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# Evaluation of Elderly's Integrated Healthcare components in primary healthcare centers of Tehran, Iran

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## Abstract:

**BACKGROUND:** Over the past few decades, significant demographic and epidemiological changes have been occurred and led to serious changes in the health-care needs of the elderly. Integrated care has been emerged as a strategy to provide better care for the elderly in the community. The aim of this study was conducted to evaluate components of integrated health-care program of the elderly.

**MATERIALS AND METHODS:** This quantitative cross-sectional study was conducted in Tehran (Iran) in 2019. For the purpose of the study, a two-stage cluster sampling method was employed. In the first stage, primary health-care centers were selected, then in the second stage, a systematic random sampling was conducted based on the number of the elderly covered by each center. Level of frailty, medication use awareness, and self-care ability were evaluated by the elderly self-report questionnaire. The questionnaire was piloted with thirty respondents. The test-retest reliability score for the questionnaire was  $r = 0.795$ ,  $P < 0.001$ . Data analysis of the questionnaire was conducted using generalized estimating equation model by SPSS software Version 22. Statistical significance for all analyses was set at  $P < 0.05$ .

**RESULTS:** Findings of the components showed that the mean  $\pm$  standard deviation of frailty ( $80 \pm 17$ ) and self-care ability ( $87 \pm 17$ ) were higher than the mean of medication use awareness ( $49 \pm 19$ ). Frailty and self-care ability ( $\beta =$  frailty, self-care) of the elderly had a positive statistical significance with the ones with good financial status ( $\beta = 5, 10$ ) and without chronic disease ( $\beta = 4, 5$ ). Medication use awareness had a negative statistical significance with illiteracy ( $\beta = -9.5$ ).

**CONCLUSIONS:** It is suggested that the medication use awareness of the elderly should be prioritized by improving integrated health-care program.

## Keywords:

Elderly, integrated health care, medication review, risk screening, self-care ability

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## Introduction

In the 20<sup>th</sup> century, dramatic changes occurred in population patterns due to a worldwide decline in fertility rates, improvements in public health, advances in medical technology, and the improvements in living standards, which have reduced mortality and prolonged life expectancy and increased the rate of the elderly.<sup>[1]</sup> Although the phenomenon of aging represents the success of the health system in the world,

it also poses important challenges such as the potential increase in chronic illnesses and disabilities, the greater complexity of multiple medications, and changes in the patterns of long-term care instead of short-term care.<sup>[2]</sup>

Some of the consequences of aging are increase in the use of health services and health expenditures which can affect the management and utilization patterns of health-care systems' resources.<sup>[3,4]</sup> Therefore, there is a critical need to reorganize care

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and services to face the challenges and try to meet the needs of the elderly with chronic conditions.<sup>[5]</sup> Integrated health-care models promise to provide a solution to control these health-care challenges.<sup>[6]</sup> The objective of more integrated health-care models is to provide a continuum of care for frail elderly people, within a system of care with a broad range of services matched to their needs.<sup>[7]</sup>

In the process of integrated health-care delivery for the elderly, the identification of frailty is important because the complexity of care should be assessed.<sup>[8]</sup> As a result, the frail elderly are an important group within the elderly population because of their diminished intrinsic capacities.<sup>[9]</sup> Screening tools such as frailty scales (having an understanding of a patient's cognitive condition and physical function) enable the health providers to consider the best way to provide care and improve the function and life quality of the frail elderly while avoiding unnecessary admission to hospital or long-term care centers.<sup>[10]</sup>

Therefore, integrated health-care models such as Walcheren Integrated Care Model (WICM), (French acronym) Services Intégrés Pour Personnes Âgées (SIPA), Program of All-inclusive Care for the Elderly (PACE), (French acronym) Coordination De Personnes Agées (COPA), and Embrace Model were implemented for the elderly. These models indicate the significance of the detection of frail elderly by initial and periodic screening.<sup>[11]</sup> WICM, as a comprehensive, integrated model, detects and assesses the health-care needs of the elderly and evaluates the care for the living independent frail elderly.<sup>[12]</sup> The SIPA program delivers integrated care through the provision of community health and social services and the coordination of hospital and nursing home care for the frail elderly.<sup>[13]</sup> PACE offers health care to individuals with disabilities and the frail elderly on low income and eligible for in-home nursing care.<sup>[11]</sup> COPA targets very frail community-dwelling elderly which was designed to provide a better fit between the services provided and the needs of the elderly to reduce excess health-care use.<sup>[14]</sup>

