RESEARCH ARTICLE

Identifying the relationship among sleep, mental status, daily living activities, depression and pain in older adults: a comparative study in Yalova, Turkey

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Abstract

Objective: To examine the dependency levels of older adults living in nursing homes and home environments in their daily life activities, and the relationship involving pain, sleep, depression, and mental status affecting these levels.

Methods: The comparative-descriptive and cross-sectional study was conducted in Cinarcik district of Yalova province, Turkey, from February to May 2016, and comprised older adults living in a nursing home and those in home environments. Data was collected using face-to-face interviews, a questionnaire, Barthel Index, Visual Analogue Scale, Standardised Mini-Mental State Examination, Pittsburg Sleep Quality Index and the Geriatric Depression Scale. Data was analysed using SPSS 20.

Results: Of the 185 subjects, 100(54%) were living in nursing homes and 85(46%) in home environments. Overall, there were 101(54.6%) women and 84(45.4%) men, and 97(52.4%) were aged >75 years. There was a significant positive relationship between Barthel Index and Standardised Mini-Mental State Examination scores ($p<0.05$) and a significant negative relationship between Barthel Index and Geriatric Depression Scale scores among those living in nursing homes. Among those living in home environments, there was a statistically significant negative relationship involving Barthel Index, Visual Analogue Scale, Pittsburg Sleep Quality Index and the Geriatric Depression Scale scores ($p<0.05$). Also there was a significant positive relationship between Barthel Index and Standardised Mini-Mental State Examination scores ($p<0.05$).

Conclusion: The dependency levels in daily life activities were found to be associated with mental status and depression in older adults living in nursing homes, while it was associated with pain, mental status, sleep and depression in those living in home environments.

Keywords: Activities of daily living, Aged, Depression, Mental health, Pain, Sleep, Nurse, Physical therapists . (JPMA 70: 236; 2020) **https://doi.org/10.5455/JPMA.301384**

Introduction

Independence in terms of daily life activities (DLAs) is a central aspect of functioning. DLAs, often termed physical DLAs, include the fundamental skills typically needed to manage basic physical needs, comprising the following areas: grooming / personal hygiene, dressing, toileting / continence, transferring / ambulating, and eating. Thus, DLA dependence is correlated with poorer quality of life, increased healthcare costs, increased risk of mortality, and institutionalisation. Once in a nursing facility, more dependent patients may be a greater drain on the available resources than those who are DLA-independent.[1] The delay of decline in DLA independence in older people is of importance for individuals and society.[2] In literature, the main factors found to affect DLAs include pain, life environment, functional limitations, marital status, sleep disorders, depression and the presence of concomitant diseases.[2]

Sleep disturbances in older adults are attributed to inactive lifestyles, such as repetitive daily routines, lacks of physical exercises, and poor sleep practices (e.g., excessive napping, drinking, and smoking) that could result in fatigue, depression, pain, restriction in daily activities, and problem of mental status.[2] Among people aged 65 years and more, approximately half who live in home environments and two-third of those who reside in long-term nursing homes have sleep disorders.[3] The rate of sleep disorder was reported between 61% and 77% of nursing home residents.[3] According to a study, the sleep qualities of the older adults either living in home environments or in a nursing home are at similar levels, and more than half of the individuals in both groups have poor sleep quality.[4]

Clinicians tend to underestimate the presence of these symptoms, especially depression, because depressive symptoms may be assumed to be a part of normal aging; and, therefore, these are sometimes overlooked.[5] Depression is a costly and potentially disabling condition affecting substantial proportions of older adults. Pharmacological treatment of sleep disorder and depression

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in the older adults is most commonly seen in clinical practice, but it is associated with hazardous side effects, such as tremor, anxiety, restlessness, drowsiness, dizziness, weakness and fatigue.[5] Non-pharmacological methods that promote a mind-body interaction without side effects should be tested to enhance the mental health of older adults.[5,6] As a result of that, it is becoming associated with sleep quality, depression and DLAs. According to a study, the decline in functionality in older adults living in the community may be related to depression. In nursing homes, this condition is associated with mental level in older adults.[7]

