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Dysphagia Frequency and Associated Risk Factors in Geriatric Patients Receiving Home Care

ABSTRACT
Objective: In our study, it was aimed to determine dysphagia frequency in patients 65 years of age and older who were received home care and to assess factors associated with dysphagia.
Methods: This cross-sectional, descriptive study was conducted in patients who were registered to Home Care Services of Samsun Training and Research Hospital between December 1, 2021, and March 1, 2022. In all patients, demographic data, level of dependence, nutrition methods, use of enteral nutrition supplement, body mass index (BMI), and comorbidity were assessed by Charlson Comorbidity Index (CCI) while dysphagia symptoms were assessed by Eating Assessment Tool (EAT-10) and nutritional status was assessed by Nutritional Risk Screening-2002 (NRS) using face-to-face interview method.
Results: A total of 413 patients were included in our study, of which 62.5% (n=258) were female. Dysphagia symptoms were present in 44.6% (n=184). The dysphagia frequency was significantly high in male patients (p=0.025), in patients aged ≥85 years (p=0.001), in those with high CCI score (p<0.001), in those with cerebrovascular disease (p<0.001), dementia (p<0.001), and hemiplegia (p=0.001), and in bedridden patients (p<0.001). Similarly, dysphagia frequency was higher in patient with nutritional risk and those using enteral nutrition supplement (p<0.001). In multivariate logistic regression analysis, it was found that dementia and increased nutritional risk were independent risk factors for presence of dysphagia symptoms (p<0.001).
Conclusions: Our study showed a high rate of dysphagia symptoms in the geriatric patient population receiving home care. It has been determined that the rate of dysphagia is increased in patients with older age, nutritional risk, dementia, cerebrovascular disease, and multiple comorbidities.
Keywords: Home Care Services, Deglutition Disorders, Aged, Comorbidity.

Evde Bakım Hizmeti Alan Geriatrik Hastalarda Disfaji Sıklığı Ve İlişkili Risk Faktörleri

ÖZET
Amaç: Çalışmamızda evde bakım hizmeti alan 65 yaş ve üstü hastalarda disfaji sıklığının belirlenmesi ve disfaji ile ilişkili faktörlerin değerlendirilmesi amaçlanmıştır.
Gereç ve Yöntem: Araştırmamız kesitsel tanımlayıcı bir çalışma olup 1 Aralık 2021 ile 1 Mart 2022 tarihleri arasında Samsun Eğitim ve Araştırma Hastanesi Evde Sağlık Hizmetlerine kayıtlı hastalar ile gerçekleştirildi. Katılımcıların demografik özellikleri, yatağa bağımlılık durumu, beslenme yöntemleri, enteral beslenme ürün kullanımı, beden kitle indeksi (BKİ) verileri ile eşlik eden kronik hastalıklarının belirlenmesi amacı ile Charlson Komorbidite İndeksi (CCI), disfaji belirtileri açısından Yeme Değerlendirme Aracı (EAT-10), beslenme durumunun değerlendirilmesi için Nütrisyonel Risk Tarama-2002 (NRS) yüz yüze uygulanarak veriler kaydedildi.
Bulgular: Çalışmaya %62,5'i (n=258) kadın olmak üzere toplam 413 hasta dahil edildi. %44,6'sında (n=184) disfaji semptomları mevcuttu. Erkeklerde (p=0,025), 85 yaş ve üzeri kişilerde (p=0,001), CCI puanı yüksek olanlarda (p<0,001), serebrovasküler hastalık (p<0,001), demans (p<0,001), hemipleji tanısı olanlarda (p=0,001), yatağa tam bağımlı kişilerde (p<0,001) disfaji oranı yüksekti. Benzer şekilde beslenme riski mevcut bireylerde ve enteral beslenme ürünü kullananlarda disfaji oranı anlamlı derecede yüksek saptandı (p<0,001). Multivaryat lojistik regresyonda demansın ve artmış beslenme riskinin disfaji semptomlarının varlığında bağımsız risk faktörleri olduğu tespit edildi (p<0,001).
Sonuç: Çalışmamız evde bakım hizmeti alan geriatrik hastalarda yüksek oranda disfaji semptomlarının varlığını göstermiştir. İleri yaş, artmış beslenme riski, demans, serebrovasküler hastalık ve çoklu komorbiditesi olan hastalarda disfaji oranının arttığı belirlenmiştir.
Anahtar Kelimeler: Evde Bakım Hizmetleri, Yutma Bozuklukları, Yaşlı, Komorbidite.

