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Research Article

Investigation of the relationship between depression levels and nutritional status in elderly patients receiving home health care services

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This study was previously submitted as a Family Medicine Specialization thesis by Gizem Çetinyol.

ABSTRACT

Objective: The research explores the factors influencing the nutrition levels of people aged 65 years and older enrolled in home health services, focusing on depression levels, functional dependency, existing comorbid conditions and sociodemographic characteristics.

Methods: The study is a single-centered, cross-sectional, descriptive, and prospective analysis conducted with patients registered at the Home Health Services at SBÜ Izmir Bozyaka Training and Research Hospital . The sample size was estimated assuming that the prevalence of malnutrition among the elderly was 40%, with a error margin of 0.05% and a 95% confidence interval, and reaching a target of 368 individuals. Sociodemographic data were collected via surveys. Nutrition levels was measured utilizing the Mini Nutritional Assessment Scale- Long Form, functional dependence with the Barthel Index, comorbidities via the Charlson Comorbidity Index, and depression levels using the Yesavage Geriatric Depression Scale. Statistical analysis of the data was performed using IBM SPSS 26 program.

Results: Among the respondents, 60.6% (n=223) were female and the mean age was 81.35±7.95 years (range: 65-99). In education terms, 84.8% had completed elementary school or less (n=312), and 79.4% received care from family members (n=292). The average body mass index was 25.4±4.2 kg/m² (min: 16.5 kg/m²; max: 49 kg/m²). Nutritional assessments showed that 29.6% were insufficiently nourished, 44% were at risk of malnutrition. In daily activities, 16.8% were fully dependent, while 47.3% were severely dependent. According to the comorbidity index, 89.1% were at very high risk for mortality. Additionally, 62.5% were confirmed as depressed, with 10.3% likely depressed. A significant association was found between nutrition status and some factors such as caregiver status, gender, dental hygiene and BMI.

Conclusion: The study highlights a considerable prevalence of depression and its adverse effect on nutritional health. Depression levels were found to have a strong negative correlation with nutritional status, indicating that high levels of depression may negatively affect the nutritional well-being of older adults and emphasizing the need to address both nutrition and mental health in this demographic group.

Keywords: home care services, malnutrition, depressive disorder, aged

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Introduction

Nowadays, the increasing elderly population has raised an important health problem, especially in developing countries. Improving the livability of elderly individuals is a necessity that affects not only their individual health status but also social welfare.[1] One of the main ways to heal livability is the prevention and management of health problems frequently encountered in the elderly. As an exemple, malnutrition is an important condition that negatively affects both physical and psychological health status of elderly individuals.[2,3]

Home health care services is a service model that enables individuals to receive medical care without leaving their own living spaces and has an crucial role to play in improving the livability of elderly individuals.[4,5] However, it is known that the prevalence of malnutrition and depression is high among individuals benefiting from these services, and that many of them are at risk of malnutrition and depression.[6] Factors such as increasing loneliness in the aging process, loss of relatives, retirement and decreasing social roles increase the risk of depression.[7] Especially in elderly individuals who have difficulty in daily living activities and who are enrolled in home health services, depression may negatively affect the nutritional status of the person and may pave the way for the development of malnutrition. In the literature, it is seen that these two conditions are frequently seen together and negatively affect each other.[3] Although malnutrition decreases the physical endurance and cognitive capacity of the individual, depression increases the risk of malnutrition by negatively affecting the appetite and eating habits of the individual.[3,7]

The main objective of this study was to identify the relationship between depression levels and nutrition levels of people aged 65 years and over enrolled in Home Health Services Unit of SBU İzmir Bozyaka Training and Research Hospital.

Material and Method

This research is a descriptive, cross-sectional, single-centre survey study. The population of the study included individuals aged 65 years and over who were registered to SBU İzmir Bozyaka Training and Research Hospital Home Health Care Services. Taking the frequency of malnutrition in elderly individuals as 40%, it was aimed to reach at least 368 people as a result of the model sample calculation (according to the Cochran formula) with an error margin of 0.05% and 95% confidence level. The study was completed with 368 people aged 65 years and over, who were registered in the Home Health Care Services of SBU İzmir Bozyaka Training and Research Hospital , who could be fed orally, who were able to answer the questionnaire questions and who agreed to participate in the study. The ethical approval was obtained from the SBU İzmir Bozyaka Training and Research Hospital Clinical Research Ethics Committee on September 14, 2023 (Decision number: 2023/157). “Informed consent form” was obtained from the participants.