Pain may affect sleep quality and create activity-related addiction in daily life in older adults. Pain is more common in older adults living in the home environments. It is the main reason for affecting physical health. As a result, DLAs are more affected by pain in older adults living in home environmentals.[8,9]

Investigation of the level of dependence in DLAs in older adults is important for early treatment of cognitive disorders.[1,10] As cognitive disorders progress slowly, indications in older adults can be assessed by the degree of dependence in DLAs. DLAs include activities such as wearing simple clothes, dragging, taking objects from the ground etc. At the same time, assessments provide information to health professionals about the functional level of older adults.[1,10]

Dependency in DLAs in older adults living in home environments is frequently investigated in relation to mobility and functional level. In older adults living in nursing home, the cognitive status and DLAs have been investigated.[7] As far as we know, no comparative studies investigating DLAs with mental status, sleep quality and depression status has been done to compare these parameters between older adults living in nursing homes and those in home environments.

The current study was planned to examine the dependency levels of older adults living in nursing homes and in home environments with resect to their DLAs, and to explore the relationship involving pain, sleep, depression, and mental status affecting these levels.

Subjects and Methods

The comparative-descriptive and cross-sectional study was conducted in Cinarcik district of Yalova province, Turkey, from February to May 2016, and comprised older adults living in a nursing home and those in home environments. The study used instant case detection method which is one of the general screening models. Individuals were approached through neutral sampling method. Older adults staying in a nursing home were included. Afterwards, the number of older adults to be included in a controlled manner, the theoretical power value was used for 90% power through 95% reliability and 0.5 effect size.[11] All of the older adults in the nursing home were enrolled, and a control group was raised using random sampling method from among older adults in social sharing areas such as parks or cafes in the study area. The power value reached thus was 86%. Therefore, the effect size value concerning the pain score was 0.45 with 95% reliability. The sample size calculation was done using G*Power version 3.0.10 software (Franz Faul, Universitat Kiel, Germany).[12]

Approval was obtained from the ethics committee of Kocaeli University, Kocaeli, Turkey, and written permission was received from the institution where the survey was conducted. Also, written and verbal informed consent was obtained from the subjects.

Those included were aged at least 65 years, had the ability to cooperate regarding effectively understanding and performing the study evaluation methods and scales, had no hearing and vision problems, and volunteered to participate. Those who did not meet the criteria were excluded along with those absent during visits to the nursing facility and those not permitted to have visitors.

Data were collected using face-to-face interviews. Moreover, a questionnaire, Barthel Index (BI), Visual Analogue Scale (VAS), Standardised Mini-Mental State Examination (SMMSE), Pittsburg Sleep Quality Index (PSQI) and the Geriatric Depression Scale (GDS) were used to collect data on participants' pain, cognitive function, sleep, and depression levels, respectively. Assessments was done by a physiotherapist.

The questionnaire consisted of questions about participants' socio-demographic characteristics (height, weight, gender, age, marital status, education level) and health status (assistive device use, chronic disease, drug use, smoking, and alcohol use).

The BI was developed in 1965. It is one of the most frequently used indexes in the assessment of DLAs, and it evaluates individuals' ability to perform daily activities (such as eating, going to the toilet, taking a bath, and going inside or outside the building) without any help. The total score on the Turkish version of the index is 100. The scale scores were evaluated as follows: 0-20 points —fully dependent; 21-61 points — extremely dependent; 62-90 points — moderately dependent; 91-99 points — slightly dependent; and 100 points — fully independent.[13]

VAS was developed in 1983[14] to measure individuals' subjective assessment of their pain levels. It has been used in many studies to assess the severity of pain, and

has been found to be reliable and valid. The participants were explained that the number "0" in the scale means "I do not feel any pain," whereas the number "10" means "I feel the most severe pain." The intensity of pain increases with the increase in the number value. The subjects were then asked to mark a number from 0 to 10 to express their pain intensity level.[15]

SMMSE provides a global assessment of mental function. The scale is easily administered and provides information regarding the degree of cognitive impairment. A maximum of 30 points can be obtained from the test and higher scores indicate better cognitive status. Scores <23 for the Turkish population are suggestive of 'abnormal' cognition, with additional levels of score breakdown specified.[16]

