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THE IMPACT OF DEPRESSION AND OTHER ASSOCIATED FACTORS ON MALNUTRITION IN THE ELDERLY IN TURKEY: A STRUCTURAL EQUATION MODELING

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Abstract

The aim of this research is to evaluate the nutritional status, depression status and some related factors of elderly people. The sampling of the descriptive and cross-sectional research consists of 365 elderly people. The data of the research were collected through the Personal Information Form, Mini Nutritional Assessment Test (MNA), and Geriatric Depression Scale (GDS). Malnutrition was found in 4.1% and malnutrition risk was detected in 26.6%. It was determined that 41.9% had depression. Path analyzes were conducted using AMOS v24 to investigate the relationships between MNA and GDS, gender, age, income level, presence of chronic disease, and whether or not living alone. A model was established to reveal the relationships between income, age, gender, presence of chronic disease, and living alone with MNA and GDS. In line with the insignificant path coefficients in both men and women, these paths were removed from the model and the new model was analyzed again. After removing the insignificant path coefficients from the model, in women; the path coefficient between GDS and income was found to be statistically significant, and as the income level increases, GDS increases. It was found that depression decreased in men not living alone. Malnutrition in men and women is associated with age and depression. The significant path coefficients retained in the model provide compelling evidence of complex relationships between sociodemographic factors, nutritional status, and depression. A holistic approach should be adopted in managing the health of the elderly people.

Keywords: Malnutrition, nutrition, depression, elderly people

TÜRKİYE'DE YAŞLILARDA DEPRESYON VE İLİŞKİLİ DİĞER FAKTÖRLERİN MALNÜTRİSYON ÜZERİNE ETKİSİ: BİR YAPISAL EŞİTLİK MODELLEMESİ

Öz

Bu çalışmanın amacı, yaşlılarda malnutrisyon ve depresyon durumunu ve bazı ilişkili faktörleri saptamaktır. Tanımlayıcı ve kesitsel türde planlanan bu çalışma toplam 365 yaşlı bireyde yürütüldü. Veriler, genel bilgi formu, Mini Nutrisyonel Değerlendirme (MNA) ve Geriatrik Depresyon Ölçeği (GDÖ) kullanılarak toplandı. Katılımcıların %4,1'inde malnutrisyon, %26,6'sında ise malnutrisyon riski saptanmıştır. %41,9'unda depresyon olduğu tespit edilmiştir. MNA ile GDÖ, cinsiyet, yaş, gelir durumu, kronik hastalık varlığı, yalnız yaşayıp yaşamama durumu arasındaki ilişkileri araştırmak için yol analizleri AMOS v24 kullanılarak yapılmıştır. Gelir, yaş, cinsiyet, kronik hastalık varlığı, yalnız yaşama durumunun MNA ve GDÖ ile ilişkilerini ortaya çıkaracak bir model kurulmuştur. Hem erkek hem de kadınlarda anlamsız olan yol katsayıları doğrultusunda modelden bu yollar çıkarılarak yeni model tekrar analiz edilmiştir. Anlamsız elde edilen yol katsayıları modelden çıkarıldıktan sonra kadınlarda; GDÖ ile gelir arasında elde edilen yol katsayısı istatistiksel olarak anlamlı elde edilmiştir ve gelir düzeyi arttıkça GDÖ artmaktadır. Birisiyle yaşayan erkeklerde depresyonun azaldığı saptanmıştır. Erkeklerde ve kadınlarda yetersiz beslenme yaş ve depresyonla ilişkili bulunmuştur. Modelde tutulan önemli yol katsayıları, sosyodemografik faktörler, beslenme durumu ve depresyon arasındaki karmaşık ilişkilere dair ikna edici kanıtlar sağlamaktadır. Yaşlıların sağlığının yönetilmesinde bütünsel bir yaklaşım benimsenmelidir.

Anahtar Kelimeler: Malnütrisyon, beslenme, depresyon, yaşlı bireyler

1. INTRODUCTION

According to the definition of the European Society of Clinical Nutrition and Metabolism (ESPEN), malnutrition is a nutritional state that has measurable adverse effects with clinical consequences on tissue/body structure and function as a result of insufficient or excessive intake of energy, protein and other nutrients (1,2). In old age, emotional, physical and biological changes in lifestyle may negatively affect nutritional status and cause malnutrition (3). Malnutrition affects 10-40% of the elderly in the society (2,4).