INTRODUCTION

Dysphagia is a clinical syndrome defined as difficulty moving intraoral content from mouth to esophagus safely or irregular swallowing (1, 2). Dysphagia is associated with malnutrition, dehydration, respiratory tract infections, mortality, increased hospitalization rate and healthcare costs (3-6). Dysphagia is defined secondary to stroke, head and neck cancer, or neurodegenerative disorders; however, it is generally specified as a geriatric syndrome which is highly common among elder individuals (7-10). The dysphagia frequency has been reported as 10-33% among elder individuals while it is estimated as 26.2-56.7% in hospitalized geriatric patients (3, 11-13).

Owing to advances in the methods for early diagnosis and treatment, the disease-related mortality has been decreased and the life expectancy has been prolonged, resulting in increased number of individuals requiring lifelong treatment and care. It can be sometimes challenging to visit outpatient clinics for elder individuals who require management for chronic diseases, particularly if they experience somewhat dependency in daily living activities (14). Home health services is an important step to provide solution in this problem and it is defined as provision of physical examination, laboratory tests, treatment, and rehabilitation in home settings by a professional medical team to the patients who experience difficulty accessing to healthcare facilities for several chronic or malignant diseases or postoperative care (15). By increasing prevalence of chronic diseases, a tendency towards reduction in swallowing function has been observed in many patients using home health services. Dysphagia worsens nutritional status and decreases food consumption, resulting in malnutrition and weight loss. This leads physical weakness, resulting in being vulnerable to acute diseases such as infections, heart diseases or dehydration (3-5). Such conditions may cause unscheduled hospitalizations in patients requiring health home services. It was found that the dysphagia was a predictor for poor prognosis in patients using health home services (14). In a study by Melgaard et al., it was found that there was a significant increase in length of hospital stay and mortality in hospitalized geriatric patients with dysphagia when compared to those without (12). In a systematic review by Attrill et al., it was reported that dysphagia increased healthcare costs by 40.4% (6).

Therapeutic interventions for dysphagia include dietary modification, swallowing maneuvers, postural adjustments, and rehabilitative swallowing exercises. In cases with severe swallowing dysfunction, nasogastric feeding tube or percutaneous endoscopic gastrostomy can be used to maintain adequate nutrition (16). These therapeutic interventions are planned or performed in the context of home healthcare services. The prevention of clinical outcomes resulting from dysphagia may improve patient outcomes and contribute reducing healthcare costs (1). In addition, the estimation of dysphagia frequency by early screening in patients receiving home healthcare services will provide knowledge about scope of potential efforts and benefits.

In our study, it was aimed to determine dysphagia frequency in patients 65 years of age and older who were received home care and to assess factors associated with dysphagia.

MATERIAL AND METHODS

Study Population and Design: This cross-sectional, descriptive study was conducted in patients who were registered to Home Care Services of Samsun Training and Research Hospital between December 1, 2021, and March 1, 2022. The study included patients 65 years of age and older and not in the terminal phase after obtaining informed consent from patients and/or primary caregivers (in patients with cognitive disorder). Patients under the age of 65, who refused to participate in the study, and who were in the terminal phase were excluded from the study. In all patients, demographic data, level of dependence, nutrition methods, use of enteral nutrition supplement, body mass index (BMI), and comorbidity were assessed by Charlson Comorbidity Index (CCI) while dysphagia symptoms were assessed by Eating Assessment Tool (EAT-10) and nutritional status was assessed by Nutritional Risk Screening-2002 (NRS) using face-to-face interview method.

Nutritional Risk Screening-2002 (NRS): The NRS is used to assess nutritional risk (17). The validity study of Turkish version was performed by Bolayır et al. (18). It incorporates a pre-screening test. In pre-screening tests, the patient was asked whether BMI of his/her is <20.5 kg/m2; whether he/she lost weight in the past 3 months; whether his/her food intake was reduced in the past week; and whether the patient is critically ill. If yes to one of these questions, primary screening is performed; however, if no for all answers, the patient should be re-screened regularly using pre-screening test. The primary screening measures disorders in nutritional status and disease severity. The points from items in the primary screening are added; an additional point is added if the patient is above 70 years of age. Total score ranges from 0 to 7. The scores ≥3 points indicate increased nutritional risk and need for nutritional support (17).

Eating Assessment Tool (EAT-10): The EAT-10 is a questionnaire including 10 items, which is used to screen dysphagia (19). It is proven

to be a reliable screening tool in patients at risk for dysphagia and aspiration. Although the EAT-10 is a symptom checklist, it can predict objective evidence for swallowing difficulty. Each item represents one dysphagia symptom, which is rated by 0-4 points based on presence and severity of specific symptom. The validity study of Turkish version was performed by Demir et al. (20).

