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Original Article

Vision-Related Quality of Life and Its Related Factors Among Older Adults

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Abstract

Background: Vision impairment (VI) becomes more prevalent with age, negatively affecting the vision-related quality of life (VRQoL) of older adults. Therefore, this study aimed to determine the status of VRQoL and related factors among older adults.

Methods: This cross-sectional study was conducted on 247 older adults randomly selected from comprehensive health centers in Yazd, Iran, in 2021. The data were collected through an interview using a demographic information questionnaire, self-reported eye diseases, and the National Eye Institute Visual Functioning Questionnaire-25 (NEI VFQ-25), and analyzed using independent t-tests, ANOVA, and hierarchical regression analysis with SPSS.

Results: Hyperopia (38.2%), cataract (35.5%), and myopia (31.3%) were the most common age-related eye diseases (ARED) among participants. The participants' average VRQoL score was 85.37 ± 15.24 on a scale of 0–100. Univariate analysis demonstrated that the VRQoL score was significantly related to age, marital status, use of glasses, and certain diseases and ARED ($P<0.05$). Based on hierarchical regression, demographics explained 25% of VRQoL variance. Adding common diseases and ARED increased it to 51% and 71% (all $P<0.001$). Diabetes (β = -0.15, $P=0.030$), hypertension (HTN) (β = -0.20, $P=0.009$), and ARED (β = -0.62, $P<0.001$) remained the most significant predictors of VRQoL in the model.

Conclusion: The participants' VRQoL was at a favorable level. Given that VRQoL is affected by numerous factors (chronic diseases and VI), policymakers should consider them when planning interventions (prioritizing optometry services and the early diagnosis of VI) for the aging population.

Keywords: Aged, Eye diseases, Vision disorders, Quality of life, Ophthalmology

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Introduction

The prevalence of visual impairment (VI) increases with age, which can significantly impact their overall quality of life (QoL). In the elderly, VI is one of the most critical factors that influences their well-being (1). Due to the rapid growth of the elderly population in Iran, the prevalence of VI is high (2).

VI refers to a functional restriction of the eye(s) (3), and it is considered the third most common physical disorder in older adults (4). According to the World Health Organization, global estimates indicate that approximately 2.2 billion individuals experience some form of VI, with the majority being over the age of 50 (5). The global prevalence of VI and blindness among adults aged 50 and older remained unchanged from 2010 to 2019. In 2020, the primary causes of blindness in this age group were cataracts)15.2 million cases(, glaucoma (3.6 million), uncorrected refractive errors (2.3 million), age-related macular degeneration (1.8 million), and diabetic retinopathy (0.86 million), respectively (6). Age-related eye diseases (ARED), such as cataracts, glaucoma, age-related macular degeneration, and diabetic retinopathy, are the leading contributors to VI (7).

A study conducted in Iran revealed that the occurrence rates of cataracts, age-related macular degeneration, glaucoma, and diabetic retinopathy in at least one eye were 29.6%, 5.8%, 3.7%, and 2.7%, respectively. The prevalence of these conditions significantly increased with advancing age. In total, 35.8% of the examined individuals had at least one of these four eye diseases. Among them, cataracts were the most prevalent, closely followed by age-related macular degeneration, highlighting the considerable

impact of age-related eye conditions within the Iranian population (8).

Research shows that ARED remarkably increases the risk of falls, hip fractures, depression, social isolation, and admission to nursing homes and affects the overall QoL (9-11). Considering that vision is the most important sensory function of the human body, ARED is often detrimental to the daily lives of affected individuals, leading to functional disabilities, other health problems, and noticeable deterioration of their QoL (12) .

Vision-related QoL (VRQoL) is a person's satisfaction with their visual performance and how visual ability affects their life (13). It is a multifaceted characteristic that includes different aspects, such as visual performance, symptoms, emotional health, social connections, concerns, and ease of use, all influenced by vision (14). Some studies have shown the relationship between VI and reduced QoL, independence, personal and social activities, and depression (15,16).

VI significantly limits various aspects of life, particularly affecting VRQoL by hindering engagement in social and religious activities, mobility, recreational pursuits, daily living tasks, and activities requiring intense visual focus (17,18). Although VI has decreased in European countries in the last 20 years, this is not the case in developing countries. Hence, caregivers in these regions should learn more about natural aging and its relationship with disease, as well as how to identify preventive factors and early indicators of diseases (19). According to various studies, age (15,16), VI (20,21), gender (22,23), marital status (24,25), employment status (25), education level, and income (25,26) are some of the main predictors of VRQoL.