With aging, changes occur in body composition, organ functions, energy need, energy expenditure, and nutritional requirements. These are decreased sense of taste and smell, decreased appetite, oral hygiene disorder and chewing defect due to loss of teeth, changes in the gastrointestinal system (dysphagia, gastric atrophy, malabsorption, etc.) and changes in the endocrine system. As a result of increased abdominal fat tissue and decrease in muscle mass, movement limitation, musculoskeletal problems, insulin resistance, hypertension, atherosclerosis and glucose/lipid metabolism disorders develop. In old age, there is a significant increase in the incidence of chronic diseases and malignancies and a decrease in cognitive abilities. Skipping meals and/or malnutrition is common as a result of psychological problems and care problems (5,6).

Depressive disorder, or depression, is a common mental health condition among elderly population. The global prevalence rate of depression increased to 28.4% from 2000 to 2021 (7). Because there aren't clear diagnostic standards tailored for depression in older adults, there's a tendency to overlook depression in the elderly, resulting in delayed treatment. This oversight contributes significantly to public health concerns affecting individuals, healthcare systems, and society at large (8). Research suggests that depression tends to be recurring and persistent, linking to heightened risks of mortality from metabolic diseases, cardiovascular issues, and cancer (9). Studies have shown that depression in the elderly increases the risk of malnutrition (9-11).

The significance of evaluating these parameters lies in the potential for early detection and intervention, which can substantially improve outcomes for the elderly. Moreover, understanding the associative and potentially causative relationships between nutritional status, depression, and various socio-demographic factors such as age, gender, income level, the presence of chronic disease, and living arrangements, is essential for formulating targeted prevention and management strategies.

Various methods are used to evaluate nutritional status in the elderly. Mini Nutrition Assessment-Short Form is one of the widely used malnutrition screening tools (12). The Geriatric Depression Scale (GDS) was designed specifically for use as a depression screening tool for older adults over the age of 65 (13). GDS consistently demonstrated high sensitivity and specificity when compared to other geriatric assessment scales (14). The aim of this study is to evaluate the nutritional status with Mini Nutritional Assessment (MNA) and depression with and Geriatric Depression Scale (GDS) of elderly people.

2. MATERIALS AND METHOD

2.1.Participants

The population of this cross-sectional research included 365 people over the age of 65 (n=365) who lived in the Elazig, Turkey. This study was conducted with elderly people who applied to Family Health Centers (FHC) and agreed to participate in the research. Written consent was taken. The inclusion criteria for the study include the absence of dementia, depression and other neurological disorders. Exclusion criteria included not being over 65 years of age.

Considering the sample size and the correlation of 0.136 between malnutrition and the geriatric depression scale (15); It was calculated as 332 individuals with 80% confidence (1-α), 95% test power (1-β), and an effect size of ρ=0.136. Considering possible losses, an increase of 10% was made and the study was completed with 365 people.

2.2.Data collection tools

The data of the research were collected through the Personal Information Form, Mini Nutritional Assessment Test, and Geriatric Depression Scale.

Mini Nutritional Assessment Test (MNA)

MNA is done using verbal questioning and anthropometric measurements. Since it does not require laboratory evaluation, it is frequently preferred, especially in outpatient patients (6). MNA is a rapid and reliable method for assessing nutritional status. The validity and reliability of MNA was determined by Guigoz et al. in 1994. The validity study of the long and short forms of the mini nutritional assessment (MNA) test in geriatric patients in Turkey was conducted by Sarıkaya (16). MNA test consists of 18 questions as 15 verbal and 3 anthropometric measurements. The total score ranges from 0 to 30 points The total MNA score between 23.5-30.0 points indicates good nutritional status, a score between 17.0-23.5 is an indicator of a risk of malnutrition, and a score lower than 17.0 points indicates malnutrition (17).

Geriatric Depression Scale (GDS)

It was developed by Yesavage et al. in 1983 for the depression scanning of the elderly population (18). Burke et al. proved the validity and reliability of the 15-item short form (19). The Turkish validity and reliability of the test was performed by Ertan and Eker (20). In this research, the short form of GDS was used. The short form of GDS contains a total of 15 questions. 5 questions (1,5,7,11,13) are constructed positively and the others are constructed negatively. In the evaluation of the scale, the answers "no" to positive questions and "yes" to negative questions were assigned 1 point each. A total score of 6 or more on the scale is considered significant for the diagnosis of depression (21).

