

The Relationship Between Environmental Factors and Health-Related Functional Disability of Older Adults With Osteoarthritis

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ABSTRACT

Advanced age is the most substantial risk factor for the development of osteoarthritis (OA), which consequently declines elderly mobility and activities. So, countless elders get a functional impairment or disability. All three aspects of a person's environment (physical, social and attitudinal) affect the activities of the elderly. Understanding in what way specific factors in one's environment affect the capacity of participation in life's roles is very important for the gerontological nurse. This study aimed to determine the association between the environmental factors and health-related functional disability of older adults with osteoarthritis. The study followed a descriptive correlation design and conducted in the Orthopedic Outpatient Clinics of Qena General Hospital, South Valley University Hospital, and El-Hakeem El Shamil for handicapped and rehabilitation centers in Qena governorate, Egypt. One hundred and fifty (150) participants of elderly persons from both sex, aged 60 years and older, who were diagnosed with osteoarthritis had participated. Three tools used for data collection. More than half (53.3 %) of the studied participants had slight limitations at the functioning level. The majority (58.0 %) of the studied participants had moderate limitations at the disability limitation level, and more than two fifths (43.3%) of the participants had slight limitations at the disability frequency level. The study concluded that communication devices are the most crucial factor that affects health-related functional disability. This followed by transportation, age, sex, social environment, attitude, home mobility, community mobility, assistive devices, and mobility devices.

Keywords: *Environmental factors, Health-related functional disability, Older adults, Osteoarthritis.*

1. INTRODUCTION

The most influential risk factors for the development of osteoarthritis (OA) is advanced age. OA is the most prevalent type of arthritis, particularly in older adults 65 years and older. Knee, hip, hand, foot, and spine joints are the most common sites [1]. As OA incidence and prevalence increase with increasing age, a higher number of people with the condition will result. 20% to 30% of elders over 60 years in the United Kingdom (UK) have symptomatic osteoarthritis [2]. Almost 50% of elders aged the 70s and 80s in the United States of America (USA) have OA [3]. More than one million people suffer from OA in the Middle East (Iraq, Yemen, Saudi Arabia, and Syria) [1]. More than five million people have OA in Egypt [4].

Osteoarthritis is a chronic degenerative arthropathy that commonly causes chronic pain and disability. It

contributes to Late-life functional limitations. Limitations develop early during the natural history of OA and can span mobility and hand function, including self-care tasks. Pain and muscle weakness appears to increase the risk of functional limitations and disability [1]. Functional impairment or disability, defined as an inability to do activities of daily living without assistance. With an ever-growing elderly population, functional disability is becoming a serious public health concern [5]. Disability accelerates the need for home assistance, hospitalization, nursing home admission, and early death. As well as the economic burden presented to society [2].

The World Health Organization (WHO) provided the International Classification of Functioning, Disability and Health (ICF) which suggests that physical, social, and attitudinal aspects of a person's environment affect particular actions or household tasks

of individuals and level of daily participation [3]. Understanding how specific factors in one's environment affect the ability to participate in life's roles is very important for the gerontological nurse. She/he has a vital role in the comprehensive assessment of older adult's environments to facilitate daily functions, mobility, social participation, and recreational activities to enhance independence [3]. So, this study conducted to determine the relationship between environmental factors and health-related functional disability of older adults with osteoarthritis.

2. MATERIALS AND METHOD

2.1 Materials

A descriptive correlation design used in this study. The study was conducted in the Orthopaedic Outpatient Clinics of Qena General Hospital, South Valley University Hospital and El-Hakeem El Shamil for handicapped and rehabilitation centre in Qena governorate, Egypt. The study included one hundred and fifty (150) participants of elderly persons from both sex, aged 60 years and older, diagnosed with osteoarthritis for at least one year and report of "any difficulty" on at least two of the following three items; going upstairs, rising from sitting and bending or squatting to the floor.

Three tools were used to collect the data. Socio-demographic data and health profile structured by an interview schedule. The second tool was the Late-Life Function and Disability Instrument that composed of two main components namely the function component and disability component [6]. The function component consists of 32 items that assess the difficulty of the task. This component is directed to the upper extremity, essential lower extremity and advanced lower extremity function items. Sixteen (16) items included in the disability component. Those items rate the task frequency and limitation. The Home And Community Environment Instrument was the third tool [7]. It is used to assess the environmental factors into six (6) subscales as follows: home mobility, community mobility, the basic mobility devices, the communication devices, transportation facilitators, and attitude of surrounding people domain.