Nonetheless, studies on VRQoL in Iran are limited and have mostly focused on age groups other than older adults (27-29). Assessing VRQoL in the elderly population of Iran is of particular importance because the prevalence of VI (e.g., cataracts, glaucoma, and macular degeneration) increases with age and can significantly affect independence, daily functioning, and mental health. Vision plays a vital role in essential activities (e.g., walking, reading, taking medication, and social interaction), and its decline may lead to dependence, falls, depression, and social isolation. Moreover, low awareness, delayed diagnosis, and limited access to eye care services exacerbate vision problems in many parts of the country, especially in underserved areas. Accordingly, understanding VRQoL can help identify hidden needs, support timely interventions, optimize health services, and reduce disability-related costs. Given the rapidly aging population in Iran, addressing this issue is crucial for public health planning and improvement of the well-being of older adults. Therefore, this study aims to investigate the status of VRQoL and its associated factors among older adults in Yazd, Iran.

Materials and Methods

Study Design and Participants

This cross-sectional study was performed in 2021 and included 247 elderly individuals from comprehensive health centers in Yazd, Iran. The total elderly population of Yazd, registered in the Integrated Health System of Iran, was 47,631, which accounted for 7.09% of the population of this city. The required sample size for the study was calculated to be 250 people, which was based on a previous study's standard deviation of the VRQoL score (11.6), with a precision of 1.5 and a type 1 error of 0.05 (30).

A multi-stage random sampling method was used in this study. First, 5 of the 25 active comprehensive health centers in Yazd were randomly selected. From each of these centers, 50 people were then randomly chosen from the Integrated Health System of Iran registry to participate in the study. After selection, the participants were contacted and invited to join. For those who agreed, questionnaires were completed via interviews at the health centers. On the other hand, for participants who preferred not to travel, researchers visited their homes after obtaining permission and coordinating with the participants and their families. It should be noted that all health guidelines were maintained during these in-home visits.

To be eligible for the study, participants had to be 60 years of age or older. They also needed to be free of hearing and speech impairments that would prevent communication and have no cognitive impairment. Cognitive status was assessed using the Abbreviated Mental Test Score, a 10-item scale introduced by Hodkinson (1972) to quickly screen elderly patients for dementia. A score of 6 or less on the Abbreviated Mental Test Score suggests cognitive impairment (31).

Instruments

In this study, a demographic information questionnaire, a self-reported eye disease checklist, and the National Eye Institute Visual Functioning Questionnaire-25 (NEI VFQ-25) were used to measure the variables (32).

Demographic Information Questionnaire

This questionnaire collected data on participants' age, gender, number of children, marital status, education level, employment status, type of housing, living situation, main source of income, use of glasses, and chronic diseases. The chronic diseases included cardiovascular disease (CVD), hypertension (HTN), diabetes, a history of stroke, sleep disorders, and digestive problems.

Self-reported Eye Diseases

Self-reported data on ARED were collected from the participants. Elderly participants were asked to indicate "yes" or "no" for the presence of various conditions, including cataracts, glaucoma, diabetic retinopathy, macular degeneration, hyperopia, myopia, dry eye, astigmatism, and color blindness.

National Eye Institute Visual Functioning Questionnaire-25

The NEI VFQ-25 is a 25-item questionnaire designed to measure VRQoL (32). It has 12 subscales: general health (1

item), general vision (1 item), near vision (3 items), distance vision (3 items), vision-specific social functioning (2 items), color vision (1 item), ocular pain (2 items), vision-specific mental health (4 items), vision-specific role limitations (2 items), vision-specific dependency (3 items), driving (2 items), and peripheral vision (1 item). The scoring algorithm for the NEI VFQ-25 calculates each subscale score by averaging the item scores within that subscale. Scores are then converted to a scale of 0–100, where higher scores indicate better vision-specific health-related QoL. The validity and reliability of the Persian version of the NEI VFQ-25 have been confirmed, with Cronbach's α and intraclass correlation coefficients above 0.7 (33).