PSQI was developed in 1989.[17] It evaluates sleep quality over the preceding one month. The scale consists of 24 questions. The total score varies between 0-21 with a range from good-quality sleep (0-4 points) to low-quality sleep (5-21 points).[18]

GDS was developed in 1982[19] to measure depression levels in older adults. It consists of 30 questions based on self-report and asked to answer using yes/no response. One point is assigned for each answer in favour of depression, and 0 points are assigned for the other answer. The obtained total score is the depression score. The scale scores vary between 0 and 30. GDS scores and meanings are defined as follows: 0-11 points — no depression; 11-14 points — possible depression, and 14 or more points — high depression.[20]

Data was analysed using SPSS 22. Chi-square analysis, Fisher's Exact Test (living places, gender, marital status, education level, assistive device use, chronic disease, drug use, smoker, alcohol use variables) and Pearson Chi-square (age variable) test was used for categorical data. Multinominal Logistic Regression analysis was performed to measure the effect of the independent variables (DLAs with assistive device use and gender) on the dependent variables. The relationship among involving DLAs, mental status, pain, depression and quality of sleep variables was assessed using Spearman correlation analysis. P<0.05 was considered statistically significant.

Results

Of the 185 subjects, 100(54%) were living in nursing homes and 85(46%) in home environments. Overall, there

Table-1: Dependency levels in daily life activities (DLAs) according to descriptive characteristics (N=185).

Descriptive Characteristics		DLA Dependency Levels									
		Full or extremely dependent (0-61 point)		Moderately dependent (62-90 points)		Lightly dependent and fully independent (90 points and above)		Total		Chi-square analysis	
		n	%	n	%	n	%	n	%	X^2 value	p
Living place	Nursing Home	7	7.0	23	23.0	70	70.0	100	1100.0	2.1	0.356
	House	11	12.9	16	18.8	58	68.2	85	1100.0		
	Total	18	9.7	39	21.1	128	69.2	185	1100.0		
Gender	Female	11	10.9	29	28.7	61	60.4	101	1100.0	8.9	0.011*
	Male	7	8.3	10	11.9	67	79.8	84	1100.0		
	Total	18	9.7	39	21.1	128	69.2	185	1100.0		
Age (year)	65-69	8	13.1	13	21.3	40	65.6	61	1100.0	1.9	0.737
	70-74	1	3.7	6	22.2	20	74.1	27	1100.0		
	75+	9	9.3	20	20.6	68	70.1	97	1100.0		
	Total	18	9.7	39	21.1	128	69.2	185	1100.0		
Marital status	Married	9	11.84	11	14.47	56	73.68	76	1100.0	-	0.483
	Single	2	10.53	5	26.32	12	63.16	19	1100.0		
	Widow	11	12.22	23	25.56	56	62.22	90	1100.0		
	Total	22	11.89	39	21.08	124	67.03	185	1100.0		
Education Level	Illiterate	8	19.05	14	33.33	20	47.62	42	1100.0	-	0.051
	P/S School	10	10.87	18	19.57	64	69.57	92	1100.0		
	High School	3	9.68	6	19.35	22	70.97	31	1100.0		
	University	1	5.0	1	5.0	18	90.0	20	1100.0		
	Total	22	11.89	39	21.08	124	67.03	185	1100.0		
Assistive device use	Yes	9	12.5	23	31.9	40	55.6	72	1100.0	10.6	0.005*
	No	9	8.0	16	14.2	88	77.9	113	1100.0		
	Total	18	9.7	39	21.1	128	69.2	185	1100.0		

*p<0.05; P/S: Primary/Secondary.

Table-2: Stepwise regression analysis results and relationship between the Barthel Index (BI) and the assistive device use and gender.

Step Summary		
Model	**Action**	**p-value**
0	Intercept	
1	Assistive device use	0,005
2	Gender	0,037

Parameter Estimates						
BI		**ß**	**p-value**	**OR**	**95% Confidence Interval OR**	
					Lower Bound	**Upper Bound**
0-61	Intercept	-2,539	0,001			
	[Gender= Female]	0,756	0,131	2,131	0,798	5,687
	[Assistive device use =Yes]	0,883	0,065	2,418	0,947	6,173
62-90	Intercept	-2,111	0,001			
	[Gender= Female]	0,92	0,024*	2,51	1,129	5,58
	[Assistive device use =Yes]	0,936	0,015*	2,551	1,198	5,431

The reference category is: 90+ *Significant at p<0.05.
ß: Beta coefficient
BI: Barthel Index OR: Odds ratio.

