




Original Article

Effects of Self-Care Education on Self-Neglect Among Older Adults

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ABSTRACT

Article history

Received 10 Aug 2024

Accepted 11 Dec 2024

Citation: Davoodi F, Pashaeypoor Sh, Partovirad M, Sharifi F, Nikpeyma N. Effects of self-care education on self-neglect among older adults. *Elderly Health Journal*. 2024; 10(2): 83-89.

Introduction: Self-neglect, a form of abuse, significantly impacts the physical, mental, and social health of older adults, leading to a diminished quality of life and, in severe cases, death. For older adults experiencing self-neglect, attention to self-care is crucial for preventing or managing health issues. This study aimed to investigate the effect of self-care education on self-neglect among older adults.

Methods: This quasi-experimental study was conducted in 2021 with 100 eligible individuals selected from older adults receiving services at comprehensive health service centers in Qazvin, Iran. Participants were chosen using a non-randomized method and were divided into two groups: the self-care education group and the control group. The intervention comprised six outdoor sessions lasting 45-60 minutes each, held twice weekly at a health center. These sessions addressed five dimensions of self-care for older adults, which were validated by experts. Participants in the control group received only routine care. Post-tests were administered six weeks later.

Results: Before the intervention, the mean self-neglect scores were 1.345 ± 0.89 in the control group and 1.453 ± 0.43 in the self-care education group ($p = 0.034$). After the intervention, mean scores improved significantly to -0.760 ± 0.43 in the self-care education group and -7.056 ± 2.31 in the control group ($p = 0.001$).

Conclusion: Self-care education addressing various dimensions—physical, psychological-emotional, social, and spiritual—can serve as an effective, accessible, and cost-effective strategy for preventing and reducing self-neglect among older adults in care centers and hospitals. Future studies should consider larger populations and diverse cultural contexts to develop comprehensive clinical guidelines for preventing self-neglect.

Keywords: Self-Neglect, Elder Abuse, Self Care, Health Education, Aged

Introduction

The older adult population is increasing worldwide due to medical advances, with 1 in 6 people expected to be over 60 years old by 2030 (1, 2). The high prevalence of physical, mental, and social disorders, as well as depression, loneliness, cognitive decline, and dementia, contribute to the increased vulnerability and dependency of older adults for daily

activities and self-care (3, 4). The inability or reluctance of older adults to meet their basic needs or engage in behaviors that compromise their health can lead to self-neglect (5, 6).

Self-neglect is defined as a form of self-abuse, where individuals fail to provide themselves with adequate food, water, clothing, shelter, or neglect

personal hygiene, take medications incorrectly, and fail to take necessary safety precautions (7, 8). The prevalence of self-neglect among community-dwelling older adults ranges from 18.4% to 29.1% (9). Risk factors include sociodemographic characteristics (e.g., male gender, old age, low economic status, lower education, living alone), health factors (e.g., cognitive impairment, physical disability, multiple comorbidities), psychological factors (e.g., depression), and social factors (e.g., lower social networks) (9, 10). Common signs of self-neglect include poor hygiene (92%), medication non-adherence (89%), dehydration (75%), unsafe living conditions (72%), unpaid bills (64%), and insufficient food (63%) (11).

Self-neglect can lead to feelings of rejection and isolation among older adults, contributing to mental distress, impaired interpersonal relationships, and distrust (9, 12). It also increases the risk of physical and mental health problems, higher healthcare needs, non-compliance with treatments, frequent hospitalizations, and even death (13, 14). Mardan et al., found a significant inverse relationship between self-neglect and self-care abilities (15).

The World Health Organization defines self-care as activities that promote health, prevent and control diseases, and restore health. It involves knowledge and decision-making skills necessary for maintaining life and health, addressing physical, psychological, emotional, social, and spiritual dimensions (15, 16). Health-promoting self-care behaviors are linked to better health outcomes, fewer doctor visits, reduced medical costs, and improved quality of life (17).