A questionnaire was administered to the people registered to the SBU İzmir Bozyaka Training and Research Hospital Home Health Care Services between 01.10.2023- 31.12.2023 by contacting them face-to-face, by telephone, by visiting them at their homes, by informing them about this study during their application to our outpatient clinic, and by making use of patient files. The people were selected according to the ‘simple random sampling’ method, one of the ‘probability-based sampling’ methods.

The sociodemographic information section of the questionnaire applied in the study was prepared by the researcher by reviewing the literature and consists of 7 questions including the descriptive participants' characteristics (gender, age, education level, caregiver, marital status, dental health, dental cleaning frequency). In addition, Mini

Nutritional Assessment Scale (MNA, kappa=0.68, sensitivity=92% and specifity=86%), Modified Barthel Activities of Daily Living Index (Barthel ADL, Cronbach's alpha=0.93), Modified Charlson Comorbidity Index (CCI) and Yesavage Geriatric Depression Scale (GDS, Cronbach's alpha=0.92) were included in the study questionnaire.[8-10]

For the statistical analysis of this study, IBM SPSS 26.0 software was used. Descriptive statistics were presented as frequency (n), percentage (%), mean ($\bar{X}$), standard deviation (SD), minimum, and maximum values. To test the relationship between categorical variables, the Chi-square test, Fisher's Exact test, and Fisher Freeman Halton Exact test were applied. The normal distribution of continuous data was assessed by examining skewness and kurtosis coefficients.[11] Since the skewness and kurtosis values were within the acceptable ranges, Independent Samples T-test and One-Way Analysis of Variance (ANOVA) were conducted, and Tukey HSD and Tamhane tests were used as post-hoc analyses where appropriate.[12] Pearson correlation analysis was performed to determine the relationships among the scale scores, and the results were considered statistically significant at a level of $p<0.05$. In addition, ordinal logistic regression analysis was performed to identify the factors influencing depression levels, and the results were evaluated using odds ratios (OR).

Results

The average age of survey participants was 81.4+8 (min. 65-max. 99), and 60.6% were female. 84.8% of the participants had completed primary school, 46.7% were married, and 79.4% had family caregivers. 41% of the participants were in the middle-aged group, while 37.8% were in the elderly group. Detailed information is provided in Table 1.

Table 1. Sociodemographic characteristics of the participants

Sociodemographic characteristics	**N**	**%**
Gender		
Male	145	39.4
Female	223	60.6
Level of Education		
Primary school graduate or less	312	84.8
High school dropout, graduate or university dropout	51	13.9
University graduates or above	5	1.3
Marital Status		
Married	172	46.7
Single	28	7.6
Widow	168	45.7
Caregivers		
Family	292	79.4
Distant Relative	38	10.3
Neighbour	9	2.4
Paid Carer	13	3.5
Lives alone	16	4.4
Does he/she use implants/ dentures?		
None	89	24.2
Using only dentures	240	65.2
Using only implants	5	1.4
Using implants and dentures	34	9.2
Are the teeth kept clean?		
Yes/clean	189	51.4
Occasional / medium cleanliness	103	28.0
No / not clean	76	20.6
Old Age Groups (WHO)		
Early Old Age (65-74 years)	78	21.2
Middle Old Age (75-84 years)	151	41.0
Advanced Old Age (85 years +)	139	37.8
Body Mass Index (WHO)		
Underweight	5	1.3
Normal	181	49.2
Overweight	138	37.5
Obese+	44	12.0
TOTAL	368	100.0

According to the MNA Scale, only 26.4% were in a normal nutritional state. 16.8% of participants were completely dependent on others for daily living activities, 47.3% were highly dependent, and 26.6% were moderately dependent. According to the CCI, 89.1% of participants were found to be at very high risk. In the GDS results, only 27.2% were not depressed.