Ethical Approval and Consent to Participate

The confidentiality of the information was assured before conducting the study, and written consent was obtained from the study participants. This study was approved by the Research Ethics Committee of Shahid Sadoughi University of Medical Sciences, Yazd.

Data Analysis

Data normality was confirmed using the Shapiro–Wilk test ($P<0.05$). Frequencies and percentages, as well as means and standard deviations, were used to analyze qualitative and quantitative data, respectively. In addition, an independent t-test was utilized to compare the average VRQoL scores based on two-category variables (e.g., gender, marital status, insurance, and glasses usage). Moreover, a one-way ANOVA was employed to compare the average VRQoL scores across variables with multiple categories, including age groups, education levels, occupation, and living situation.

Hierarchical regression analysis is used to understand the contribution of different groups of variables in predicting an outcome. Instead of entering all predictors at once, variables are added in steps (blocks), usually in a theoretically meaningful order. This process allows researchers to (1) control for certain factors (e.g., demographic variables), (2) test the added value of new predictors (e.g., health conditions), (3) compare model improvements, and (4) clarify unique contributions. In brief, hierarchical regression is utilized to examine the incremental predictive power of variables while keeping the order of entry aligned with the theory or research goals. In this study, this statistical method was employed to find how much additional variance in the VRQoL can be explained when chronic diseases and ARED are added to the regression model of demographic variables (i.e., age, gender, education level, employment status, living situation, and use of glasses) step by step. All statistical analyses were conducted using SPSS software (version 19), with a significance level of 5%.

Results

The average age of the participants was 68.35 ± 8.21. The majority of them were male (52.7%), married (76.6%), retired (42.8%), and lived with their spouses (75%). Additionally, more than 60% of them used glasses.

The most common ARED (cause of VI) in the participants included hyperopia (38.2%), cataract (35.5%), myopia (31.3%), and dry eye (13.8%), respectively. The prevalence of ARED was 27.8%. Furthermore, HTN (55%), diabetes mellitus (DM, 48.3%), and CVD (33.5%) were the most prevalent diseases and health problems among them.

The average score of VRQoL in the participants was 85.37 ± 15.24 from the range of 0 to 100. The vision-specific social functioning, driving, and color vision, with mean scores of 88.19, 86.28, and 82.06, obtained the highest scores among VRQoL dimensions (Table 1).

The mean VRQoL score was statistically significant in terms of age ($P<0.001$), marital status ($P=0.004$), use of glasses ($P=0.015$), and living with a spouse ($P=0.012$), so that the age range of 60–69 years, marriage, use of glasses, and living with a spouse had a better VRQoL (Table 2).

According to the results (Table 3), the mean VRQoL score was statistically significant with regard to VI ($P<0.05$) and chronic diseases ($P<0.05$); more precisely, older adults with ARED and common chronic illnesses (excluding stroke and digestive problems) had significantly lower average VRQoL scores ($P<0.05$).

Based on the hierarchical regression analysis, several factors were found to be significant predictors of VRQoL. In the first step, demographic variables alone explained approximately 25% of the variance in VRQoL. When common diseases of old age were added in the second step, the explanatory power of the model considerably increased to 51% ($P<0.001$). Finally, by including the ARED variable in the third step, the model's ability to predict VRQoL rose to 71% ($P<0.001$). In the final model, DM (β = -0.15), HTN (β = -0.20), and ARED (β = -0.62) remained as the most significant predictors of VRQoL, suggesting that the presence of these conditions strongly

Table 1. Distribution of Mean and Standard Deviation of VRQoL and Its Dimensions in Participants

VRQoL and Its Dimensions	Mean*	Standard Deviation
General health	64.83	18.16
General vision	72.26	15.19
Ocular pain	77.58	22
Near vision	77.49	23.63
Distance vision	81.38	23.37
Vision-specific social functioning	88.19	20.12
Vision-specific mental health	77.74	25.30
Vision-specific role limitations	73.29	29.04
Vision-specific dependency	81.55	29.98
Driving	86.28	23.28
Color vision	82.06	25
Peripheral vision	80.39	21.33
VRQoL	85.37	15.24

Note. VRQoL: Vision-related quality of life. *The possible score range for the VRQoL and all sub-scales is 0-100.