Effective self-care education can improve the quality of life, independence, and participation of older adults in self-care, fostering spiritual growth, higher self-esteem, medication adherence, and better nutrition, while also reducing medical costs (9, 18-20).

Self-neglect is associated with several harmful consequences for the physical and psychological well-being of older adults, including a disregard for personal hygiene, refusal of helpful services, and engaging in unsafe behaviors (20). Elder abuse and neglect are prevalent issues in the Middle East and West Asia. The prevalence rates vary across different regions in Iran, with the highest reported in Tehran at 87.8% and the lowest in Shahrekord at 17.1% (5). The socio-economic challenges, caregiving burdens, and physical isolation are significant risk factors for elder mistreatment (21).

A study conducted in Iran revealed that emotional abuse was the most prevalent form of elder abuse reported, whereas physical abuse was the least frequently reported (17).

Volunteering and engaging in leisure activities have been linked to positive aging, enhanced mental health, and subjective well-being, acting as protective factors against self-neglect (22, 23). Increasing independence in daily activities and improving the quality of life can also reduce self-neglect (24). A study showed that promoting social support and daily

activities is essential for reducing self-neglect by improving aging outcomes and quality of life (25).

Self-care education programs help older adults improve their physical, mental, and emotional health, boosting mental fitness, reducing stress, and strengthening relationships (30). Promoting social support reduces isolation and enhances the sense of belonging, which can significantly reduce self-neglect (26). Despite numerous studies, few have proposed appropriate interventions for reducing self-neglect, indicating a need for more research in this area (9, 27). The understanding of elder self-neglect has increased, but further comprehensive research is still needed (27, 28).

At present, considering the limitations caused by disabilities in older adults and the consequences of self-neglect in this group of people, self-neglect is of greater importance in older adults. In addition, self-care is a decision-making process that helps one respond effectively to different situations. This study hence aimed to investigate the effects of self-care training on self-neglect among older adults.

Methods

Study design

This quasi-experimental study was conducted in Qazvin, Iran, in 2021.

Participants

The statistical population consisted of all older adult people living in the community who visited the Comprehensive Health Service Centers. The inclusion criteria were aged 60-70, not receiving care from others, physical ability to attend training sessions, no psychological disorders based on self-reports or medical records, no chronic debilitating diseases, no history of receiving similar training, and willingness to participate in the study. The exclusion criteria were more than two consecutive absences in the training sessions and the development of acute physical and mental health problems during the study.

Given the lack of previous interventional studies specifically addressing self-neglect, the sample size was calculated using the effect size of interventions on caregiving neglect. The sample size was determined with the PASS 11 software, utilizing non-parametric methods and multiple comparison treatment versus control group analysis. The computer determined the sample size using simulation, repeating the process 2,000 times with different numbers until reaching 90% power and the specified type I error rate. With a type I error rate of 0.01 and a type II error rate of 10% (study power of 90%), the calculated sample size was 80 participants. Considering a 20% attrition rate, the final sample size was determined to be 100 participants ($n = 50$ in each group).

Sampling

The participants were selected using non randomized sampling from among those who met the inclusion criteria, and then they were randomly

assigned to the self-care education group (n = 50) and the control group (n = 50).

Instrumentation

The required data were collected using an author-made demographics questionnaire and the Istanbul Medical School Elder Self-Neglect Questionnaire (IM Self-neglect).

The demographics questionnaire consisted of items about gender, age, educational attainment, marital status, number of children, occupation, income level, and history of chronic diseases and medication use.