Significant relationships were found between GDS, Barthel, CCI, and MNA scores ($p<0.001$; $p<0.001$; $p=0.021$). While 60% of those without depression and the majority of individuals with higher levels of independence were in normal nutritional status, 63.2% of those at risk of depression, 59.8% of the highly dependent, and 44.8% of the very high-risk group were at risk of malnutrition. Moreover, 45.2% of those with definite depression and 83.9% of the completely dependent were malnourished. Detailed information is provided in Table 2.

Significant associations were found between MNA, Barthel, and CCI scores and GDS ($p<0.001$; $p<0.001$; $p=0.029$). Most individuals who were malnourished, at risk of malnutrition, completely or highly dependent, and those in the high and very high CCI risk groups were classified as having definite depression. In contrast, the majority of those with normal nutritional status, higher levels of independence, and all individuals in the moderate CCI risk group had no depression. Detailed information is provided in Table 3.

There was no significant difference between the age groups classified according to the WHO and the scores of the MNA, Barthel, and GDS scales. A significant difference was found in CCI between the groups ($p<0.001$). In particular, the CCI scores of the 65-74 age group were lower than those of the 75-84 and 85 and older age groups, indicating that the early elderly group had fewer comorbidities.

By gender, there was no significant difference between genders in Barthel, CCI, and GDS scale scores, but there was a statistically significant difference between women and men in MNA scores ($p=0.006$), with an average of 20.10 for women and 18.43 for men, indicating that women's nutritional status is better than men's.

When analyzed according to marital status, the single group was found to have less comorbidity than the widowed group. No significant differences were found between marital statuses in terms of other scales (MNA, Barthel, GDS).

According to caregiver status, MNA and Barthel scores showed significant differences, with those living alone having better nutritional status and independence; no differences were observed in CCI and GDS scores.

MNA scores were found to be higher in the group using implants and dentures than in the group using neither. Similarly, GDS scores showed that the group using implants and prostheses had lower scores than the group using neither. CCI scores indicate that the group using only dentures has higher comorbidity compared to the group using neither ($p=0.047$). Barthel scores didn’t show a significant difference based on the use of implants and/or dentures ($p=0.308$).

MNA scores showed that the group that always kept their teeth clean had higher scores than the other groups ($p<0.001$). Similarly, MNA scores were significantly higher in the group that did not keep their teeth clean than in the group that did keep their teeth clean ($p=0.013$). There was no significant difference in Barthel and CCI scores.

According to BMI, MNA, Barthel, and GDS scores showed significant differences. The underweight group had lower MNA and Barthel scores, while their GDS scores were higher compared to overweight and obese groups. No significant association was found between BMI and CCI. Detailed information can be found in Table 4.

Participants' MNA (Mean=19.44, SD=5.57), Barthel (Mean=52.19, SD=27.88), CCI (Mean=7.17,

Table 2. Chi-square table between MNA and other scales

	MNA total score	Malnutrition N (%)	At risk of malnutrition N (%)	Normal nutritional levels N (%)	Total	X2	df	p
GDS Total Score	No Depression	1 (1.0)	39 (39.0)	60 (60.0)	100	116.6	4	p<0.001
	Possible Depression	4 (10.5)	24 (63.2)	10 (26.3)	38			
	Definite Depression	104 (45.2)	99 (43.0)	27 (11.7)	230			
Barthel Total Score	Completely Dependent	52 (83.9)	10 (16.1)	0 (0.0)	62	189.1	8	p<0.001
	Highly Dependent	50 (28.7)	104 (59.8)	20 (11.5)	174			
	Moderately Dependent	6 (6.1)	38 (38.8)	54 (55.1)	98			
	Mildly Dependent	1 (6.3)	5 (31.3)	10 (62.5)	16			
	Fully Independent	0 (0.0)	5 (27.8)	13 (72.2)	18			
CCI Total Score	Low Risk	0 (0.0)	0 (0.0)	0 (0.0)	0	9.6	4	0.021
	Medium Risk	0 (0.0)	0 (0.0)	2 (100.0)	2			
	High Risk	7 (18.4)	15 (39.5)	16 (42.1)	38			
	Very High Risk	102 (31.1)	147 (44.8)	79 (24.1)	328			