Table 2. Distribution of Mean and SD of VRQoL According to Demographic Variables in Participants

Variables	Labels	N	%	Mean	SD	*P* Value
Gender	Male	129	52.7	85.06	15.11	0.685
	Female	116	47.3	86.84	16.27	
Age*	a. 60-69	162	65.6	88.02	13.51	0.001
	b. 70-79	55	22.3	72.48	18.03	
	c. ≥80	30	12.1	69.14	19.90	
Marital status	With a spouse	190	76.6	87.01	13.22	0.004
	Without a spouse	58	23.4	66.56	24.05	
Education level	Illiterate	38	15.7	78.29		0.109
	Primary	88	36.4	84.37	13.86	
	Under high school diploma	39	16.1	84.04	17.32	
	High school diploma	38	15.7	80.38	19.02	
	Academic	39	16.1	91.96	7.55	
Employment status	Employed	46	18.9	87.72	14.58	0.120
	Housewife	93	38.3	93.63	3.58	
	Retired	104	42.8	83.21	16.10	
Insurance	Yes	203	94	86.31	15.76	0.559
	No	13	6	82.64	15.02	
Use of glasses	Yes	151	62.1	82.46	16.29	0.015
	No	92	37.9	90.97	11.09	
Living with whom**	a. With spouse	184	75.1	86.85	13.22	0.012
	b. With single children	15	6.1	71.12	35.10	
	c. With married children	13	5.3	57.31	29.67	
	d. Alone	33	13.5	79.33	16.14	

Note. VRQoL: Vision-related quality of life; N: Number; N: Number; SD: Standard deviation. *The results of multiple comparisons showed that only the mean of VRQoL in groups a and b had a significant difference ($P<0.05$). **Based on the results of multiple comparisons, only the mean of VRQoL in groups a and c had a significant difference ($P<0.05$).

influences an individual's VRQoL (Table 4).

Discussion

This study determined the status of VRQoL and its associated factors among older adults in Yazd, Iran. Overall, the VRQoL of participants was found to be at a favorable level. Specifically, the dimensions of social functioning, driving, and color vision received the highest scores. However, general health and general vision were rated as unfavorable. VRQoL is influenced by various factors, with diabetes, HTN, and ARED identified as the most significant predictors.

The prevalence of ARED among older adults in this study was 27.8%, with the most common conditions being hyperopia (farsightedness), cataracts, and myopia (nearsightedness). These findings are consistent with those of other international and national studies. Man et al (15) reported an ARED prevalence of 26.3%. Likewise, Vignesh et al (34) found a prevalence of 24.5%, with cataracts (50.7%) and uncorrected refractive errors (36.8%) being the main causes. Similarly, Dev et al (18) estimated a prevalence of 60.7%, which included cataracts (9.8%), corneal opacity (8.33%), glaucoma (7.0%), macular scar (6.73%), and retinal degeneration and dystrophy (5.41%). Moreover, Havstam Johansson et al (35) concluded that cataracts (23.4%), age-related macular degeneration (4.7%), glaucoma (4.3%), and diabetic retinopathy (1.4%) were the most common eye disorders among the elderly. In Iran, a study in Mashhad reported a VI prevalence of 43.59% in people over 65, with cataracts being a prevalent cause at 20% (36). A systematic review in Iran demonstrated a VI prevalence of 5.57%, with cataracts as the most widespread cause at a pooled prevalence of 37.4% (2). The prevalence and types of ARED in our study were similar to those reported in other research. Many eye diseases are closely linked to the aging process and often go unnoticed until vision significantly declines (37). Most of these disorders are common due to age-related changes or diseases like diabetes. While the main causes of VI globally include cataracts, macular degeneration, glaucoma, and diabetic retinopathy, their specific distribution can slightly vary from country to country (7).

