



Association Between Quality of Life and Nutritional Status of Nursing Home Residents or Community Dwelling Elderly

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ABSTRACT

Objective: In developed countries, the importance of healthy aging and quality of life (QoL) is increasing. This study aimed to evaluate the relationship between nutritional status and QoL in elderly people who are living in a nursing home and community dwelling.

Materials and Methods: In this cross-sectional study, a total of 100 elderly participants aged 65 years and older were recruited from nursing homes and community. Nutritional status was evaluated using the Mini Nutritional Assessment (MNA), 24 h dietary recall, and anthropometric measurements. QoL was determined using the World Health Organization QoL-Old. Multiple regression analyses were performed to evaluate the association between nutritional status and QoL domains, adjusted for possible confounders.

Results: The QoL was lower and the frequency of malnutrition risk was higher in nursing home residents ($p < 0.05$). There was a significant association between nutritional status and overall QoL score ($r: 0.61$ $p < 0.05$) and according to multivariate regression analyzes, “sensory abilities” domain ($\beta: 0.22$; $p < 0.05$) was found to be significantly associated with MNA score.

Conclusion: According to this study, the elderly who were living in nursing homes had more disadvantages for both nutrition and QoL. Further researches on the relationship between nutritional status and QoL domains are as notable as the diagnosis, monitoring, and treatment of nutritional problems of this sensitive group. Besides, it has great importance in the protection and development of health.

Keywords: Elderly, nutrition, quality of life

Cite this article as:
Şimşek H, Uçar A.
Association Between
Quality of Life and
Nutritional Status of
Nursing Home Residents
or Community Dwelling
Elderly. Erciyas Med J
2021; 43(3): 244-50.

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Submitted
15.04.2020

Accepted
29.10.2020

Available Online
06.04.2021

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Available online at
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INTRODUCTION

The world population is rapidly aging as a result of the demographic transition and increased life expectancy (1). The proportion of the population aged 65 and over are 9% in the world, and 8.8% in Turkey (2, 3). The concepts of health protection and healthy aging are becoming more important to the increase in elderly population. According to the World Health Organization (WHO), healthy aging is the process of developing and maintaining functional abilities to maintain well-being in old age (4). Healthy years and quality of life (QoL) are two important points in the concept of healthy aging. Understanding the effectiveness of QoL and the key determinants of QoL in the context of healthy aging are a priority issue (5).

QoL which reflects emotional and functional status, general health, and social participation is a subjective concept (6). Decreased QoL in elderly individuals may indicate health, problems associated with reduced independence, frailty, and malnutrition (7). Various studies in different elderly populations have shown a direct correlation between the QoL and nutritional status (8–10). Social isolation, living alone, and low socioeconomic status which are reported to be risk factors for malnutrition are also determinants of QoL in the elderly (9, 10).

Some factors may cause a difference for QoL of the elderly between the living in the nursing home and community dwelling, such as routine medical care and treatment, improving social relationships, functional capacity, and medical comorbidities (11). However, most studies about this issue have been focused on community dwelling elderly. Furthermore, there are different results in the previous studies about the relationship between QoL domains and malnutrition (12–14).

This study aimed to evaluate and to compare the relationship between nutritional status and QoL in elderly people who live in a nursing home and community dwelling.

MATERIALS and METHODS

Participant Selection

The sample of research consists of two different groups, 65 years of age and above, who live in a nursing home or community dwelling. The sample size calculation is based on similar studies in the literature (12–14). Power

analysis performed to determine the association of WHOQOL-Old domains with Mini Nutritional Assessment (MNA) score by multiple linear regression (5% significance level [α] and 95% power) and it was calculated to be at least 89 persons. Thus, 100 people were included in the study.

The participants were randomly recruited among persons who are living a nursing home permitted by the Ministry of Family and Social Policies or persons who are living alone/with their family (community dwelling elderly). The data of community dwelling elderly were collected in elderly care centers, hobby centers, or their homes if they allowed. The inclusion criteria for the participants were as follows: Being 65 years of age or older, absence of any diagnosed for dementia/mental diseases, stay in a nursing home or live independently (not being in home care or rehabilitation center, walking independently or with walking sticks, etc.), and willingness to sign the informed consent form. The exclusion criteria were as follows: Being under 65 years of age, diagnosed dementia or mental diseases, and lack of criteria for selection of community dwelling elderly. Before the data collection, all participants were informed about the study and signed the corresponding informed consent form.