Table 3. Chi-square table between GDS and other scales

	GDS total score	No depression N (%)	Possible depression N (%)	Definite depression N (%)	Total	X2	df	p
MNA Total Score	Malnutrition	1 (0.9)	4 (3.7)	104 (95.4)	109	116.6	4	p<0.001
	At risk of malnutrition	39 (24.1)	24 (14.8)	99 (61.1)	162			
	Normal nutritional levels	60 (61.9)	10 (10.3)	27 (27.8)	97			
Barthel Total Score	Completely Dependent	1 (1.6)	1 (1.6)	60 (96.8)	62	124.2	8	p<0.001
	Highly Dependent	22 (12.6)	23 (13.2)	129 (74.1)	174			
	Moderately Dependent	54 (55.1)	12 (12.2)	32 (32.7)	98			
	Mildly Dependent	12 (75.0)	1 (6.3)	3 (18.8)	16			
	Fully Independent	11 (61.1)	1 (5.6)	6 (33.3)	18			
CCI Total Score	Low Risk	0 (0.0)	0 (0.0)	0 (0.0)	0	9.5	4	0.029
	Medium Risk	2 (100.0)	0 (0.0)	0 (0.0)	2			
	High Risk	13 (34.2)	7 (18.4)	18 (47.4)	38			
	Very High Risk	85 (25.9)	31 (9.5)	212 (64.6)	328			

SD=2.41), and GDS (Mean=16.35, SD=7.43) scores were measured using Pearson Correlation.

The results showed a positive and strong correlation between MNA and Barthel (0.69), a negative and weak-moderate correlation between MNA and Modified CCI (-0.36), and a negative and strong correlation between MNA and GDS (-0.67).

The relationship between the Barthel scale and the CCI scale was negative (-0.31) with a weak correlation, while the relationship between the Barthel scale and the GDS was negative (-0.63) with a strong correlation.

The correlation between the CCI scale and GDS is positive (0.33) and weak to moderate (Table 5).

Ordinal logistic regression analysis was conducted to identify factors associated with depression categories among older adults. The model showed a good fit to the data (χ^2=206.22, df=22, p<0.001), and

Table 4. Parametric tests of the scales appl ied to the participants

		MNA		Barthel		CCI		Yesavage GDS	
	N	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Old Age Groups *									
Early Old Age (65-74 years)	78	18,87	5,78	51,87	29,82	6,31	2,67	17,35	7,86
Middle Old Age (75-84 years)	151	20,04	5,68	54,74	27,60	7,23	2,39	15,69	7,50
Advanced Old Age (85 years +)	139	19,11	5,32	49,60	26,99	7,60	2,16	16,50	7,09
Tests / p		1,525/0,219		1,234/0,292		7,446/ <0,001		1,327/ 0,266	
Difference between groups[a]						1<2; 1<3			
Gender**									
Male	145	18,43	6,02	53,10	27,85	7,26	2,66	17,03	7,81
Female	223	20,10	5,17	51,60	27,94	7,11	2,25	15,90	7,16
Tests/p		-2,751/**0,006**		0,506/0,613		0,582/0,561		1,422/0,156	
Education Level*									
Primary school graduate or below	312	19,39	5,52	50,68	27,05	7,28	2,40	16,57	7,43
High school dropout, graduate or university dropout	51	19,70	5,78	59,80	30,05	6,45	2,51	15,14	7,45
University graduates or above	5	19,80	7,82	69,00	42,78	7,60	1,52	14,80	7,89
Tests/p		0,074/0,928		3,313/**0,038**		2,703/0,068		0,921/0,399	
Difference between groups[a]				*** No significant difference was found in Tukey.					
Marital Status*									
Married	172	19,34	5,90	53,81	28,49	6,98	2,39	16,54	7,82
Single	28	19,77	5,28	57,32	28,04	6,32	2,28	17,75	8,13
Widow	168	19,49	5,30	49,68	27,13	7,51	2,42	15,92	6,90
Tests/p		0,085/0,918		1,450/0,236		4,032/**0,019**		0,835/0,435	
Difference between groups[a]						2<3			
Caregivers*									
Family	292	19,35	5,66	50,96	27,55	7,274	2,52	16,46	7,53
Distant Relative	38	18,33	4,82	48,16	25,35	7,368	1,99	17,50	6,50
Neigbour	9	20,17	6,83	57,22	26,47	5,778	1,79	19,89	8,19
Paid Carer	13	18,58	4,96	46,62	31,26	6,462	1,56	13,85	6,94
Lives alone	16	24,06	2,96	85,94	14,86	6,188	1,68	11,50	5,62
Tests/p		3,348/**0,010**		6,813/<**0,001**		1,910/0,108		2,884/**0,023**	
Difference between groups		1<5; 2<5; 4<5[b]		1<5; 2<5; 4<5[b]				*** No significant difference was found in Tukey.[a]	