Our results revealed that participants had a favorable level of VRQoL, which aligns with the results of some previous studies (24,35,38) while contrasting with those of others that reported moderate (33,39-41) or poor VRQoL (15,42). VI increases with age and affects the quality and performance of people's vision. The majority of the elderly investigated in this study were in the age group of 60–70 years, so their QoL was acceptable. There was a

Table 3. Distribution of Mean and SD of VRQoL According to Visual Impairments and Chronic Diseases in the Participants (N = 247)

Variables		Yes		No		*P* Value
		Mean	SD	Mean	SD	
Visual impairment	Hyperopia	79.86	19.10	88.11	12	0.041
	History of cataracts	69.83	18.28	89.98	10.63	0.001
	History of glaucoma	60.84	1.79	86.25	14.76	0.004
	Diabetic retinopathy	46.55	14.43	87.47	12.50	0.001
	Age-related macular degeneration	63.12	12.26	88.27	12.12	0.001
	Myopia	75.88	17.44	88.98	12.69	0.001
	Astigmatism	70.44	10.78	87.31	14.69	0.001
	Darkness of the cornea	55.17	32.70	86.17	14.40	0.015
	Dry eyes	66.74	21.28	88.36	12.30	0.001
	Feeling of flying flies in the eyes	65.84	18.70	89.11	11.22	0.001
	Inflammation of the eyelids	56.68	34.84	86.04	14.25	0.006
	Drooping eyelids	61.69	23.02	87.44	12.59	0.001
	Color blind	64.05	24.26	86.50	14.15	0.013
	ARED	80.86	16.29	94.28	7.10	<0.001
Chronic diseases	Cardiovascular diseases	76.72	18.98	85.11	12.92	0.044
	Diabetes	75.37	18	86.26	12.52	0.006
	Depression	56.35	21.51	84.80	11.81	0.001
	Respiratory diseases	72.06	14.88	83.48	15.69	0.050
	Sleep problems	71.20	17.80	83.71	14.76	0.016
	Kidney disease	69.94	21.62	83.04	14.60	0.041
	Hypertension	74.62	18.05	88.31	11.09	0.001
	History of stroke	71.75	31.74	82.52	15.15	0.266
	Digestive problems	77.74	19.31	81.83	16	0.516
	Headache	67.07	19.92	85.85	11.71	0.001

Note. VRQoL: Vision-related quality of life; ARED: Age-related eye diseases; SD: Standard deviation.

Table 4. Hierarchical Regression Analysis for Determining the Predictors of VRQoL in Participants

Variable/Model	Standard Beta (Significance Level)		
	Stage 1	Stage 2	Stage 3
Age	-0.40 (0.001)	-0.29 (0.002)	-0.08 (0.30)
Gender	0.02 (0.82)	0.05 (0.55)	0.01 (0.80)
Level of education	0.05 (0.59)	-0.06 (0.47)	-0.09 (0.15)
Employment status	-0.08 (0.41)	-0.10 (0.21)	-0.13 (0.52)
Living with whom	-0.05 (0.57)	-0.05 (0.48)	-0.07 (0.23)
Use of glasses	0.18 (0.07)	0.07 (0.37)	-0.055 (0.94)
Cardiovascular disease		-0.06 (0.57)	-0.03 (0.63)
Diabetes		-0.25 (0.007)	-0.15 (0.030)
Sleep problems		-0.17 (0.05)	0.02 (0.07)
Hypertension		-0.27 (0.006)	-0.20 (0.009)
ARED			-0.62 (0.001)
R^2	0.257	0.255	0.197
Cumulative R^2	0.257	0.513	0.710
P-value	<0.001	<0.001	<0.001

Note. VRQoL: Vision-related quality of life; ARED: Age-related eye diseases.

relationship between ARED and poor QoL. In addition, the prevalence of ARED in the elderly was low, which can be a reason for their better QoL. This variation might be due to several factors, including differences in lifestyle, the prevalence of underlying chronic diseases (e.g., DM and HTN), socioeconomic status, healthcare systems, and cultural values.

Based on our findings, vision-specific social functioning, driving, and color vision were rated favorably by participants. However, their perceptions of general health and general vision were not as positive. While participants generally rated their vision as inadequate—a common finding due to age-related decline—they reported few problems with specific activities. For example, they had little difficulty seeing people's reactions or meeting with others in social settings. These results conform to those of other studies, demonstrating that older adults often report their general health as unfavorable and tend to complain about their living conditions (41,43-45). This tendency likely explains the lower scores in the general health dimension, which is often measured by a single question (46).