2.3. Data Analysis

SPSS 21.0 (Statistical Package for Social Sciences) was used for the analysis of the data obtained. In statistical analysis, the significance level was accepted as $p<0.05$ within the 95% confidence interval. Descriptive statistics were performed to analyze the data. Then, to explore the relationships between MNA and depression, gender, age, income level, presence of chronic disease, whether or not living alone, path analyses were conducted using AMOS v24.

Path analysis is a powerful method of simultaneously modeling the causal relations among different variables, including one or more dependent variables and one or more independent variables.

2.4. Ethical considerations

Necessary permissions were obtained from the Non-Interventional Research Ethics Committee of Firat University (Elazig, Turkey) before conducting the study (decision dated and numbered 23.05.2019/09-05). Participating students were informed about the study and their verbal consent was obtained.

3. RESULTS

A total of 365 elderly individuals participated in our research and 54% were women. The average age is 72.75±5.75 (min 65-max 98) and the average age for women is 72.99±6.17 (min 65-max 98); In men, it is 72.47±5.21 (min 65-max 91). While 4.1% of elderly individuals have malnutrition, 26.6% are at risk of malnutrition. It was determined that 41.9% had depression. Data on other socio-demographic variables are presented in Table 1.

Table 1. Distribution of Elderly People According to Demographic Characteristics

		n	%
Age	60-74	268	73.4
	75-84	76	20.8
	≥85	21	5.8
Gender	Women	197	54.0
	Men	168	46.0
Marital status	Married	304	83.3
	Single	61	16.7
Educational status	İlliterate	117	32.1
	Primary school	155	42.5
	Middle school and above	93	25.5
Living alone	Yes	38	10.
	No	327	89.6
Income status	Good	77	21.1
	Middle	256	70.1
	Bad	32	8.8
MNA	≤ 17	15	4.1
	17-23	97	26.6
	≥23.5	253	69.3
GDS	Yes	153	41.9
	No	212	58.1
Diagnosed chronic disease	Yes	320	12.3
	No	45	87.7
TOTAL		365	100.0

In the light of the information obtained from the literature, we established a model that will reveal the relationships between income, age, gender, presence of chronic disease, and living alone with MNA and GDS (11,22,23). This model was set separately for men and women (Figure 1). The potential direct and indirect effects of the income, age, chronic disease, living with someone, (as independent variables) on MNA (as dependent variable) with GDS were tested. The model was re-specified according to the significance of the coefficients and the modified model was retested to identify the model's fit. The final tested model is displayed in Figure 2

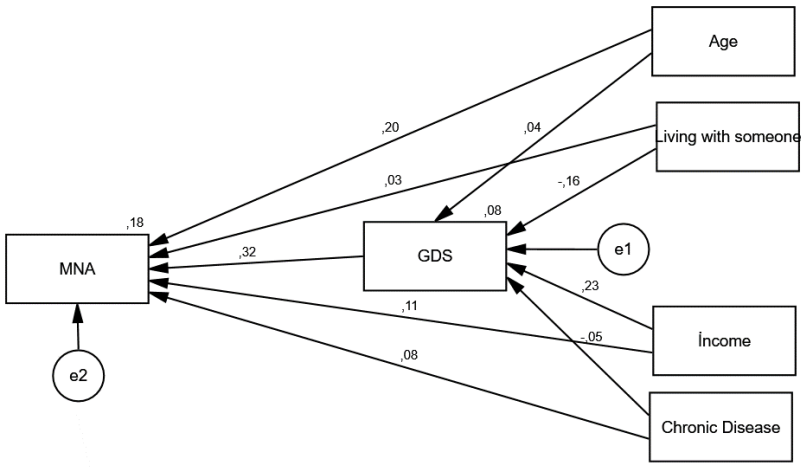
Table 2. Standardized and Unstandardized Regression Weights