The IM Self-neglect Questionnaire was developed by Ilhan et al., in Istanbul, Turkey. The IM Self-neglect consists of 11 Yes/No items in three dimensions: personal hygiene, health habits, and social functioning. The total score on this tool ranges between 0 and 11, and a score of 7 or more indicates a high level of self-neglect in older adults. The construct validity of the original version of this scale was assessed by exploratory factor analysis. It was based on a social worker's interview. The cut-off threshold for this scale was calculated by using a receiver operating characteristic curve and predicted the social worker's opinion: whether the participant experienced self-neglect or not. The results showed a significant agreement between the social worker's evaluation and the results obtained from IM Self-neglect ($p < 0.05$) (29). The reliability of the instrument, determined using the internal consistency method, was confirmed (Cronbach's alpha was 0.70). In addition, the correlation coefficient in the test-retest after two weeks was 0.94. It could be hence concluded that IM Self-neglect was acceptably reliable (30).

After obtaining permission from the developer of IM Self-neglect, the scale was translated into Farsi following a rigorous translation process. This included forward and backward translation by bilingual experts to ensure conceptual equivalence. Once the translation was completed, its face and content validity were evaluated by a panel of four experts specializing in geriatric nursing. These experts reviewed the scale for linguistic clarity, cultural relevance, and alignment with the study objectives, providing detailed feedback for refinement.

The reliability of the questionnaire was assessed using the test-retest method with a sample of 20 older adults. Participants completed the questionnaire twice, with a two-week interval between administrations. The test-retest reliability was calculated, yielding a correlation coefficient of 0.78, indicating strong temporal stability. Internal consistency, measured using Cronbach's alpha, was found to be 0.71, demonstrating acceptable reliability for the t scale. After obtaining informed written consent from the participants, a nursing expert conducted face-to-face interviews with the participants in both the self-care education group and the control each lasting half an hour as a pretest for blinding and preventing bias. Those in the self-care

education group then participated in the relevant intervention.

Intervention

The 6 sessions of the intervention (each session lasting 45-60 minutes) were held in the open air at the health center twice a week. Each training session included lectures and a question and answer. To make participation in the sessions easy for the participants, they were divided into groups of 12-14 and the sessions were held on different weekdays. The educational content of the intervention was developed based on up-to-date Farsi and English resources and covered the main five dimensions of self-care in older adults: the physical, mental, emotional, social, and spiritual dimensions. The validity of the educational content was qualitatively evaluated by three experts in geriatric nursing before the intervention. The participants in the control group attended no training sessions and only received routine care and services offered at the health centers. The post-test was conducted 6 weeks after the last intervention session. To observe the principles of ethics in the research, participants of both groups were provided with an educational pamphlet on self-care in older adults. (Figure 1)

Statistical analysis

Finally, the obtained data were statistically analyzed using descriptive statistics (percentage and frequency) and inferential statistics (independent t-test, Mann-Whitney U test, and Chi-square) in IBM SPSS Statistics for Windows, Version 16.0. Armonk, NY: IBM Corp. The significance level was set to $p < 0.05$.

Ethical considerations

The participants were first informed of the research objectives, the confidentiality of their information, and the voluntary nature of their participation in the research. Each participant then signed a written informed consent form. In addition, this research project was approved and registered by the Research Ethics Committee of Tehran University of Medical Sciences (IR.TUMS.FNM.REC.1398.208).

Results

There was no significant difference between the participants in the control and self-care education groups in terms of demographics. Most participants in both groups were female (60%) and married (about 90%). In addition, most of them (about 70%) had an educational degree lower than a high school diploma. (Table 1)

The results showed no significant difference between the two groups in the pretest mean score for self-neglect ($p > 0.05$). However, the post-test means a score of self-neglect significantly decreased in the self-care education group ($p < 0.05$). (Table 2)

The results of the difference between the mean score of self-neglect in the older adult showed that in the self-care education group, the self-neglect score increased over time, which means a decrease in self-neglect in the older adult ($p < 0.05$).