Ethical Approval: Ethics committee approval was obtained with the Ethics Committee decision no. 2021/19/6 of Samsun University Samsun Training and Research Hospital Clinical Research Ethical Committee.

Data Analysis: Descriptive statistics are presented with mean and standard deviation values for continuous data; they are presented with numbers and percentages for categorical data. The compliance of continuous data with a normal distribution was evaluated by Kolmogorov-Smirnov test. Independent groups t-test was used to compare two independent groups with parametric characteristics, and the Mann-Whitney U test was used to compare two non-parametric independent groups. Finally, a multivariate logistic regression model was created to identify risk factors associated with signs of dysphagia. For statistical significance, p values in the confidence interval of 95% and below 0.05 were considered significant. The program International Business Machines Corporation Statistical Package for the Social Sciences (IBM SPSS) version 26.0 was used in the statistical analysis of data.

RESULTS

A total of 413 patients were included in our study, of which 62.5% (n=258) were female. Mean age was 80.19 ± 9.25 years (range: 65-103 years) and 38.7% (n=160) of patients were aged ≥85 years. Of the patients 57.1% (n=236) were bedridden while 35.6% (n=147) were semi-dependent. There was dementia in 42.9%, cerebrovascular disease in 34.1%, diabetes mellitus in 32.7% and heart failure in 28.3% of the patient. Of the patients, 12 were fed by nasogastric tube and 23 by percutaneous endoscopic gastrostomy while 28.1% (n=116) were using enteral nutrition products. Of the patients, 37.8% (n=156) had normal weight while 47.5% (n=196) were overweight and 26.2% (n=106) had increased nutritional risk. Dysphagia symptoms were present in 44.6% (n=184) (Table 1).

The dysphagia frequency was significantly high in male patients (p=0.025); in patients aged ≥85 years (p=0.001); in those with high CCI score (p<0.001); in those with cerebrovascular disease (p<0.001), dementia (p<0.001) and hemiplegia (p=0.001); and in bedridden patients (p<0.001). Similarly, dysphagia frequency was significantly higher in patient with nutritional risk and those using enteral nutrition products (p<0.001). Dysphagia frequency was lower in obese and overweight patients compared to remaining groups (p<0.001) (Table 2).

Table 1. Demographic and clinical characteristics of the patients (n=413)

Variables	n	%
Gender		
Female	258	62.5
Male	155	37.5
Age		
65-74	123	29.8
75-84	130	31.5
≥ 85	160	38.7
Level of dependence		
Independent	30	7.3
Semi-dependent	147	35.6
Bedridden	236	57.1
Chronic diseases[a]		
Myocardial infarction	34	8.2
Heart failure	117	28.3
Peripheral vascular disease	50	12.1
Cerebrovascular disease	141	34.1
Dementia	177	42.9
Rheumatological disease	33	8.0
Peptic ulcer	40	9.7
Chronic pulmonary disease	65	15.7
Diabetes	135	32.7
Hemiplegia	57	13.8
Renal disease	39	9.4
Cancer	29	7.0
Use of enteral nutrition supplement		
Present	116	28.1
Absent	297	71.9
Feeding method		
Oral	378	91.5
Nasogastric tube (NG)	12	2.9
Percutaneous endoscopic gastrostomy (PEG)	23	5.6
Nutritional risk[b]		
Absent	305	73.8
Present	106	26.2
BMI category[c]		
Underweight	1	0.2
Normal weight	156	37.8
Overweight	196	47.5
Obese	60	14.5
Dysphagia[d]		
Absent	229	55.4
Present	184	44.6

[a] Charlson Comorbidity Index (CCI)
[b] Nutritional Risk Screening-2002 (NRS), Nutritional risk (NRS ≥ 3)
[c] BMI (Body Mass Index) category: <18.5 = underweight, 18.5-24.9 = normal weight, 25.0-29.9 = overweight, and ≥30 = obese
[d] Dysphagia (Eating Assessment Tool (EAT-10) ≥ 3)

A binary logistic regression model was established to determine the factors affecting the dysphagia dependent variable with the independent variables. In multivariate logistic regression analysis, it was found that dementia (OR=2.352, 95% CI 1.635-3.384, p<0.001) and increased nutritional risk (OR=41.368, 95% CI 13.329-

128.394, p<0.001) were independent risk factors for presence of dysphagia symptoms. The model's goodness of fit was statistically significant (p<0.01). It was determined that the general fit of the logistic model was good (Cox-Snell R2=0.537,

Nagelkerke R2=0.718). When the model was examined by the Hosmer-Lemeshow test, the model was found adequate to predict dysphagia risk factors ($\chi2$ =10.374, p>0.05) (Table 3).