GENDER				β 0	β 1	SE	TEST statistics	p
WOMEN	GDS	<---	Income	0.186	1.078	0.401	2.685	**0.007**
	MNA	<---	Age	0.249	0.023	0.006	3.796	**<0.001**
	MNA	<---	GDS	0.281	0.053	0.013	4.155	**<0.001**
MEN	GDS	<---	Income	0.237	1.193	0.373	3.197	**<0.001**
	MNA	<---	GDS	0.343	0.066	0.014	4.856	**<0.001**
	MNA	<---	Age	0.217	0.022	0.007	3.063	**0.002**
	GDS	<---	Living with someone	-0.164	-1.1975	0.892	-2.215	**0.027**

β 0: Standardize regression weights; β 1: Unstandardize regression weights.
MNA: Mini Nutritional Assessment; GDS: Geriatric Depression Scale

In the first analysis of the established model, it was determined that the presence of chronic disease and living alone in women did not affect both GDS and MNA, and that there was no relationship between age and depression, or between income and malnutrition. Similarly, it was observed that the presence of chronic disease in men was not associated with both GDS and MNA, depression and living alone did not affect MNA, and depression did not increase as age increased. When the fit values were examined, CMIN= 19.528, DF= 12, CMIN/DF= 1.627, RMSEA= 0.042. , CFI = 0.845 and GFI = 0.982.

A



B

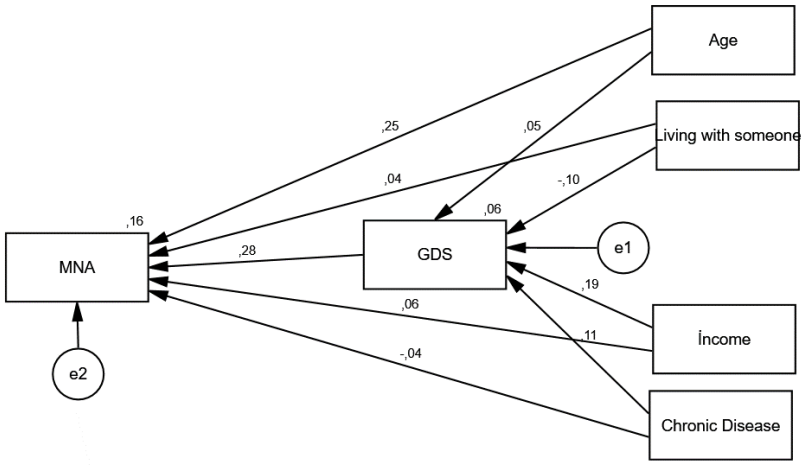
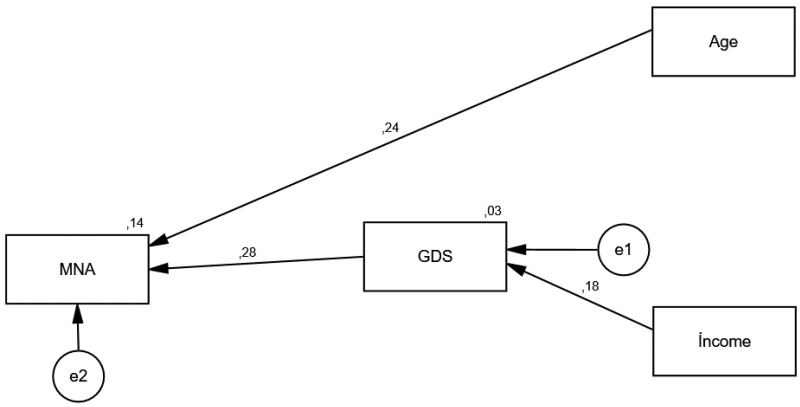


Figure 1. Path diagram of malnutrition (MNA) in the elder (A) women, (B) men.
Values are presented as standardized coefficient. All coefficients are significant in 0.05.

In line with the insignificant path coefficients in both men and women, these paths were removed from the model and the new model was analyzed again (Figure 2). In Table 2, the unstandardized and standardized analysis results are presented separately for men and women. After removing the insignificant path coefficients from the model, in women; The path coefficient between GDS and income was found to be statistically significant, and as the income level increases, GDS increases by 0.186 (β= 0.186; p=0.007). Similarly, it is seen that MNA increases as age increases (β= 0.249; p=<0.001) and MNA increases as GDS increases (β= 0.281; p=<0.001). GDS increased as income increased in men (β= 0.237; p=<0.001); It was found that depression decreased in men living with someone (β = -0.164; p = 0.027). Malnutrition in men is associated with age and depression; It was determined that malnutrition increased in men as age increased (β = 0.217; p = 0.002). It is also observed that malnutrition develops when depression occurs (β= 0.343; p=<0.001).