2.2 Method

This study had been approved by the Faculty of Nursing, Alexandria University. The first tool developed by the researcher after reviewing the relevant literature. Tool II (LLFDI) and tool III (HACE) translated into Arabic by the researcher. These tools tested for content validity by seven experts in the related fields of gerontological nursing and community health nursing. The required modifications were undertaken. The reliability of tool II and tool III tested using Cronbach's Alpha test. It applied to 20 elderly patients who fulfilled the inclusion criteria and selected from the elderly's club of Qena (those participants excluded from

the study subjects). The reliability result for tool II $r = 0.95$ and for tool III $r = 0.70$). A pilot study was carried out on 15 elderly persons (those participants were excluded from the study subjects) assigned randomly from the elderly's club not included in the study setting to assess the tools for their applicability, clarity. Necessary modifications were done accordingly. Each older adult who fulfilled the inclusion criteria was interviewed individually from 35 to 45 minutes after explaining the study aim. The data collection covered five months started from mid of July 2011 and ended at mid of December 2011. Data analysis was done by using SPSS version 16.

3. RESULTS

The socio-demographic characteristics of osteoarthritic elders showed at the Table I. The age mean of the osteoarthritic elders was 64.89 ± 6.560 years. More than two- thirds of participants were females 71.3 %, and the rest (28.7) were male. Concerning marital status, nearly two-thirds of the study sample (64.0 %) was married. More than one half (55.3%) of the participants were illiterate. More than one half (58.0%) of the participants were housewives.

Table 1. Distribution of the osteoarthritic elders according to socio-demographic characteristics

Sociodemographic characteristics	N=150	%
Age in years		
60 – 64	105	70.0
65 – 69	11	7.3
70 – 74	17	11.3
75+	17	11.3
Mean \pm SD		64.89 \pm 6.560
Sex		
Female	107	71.3
Male	43	28.7
Marital status		
Married	96	64.0
Widowed	50	33.3
Divorced	4	2.7
Level of education		
Illiterate	83	55.3
Read & write	24	16.0
Primary & preparatory	10	6.7
Secondary education	17	11.3
Higher education	16	10.7
Occupation before retirement		

Housewife	87	58.0
Employee	39	26.0
Skilled work	11	7.3
Farmer	7	4.7
Free work	6	4.0

Figure 1 demonstrates the distribution of the osteoarthritic elders according to their functional disability levels. As for the functioning level, more than half (53.3 %) of the studied participants had slight limitations. Concerning the disability limitation level, the majority (58.0 %) of the studied participants had moderate limitations. As regards to the disability frequency level, more than two-fifth (43.3%) of the participants had slight limitations.

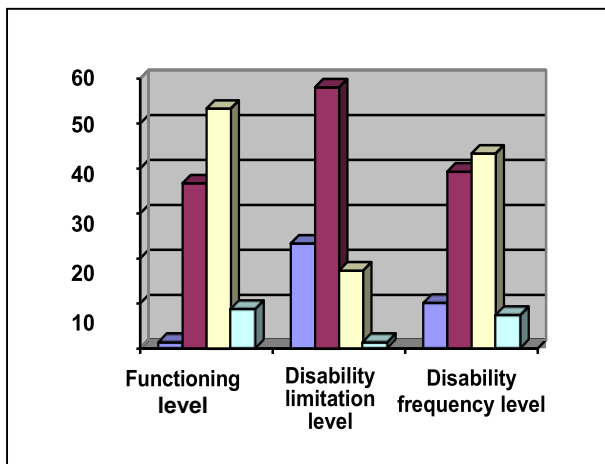


Figure 1. Functional disability levels of the osteoarthritic elders

Table 2 shows the relationship between health-related functional disability levels and other independent variables. There was a highly statistical significance between all levels and occupation before retirement, vision status, communication devices, transportation, basic mobility and assistive devices.