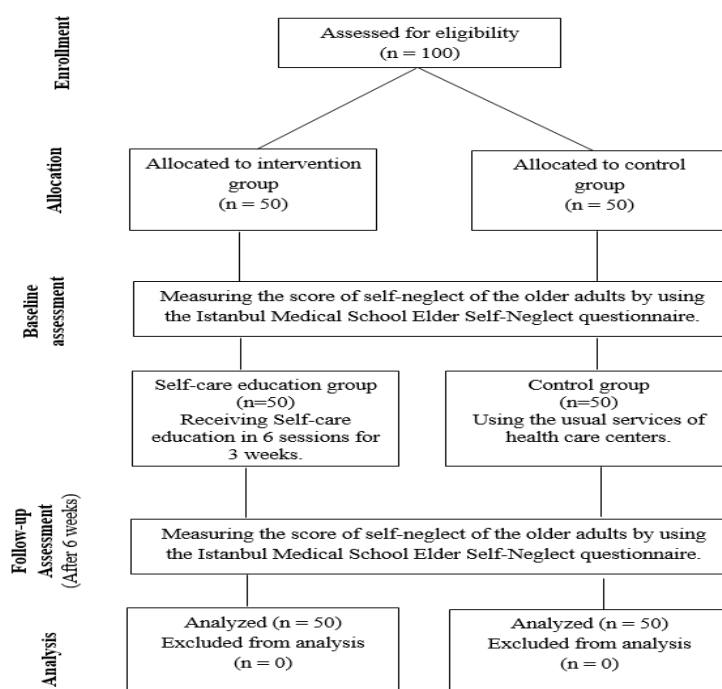


Figure1. The enrollment, randomization and follow-up the study

Table 1. Comparison of demographic variables in the self-care education group (n = 50) and the control group (n = 50)

Variables	Level	Self-care education group n (%)	Control group n (%)	p
Gender	Male	19 (38)	20 (40)	0.83
	Female	31 (62)	30 (60)	
Married Status	Single	0	0	0.46
	Married	47 (94)	45 (90)	
Education	Lone	3 (6)	5 (10)	0.56
	Illiterate	19 (38)	14 (28)	
	Under diploma	30 (60)	35 (70)	
Number of children	Diploma and upper diploma	1 (2)	1 (2)	0.91
	2	14 (28)	13 (26)	
	3	24 (48)	22 (44)	
	4	10 (20)	12 (24)	
Job	5	2 (12)	3 (6)	0.99
	Employee	18 (36)	19 (38)	
	Unemployed	17 (34)	16 (32)	
	Retired	12 (24)	12 (24)	
Income adequacy	Self-employed	3 (6)	3 (6)	0.94
	Good	5 (10)	4 (8)	
	Medium	36 (72)	37 (74)	
Medical History	Poor	9 (18)	9 (18)	0.11
	Diabetes	8 (38)	7 (24)	
	Hypertension	7 (33)	8 (28)	
	Asthma	4 (9)	3 (10)	
	Respiratory disease	2 (10)	5 (17)	
Drug History	Other	0	6 (21)	0.54
	Yes	19 (38)	22 (44)	
	No	31 (62)	28 (56)	
Age		$\bar{x} \pm SD$ 64.02 ± 2.85	$\bar{x} \pm SD$ 64.64 ± 2.58	P** 0.36

*Chi-square, ** Independent t-test

Table 2. Comparison of the mean scores of self-neglect among older adults in two groups (n = 50)

Variable	Before intervention		p ***	After intervention		p ***
	Mean ± SD			Mean ± SD		
	Control	Intervention		Control	Intervention	
Self-neglect	2.20 ± 1.39	2.59 ± 1.6	0.069	2.38 ± 1.46	9.83 ± 1.38	0.001

*** Mann-Whitney U Test

Discussion

There are two primary hypotheses explaining self-neglect: active and passive choice. The passive choice hypothesis suggests that circumstances beyond an individual's control, such as illness or disability, can lead to self-neglect. In contrast, the active choice hypothesis attributes self-neglect to deliberate decisions stemming from a lack of awareness or inadequate knowledge about self-care (9). Given that both factors contribute to self-neglect among older adults, interventions focusing on self-care education can empower this population and help them address their needs effectively (31).