Note: 1: * One-way Variance Test (ANOVA)
** Independent Samples T- Test
a) Post-hoc: Tukey, b) Post-hoc: Tamhane

Table 4. Continued

		MNA		Barthel		CCI		Yesavage GDS	
	N	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
Implant/ denture status *									
None	89	19,11	5,58	50,29	27,81	6,640	2,55	17,40	7,36
Using only dentures	240	19,14	5,70	51,73	27,98	7,425	2,43	16,49	7,48
Using only implants	5	22,40	4,51	68,00	26,60	7,200	1,10	13,40	6,99
Using dentures and implants	34	21,97	3,93	58,09	27,16	6,765	1,76	13,00	6,54
Tests/p		3,192/**0,024**		1,205/0,308		2,677/**0,047**		3,248/**0,022**	
Difference between groups		1<4; 2<4[b]				1<2[a]		4<1; 4<2[a]	
Are the teeth kept clean?*									
Yes/clean	189	20,53	5,35	54,08	29,06	7,23	2,35	15,26	7,42
Occasional / medium cleanliness	103	18,85	5,54	50,10	24,56	7,48	2,33	17,20	7,52
No/ Not clean	76	17,52	5,59	50,33	29,09	6,62	2,62	17,88	7,00
Tests/p		9,110/<**0,001**		0,893/0,410		2,894/0,057		4,409/**0,013**	
Difference between groups[a]		2<1; 3<1						1<3	
Body Mass Index*									
Underweight	5	6,30	2,361	22,00	16,05	25,80	4,92	25,80	4,92
Normal	181	16,96	5,321	46,19	27,55	17,69	7,39	17,69	7,39
Overweight	138	22,38	4,08	60,33	26,41	14,61	7,31	14,61	7,31
Obese+	44	21,86	3,69	54,80	27,06	15,18	6,41	15,18	6,41
Tests/p		51,889/<**0,001**		9,404/<**0,001**		2,700/**0,046**		7,975/<**0,001**	
Difference between groups		1<2; 1<3; 2<3; 1<4; 2<4[b]		1<3; 2<3[a]		*** No significant difference was found in Tukey.[a]		3<1; 4<1; 3<2[a]	

Note: 1: * One-way Variance Test (ANOVA)
** Independent Samples T- Test
a) Post-hoc: Tukey, b) Post-hoc: Tamhane

the parallel lines assumption was met (p=0.346). The Nagelkerke R^2 was 0.52, indicating that approximately 52% of the variance in depression categories was explained by the model.

An increase in BMI was significantly associated with a higher likelihood of being in a higher depression category (OR=1.10, 95% CI=1.02–1.20, p=0.018). Conversely, higher MNA scores were associated with a reduced risk of depression (OR=0.71, 95% CI=0.64–0.79, p<0.001). Similarly, higher Barthel scores, reflecting greater independence in daily living activities, were associated with a lower risk of depression (OR=0.97, 95% CI=0.96–0.99, p<0.001). Caregiver type also emerged as a significant predictor: participants with professional caregivers had a substantially lower risk of depression compared to other groups (OR=0.06, 95% CI=0.01–0.38, p=0.003). The Charlson comorbidity index was not found to have a significant effect on depression (p=0.715) (Table 6).