The VRQoL score was higher among participants aged 60–69 years, those who were married, those who used glasses, and those living with a spouse and married children. The observed association between increasing age and decreasing VRQoL appears logical (15) since aging is a known risk factor for eye problems and diseases (47), and older adults are the most vulnerable group to VI. In this

study, most participants were literate, insured, and retired; therefore, VRQoL scores did not significantly differ by the educational level or employment status. Regarding gender, there were no structural, genetic, or biological differences in the eyes between men and women, so no significant difference in VRQoL was found between elderly men and women. Previous studies have reported contradictory findings; some identified significant relationships between QoL and age, gender, occupation, and education (24,30,33,35,48,49), while others found no such associations (41,50,51). These inconsistencies highlight the need for further research in this area.

VRQoL was also higher among older adults who did not require glasses for all activities, likely reflecting that their visual problems were not severe enough to necessitate glasses for every task. Only a small proportion of these individuals needed glasses for specific activities, such as driving, reading, or watching television. Consequently, their VRQoL tended to be superior.

VRQoL was poorer in elderly individuals with ARED, consistent with the findings of previous studies (21,42,52). In older adults, ARED leads to limitations across all areas of life, particularly VRQoL. More precisely, it is associated with difficulties in performing daily activities, a higher risk of falls, social isolation, reduced life satisfaction, cognitive decline, mental health problems, increased need for nursing care, and greater reliance on health services (21).

VRQoL was also lower among older adults with heart disease, diabetes, depression, sleep disorders, kidney disease, HTN, and chronic headaches. In a study by Crews et al, elderly individuals with CVD, DM, or a history of stroke also reported poorer QoL (53). The coexistence of multiple chronic conditions can significantly impact VRQoL (54). Notably, the combined effect of coexisting diseases may differ from the simple additive effects of each condition. Social and economic factors undoubtedly influence the relationship between chronic disease and QoL, reflecting broader health inequalities among socio-economic groups (55).

Based on multivariate analysis, diabetes, HTN, and ARED were the strongest predictors of VRQoL. ARED has been identified as a key determinant of VRQoL in multiple studies (18,35,51). In the study by Harutyunyan et al (25), the VFQ-25 global score was significantly associated with VI, age, socioeconomic status, and the presence of eye diseases (e.g., glaucoma and cataract). Considering that DM and HTN are well-established risk factors for ARED, ARED prevention may be the most effective strategy for improving VRQoL and, by extension, overall QoL in the elderly. It is noteworthy that ARED negatively affects participation in social and religious activities, mobility, leisure, daily living, and visual tasks, leading to limitations in nearly all aspects of life, especially VRQoL (18).

This study had certain limitations, including reliance on self-reported eye diseases without confirmation by an ophthalmologist and its cross-sectional design, thereby precluding causal inferences. While age, marital status, and other factors were examined, potential confounders (e.g., socioeconomic status or mental health status) were not discussed or controlled adequately, which may affect the generalizability of the findings. Research focusing on the elderly is particularly important, given the higher prevalence of vision problems in this age group, as it enables the identification of specific health needs. On the other hand, our findings can inform the development of targeted health interventions, screening programs, and prevention strategies for vision loss among older adults. Moreover, the inclusion of relevant factors, such as chronic diseases (e.g., DM and HTN), and the use of standardized assessment tools strengthen the contribution of the study to the field.

Conclusion

In this study, the overall VRQoL was found to be favorable. Specifically, the dimensions of social functioning, driving, and color vision were rated highly. However, the findings revealed that older adults rated their general health and general vision less favorably, an area that requires special attention from healthcare providers. Based on the findings, age, marital status, use of glasses, certain chronic diseases, and ARED could significantly impact VRQoL. More precisely, VRQoL is influenced by a combination of both visual and non-visual factors. While early diagnosis and treatment of ARED are crucial, other contributing factors must also be addressed to improve QoL.

ARED is common, and the need for eye care and vision rehabilitation is often unmet in this population; thus, interventions that improve VRQoL are vital. In other words, there is a need for further research to develop, implement, and evaluate community-based programs that can enhance the health-related QoL for visually impaired older adults. Our findings provide valuable insights for policymakers to improve eye health services and create interventions that aim to enhance vision, slow the progression of eye diseases, or at least delay the onset of further VI.

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Authors' Contribution

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Competing Interests
The authors declare that they have no competing interests.

Ethical Approval
Before conducting the study, the confidentiality of the information was assured, and a written consent form was obtained from the study participants. Moreover, this study was approved by the Research Ethics Committee of Shahid Sadoughi University of Medical Sciences, Yazd (IR.SSU.SPH.REC.1400.181).

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