Table 2. Evaluation of dysphagia according to demographic and clinical characteristics of the patients

Variables	Dysphagia		p value
	Absent	**Present**	
Gender			
Female	154 (59.6%)	104 (40.4%)	**0.025**[a]
Male	75 (48.4%)	80 (51.6%)	
Age			
65-74	84 (68.3%)	39 (31.7%)	
75-84	71 (54.6%)	59 (45.4%)	**0.001**[a]
≥ 85	74 (46.3%)	86 (53.7%)	
CCI (points)	2.61±1.96	3.52±2.46	**<0.001**[b]
Chronic diseases			
Myocardial infarction	20 (58.8%)	14 (41.2%)	0.554[a]
Heart failure	64 (54.7%)	53 (45.3%)	0.848[a]
Peripheral vascular disease	30 (60.0%)	20 (40.0%)	0.490[a]
Cerebrovascular disease	60 (42.5%)	81 (57.5%)	**<0.001**[a]
Dementia	56 (31.6%)	121 (68.4%)	**<0.001**[a]
Chronic pulmonary disease	31 (47.7%)	34 (52.3%)	0.171[a]
Rheumatological disease	18 (54.5%)	15 (45.5%)	0.913[a]
Peptic ulcer	21 (52.5%)	19 (47.5%)	0.693[a]
Diabetes	86 (63.7%)	49 (36.3)	0.112[a]
Hemiplegia	20 (35.1%)	37 (64.9%)	**0.001**[a]
Renal disease	22 (56.4%)	17 (43.6%)	0.899[a]
Cancer	12 (41.4%)	17 (58.6%)	0.114[a]
Level of dependence			
Independent	25 (83.3%)	5 (16.7%)	
Semi-dependent	104 (70.7%)	43 (29.3%)	**<0.001**[a]
Bedridden	100 (42.4%)	136 (57.6%)	
Use of enteral nutrition supplement			
Present	9 (7.7%)	107 (92.3%)	**<0.001**[a]
Absent	220 (74.1%)	77 (25.9)	
BMI category[c]			
Underweight	0 (0.0%)	1 (100.0%)	
Normal weight	54 (34.6%)	102 (65.4%)	**<0.001**[a]
Overweight	124 (63.3%)	72 (36.7)	
Obese	51 (85.0%)	9 (15.0%)	
Nutritional risk[d]			
Absent	224 (73.4%)	81(26.6%)	**<0.001**[a]
Present	5 (4.6%)	103 (95.4%)	

Abbreviations: CCI, Charlson Comorbidity Index; BMI, Body Mass Index.
[a] Pearson Chi-square test. Bold values define the statistical significance of p <0.05.
[b] Mann-Whitney U test. Bold values define the statistical significance of p <0.05.
[c] BMI (Body Mass Index) category: <18.5 = underweight, 18.5-24.9 = normal weight, 25.0-29.9 = overweight, and ≥30 = obese
[d] Nutritional Risk Screening-2002 (NRS), Nutritional risk (NRS ≥ 3)

Table 3. Multivariate logistic regression analysis of variables[a]

Variables	OR*	95% CI	p
Gender	1.302	0.587-2.885	0.516
Age	1.301	0.841-2.015	0.238
Cerebrovascular disease	1.383	0.928-2.061	0.111
Dementia	2.352	1.635-3.384	**<0.001**
Bedridden	0.960	0.477-1.933	0.909
Nutritional risk	41.368	13.329-128.394	**<0.001**
BMI category	0.818	0.461-1.449	0.491

- Abbreviations: OR, Odds Ratio; CI, Confidence interval; BMI, Body Mass Index.
[a] Constant p=0.030, model p<0.01.
Cox-Snell R^2=0.537, Nagelkerke R^2=0.718.
Hosmer-Lemeshow test ($\chi2$ =10.374, p>0.05).

DISCUSSION

This cross-sectional study showed that frequency of dysphagia symptoms was high in patients aged ≥65 years who were registered to Home Care Services of Samsun Teaching and Research Hospital between December 1, 2021, and March 1, 2022. The dysphagia frequency was determined as 44.6% among 413 patients assessed. It was found that dysphagia was high in male patients; in patients aged≥85 years; in those with high comorbidity score; in those with cerebrovascular disease, dementia, and hemiplegia; and in bedridden patients. The dementia and increased nutritional risk were identified as independent risk factors for presence of dysphagia symptoms.