Table 5. Correlation Test Between MNA, Barthel, CCI and GDS Scales

	MNA	Barthel	CCI	Yesavage GDS
MNA	1	0.693**	-0.360**	-0.671**
Sig. (2-tailed)		<0.001	<0.001	<0.001
N	368	368	368	368
Barthel	0.693**	1	-0.313**	-0.631**
Sig. (2-tailed)	<0.001		<0.001	<0.001
N	368	368	368	368
CCI	-0.360**	-0.313**	1	0.334**
Sig. (2-tailed)	<0.001	<0.001		<0.001
N	368	368	368	368
Yesavage GDS	-0.671**	-0.631**	0.334**	1
Sig. (2-tailed)	<0.001	<0.001	<0.001	
N	368	368	368	368

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6. Ordinal logistic regression results (factors associated with depression categories)

Variable	B (SE)	OR [95% CI]	p value
BMI	0.099 (0.042)	1.10 [1.02–1.20]	0.018
MNA Score	-0.338 (0.053)	0.71 [0.64–0.79]	<0.001
Barthel Score	-0.028 (0.007)	0.97 [0.96–0.99]	<0.001
Caregivers (Paid Carer)	-2.773 (0.922)	0.06 [0.01–0.38]	0.003

Note: (OR: Odds ratio, CI: Confidence Interval). Only statistically significant variables were included in the table. Exp(B) values were calculated by transforming the B coefficients as e^B.

Discussion

In this study, the effects of depression levels on nutritional status were examined among patients aged 65 years and older who were enrolled in home healthcare services. The findings indicate that as the level of depression increases, patients' nutritional status deteriorates. It is thought that loss of appetite, lack of energy, and reduced quality of self-care associated with depression contribute to these results, thereby negatively affecting nutritional status.[13] Similar studies in the literature have also concluded that there is a negative association between depression levels and nutritional status.[14-17] However, most of these studies primarily included physically independent geriatric patients, while research focusing on patients receiving home healthcare remains limited. From this perspective, the present study provides an important contribution to the understanding of this population.

In our study, no significant differences were found between age groups in terms of depression levels, activities of daily living (ADL), or nutritional status. However, some studies have shown that the rates of malnutrition and depression increase with age.[15,18,19] A significant difference was observed between groups in terms of the CCI, with the early elderly group having fewer comorbidities.

It was also observed that individuals cared for by a caregiver were at a higher risk of "malnutrition" or "risk of malnutrition" compared to those living alone. Supporting evidence for this finding exists in the literature.[20] This may be explained by the fact that the individuals living alone in our study had higher mean Barthel ADL scores, indicating greater functional independence (Table 4). Similar

findings have been reported in previous studies.[21] Other studies, however, did not find a significant association between nutritional status and living arrangements.[15] Furthermore, participants with professional caregivers were found to have a 94% lower risk of depression compared with those living alone (95% CI=0.01–0.38, p=0.003).

A statistically significant difference was observed between men and women in terms of MNA scores, with women having better nutritional status. This finding is supported by other studies[18,22], although some research reports no association between gender and nutritional status.[16,23] In our study, no significant relationship was found between gender and depression levels, a result also supported by several studies.[15] Nonetheless, some reports in the literature suggest that women are more prone to depression than men.[19]

No significant associations were found between educational level and nutritional status or depression in our study, a finding consistent with some previous studies.[15] While education level did not show a significant relationship with the dependent variables, certain studies have reported that improved educational attainment is associated with better nutritional outcomes.[16]

A significant association was found between CCI scores and marital status (p=0.019), with unmarried participants having fewer comorbidities compared with widowed individuals. While no significant associations were found between marital status and other scales, some studies have reported that single or widowed individuals experience higher levels of depression than married individuals.[15,24] Other studies have shown no relationship between nutritional status and marital status.[15] Although marital status did not significantly affect ADL in our study, research indicates that individuals with a living spouse tend to have higher Barthel ADL scores compared to divorced or widowed participants.[25]

MNA scores were higher in participants using implants and prostheses compared with those who used neither. However, the opposite has been reported in the literature.[14] Depression levels were also lower among participants using implants and prostheses than among those not using them.