The findings of this study underscore the significant role of self-care education in reducing self-neglect scores among older adults. The limited research in this area highlights the pressing need for further intervention-based studies. A systematic review has shown that self-neglect, as a multifaceted phenomenon, encompasses physical, psychological, social, and moral dimensions. These dimensions are directly influenced by the overall health of older adults, including their physical, psychological, and social well-being (9). This evidence supports the importance of providing self-care education that integrates these dimensions, which can substantially mitigate self-neglect.

Self-neglect, especially in older adults with serious health problems, can have extensive adverse outcomes, both for the individuals and the healthcare system. Early implementation of interventions, such as self-care training, can prevent disease exacerbation and reduce healthcare costs (2). This study affirmed the effectiveness and cost-efficiency of self-care education in addressing self-neglect, emphasizing its role as a preventive measure. Prior research has also shown that mental health issues, loneliness, and social isolation significantly increase the risk of self-neglect in older adults, suggesting that interventions targeting psycho-emotional and social dimensions are vital (4, 32).

A study revealed that programs aimed at enhancing self-care abilities, mental health, and reducing loneliness could effectively lower the risk of self-neglect while promoting overall well-being (33). This aligns with findings from this study, which demonstrated the positive impacts of self-care education on minimizing self-neglect. A systematic review of self-abuse and self-neglect prevalence among Iranian older adults found high rates of self-neglect (41%) and other forms of self-abuse, indicating a critical need for targeted interventions (33). Empowering older adults through self-care education can significantly reduce their dependency and vulnerability to self-neglect.

Furthermore, addressing the broader psychosocial context is crucial. Initiatives that foster respect for older

adults within families and communities, increase their independence, and provide self-care training for caregivers can substantially decrease self-neglect (34). Neglecting the care needs of older adults in various dimensions—including spiritual, social, and psycho-emotional—adversely affects their quality of life, a critical determinant of self-neglect. Studies have shown that higher levels of self-neglect are associated with lower quality of life scores, particularly in physical health, mental health, and social relationships (5). Enhancing quality of life through comprehensive self-care education is, therefore, an effective strategy to combat self-neglect.

Conclusion

Self-neglect among older adults represents a critical issue with far-reaching implications for their physical health, psychological well-being, and social interactions. This study highlights the significant impact of self-care education in reducing self-neglect, underscoring its potential to empower older adults by improving their self-efficacy, independence, and overall quality of life. Addressing the multi-dimensional nature of self-neglect—spanning physical, emotional, social, and spiritual aspects—through tailored interventions can mitigate its adverse outcomes, including increased vulnerability to chronic diseases, social isolation, and diminished quality of life. Given the high prevalence of self-neglect and its profound consequences, integrating structured self-care education programs into public health strategies is essential. Such initiatives can serve as cost-effective, preventive measures to address self-neglect and its underlying causes. Furthermore, the findings call for greater attention to cultural and contextual factors when designing and implementing these programs, as well as the inclusion of family and community support systems to enhance their efficacy. To build on these insights, future research should involve diverse populations, including institutionalized older adults, and employ robust experimental designs, such as randomized controlled trials, to further validate and optimize intervention strategies. Expanding the scope of these studies across different cultural and social settings will provide a deeper understanding of self-neglect and inform globally relevant solutions to promote the health, dignity, and well-being of older adults.

Study limitations

While the findings of this study are promising, its limitations must be acknowledged. The sample was restricted to community-dwelling older adults, limiting the

generalizability to those in other settings, such as care homes or hospitals. Moreover, due to COVID-19 restrictions, training sessions were held outdoors, limiting the use of certain educational tools. Future studies should focus on larger, more diverse populations across cultural contexts to gain deeper insights into self-neglect and explore effective interventions through randomized controlled trials.

Conflict of interest

The authors declare that they have no competing interests.