A



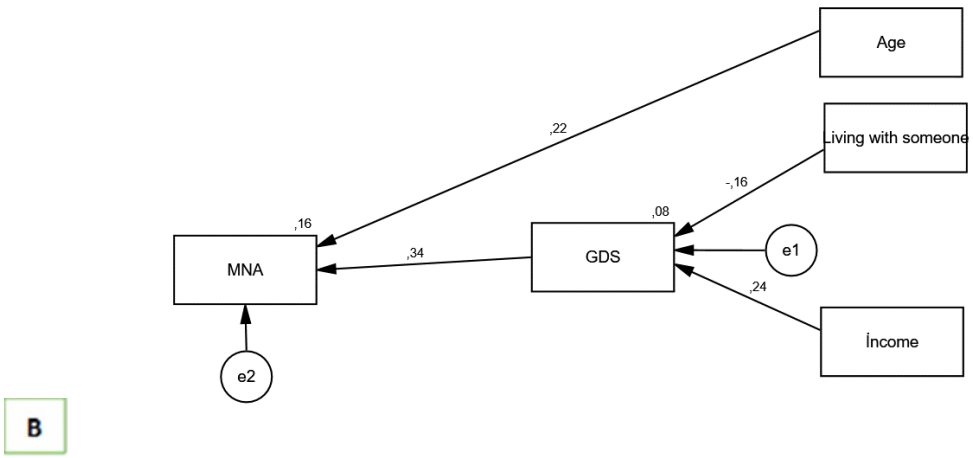


Figure 2. The final Path diagram of malnutrition (MNA) in the elder (A) women, (B) men. Values are presented as standardized coefficient. All coefficients are significant in 0.05.

4. DISCUSSION

This study was planned and conducted in order to evaluate the nutritional status with MNA and depression with GDS of elderly people. Malnutrition was found in 4.1% and malnutrition risk was detected in 26.6%. It was determined that 41.9% had depression. Path analyses were performed to investigate the relationship between MNA and depression, gender, age, income level, presence of chronic disease, and living alone or not.

Depression, a prevalent mental health condition, is intricate in its origins and poses a substantial burden on public well-being. Prompt recognition of individuals susceptible to depression is paramount for implementing effective interventions and preventive measures (24). Because this directly affects their functional abilities and general sense of well-being (25). Researchers had documented 20 predictive models for identifying depression onset. These models integrate various risk factors such as age, physical health, and cognitive abilities. However, there's a notable gap in research concerning the connection between dietary habits and predicting depression (10).

The malnutrition of older adults can result in a range of detrimental outcomes, including compromised immunity, reduced disease resilience, muscle wasting, decreased body temperature, osteoporosis, cognitive decline, heightened risk of falls, and premature mortality (26). Our study highlighted the complex interrelationships between sociodemographic factors, nutritional status, and depression in an elderly cohort, underpinning the multifaceted nature of these conditions. The prevalence rates of malnutrition (4.1%) and malnutrition risk (26.6%), alongside a notable incidence of depression (41.9%), underscore the critical need for integrated care strategies targeting these health parameters. In a study conducted with 335 participants over the age of 60, the distribution of nutritional status of the participants was found that 67% had normal MNA scores, 32% were at risk of malnutrition and less than 1% were malnourished (27). Compared with similar study conducted in Colombia, we found similar level frequency for malnutrition and slightly lower risk of malnutrition: 4.8% and 34.2% as compared with 4.1% and 26.6% in our study (25).

The finding resonates with previous research indicating the complex and sometimes contingent nature of these relationships. For instance, the lack of associativity between chronic disease presence and both GDS and MNA scores in our study aligns with earlier research suggesting that the impact of chronic diseases on mental and nutritional health may be mediated by other

variables, such as the type and severity of the disease, as well as individual coping mechanisms and social support systems (28). Notably, the revised model revealed significant associations among GDS and income, age, and MNA scores, suggesting that higher income levels are associated with an increased risk of depression, a finding that contrasts with some earlier studies but points to the potential impact of psychosocial factors and expectations associated with socioeconomic status (29). Moreover, our findings align with established literature regarding the positive correlation between age and MNA scores, emphasizing the greater nutritional vulnerability associated with advanced age (25,30).