Table-3: Relationship between the participants' mean scores based on BI, VAS, SMMSE, PSQI, and GDS according to their living places.

Living place			**SMMSE**	**PSQI**	**GDS**	**BI**
Nursing Home	VAS	r	-.144	.077	.201	-.026
		p	.154	.444	.044*	.795
		n	100	100	100	100
	SMMSE	r		-.124	-.355	.317
		p		.217	.000**	.001*
		n		100	100	100
	PSQI	r			.187	-.130
		p			.062	.198
		n			100	100
	GDS	r				-.297
		p				.003*
		n				100

Living place			**SMMSE**	**PSQI**	**GDS**	**BI**
House	VAS	r	-.130	.414	.276	-.231
		p	.237	.000*	.011*	.033*
		n	85	85	85	85
	SMMSE	r		-.209	-.267	.439
		p		.054	.013*	.000*
		n		85	85	85
	PSQI	r				-.349
		p				.001*
		N				85
	GDS	R				-.407
		p				.000*
		n				85

*Significant at p<0.05. **Significant at p<0.01.
BI: Barthel Index. VAS: Visual Analogue Scale.
SMMSE: Standardised Mini-Mental State Examination.
PSQI: Pittsburg Sleep Quality Index.
GDS: Geriatric Depression Scale.

were 101(54.6%) women and 84(45.4%) men, and 97(52.4%) were aged >75 years. No significant difference was found between DLA dependence levels and variables of living place, age, marital status, education levels, chronic disease status, drug use, smoking and alcohol use ($p>0.05$ each). However, a significant difference was found in men, in those who did not use assistive devices, slightly dependent and fully independent in DLAs ($p<0.05$ each) (Table-1).

There was a significant relation between BI and assistive device use, and gender ($p<0.05$ each). However, there was no significant association of BI with the living place, chronic disease status, age group, alcohol and smoking cessation variables ($p>0.05$ each) (Table-2).

A significantly positive relationship between BI and SMMSE, and a significantly negative relationship between BI and GDS ($p<0.05$ each) were found in subjects at the nursing home. Moreover, a significantly negative relationship between BI and VAS, PSQI, GDS ($p<0.05$ each) and a significant positive relationship between BI and SMME ($p<0.05$) were found in older adult living at home (Table-3).

Discussion

The findings of the study are similar to earlier studies examining the factors affecting the dependency levels of the older adult in their DLAs and reporting a relationship between the dependency level in DLAs and depression,[1,8] pain,[8,9] mental status,[1,10] health status, and descriptive characteristics.[20] The present study evaluated the dependency levels in DLAs according to the descriptive characteristics of the older adults and found that factors such as gender and assistive device use affected the dependency levels. However, factors such as age, marital status, education level having a chronic disease, number of drugs used, alcohol-cigarette use, and living place (nursing home or home environment) did not affect these levels.

Previous studies showed that the activity levels of older adults were not significantly affected by the aging process due to the development of technology and science.[1,9,10] Similarly, the effect of marital status on DLAs of the older adult is seen more clearly if the older adults are married, and have a more active social life due to living with their children. Moreover, the feeling that other family members need them also affects their DLAs. However, studies show that alcohol use, smoking, chronic disease and the number of drugs used does not affect the dependency levels of the older adults in their DLAs.[1,9,10] Moreover, gender and use of assistive devices affect the dependency status in DLAs.[1,9,10]

Women may be at greater risk of physical health problems.[21] Gender differences in the underlying norms and gender roles associated with specific DLAs because, for example, women of this generation might be less likely than men to report that they need help with yard-work simply because they do less of it. It has been reported that functional status is influenced by such underlying norms.[22] Being women and their functional disabilities due to age and diseases depending on prolonging the lifespan increase their dependency levels in DLAs.[9,10] These opinions concur with the results achieved in the present study.