Table 2. Distribution of the osteoarthritic elders according to socio-demographic characteristics

Functional disability levels	Occupation before retirement	Vision status	Communication devices	Transportation	Basic mobility and assistive devices	Community mobility obstacles
	FET_P	χ^2_P	FET_P	FET_P	FET_P	FET_P
Severe	87	58.0	39	26.0	11	7.3
Moderate	7	4.7	6	4.0		
Slight						
No limit						

Functional disability levels	Occupation before retirement	Vision status	Communication devices	Transportation	Basic mobility and assistive devices	Community mobility obstacles
	FET_P	χ^2_P	FET_P	FET_P	FET_P	FET_P
Functional level						
Severe	47.8	35.7	38.6	64.3	52.3	9.3
Moderate	0.00	0.00	0.00	0.00	0.00	0.16
Slight						
No limit						
Disability limitation level						
Severe	42.8	40.3	89.2	146.4	117.9	9.4
Moderate	0.00	0.00	0.00	0.00	0.00	0.16
Slight						
No limit						
Disability frequency level						
Severe	47.3	36.8	84.9	42.3	39.0	7.3
Moderate	0.00	0.00	0.00	0.00	0.00	0.29
Slight						
No limit						

Table 3 and 4 shows the priority of factors that affect health-related functional disability. It is observed that communication devices are the most important factor followed by transportation, age, sex, social environment, attitude, home mobility, community mobility and assistive and mobility devices.

Table 3. Socio-demographic and environmental factors that affect functional disability levels by multiple linear regression analysis

Factors	Unstandardized coeff.		Stand coeff.	Sig.
	B	$Std. error$	$Beta$	
Age	-1.332	0.282	-0.250	0.000*
Sex	13.106	4.127	0.171	0.002*
Home mobility	0.074	1.105	0.004	0.947
Community mobility	0.093	1.372	0.004	0.946
Social environment	4.043	1.645	0.154	0.015*
Assistive & mobility devices	-0.083	1.490	-0.003	0.956

Factors	Unstandardized coeff.		Stand coeff.	Sig.
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>	
Communication devices	-9.576	1.640	-0.383	0.000*
Transportation	12.838	2.424	0.350	0.000*
Attitude	-0.392	1.555	-0.016	0.801

Table 4. Relative importance of independent variables in descending order

Variables	Absolute beta
Communication devices	0.383
Transportation	0.350
Age	0.250
Sex	0.171
Social environment	0.154
Attitude	0.016
Home mobility	0.004
Community mobility	0.004
Assistive & mobility devices	0.003

4. DISCUSSION

Older adults with OA who get dependent mobility are less likely to continue in the community. They have greater degrees of self-care disability and experience worse quality of life [8]. The findings of the present study represented a highly statistical significance between all functional disability levels and occupation before retirement. These may be due to the workload of household activities because the majority was housewives.

The present findings showed a significant association between all functional disabilities' levels and visual impairment. The current findings were in agreement with Raina et al. who mentioned that visual impairment might be accompanying more functional disability than hearing impairment because the vision is the primary sense for obtaining information from surrounding environment [9].

Concerning the community environment, the present findings showed no relationship between community mobility obstacles and the degree of functional disability among older adults. This finding is consistent with study conducted by Haak et al. and Oswald et al. Those study used the same environmental assessment scale and found that several environmental barriers were not associated with functional disability among elders [10], [11]. This may be due to the elderly with a functional disability can adapt and remain involved in daily activities. While other studies found that people who stated a higher existence of community mobility barriers were likely to report more functional disability

[12], [13].

Transportation availability is one of the most critical factors that facilitate older adult mobility and functional ability [12]. The current study represented a highly statistical significance between functional disability levels and transportation. People reporting fewer transportation opportunities in their community perceived more limitation in their daily activities [12].

Basic mobility and assistive technology (devices) mainly refer to technologies or devices that are used to keep or improve a person's ability to carry out daily tasks by compensating for physical, sensory, and cognitive impairments and by promoting self-management and independence [14]. The present study found that increasing the number of assistive and mobility devices, the decreasing the level of the most functional disability levels, with a high statistical significance was found. This result was in accordance with a randomized controlled trial done by Nann et al. who found that the rate of functional impairment was lesser among assistive technologies users [15].

Concerning the priority of factors that affect health-related functional disability, communication devices are the most important factor, followed by transportation, age, sex, social environment, attitude, home mobility, and community mobility and assistive & mobility devices. Therefore, disability among older adults should be a focus of all public health concern.