Design

The research was cross-sectional and data were collected by face-to-face interview technique and recorded with a questionnaire. The questionnaire consists of the following sections: General questions, questions to determine nutritional status, 24 h dietary recall, anthropometric measurements (body weight, height, mid-upper arm, and calf circumference), MNA Long Form, and WHOQoL-Old.

All anthropometric measurements were taken by trained personnel using appropriate techniques and devices (15, 16). Body mass index (BMI) was calculated from measured height (m) and body weight (kg) (kg/m^2). Classification of BMI was as according to the Consensus Statement of the European Society for Clinical Nutrition and Metabolism: Underweight with $20.0 \text{ kg}/\text{m}^2$ for persons <70 years of age and $<22.0 \text{ kg}/\text{m}^2$ for persons 70 years and above, normal weight with 20.0 or 22.0 – $24.9 \text{ kg}/\text{m}^2$, overweight with 25.0 – $29.9 \text{ kg}/\text{m}^2$, and BMI $\geq 30.0 \text{ kg}/\text{m}^2$ for obesity (17).

To determine the eating habits of the participants, the following were questioned; number of consumed meals and snack, skipped meals and their reasons, chewing or swallowing difficulties, self-appetite assessment, status of entirely finishing their dish, and the person who usually prepares their meals. In the 24 h recalls, the type and amount of each food and beverages consumed the previous day were recorded detailedly by the researcher. The amount of consumed food and beverages was recorded in household size and mL/g using the “Photographic Food Atlas (Yemek ve Besin Fotoğraf Kataloğu) (18).” The “Standardized Recipes for Institutional Catering (Toplu Beslenme Yapan Kurumlarda Standart Yemek Tarifeleri)” was used to determine the content of the ready-to-eat meal or food consumed outside the home (19), also the institution’s standard recipes and menus were also used for meals consumed in nursing homes. Twenty-four hours recall records were analyzed using the “Beslenme Bilgi Sistemi (BeBİS)” software.

MNA that validated in Turkish population was used to evaluate the nutritional status of participants (20). MNA is a nutritional status screening and evaluation form based on anthropometric mea-

surements and questions related to nutritional status. The MNA score is classified as follows: Below 17 points is malnutrition, 17–23.5 is at malnutrition risk, and 24–30 points is the normal nutritional status (21).

The WHOQOL-Old that validated for elderly population was used to evaluate the QoL of participants. This scale consists of 5-point Likert-type items with various evaluations and has six domains related to the QoL of elderly individuals. These domains are; sensory abilities, autonomy, past, present, and future activities, social participation, death and dying, and intimacy. In the assessment of the scale, the total or average of the items is used, and a higher score means that the QoL is better (22).

Ethics Committee Approval

The study was approved by the ethics committee of the Ankara University Rectorate (reference number: 08/153).

Statistical Analysis

The data analysis was conducted using the software package IBM SPSS Statistics v.22.0 (Armonk, NY: IBM Corp., U.S.). To check normality of data distribution, Kolmogorov–Smirnov test was done. Mean (SD) is presented for normally distributed quantitative data, median (minimum-maximum) is reported for quantitative data not normally distributed and percentages for categorical data. Independent samples t-test and Mann–Whitney U-test were used to compare differences between the two groups for parametric and non-parametric data, respectively. Chi-square or Fisher’s exact tests were used for categorical variables. For correlation analysis, Spearman rank correlation was used. Multiple linear regression analysis used to determine the association of the WHOQOL-Old domains with MNA score. The results were evaluated at 95% confidence interval and $p < 0.05$ significance level.

RESULTS

Participant Characteristics

The proportion of divorced or widowed participants and the mean age was higher in nursing home residents. Mid-upper arm and calf circumferences were lower in nursing home residents than those of the community dwelling elderly ($p < 0.05$) (Table 1).