Acknowledgments

This article is taken from the Master of Nursing Thesis. We thank all those who participated in this study, especially the older adults.

Funding

No specific funding has been received from any individual or institution for this research.

Authors' contributions

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Final approval: All authors.

References

- Arab-Zozani M, Mostafazadeh N, Arab Zozani Z, Ghoddoosi-Nejad D, Hassanipour S, Soares JJ. The prevalence of elder abuse and neglect in Iran: a systematic review and meta-analysis. *Journal of Elder Abuse & Neglect*. 2018; 30(5):408–23.
- Hanefeld J, Fischer HT. Global health: Definition, principles, and drivers. *Handbook of Global Health*. 2021: 3–27.
- Boyer S, Trimouillas J, Cardinaud N, Gayot C, Laubarie-Mouret C, Dumoitier N, et al. Frailty and functional dependence in older population: lessons from the freedom limousin–nouvelle Aquitaine cohort study. *BMC Geriatrics*. 2022; 22(1): 1–10.
- Yu M, Qian M, Guo C, Wang Q. The role of frailty, social networks, and depression in self-neglect in an older Chinese population: a cross-sectional descriptive study. *Geriatric Nursing*. 2023; 51: 394–9.
- Molaei M, Etemad K, Taheri Tanjani P. Prevalence of elder abuse in Iran: A systematic review and meta analysis. *Iranian Journal of Ageing*. 2017; 12(2) :242-53. [Persian]
- Salvador JT, Alqahtani FM. The phenomenon of aging: The adaptation of Filipino elderly. *Activities, Adaptation & Aging*. 2020; 44(4): 309–26.
- Addo KM, Khan H. Factors affecting healthy aging and its interconnected pathways. *Turkish Journal of Healthy Aging Medicine*. 2024; 1: 9–24.
- Wang B, Hua Y, Dong X. Development and validation of a predictive index of elder self-neglect risk among a Chinese population. *Aging & Mental Health*. 2021; 25(8): 1572–9.
- Yu M, Gu L, Shi Y, Wang W. A systematic review of self-neglect and its risk factors among community-dwelling older adults. *Aging & Mental Health*. 2021; 25(12): 2179–90.
- Dong X. Elder self-neglect: research and practice. *Clinical Interventions in Aging*. 2017; 12: 949–54.
- Dong X, Simon MA, Evans D. Prospective study of the elder self-neglect and ED use in a community population. *The American Journal of Emergency Medicine*. 2011; 30(4): 553–61.
- Ghalenow HR, Nikpeyma N, Kazemnejad A, Ansari M, Pashaepoor S. Effect of educational program based on health literacy index on self-care ability among older adults: A randomized clinical trial. *International Journal of Preventive Medicine*. 2022; 13(24): 1-7.
- İlhan B, Bahat G, Saka F, Kılıç C, Oren MM, Karan MA. A new screening tool for self-neglect in community-dwelling older adults: IMSelf-neglect questionnaire. *The Aging Male*. 2020; 23(5): 388-95.
- Joosten M, Vrantsidis F, Dow B. Understanding elder abuse: A scoping study [Internet]. Melbourne: University of Melbourne and the National Ageing Research Institute; 2017 [cited 2024 Aug 12]. Available from: https://socialequity.unimelb.edu.au/_data/assets/pdf_file/0011/2777924/Elder-Abuse-A-Scoping-Study.pdf
- Johnson YO. Nurse perceptions of elder self-neglect. The University of North Carolina at Greensboro; 2014.
- Martínez N, Connelly CD, Pérez A, Calero P. Self-care: A concept analysis. *International Journal of Nursing Sciences*. 2021; 8(4): 418–25.
- Morowatisharifabad MA, Rezaeipandari H, Deghani A, Zeinali A. Domestic elder abuse in Yazd, Iran: a cross-sectional study. *Health Promotion Perspectives*. 2016; 6(2): 104-110.
- Nikpeyma N, Negarandeh R, Partovirad M. Comparison of the effects of mobile learning and traditional self-care education on loneliness and social isolation in community-dwelling older adults: Study protocol of a three-arm randomized controlled trial. *Elderly Health Journal*. 2024; 10(1): 43–51.
- Nassiri H, Heravi Karimooi M, Jouybari L, Sanagoo A, Chehrehgosha M. The prevalence of elder abuse in Gorgan and Aq-Qala cities, Iran in 2013. *Iranian Journal of Ageing*. 2016; 10(4): 162–73. [Persian]
- Salimi F, Garmaroudi G, Hosseini SM, Batebi A. Effect of self-care educational program on improving quality of life among elderly referred to health centers in Zanjan. *Journal of Education and Community Health*. 2015; 2(2): 28–37. [Persian]
- Mohseni M, Rashedi V, Iranpour A, Naghibzadeh Tahami A, Borhaninejad V. Prevalence of elder abuse and associated factors among community-dwelling older adults in Iran. *Journal of Elder Abuse & Neglect*. 2019; 31(4–5): 363–72.
- Ling WHH, Lee WPV, Chui WH, Sin KMC. Older adults and volunteering: Mental wellness, motivation, and satisfaction. *Activities, Adaptation & Aging*. 2023; 47(4):