Participants who consistently maintained oral hygiene had higher MNA scores than those in other groups, a finding supported by previous studies.[26] Similarly, studies have demonstrated an association between depression and oral hygiene.[27]

According to our findings, as depression levels increased, nutritional status decreased, and the tendency toward malnutrition rose, a result supported by previous research.[14-16] Furthermore, increasing dependency in ADL and higher CCI scores were associated with a decline in nutritional status (Table 2).

When compared with the literature, it can be suggested that individuals receiving home healthcare services are at higher risk of depression. This may be explained by the higher rates of functional dependency observed in this group (Table 3). Additionally, our study revealed that for every 1-point increase in the MNA score, the risk of depression decreased by approximately 29% (95% CI=0.64–0.79, p<0.001), a finding consistent with previous studies.[15-17] Similarly, each 1-point increase in the Barthel score was associated with a 3% reduction in the likelihood of depression being categorized in higher levels. However, increased CCI scores were not found to have a significant effect on depression levels (p=0.715) (Table 6).

According to the Barthel ADL Scale results, greater independence in daily living activities positively influenced participants' nutritional status.[16,20,22,28] Individuals with higher Barthel ADL scores were more successful in self-care, better able to

meet their nutritional needs, and demonstrated improved nutritional status (Table 2).

The mean total CCI score among participants was 7.2 ± 2.4 (min. 2–max. 17), whereas a similar study reported a score of 2.4 ± 1.9.[29] This difference may be attributed to the higher prevalence of conditions with high comorbidity scores, such as metastatic solid tumors and severe liver disease, in our study population. Karakaş et al. also utilized the CCI scale in their study but did not find a statistically significant difference between comorbidity and mean MNA scores.[16] A high comorbidity burden may contribute to greater functional limitations in daily activities, which in turn negatively affect nutritional status (Table 5).

In some studies, individuals with a BMI below 18 kg/m² have been shown to have higher mortality rates and to be at greater risk of malnutrition. Therefore, in this study, a statistically significant correlation was expected between BMI and MNA, Barthel ADL, CCI, and GDS scores.[30] However, our findings revealed that an increase in BMI was significantly associated with a higher likelihood of being in a more severe depression category. Ordinal logistic regression analysis demonstrated that each one-unit increase in BMI increased the probability of being classified in a higher depression category by 10% (95% CI=1.02–1.20; p=0.018) (Table 6). This finding is consistent with the "U-shaped relationship" frequently emphasized in the literature, whereby both very low and high BMI levels can be risk factors for depression.[14-16,30] Nonetheless, multivariate analyses indicated that BMI may have an independent effect on depression.

Limitations

The limitations of our study include the single-center structure of the study, the unbalanced distribution of the independent variables, the limited sample size, the fact that the sample was limited to a specific geographical area, the fact that the study was conducted in a certain period of time, and the fact that the depression levels of the participants were determined with a scale. In addition, since the data were collected by self-report method, the tendency of the participants to give socially acceptable answers may have affected the data accuracy. Some potential influential variables may not have been controlled for in the study, which may make it difficult to clearly understand the effects on the dependent variable.

Conclusion

In this study, malnutrition was detected in approximately one third of the participants (29.6%) and 44% were considered to be at risk of malnutrition. In addition, depression was detected in more than half of the participants (62.5%) and 10.3% were considered to be at risk of depression. This study shows that it is important for primary care family medicine, which is the first point of contact of individuals, and professionals providing home health services to recognize and intervene in the early stages of depression symptoms in order to prevent malnutrition in individuals. Early recognition of possible or existing depression and timely treatment of depression will positively affect the nutritional status of the individual. In this respect, it is important to screen for depression in people who apply to family health centers or home health services and to recognize and treat it early in order to positively affect nutritional status.

Ethical approval

This study has been approved by the Clinical Research Ethics Committee of SBU İzmir Bozyaka Training and Research Hospital (approval date 14.09.2023, number 2023/157). Written informed consent was obtained from the participants.

Author contribution

The authors declare contribution to the paper as follows: Study conception and design: GÇ, ÖT; data collection: GÇ, ÖT; analysis and interpretation of results: GÇ, ÖT; draft manuscript preparation: GÇ, ÖT. All authors reviewed the results and approved the final version of the article.

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Conflict of interest

The authors declare that there is no conflict of interest.

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