Embrace Model targets 75-year-old and over elderly. It recognizes their care and frailty levels by risk screening, then categorizes them as robust, frail, and complex care needs to deliver fitting integrated health care.<sup>[15]</sup>

In addition to risk screening, self-care management and medication use review of the elderly have been reported as common components which affect the effectiveness of integrated health-care models to improve the integrated health-care delivery to the elderly.<sup>[16]</sup> On the importance of self-care management, it is worth mentioning that

many health-care organizations and providers have considered self-care management as a mechanism to reduce high costs of medical services and thus to improve the elderly health.<sup>[17]</sup>

Considering the significance of medication use review, it was reported by the World Health Organization (WHO) that over 50% of all medicines are prescribed, dispensed, or sold inappropriately, and more than half of patients fail to take them properly. Drug-related problems (DRPs) are responsible for an increased risk of hospital admissions and emergency department visits. Regarding health concerns associated with DRPs in home-dwelling elderly patient, the identification and prevention of DRPs and DRP risk factors is essential to find effective strategies to improve DRPs-related outcomes.<sup>[18]</sup> Consequently, these three components have been highlighted in integrated health-care systems.

Currently, most developed countries such as Canada, Sweden, the US, and Japan use integrated health-care systems.<sup>[7,19]</sup> Furthermore, the WHO report on aging and health also declared the type of health-care necessary and appropriate for older people as Integrated Health Care for Older People.<sup>[20]</sup> Accordingly, the Ministry Health of Iran has implemented a program called "Integrated and Comprehensive Elderly Care" in 2017, as a planned and coordinated package of care tailored to the needs of the elderly. This program utilizes both physician and non-physician practitioners and currently runs in all primary health-care (PHC) centers.<sup>[21]</sup> A study has assessed the effectiveness of this program in terms of physical and mental health of elderly. According to the findings of this study demonstrated that this program was effective for controlling blood pressure, however, it was not effective for preventing depression.<sup>[22]</sup>

This study evaluated the elderly frailty by risk screening, self-care ability, and medication use awareness. Identifying status of the integrated health-care components can help improve integrated health care for the elderly people.

## Materials and Methods

This quantitative cross-sectional study was performed among elderly people across PHC centers located in three districts of Tehran (North, Northwest, and South) in 2019, Iran. Inclusion criteria for the setting and the elderly were as follows: PHC centers which are affiliated to Tehran University of Medical Science and Iran University of Medical Science. The sample elderly age was 60 years old or above who had active health records in PHC centers; they were also able to communicate and answer the questionnaire items by phone. The exclusion criteria were the 60 years old or above elderly with active

health records but unable to communicate or answer the questionnaire items by phone.

The sampling was based on a two-stage cluster sampling. The first stage was selecting clusters (PHC centers), and the second stage was the selection of the elderly of the clusters using systematic random sampling. For this purpose, 17 centers out of 110 were selected by proportionate sampling. In the second stage, 707 samples were selected by systematic random sampling from each center based on the following formula.

Finally, 568 samples were willing to participate in the study. Since the contact information of participants were available in the PHC centers, the data were collected by phone call and also obtaining their consent.

The self-report questionnaire was grouped into two parts, the first part with three components (risk screening, medication use awareness, and self-care ability), and the second part included general characteristics (age, sex, marital status, degree of education, profession, financial status, physical activity, chronic disease, and family support). Risk screening, self-care ability, and medication use awareness review (identification of dosage sensitivity, side effect, and a number of used medicine) were evaluated by prisma-7, SASE-CHI, and by 7 items in the questionnaire, respectively. The final questionnaire was piloted with thirty respondents. Data of the thirty piloted elderly were not included in the dataset. The test-retest reliability score for questionnaire was  $r = 0.795$ ,  $P < 0.001$ .

Descriptive statistics (mean and standard deviation [SD]) were used to report risk screening (frailty), self-care ability, and medication use awareness review in elder people. To facilitate comparison, the scores were converted to a scale of 0–100. The higher mean score,  $\geq 50$ , indicates a better status of the studied components.