Nutritional Problems and Dietary Intake

Frequency of meal skipping was lower in nursing home residents. Whereas the proportion of who evaluate their appetite as “good” was higher the community dwelling elderly. While there was no difference between the two groups in terms of chewing difficulty; the proportion of individuals who have difficulty swallowing was higher in nursing homes ($p < 0.05$) (Table 2). Daily energy, macronutrients intake, and dietary fiber were lower in individuals living in nursing homes than community dwelling. As presented in Table 2, while the median intake of the Vitamin E was higher and Vitamin C, Vitamin B₆, folate, iron, and zinc intakes were lower in nursing home residents ($p < 0.05$).

MNA and WHOQOL-Old

The MNA score was lower in nursing home residents than community dwelling elderly ($p < 0.05$). While the proportion of individuals with normal nutritional status was 54.0% in the nursing home;

Table 1. Characteristics of the participants living in nursing homes or community

	Community dwelling elderly (n=50)	Nursing home residents (n=50)	p
Gender, n (%)			
Male	29 (58.0)	21(42.0)	>0.05 ^c
Female	21(42.0)	29 (58.0)	
Age (years), mean (SD)	71.52 (5.32)	80.74 (6.92)	<0.001 ^c
Age classification, n (%)			
65–74	36 (72.0)	10 (20.0)	<0.001 ^a
75–84	13 (26.0)	26 (52.0)	
≥85	1 (2.0)	14 (28.0)	
Educational level, n (%)			
Primary	16 (32.0)	11 (22.0)	>0.05 ^a
Secondary	5 (10.0)	13 (26.0)	
Tertiary	29 (58.0)	26 (52.0)	
Marital status, n (%)			
Married	31 (62.0)	5 (10.0)	<0.001 ^b
Single/divorced/widowed	19 (38.0)	45 (90.0)	
Smoking status, n (%)			
No	44 (88.0)	48 (96.0)	>0.05 ^b
Yes	6 (12.0)	2 (4.0)	
Alcohol consumption status, n (%)			
No	40 (80.0)	39 (78.0)	>0.05 ^a
Yes	10 (20.0)	11 (22.0)	
Non-communicable diseases ^e , n (%)			
Hypertension	17 (44.7)	21 (65.6)	>0.05 ^a
Diabetes mellitus	19 (50.0)	13 (40.6)	
Cardiovascular diseases	10 (26.3)	8 (25.0)	
Others (chronic obstructive pulmonary disease, kidney diseases, gastrointestinal diseases, and cancer)	7 (18.4)	10 (31.3)	
Anthropometric measurements			
Mid-upper arm circumference (cm), mean (SD)	30.2 (4.5)	26.1 (3.8)	<0.001 ^d
Calf circumference (cm), mean (SD)	36.6 (3.8)	33.9 (2.6)	<0.001 ^d
BMI (kg/m ²), mean (SD)	27.3 (3.7)	27.3 (5.1)	>0.05 ^d
BMI classification, n (%)			
Underweight (≤20.0 for <70 years and ≤22.0 for ≥70 years)	3 (6.0)	8 (16.0)	>0.05 ^a
Normal weight (>20.0–24.9 for <70 years and >22.0–24.9 for ≥70 years)	10 (20.0)	8 (16.0)	
Overweight (25.0–29.9)	28 (56.0)	22 (44.0)	
Obese (≥30)	9 (18.0)	12 (24.0)	

a: Chi-square test; b: Fisher's exact test; c: Independent samples t-test; d: Mann-Whitney U-test; e: Multiple responses were received; BMI: Body mass index. Mean (SD) is presented for normally distributed data, median (minimum-maximum) is presented for data not normally distributed and percentages are presented for categorical data

this proportion was 88.0% in community dwelling elderly. There was no malnourished individuals in the community dwelling elderly, however, the proportion of malnutrition was 10.0% among nursing home residents ($p<0.05$) (Table 3). As presented in Table 4,

all WHOQOL-Old domains and total scores were lower in nursing home residents ($p<0.05$). According to the results of correlation analysis; there was a significant positive correlation between MNA score and WHOQOL-Old domains (Table 5). According to multiple

Table 2. Eating habits, nutritional problems, and dietary intakes of participants