482–500.

23. Bian J, Xiang Z. Do the various leisure forms have equal effects on mental health? A longitudinal analysis of self-selected leisure activities. *Frontiers in Public Health*. 2023; 11:1-11.

24. Lim WM, Bowman C. Aging in a place of choice. *Activities, Adaptation & Aging*. 2022; 46(3): 183–9.

25. Kim KT, Hawkins BA, Lee YH, Kim H. Social support and daily life activity: determinants of aging well. *Activities, Adaptation & Aging*. 2023; 47(2):171–94.

26. Ricci L, Buzzi M, Kivits J, Rat AC. Patient satisfaction and perspectives on self-management education programs: A qualitative study. *Patient Preference and Adherence*. 2023; 17: 2175–86.

27. Pickens S, Daniel M, Jones EC, Jefferson F. Development of a conceptual framework for severe self-neglect (SN) by modifying the CREST model for self-neglect. *Frontiers in Medicine*. 2021; 8: 1-15.

28. Vaezi A, Lotfi MH, Shaker M. The effect of implementation of elderly respect training program in families on elder abuse in Yazd. *Journal of Community Health Research*. 2018; 7(2): 74–84.

29. İlhan B, Bahat G, Saka F, Kılıç C, Oren MM, Karan MA. A new screening tool for self-neglect in community-

dwelling older adults: IMSelf-neglect questionnaire. *The Aging Male*. 2021; 23(5): 388–95.

30. Vizeshfir F, Ghelbash Z. Effect of a self-care training program using smartphones on general health, nutrition status, and sleep quality in the elderly. *Psychogeriatrics: Official Journal of the Japanese Psychogeriatric Society*. 2021; 21(6): 910–9.

31. Chen YW, Wei J, Chen HL, Cheng CH, Hou IC. Developing a heart transplantation self-management support mobile health app in Taiwan: qualitative study. *JMIR MHealth and UHealth*. 2020; 8(8): 1-13.

32. World Health Organization. Self-care can be an effective part of national health systems [Internet]. 2019. Available from: <https://www.who.int/news/item/02-04-2019-self-care-can-be-an-effective-part-of-national-health-systems>

33. Yu M, Gu L, Jiao W, Xia H, Wang W. Predictors of self-neglect among community-dwelling older adults living alone in China. *Geriatric Nursing*. 2019; 40(5): 457–62.

34. Zhao Y, Hu C, Feng F, Gong F, Lu S, Qian Z, et al. Associations of self-neglect with quality of life in older people in rural China: a cross-sectional study. *International Psychogeriatrics*. 2017; 29(6): 1015–26.