The core statistical analysis was based on generalized estimating equations that estimate the parameters of a generalized liner model with a possible unknown correlation between outcomes.<sup>[23]</sup> This model could consider the cluster sampling in the evaluation of the SE and  $P$  value.  $P < 0.05$  was considered to be statistically significant. All statistical analyses were performed by SPSS software (IBM Corp. Released 2013, IBM SPSS Statistics for Windows, Version 22.0, Armonk, NY: IBM Corp.).

## Results

The majority of participants were in the age group of 60–65 years; further general (demographic and socio-economic) characteristics are presented in Table 1.

The findings of risk screening showed a mean  $\pm$  SD of frailty was  $80 \pm 17$ . Elderly characteristics such as 76–80 years ( $\beta = -1$ ), joblessness ( $\beta = -8$ ), illiteracy ( $\beta = -3$ ), and sedentary physical activity ( $\beta = -8$ ) were negatively correlated with less frailty ( $P < 0.05$ ). General characteristics such as 60–65 years ( $\beta = 24$ ), good financial status ( $\beta = 5$ ), having family support ( $\beta = 7.08$ ), and not suffering from chronic disease ( $\beta = 4$ ) were positively correlated with less frailty ( $P < 0.05$ ).

Medication use awareness review mean  $\pm$  SD was  $49 \pm 19$ . Medication use awareness was negatively correlated with elderly characteristics such as 76–80 years ( $\beta = -1$ ), joblessness ( $\beta = -8$ ), illiteracy ( $\beta = -3$ ), and sedentary physical activity ( $\beta = -8$ ) ( $P < 0.05$ ) and positively correlated with 60–65 years ( $\beta = 13.7$ ), good financial status ( $\beta = 4$ ), and having family support ( $\beta = 2.1$ ) ( $P < 0.05$ ).

**Table 1: General characteristics of the participants**

Characteristics	Category	n (%)
Age group	60-65	386 (67)
	66-70	111 (19)
	71-75	34 (5)
	76-80	26 (4)
	80+	11 (1)
	Total	568 (100)
Sex	Female	326 (57)
	Male	242 (42)
	Total	568 (100)
Marital status	Single	11 (1)
	Married	453 (79)
	Other	104 (18)
	Total	568 (100)
Degree of education	Illiteracy	150 (26)
	Scholarly	347 (61.1)
	University	71 (12)
Total	568 (100)	
Chronic disease	No	102 (17)
	Yes	466 (82)
Profession	Retired	171 (30)
	Jobless	21 (3)
	Housewife	294 (51)
	Tradesman	82 (14)
	Total	568 (100)
Family support	Yes	495 (87)
	No	73 (12)
	Total	568 (100)
Physical activity	Yes	163 (28)
	No	282 (49)
	Somehow	123 (21)
	Total	568 (100)
Financial status	Good	156 (27)
	Average	293 (51)
	Poor	119 (20)
	Total	568 (100)

Self-care ability mean  $\pm$  SD was  $87 \pm 17$ . Self-care ability were negatively correlated with illiteracy ( $\beta = -1$ ), joblessness ( $\beta = -17$ ), and sedentary physical activity ( $\beta = -8$ ) and positively correlated with good financial status ( $\beta = +10$ ), having family support ( $\beta = +2$ ), and not suffering from chronic disease ( $\beta = +5$ ) ( $P < 0.05$ ).

More details are presented in Table 2.

### Discussion

The findings of risk screening showed less frailty among elderly people. It is notable that 67% of participants were in the age range of 60–65 years old that affected the mean of frailty. A previous study which used prisma-7 showed high frailty in the elderly of 65 years old and over<sup>[24]</sup> and higher age demonstrated higher frailty in elderly people.<sup>[25]</sup>

Our study also revealed that the elderly characteristics such as 76–80-year-old age group, female, married, illiterate, financially poor, jobless, physically less active, without family support, and with chronic disease have positive statistical correlation with higher frailty. Some

studies indicated an association of frailty with old age, chronic disease,<sup>[26,27]</sup> poor financial status, less physical activity, less supportive environment, and low social contact of women<sup>[27]</sup>. Findings of another study which assessed the relationship between the frailty and physical activity confirmed that there is a significant statistical relationship between more physical activity and less frailty.<sup>[28]</sup>