	Community dwelling elderly (n=50)	Nursing home residents (n=50)	p
Skipping meal, n (%)			0.009 ^a
No	29 (58.0)	41 (82.0)	
Yes	21(42.0)	9 (18.0)	
Skipped meals, n (%)			>0.05 ^a
Breakfast	3 (6.0)	3 (6.0)	
Lunch	16 (32.0)	5 (10.0)	
Dinner	2 (4.0)	1 (2.0)	
Reasons for skipping meals ^c , n (%)			
Low appetite	1 (4.3)	4 (44.0)	
Chewing difficulties/poor oral health	2 (8.7)	3 (33.0)	
Swallowing difficulties	1 (4.3)	–	
Others (personal preference/late waking up)	19 (82.6)	4 (44.0)	
Self-appetite assessment, n (%)			0.025 ^a
Good	37 (74.0)	26 (52.0)	
Fair	13 (26.0)	20 (40.0)	
Poor	–	4 (8.0)	
Do you usually finish all the food on your dish?			0.001 ^a
No	4 (8.0)	17 (34.0)	
Yes	46 (92.0)	33 (66.0)	
Who do you usually eat with?			<0.001 ^a
Alone	20 (40.0)	3 (6.0)	
With family	26 (52.0)	–	
With friend/s	4 (8.0)	47 (94.0)	
Chewing difficulty, n (%)			>0.05 ^a
No	37 (74.0)	34 (68.0)	
Yes	13 (26.0)	16 (32.0)	
Swallowing difficulty, n (%)			0.037 ^a
No	45 (90.0)	37 (74.0)	
Yes	5 (10.0)	13 (26.0)	
Energy (kcal)	2113 (536)	1735 (450)	<0.001 ^a
Macronutrients			
Protein (g)	81.4 (28.2)	65.3 (17.7)	0.001 ^{a,b}
Fat (g)	101.1 (28.3)	85.3 (24.8)	0.005 ^{a,b}
Carbohydrate (g)	209.4 (66.5)	173.0 (59.5)	0.005 ^a
Dietary fiber (g)	28.3 (11.0)	20.3 (7.7)	<0.001 ^b
Micronutrients			
Vitamin A (µg)	1042.2 (469.4–9251.9)	867.5 (179.2–4794.6)	>0.05
Vitamin C (mg)	114.4 (5.2–516.2)	71.7 (17.0–146.3)	<0.001 ^c
Vitamin E (mg)	19.6 (8.5–52.9)	25.7 (7.5–55.8)	0.010 ^c
Vitamin B12 (µg)	5.0 (0.7–5.1)	5.5 (1.1–8.8)	>0.05
Vitamin B6 (mg)	1.66 (0.7–3.3)	1.3 (0.4–2.4)	<0.001 ^c
Folate (µg)	326.6 (159.2–753.7)	251.7 (116.9–475.1)	<0.001 ^c
Calcium (mg)	721.9 (336.4–1603.8)	768.1 (251.4–1321.5)	>0.05
Iron (mg)	13.9 (6.2–35.5)	9.5 (4.0–18.1)	<0.001 ^c
Zinc (mg)	11.9 (5.8–28.7)	9.4 (4.6–15.4)	0.001 ^c
Vitamin A (µg)	1042.2 (469.4–9251.9)	867.5 (179.2–4794.6)	>0.05

a: Chi-square test; b: Log₁₀ transformation was used to ensure normal distribution; c: Mann–Whitney U-test. Mean (SD) is presented for normally distributed data, median (minimum-maximum) is presented for data not normally distributed and percentages for categorical data

Table 3. MNA scores and classifications of the participants living in nursing homes or community

	Community dwelling elderly (n=50)	Nursing home residents (n=50)	p
MNA score	27.0 (21.0–29.5)	23.5 (14.0–29.0)	<0.001 ^a
Normal nutritional status (24–30), n (%)	44 (88)	27 (54)	
Malnutrition risk (17–23.5), n (%)	6 (12)	18 (36)	<0.001 ^b
Malnutrition (<17), n (%)	–	5 (10)	

a: Mann–Whitney U-test; b: Fisher’s exact test; MNA: Mini Nutritional Assessment. Mean (SD) is presented for normally distributed data, median (minimum–maximum) is presented for data not normally distributed, and percentages are presented for categorical data