5. CONCLUSION

It can be concluded that communication devices are the most important factor followed by transportation, age, sex, social environment, attitude, home mobility, community mobility, assistive and mobility devices. The recommendations of this study were creating accessible environments by architectural and structural modifications to the home including installation of ramps, side rails and stairlifts and automatic door openers if possible; adjust the environment at the street level by introducing safe sidewalks, curb cuts and straight or Flat Street by organising with local units of each city; raise attentiveness about the availability and benefits of assistive technologies such as recent mobility aids (cane and walker with light), eating aids (kitchen aids such as cutting boards that hold food) and dressing aids (button adapters of zipper pulls) and services that support osteoarthritic elders by collaborating with other agencies as mass media; and providing transportation suitable to osteoarthritic elderly, have many low stairs and appropriate seats for elderly or other varieties of help to allow older adults to join social activities.

REFERENCES

- [1] J. B. Halter, J. G. Ouslander, M. Tinetti, S. Studenski, K. High, and S. Asthana, *Hazzard' Geriatric Medicine and Gerontology*, 6th ed. New York: The McGraw-Hill Companies, 2009.

- [2] E. Heikkinen, S. Ebrahim, L. Ferrucci, J. Guralnik, T. Rantanen, and S. Marianne, "Disability in Old Age," University of Jyväskylä, 2004.
- [3] J. Keysor, A. Jette, S. Haley, "Development of the Home And Community Environment Instrument," *Am. J. Rehabil.*, vol. 37, pp. 37–44, 2005.
- [4] B. Hassan, "Comparative clinical study of non-pharmacologic interventions for relieving moderate to severe knee pain in elderly patients," University of Alexandria, 2011.
- [5] W. Moran, Lv. Sihan, and G. John, "Impairments and Disability in the Chinese and American Oldest-Old Population," *Springer Sci. + Bus. Media*, vol. 20, pp. 305–314, 2008.
- [6] A. Jette, S. Sayers, S. Haley, T. Heeren, J. Guralnik, and R. Feilding, "Validation of the Late-Life Function and Disability Instrument," *J. Am. Geriatr. Soc.*, vol. 52, no. 9, pp. 1554–1559, 2004.
- [7] J. Keysor, "Home and Community Environment (HACE) Survey: Instrument and Scoring Manual," 2008.
- [8] Th. Gill, E. Gahbauer, T. Murphy, L. Han, and H. Allore, "Risk Factors and Precipitants of Long-Term Disability in Community Mobility," *Ann. Intern. Med. J.*, vol. 156, no. 2, pp. 131–140, 2012.
- [9] P. Raina, M. Wong, and H. Massfeller, "The relationship between sensory impairment and functional independence among the elderly," 2004. [Online]. Available: <http://www.biomedcentral.com/1471-2318/4/3>.
- [10] M. Haak, A. Fänge, V. Horstmann, and S. Iwarsson, "Two dimensions of participation in very old age and their relations to home and neighbourhood environments," *Am. J. Occup. Ther.*, vol. 62, no. 1, pp. 77–86, 2008.
- [11] F. Oswald *et al.*, "Relationships between housing and healthy ageing in very old age," *Gerontologist*, vol. 47, no. 1, pp. 96–107, 2007.
- [12] J. Keysor *et al.*, "Community Environmental Factors Are Associated With Disability in Older Adults With Functional Limitations: The MOST Study," *J. Gerontol. Med. Sci.*, vol. 65, no. 4, pp. 393–399, 2010.
- [13] AR. Meyers, JJ Anderson, DR Miller, K. Shipp, and H. Hoenig, "Barriers, facilitators and access for wheelchair users: substantive and methodologic lessons from a pilot study of environmental effects," *Soc Sci Med*, vol. 55, no. 8, pp. 1435–1446, 2002.
- [14] U.S. Department of Health & Human Services, "Administration on Aging. Assistive Technology," 2010. [Online]. Available: http://www.aoa.gov/AoAroot/Press_Room/Products_Materials/fact/pdf/Assistive_Technology.pdf.
- [15] WC. Mann, KJ. Ottenbacher, L. Fraas, M. Tomita, and CV. Granger, "Effectiveness of assistive technology and environmental interventions in maintaining independence and reducing home care costs for the frail elderly," *Arch Fam Med.*, vol. 8, no. 3, pp. 210–217, 1999.