The gender-specific analysis further elucidated distinct patterns of association. In women, significant relationships between income and GDS scores, and between age and MNA scores, were discerned, highlighting gender as a key variable in understanding these health outcomes. This gender disparity accords with prior research indicating that socioeconomic and biological differences may influence the manifestation and impact of depression and nutrition-related outcomes (31). In men, the findings indicate a marked relationship between living arrangements and depression levels, suggesting the protective role of cohabitation in mitigating depressive symptoms. This is supported by literature underscoring the importance of social support and companionship in preserving mental health (32). Furthermore, the dual role of age and depression in predicting malnutrition among men underscores the intertwined nature of mental and nutritional health, resonating with studies identifying these as bidirectional influential (33).

The significant path coefficients retained in the model offer compelling evidence of the intricate associations between sociodemographic factors, nutritional status, and depression, underscoring the critical importance of adopting a holistic and nuanced approach to managing health among the elderly.

The findings of our research have significant implications for both nursing practice and public health, offering critical insights into the interconnectedness of nutritional status, depression, and socio-demographic factors among the elderly. Understanding these complex relationships is essential for nurses, public health professionals, and policymakers, enabling the development of more targeted, effective interventions aimed at improving the well-being of older populations. For nursing professionals, particularly those working in geriatric care, the study highlights the necessity of comprehensive assessments that go beyond traditional health evaluations. Nurses are often at the frontlines of patient care, and with these findings, they can tailor their care plans to incorporate not just physical health assessments but also screenings for malnutrition risk and depressive symptoms. Identifying individuals at risk allows for early intervention, potentially preventing the progression of malnutrition and depression, which can have profound implications for the patient's quality of life and health outcomes. From a public health perspective, the evidence underscores the importance of creating and implementing age-sensitive health policies that address the multifaceted needs of the elderly. With the understanding that socioeconomic status, including income levels, substantially affects depression and nutritional status, public health initiatives can be better tailored to address these determinants. Programs focusing on nutritional education, mental health support services, and social inclusion could be particularly beneficial in mitigating the risks identified in this study.

The significant associations found between sociodemographic factors, malnutrition, and depression call for the integration of screening programs within routine healthcare services for the elderly. Such initiatives could involve multidisciplinary teams to ensure a holistic approach to patient care, integrating nutritional counseling, mental health support, and social services as part of routine health check-ups. The gender-specific findings of the study also provide a compelling case for gender-sensitive approaches in nursing and public health strategies. Recognizing the distinct needs and risk

profiles of men and women in relation to malnutrition and depression can guide the development of targeted interventions, promoting more equitable health outcomes across genders.

Lastly, these findings serve as a valuable resource for healthcare policymakers, offering evidence-based insights that can guide the allocation of resources and the formulation of policies aimed at addressing the intersecting issues of malnutrition and depression among the elderly. Furthermore, identifying gaps in current knowledge can spur future research initiatives, particularly in exploring the underlying mechanisms driving the observed associations and in evaluating the effectiveness of interventions tailored to the elderly population.

5. CONCLUSION

In conclusion, the prevalence rates of malnutrition (4.1%) and malnutrition risk (26.6%), alongside a notable incidence of depression (41.9%), underscore the critical need for integrated care strategies targeting these health parameters. Our study contributes significantly to the fields of nursing and public health by highlighting the critical intersections between malnutrition, depression, and socio-demographic factors among the elderly. By informing more nuanced, comprehensive care strategies and public health policies, these findings can help pave the way for improved health outcomes, enhanced quality of care, and greater well-being for older adults. Prospective research should further explore these relationships within larger, more diverse cohorts, incorporating longitudinal designs to elucidate causal pathways and inform targeted interventions.

LIMITATIONS

This study only investigated elderly in one province, Turkey.

DISCLOSURE

The authors report no conflicts of interest in this work.

AUTHORSHIP CONTRIBUTIONS

Concept – B.U.K., P.S.; Design –B.U.K., P.S.; Data collection and data analysis – B.U.K., P.S.; Writing – B.U.K., P.S.; Critical review – B.U.K., P.S.

CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

FINANCIAL DISCLOSURE

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

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