of those living with their family members. Lonely elders need to get support from other people for their basic needs. They may also be responsible to afford their daily needs themselves, which requires them to go out. Fragile elderlies are unable to access the nutrients they require to survive without relying heavily on support from others. Many elderly patients also do not have the finances to buy enough food to last for a long period of self-isolation. Charities and social campaigns in Iran have acted very well in addressing the needs of vulnerable populations. Charities and volunteers should ensure the elderly do not go hungry as they fear to leave their home and they should also ensure that the elderly can afford their basic needs.

Moreover, the prolonged cocooning in older adults, especially those with comorbidities, may result in health-related problems. Older adults are much more likely than other age groups to have inadequate vitamin D status. The role of vitamin D in supporting normal immune function links the importance of adequate vitamin D status as a protective factor in the Covid-19 pandemic. A nationally-representative population-based study reported that in cold seasons, vitamin D deficiency (25OHD <30 nmol/L) is evident in nearly 50% of frail elderly and in about 18% in late middle age. In warmer seasons, vitamin D deficiency was still common at 31% in the frail elderly but was lower at about 9% in late middle age (24-27). Home isolation may aggravate vitamin D status of older adults, which highlights the need for considering vitamin D replacement to supply daily vitamin D requirements. Providing the opportunity for daily exposure to sun light under physical distancing measures would be another alternative, especially for the elderly living in metropolises with mass urbanization.

Mental health issues may also rise as a result of self-isolation. The issue may also be more significant among older adults. Cocooning may intensify the feeling of isolation, which greatly impacts mental health of many elderlies and this could easily lead to depression. Social isolation in itself, both actual and perceived, has been associated with an increased risk of premature death (28). Therefore, it is necessary to develop creative solutions for maintaining effective communications and social ties of the elderly, while keeping them protected against the virus. Contact with family and friends through virtual means have been widely proposed as an available yet inexpensive option (5, 9, 14). However, the applicability of these services by the elderly is in question, given that many elderlies do not have smart phones or are not familiar with them. Thus, while technology is allowing us to reduce the risk of transmission of COVID-19, it may well be alienating people in our society who arguably require the most help. Systematic and creative plans should be considered to specifically target the elderly in this respect. Also, charities have a good potential to help reduce the increased burden of mental health on the elderly population. To support the population in possible mental health issues during the quarantine, Iran established hotlines that provided mental health services and therapy through phone. Supportive interventions for the elderly during the epidemic may not be similar to those offered for the younger populations, and tailored interventions based on the specific needs and conditions of the elderly may be needed to be put in place. Therefore, online or telephone consulting may not be an efficient method for all elderly subgroups, as many of them do not have or are not able to use these technologies, for whom, tailored interventions should be developed.

Conclusion

In summary, about two thirds of Iranian elder people adhered to cocooning during the epidemic. Our results can be useful in predicting the epidemic in the future and foreseeing the supply needs. Sample preparation from all parts of Iran and accurate phone questioning are among perceived strengths of this study. However, small sample size and nonrandom sampling in different cities are some of the limitations of this study. It is suggested that a similar study be conducted regionally. The results should foster policy development for epidemic control and maintenance of physical and mental health of the elderly. With the decline of the first wave of epidemics in most countries, protecting the elderly against COVID-19 is still important and necessary (29). With the relaxation of social distancing measures, it is necessary to strengthen the protection of the elderly (30). Public policy goals should prioritize pandemic preparedness in nursing homes, as well as civic and local government–based support programs for community-dwelling older adults to ensure that risk of infection is mitigated while promoting wellness during a period of stress and uncertainty.

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Conflict of Interests

The authors declare that they have no competing interests.

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