Table 4. QoL scores of the participants living in nursing homes or community

WHOQOL-OLD	Community dwelling elderly (n=50)	Nursing home residents (n=50)	p
Sensory abilities	93.75 (0–100)	50.00 (0–100)	<0.001 ^a
Autonomy	81.25 (25.00–100)	62.50 (18.75–100)	
Past, present, and future activities	81.25 (31.25–100)	56.25 (12.50–93.75)	
Social participation	78.13 (6.25–100)	43.75 (6.25–100)	
Death and dying	100.00 (0–100)	65.50 (0–100)	
Intimacy	93.75 (50.00–100)	75.00 (12.50–100)	
Total score	82.29 (34.38–98.96)	57.29 (25.00–95.83)	

a: Mann–Whitney U-test; QoL: Quality of life; WHOQOL: World Health Organization Quality of life. Mean (SD) is presented for normally distributed data, median (minimum–maximum) is presented for data not normally distributed, and percentages are presented for categorical data

Table 5. Spearman correlations (r-values) between MNA and WHOQOL-Old scores

	1	2	3	4	5	6	7	8
1 MNA score	–	0.50*	0.45*	0.52*	0.52*	0.34*	0.38*	0.61**
2 Social participation	–	–	0.60*	0.35*	0.54*	0.26*	0.31*	–
3 Autonomy	–	–	–	0.55*	0.62*	0.42*	0.42*	–
4 Past, present, and future activities	–	–	–	–	0.69*	0.39*	0.52*	–
5 Social participation	–	–	–	–	–	0.34*	0.61*	–
6 Death and dying	–	–	–	–	–	–	0.16	–
7 Intimacy	–	–	–	–	–	–	–	–
8 WHOQOL-total score	–	–	–	–	–	–	–	–

*: p<0.01; MNA: Mini Nutritional Assessment; WHOQOL: World Health Organization Quality of life

linear regression analysis, after adjusted for possible confounders, the MNA score was significantly associated with “sensory abilities” domain ($p<0.05$) (Table 6).

DISCUSSION

This study aimed to evaluate the relationship between nutritional status and QoL (also different domains of the WHOQOL-Old) in elderly people living in a nursing home and community dwelling. According to this study; QoL scores were lower in nursing home residents compared to the community dwelling elderly and there was a significant association between nutritional status and QoL,

especially between the QoL domain “abilities.” These results are consistent with the previous studies that reported lower QoL scores in nursing home residents. Moreover, these outcomes are related to the main factors determining the QoL, such as social relationships, living independently, and older age (11, 23). Although the QoL scale developed for elderly individuals was once again confirmed to be closely related to the MNA score, significant association after adjustments was for only the “sensory abilities.” In studies carried out in different populations and in different elderly groups, a direct relationship between QoL and nutritional status was shown previously (9, 10, 12, 14). In a meta-analysis on the relationship between QoL and malnutrition in elderly individuals, malnourished

Table 6. Multiple linear regression analyses for the MNA score with WHOQOL-Old QoL domains

WHOQOL-Old domains	Model 1 (R ² =0.354*)		Model 2 (R ² =0.389*)		Model 3 (R ² =0.398*)	
	β	p	β	p	β	p
Sensory abilities	0.31	0.005*	0.26	0.020*	0.22	0.045*
Autonomy	-0.02	>0.05	-0.04	>0.05	0.02	>0.05
Past, present, and future activities	0.20	>0.05	0.15	>0.05	0.13	>0.05
Social participation	0.07	>0.05	0.08	>0.05	0.01	>0.05
Death and dying	0.21	0.026*	0.19	0.040*	0.15	>0.05
Intimacy	0.11	>0.05	0.14	>0.05	0.13	>0.05

Model 1: Unadjusted; Model 2: Adjusted for gender, age, marriage status, educational level, non-communicable diseases; Model 3: Model 2 + place of residence, alcohol consumption, and smoking; *: p<0.05; QoL: Quality of life; MNA: Mini Nutritional Assessment; WHOQOL: World Health Organization Quality of life

individuals were found to have a higher probability of having a lower QoL score. However, there are significant differences in terms of method and design of the studies in this meta-analysis (9). Indeed, various studies that have been evaluated this association performed risk assessments for malnutrition with MNA (13, 24) or examined the relationship between MNA score and QoL (12, 14). Even though these studies evaluated this relationship from different perspectives, the results were consistent; QoL was found to be higher when the nutritional status was better.