It is known that older adults use assistive devices to adapt to their surroundings and act confidently.[9] However, previous studies, as did the current study, showed that the dependency levels in DLAs are higher in older adults using assistive devices.[9,10] This can be explained by the fact that the assistive devices used by older adults do not have an appropriate design and usage pattern, making the user more dependent in DLAs because they need to exert more power and energy to move with these devices.[9]

The present study found that living place did not affect the dependency levels in DLAs of older adults. Moreover, it was determined that the effect of living place on the dependency levels in DLAs of older adult vary due to environmental and socio-cultural risk factors.[23] Thus, the individuals' bio-psycho-social situations come into prominence.

DLAs are conducted by the integrity of physical, cognitive or psychological factors, and any disorder in these functions can cause dependence in DLAs.[5,21] Pain, mental status, depression and sleep disturbance are stated among the factors causing dependence in DLAs. The structure based on neuromuscular performance between risk factors and functional limitations reveals the dependence-independence status in DLAs of the older adults.[2,10] The present study showed that mental status and depression were related to dependence in DLAs for both groups, and, also, pain and sleep disorders were associated with dependence in DLAs only for the older adults living in home environments. This multifactorial and dynamic relationship between aging and risk factors is explained by different methods, such as changes in the immune system, peripheral changes in the nervous system structure, and changes in cognitive functions.[5,21] The relationship among pain, sleep disorders and dependence in DLAs for older adults living at home can be explained by the fact that the health status and sleeping conditions of older adults living in nursing homes are regularly checked.[24] Conversely, the degree of

pain in the elderly can vary according to their memories, anticipations and emotional structures. Therefore, they may not pay enough attention to the symptoms of pain due to the loss of spouses or close friends, high morbidity of those in the near circle and friends, and diseases such as depression and dementia which are more common in the older adults, or they may not report the pain because they do not notice.[2]

Sleep, which has an important place in human life, is a fundamental requirement to maintain vital activities.[3,5] Moreover, an abnormal change in the sleep pattern and quality can negatively affect the DLAs.[3,5] Old age is a period of intense changes in sleep patterns and disorders. Over 50% of older adults have sleeping problems.[6] The present study determined that the deterioration in sleep quality increases the level of dependency in DLAs. This indicates that the presence of a negative relationship between pain and DLAs of the older adults living at home negatively affects their sleeping and activity levels[6] and increases the level of dependency in DLAs.

Depression has negative effects on DLAs and the dependence in DLAs is a risk factor for depression.[2,24] A study on depression and daily life functioning in older adults living in nursing homes reported that DLAs decreased as depression increased.[25] This result concurs with the results obtained by other studies,[5,8,24] and supports the view that the presence of a variable such as depression is a risk factor for dependence in DLAs. Mental status in the older adults is often associated with depression. If depression and serious cognitive impairment are not properly treated, they lead to severe mental and body damage, additional illnesses, unnecessary health expenditure and drug use, resulting in increased drug side effects, decreased quality of life, impaired social life and accelerated nursing home care. However, these diseases are likely to be treated by an early diagnosis.[3,5] In the present study, both mental status and depression were correlated with the DLAs in both groups. Therefore, early diagnosis of depression and mental status level in older adults regardless of their living places and the necessary precautions to treat these disorders is imperative.

In terms of limitations, the current study had a small sample size. Also, previous studies have stated that the economic situation of older adults is a factor affecting their health status.[26] The present study, however, did not consider economic situations, which may also be a limitation of the study.

Future studies should holistically investigate the relationship involving mental status, depression, pain, sleep and functional status by increasing the sample size. However, according to the obtained results, it can be said that the identification of the relevant risk factors will be helpful to develop interventions for decreasing the dependence in DLAs of the older adults, particularly of those living at home, and increasing their functionality. A detailed assessment of risk parameters for decreasing the level of dependency in DLAs of older adults living at home environments or nursing homes will be a guiding instrument for clinicians and researchers to establish relevant and proper treatment and rehabilitation programmes for increasing their independence in DLAs.

Conclusion

Gender and assistive device usage increased the dependency levels of older adults in their DLAs. Moreover, the dependency level in DLAs was found to be associated with the mental status and depression in those living in nursing homes. However, it was determined to be associated with pain, mental status, sleep and depression in older adults living in home environments.

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