In this study, mean of self-care ability signified the high self-care ability of elderly people. It also demonstrated that high self-care has a significant statistical correlation with elderly characteristics such as 60–65-year-old age group, retirement, high physical activity, good financial status, family support, and not suffering from chronic disease. Our findings concur with previous research that showed a statistical significance of high self-care ability with being 65–69 years old, having high education, and having high economic status.<sup>[29]</sup> Results of another study (the mean  $\pm$  SD age of samples were  $68.65 \pm 7.17$  year) showed weak self-care ability (mean  $\pm$  SD =  $56.69 \pm 15.07$ ) of the elderly, and its significant relationship with factors such as

**Table 2: Generalized estimating equations analysis of the correlation between elderly general characteristics and studied components of integrated healthcare program**

Integrated health care component		Risk screening			Medication use awareness review			Self-care ability		
Variable	Category	B	SE	P	B	SE	P	B	SE	P
Age group	60-65	24.0	4.0	0<0.001	13.7	6.3	0<0.001	6	4	0.055
	66-70	24.0	3.0		12.3	7.0		5	4	
	71-75	17.0	3.0		3.2	4.6		-1	5	
	76-80	-1.0	5.0		6.2	8.2		-1	7	
	80+	Reference			Reference			Reference		
Gender	Male	9.0	2.0	0<0.001	-1.5	2.5	0.539	0	2.0	0<0.001
	Female	Reference			Reference			Reference		
Marital status	Single	0.000	4.0	0<0.001	4.4	5.3	0.689	2.0	5.0	0<0.001
	Married	1.0	1.0		0.0	1.2		1.0	1.0	
	Other	Reference			Reference			Reference		
Degree of education	Illiteracy	-3	1	0<0.001	-9.5	3.3	0.011	-1.0	2.0	0<0.001
	Scholarly	0.000	1.0		-4.9	2.4		1.0	1.0	
	Academic	Reference			Reference			Reference		
Profession	Retired	0.000	1.0	0.012	2.9	2.5	0.065	0.0	1.0	0<0.001
	Jobless	-8	4.0		-7.1	3.6		-17.0	7.0	
	Housewife	3	2.0		-1.0	3.4		-3.0	2.0	
	Tradesman	Reference			Reference			Reference		
Physical activity	High	2.0	1.02	0<0.001	0.4	1.7	0.122	1.0	1.0	0<0.001
	Sedentary	-7.0	1.0		-2.7	1.3		-8.0	1.0	
	Moderate	Reference			Reference			Reference		
Financial status	Good	5.0	1.0	0<0.001	4.0	2.4	0.240	10.0	1.0	0<0.001
	Average	3.0	1.0		1.6	2.0		7.0	1.0	
	Poor	Reference			Reference			Reference		
Family support	Yes	7.08	1.0	0<0.001	2.1	2.4	0.381	2.0	1.0	0<0.001
	No	Reference			Reference			Reference		
Chronic disease	No	4.0	1.0	0<0.001	24	1.9	0<0.001	5.0	1.0	0<0.001
	Yes	Reference			Reference			Reference		

\*\*The final category of each group in the independent variables was considered as the reference group. SE=Standard error

education and marital status had significant relation with self-care ability of elder people.<sup>[17]</sup>

Male elder people self-care ability was higher than that of females, but this difference was not significant that is consistent with findings of our study. The level of effect of gender difference on self-care ability can be affected by other variables such as the level of knowledge and physical, psychological, and behavioral status of people.<sup>[30]</sup>

Medication use awareness review of elderly people in this study showed less mean in comparison with other two components (risk screening and self-care ability). It also indicated that elderly people who are over 80 years old, illiterate, and with chronic disease suffer from taking more medicine while they are not aware of the sensitivity and side effects of their medicine. According to two other studies conducted in this subject, the elderly who used more medicine and were over 80 years old were associated with increased difficulty in the management of medicines.<sup>[18,31]</sup>

## Conclusion

Our study concluded that it would be better to prioritize medication use awareness within integrated health-care program. In addition, finding effective strategies such as elderly education to increase their medication use awareness in PHC centers is highly recommended. Notably, the findings demonstrated less frailty and high self-care ability among the elderly. Therefore, it is suggested to conduct similar studies to evaluate the components among 75-year-and-over elderly to accurately identify target elderly people. Generally, the findings of this study can be considered by policymakers, health-care providers, and elderly people.

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## Conflicts of interest

There are no conflicts of interest.

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