There are different results in the literature regarding the relationship between WHOQOL-Old domains and MNA score. According to the study of Luger et al. (12), “autonomy” and “social participation” domains were significantly associated with MNA score. Similarly, another study reported lower QoL and especially autonomy loss in individuals at risk of malnutrition/malnourished (score ≤ 23.5) (13). Moreover, according to the study of Damião et al. (14), “social participation” and “sensory abilities” were efficient domains in determining the risk of malnutrition according to MNA score (17–23.5). Consequently, the outcomes of this study which on the relationship between domains of WHOQOL-Old and MNA scores were not entirely consistent with the literature. While all of the studies in the literature were conducted with community-dwelling elderly, this study was conducted with a mixed sample with nursing home residents. This situation may be a possible explanation for the outcomes different from the literature.

According to this study, the MNA score was lower and the risk of malnutrition was higher among nursing home residents than those who community dwellings. These consequences are consistent with the previous studies (25, 26). However, some results of this study are different from the previous studies. While malnutrition is not detected in the community, the malnutrition rate in the nursing home (10.0%) is different from the previous studies. Higher and lower rates have been reported in the previous studies. According to a multicenter and representative study conducted in 25 nursing homes in Turkey; the prevalence of malnutrition is 6.7%. (27). In another multicenter study (21 nursing homes) in 2019, this rate is 23.4% (28). In the previous studies, the prevalence of malnutrition in the community dwelling elderly has different values such as 3.6% (29) and 19.0% (30). These differences may have been due to the selection of the participants. The fact that data were collected from only one nursing home in this study may have caused the results to

differ from multicenter and comprehensive studies. Furthermore, due to community dwelling elderly predominantly recruitment from social clubs (or hobby clubs), individuals who are not in these social environments or who are not leaving their homes may have been ignored and maybe the prevalence of malnutrition was underestimated. Due to the same reason, the participants who represent community dwelling elderly in this study may have better functional capacity than the general population.

In nursing home residents which represent the sample of this study, had a higher mean age compared to the community dwelling elderly, also this situation may be one of the reasons for the difference in QoL and nutritional status. Furthermore, according to other indicators of nutritional status; whereas the frequency of loss of appetite, swallowing difficulty was higher in nursing home residents, daily energy and macronutrient intake were higher in community dwelling elderly. The previous studies which compared the nutritional status of the nursing home residents and community dwelling elderly indicate these differences that have a significant relationship (25, 26).

This study has several limitations and strengths. One of the strengths of this study is the use of age-specific, reliable, and validated instruments for nutritional status and QoL. The limitations of the study are the small sample size and possible selection bias mentioned before. The recruitment was carried out in two different areas. While medical evaluation by a physician of the institution was available for cognitive status (e.g., Alzheimer’s disease or dementia) in the samples taken from the nursing home, this evaluation was not possible for those living in the community. This issue may have caused bias, especially in the food consumption records of older persons.

CONCLUSION

The nursing home residents compared to community dwelling elderly, some disadvantages were identified for various factors affecting the nutritional status. Since this group can be described as more sensitive than community dwelling elderly; in the nutrition services that carried out in the nursing homes, routine assessment of menu satisfaction and menu changes for reducing the possible effects of nutritional problems such as chewing and swallowing difficulties are important preventative strategies. Furthermore, routine nutritional screening is important in terms of early detection of appetite loss or possible nutritional problems. These small but

effective precautions can retain or improve the nutritional status of elderly individuals and thereby improve overall health and QoL.

Although the WHOQOL-Old was once again confirmed to be closely related to MNA results, only “sensory abilities” had a significant association with the MNA score in this study. However, due to different sample design and relatively small sample size, results may differ from the previous studies. In this context, further studies, including a larger sample and multicenter nursing home, may elucidate which dimensions on the QoL scale are associated with malnutrition risk, and thus, more effective steps can be taken to solve this public health problem in the future.

Ethics Committee Approval: The Ankara University Rectorate Ethics Committee granted approval for this study (date: 01.04.2019, number: 08/153).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – AU, HŞ; Design – AU, HŞ; Supervision – AU; Materials – HŞ; Data Collection and/or Processing – HŞ; Analysis and/or Interpretation – HŞ; Literature Search – HŞ; Writing – HŞ; Critical Reviews – AU, HŞ.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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