In our study, dysphagia frequency in elder individuals was consistent with literature. In studies including hospitalized patients aged ≥65 years, dysphagia frequency was reported as 43.1% and 42% (1, 13). In Denmark, it was found that dysphagia symptoms were present in 50% of elder individuals admitted to geriatrics department (12). In Japan, there was increased symptoms of dysphagia in 78.7% of elder individuals given home care services (14). Lin et al. found dysphagia frequency of >60% in elder individuals residing in nursing facilities (21).

In our study, dysphagia frequency was significantly increased in patients aged ≥85 years; however, age was not an independent factor for dysphagia in multivariate logistic regression analysis. In a study by Olesen et al., it was found that patients with dysphagia symptoms were significantly older than those with normal swallowing capacity (1). In Spain, dysphagia frequency was found to be 82.4% in elder individuals (≥80 years; mean age: 93.5) presented to acute geriatrics unit of an academic center (2).

In our study, frequency of dysphagia symptoms was significantly higher in patients with cerebrovascular disease and dementia. The dementia was identified as an independent risk factor for presence of dysphagia symptoms in multivariate logistic regression analysis in our study. Baijens et al. reported that frequency of swallowing difficulties could reach up to 93% in patients with dementia (9). Dysphagia rate was reported as 45% in patients with dementia living in nursing facilities (22). In the literature, there is a well-defined relationship between dysphagia and cerebrovascular disease. In a systematic review by Takizawa et al., it has been reported that dysphagia frequency estimations ranged from 8.1% to 80% in stroke patients (7). Güçmen et al. detected dysphagia symptoms in 23.4% of stroke patients (23). In general, patients with stroke recover motor functions partially or near-completely within few months after stroke. It was predicted that only 11-13% of patients with dysphagia after stroke had persistent dysphagia after 6 months (24). In home care settings, frequency of neurological disease is higher in elder individuals at risk for dysphagia. Watanabe et al. found that there was history of stroke in 44.7% and 27.9% of elder individuals with or without dysphagia in home care settings, respectively (14).

In our study, it was found that CCI score was significantly higher in patients with dysphagia. Similarly, in a study Olesen et al., high CCI scores were linked to dysphagia symptoms (1). These results indicate that presence of dysphagia symptoms based on CCI scoring system can be associated to multi-morbidity and severe comorbidities. Carrion et al. reached similar conclusion by assessing dysphagia symptoms and CCI scores in acute geriatric patients while Melgaard et al. found no significant association (3, 12). In elder individuals, muscle atrophy is common particularly in the presence of multiple morbidities. This leads further impairment in swallowing function (10).

In our study, it was found that nutritional risk was significantly correlated with dysphagia symptoms. In an acute geriatric patient group, Olesen et al. found similar outcomes using EAT-10 and NRS to detect dysphagia and nutritional risk (1). Güçmen et al. found higher malnutrition rate in stroke patients with dysphagia using EAT-10 and Geriatric Nutrition Risk Index (GNRI) (23). Carrion et al. found a significant correlation between malnutrition and dysphagia using V-VST and Mini Nutritional Assessment (MNA) (3). Dysphagia may increase risk for insufficient food intake and nutrition by leading challenging, painful, anxious, and socially disturbing mealtimes. On the other hand, malnutrition can cause sarcopenia, neuromuscular dysfunction and other comorbidities which may lead impaired swallowing activity (1, 25, 26). In cancer patients, dysphagia is generally associated with cachexia (27). Dysphagia results in anorexia in elder individuals and subsequent weight loss may exacerbate dysphagia (10).

It should be noted that the current study was limited to investigating the symptom of dysphagia. Again, no dysphagia diagnosis was made, or no gold standard tools such as point-of-care screening, Video Fluoroscopic Swallowing Study (VFSS) or Fiberoptic Endoscopic Evaluation of Swallowing (FEES) were used in the study. This study has some strengths such as prospective design and inclusion of elder individual with progressive physical and/or cognitive regression.

CONCLUSION

Our results showed that dysphagia frequency was higher among geriatric patient population receiving home care services. The results indicate increased dysphagia rate in individuals with nutritional risk, dementia, cerebrovascular disease, or multiple comorbidities. In elder individual, early recognition of dysphagia risk is important to

prevent dysphagia-related complications as well as morbidity and mortality in home care settings. Specific exercises and rehabilitations programs are available to enhance muscles involved swallowing. In order to promote early intervention in patients at risk for dysphagia, it is recommended that healthcare professionals involved in the management of geriatric patients should recognize early symptoms and that an objective swallowing assessment should be routinely performed during provision of home healthcare services.

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