Functional Disability and Their Associated Chronic Diseases among Elderly Patients Attending an Egyptian Family Practice Clinic

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Submission Date: 17-01-2021 **Revision Date:** 03-02-2021 **Acceptance Date:** 03-02-2021

Abstract

Background: With the enhanced life expectancy, the number of elderly persons is constantly increasing. Functional disabilities increase among elderly persons with the growing burden of chronic diseases leading to dependency and affection of performance of daily activities. **Objectives:** The present study was carried out to determine the prevalence of functional disabilities among elder of various chronic diseases and disabilities, and the relation between chronic diseases and disabilities. **Method:** The design of the present study was cross-sectional. Data collection was done using a semi-structured anonymous questionnaire. SPSS program, version 24 was used for data analysis. **Results:** The mean age of the studied participants was 67.19±5.94 years. Seventy-three percent of the studied participants had three chronic diseases or more. Most of the respondents had diabetes mellitus (62.3%), hypertension (75.8%), musculoskeletal pain (61.3%), and eye diseases (51.7%). Concerning the prevalence of functional disability, 50.9% and 49.1% of the studied participants were independent and partially dependent, respectively. The significant predictors of functional disability were age > 75 years (odds ratio (OR): 2.06; confidence interval (CI): 1.08-3.91), very low socioeconomic status (OR): 2.64; confidence interval (CI): 2.01–4.80), and number of chronic diseases ≥ 3 (odds ratio (OR): 9.62; confidence interval (CI): 4.39-21.04). **Conclusions:** The present study showed a significant association between elderly chronic diseases and disabilities. Furthermore, advanced age and very low socioeconomic status were significant determinants of functional disability among the studied participants. Implementation of geriatric health programs is of vital importance for the screening of chronic diseases and disabilities identification.

***Keywords**: disability, elderly, chronic diseases, dependence*
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Introduction

Population aging would be the driving force of the predicted rise in the burden of disease in the elderly, mostly noticeable in low-income, middle-income countries and in diseases that depend highly on age (dementia, stroke, chronic obstructive pulmonary disease, and diabetes).[1]

The global epidemic of chronic diseases is closely related to the aging of the population. In addition to the actual and proportional numbers (comparative to the overall population size) of elderly people (≥60 years), diseases with a clear age-dependent relationship will rise in prevalence.[2]

An important health indicator that points to the jeopardized quality of life is a disability in older people.[3]. Despite the population's aging, medical care has some difficulties in developing methodologies aimed at providing the best care for elderly patients. Although in the traditional disease-oriented model of care, chronic diseases have been the subject of concern, studies show that geriatric impairments are stronger determinants of disability in activities of daily living (ADLs) and nearly as strong for mobility disability.[4]

The International Classification of Functioning, Disability, and Wellbeing (ICF) model of the World Health Organization indicates that clinicians should concentrate on the severe disabilities that result from health problems and on the factors affecting the capacity of the patient to adapt to all those disabilities.[5, 6]

Geriatric treatment puts a tremendous strain on the health system and family members as there are a lot of elderly age health conditions and physical disorders.

Their functional status is among the main components of elderly patients ' quality of life. This is the capacity of the person to live a comfortable life and to adjust to his / her environment or, for basic human needs, to conduct normal daily activities and to perform normal functions of health and well-being.[7]

One of the strategies to the review of the elderly's well-being is to study their capability in daily living activities (ADLs) or a daily task of self-care that a person must execute, which is a composite measure of the individual's ability to conduct certain fundamental functions.[8]

The disability may be prevented either by the disease being prevented or by the disability being avoided. As the main causes of impairment are chronic illnesses, it is important to determine chronic disorders and their relationship with disability. Egypt like many other countries is undergoing a demographic transition towards an aging society, so such studies will be considered important in Egyptian community. The present study was done to determine the prevalence of functional disability among elderly patients with chronic diseases presenting to the family practice clinic at Suez Canal University Hospital, Ismailia, Egypt.

Method

Study design and setting: The present study was conducted at the family practice clinic at Suez Canal University hospital, from January 2020 until June 2020. The clinic was chosen for geographic proximity, accommodating clinic environment, established chronic diseases services, its ability to achieve the recruitment rate, to provide a fair representation of the patient population in Ismailia, and for the availability of infrastructure such as patient's records, available resources for patient investigations, referral and follow up.

Sample size and sampling: The sample size was calculated using $n= P (1-P) z^2/ d^2$ [9] assuming the prevalence of chronic diseases among the elderly to be 45% (10) with a precision of 5%, applying a confidence level of 95% and 80% power of the study. The calculated sample size was 385. A systematic random sampling technique was done for selection of the cases. As the total number of patients attending the family practice clinic at Suez Canal University hospital was 2400 and the sample size was 385. So, the sampling interval was 6.2. The case was selected every 6^{th} patient if it fulfilled the inclusion criteria.

Inclusion criteria: old age patients 60 years old and above who have any chronic disease. Chronic diseases are long lasting

conditions with persistent effects and require ongoing medical attention or limit activities of daily living or both.[11]

Exclusion criteria: Elderly patients who refused to participate in the study and who have severe chronic diseases such as cancer in advanced stages rendering a subject's participation in the study non-feasible.

Data collection tool

A semi-structured anonymous questionnaire was used to collect the data and was modified according to the results of the pilot study. A pilot study was carried out on 10 elderly patients to assess the significance of the questions to the aim of the work, determine whether the respondents understand them or not, and to determine the time needed to complete the interview. The pilot study findings have not been used in the current study. The questionnaire is composed of four parts. The first part included sociodemographic data, age in years, gender, marital status, and current work. The second part included a scale for measuring family socioeconomic status (SES) for health research in Egypt.[12] This score includes 7 domains, total score: (out of 84), socioeconomic level: to be classified into very low, low, middle, and high levels depending on the quartiles of the score calculated (Very Low: 1-21), (Low: 22-43), (Middle: 44-65), and (High: 66-84). Every enrolled participant was asked about his/her educational and cultural domain, occupation domain, family domain, family possessions domain, economic domain, home sanitation domain, and health care domain. The third part included questions about chronic morbidities among the target population such as hypertension, diabetes mellitus, heart diseases, kidney diseases, liver diseases, stroke, musculoskeletal pain, and eye diseases. The fourth part was the Arabic ADL Scale (13). The Arabic ADL Scale is a 6-item ordinal scale that measures functional independence in the domains of personal care and mobility. Specifically, it measures self-care, sphincter management, transfers, and locomotion. The Arabic ADL Scale includes six personal activities: bathing, dressing, and undressing getting on and off a toilet, moving from wheelchair to bed and returning, controlling the bladder, controlling bowel, and feeding. The disability inactivity interview questions were described and graded in scale steps (0, 1/2, 1). Based on the Arabic ADL Scale, scores of 0 points indicate very dependent, 1-5 points indicate partially dependent, and 6 points indicate independent.

Data analysis

Data analysis was done utilizing the SPSS program (SPSS Inc., Chicago, IL, USA), version 24. Quantitative data were expressed as means ± standard deviation while qualitative data were expressed as frequencies and percentages. Chi-square test was used when qualitative categorical variables were compared. Whenever the predicted values were lower than Five in one or more of the cells in a 2x2 table, Fisher's exact test was being used. Binary logistic regression analysis was performed to adjust for confounding variables. At p-value < 0.05, statistical significance was assumed.

Ethical considerations

The study was done with the approval of the Research Ethics Committee of Faculty of Medicine Suez Canal University, Egypt (reference number#4028). The objectives of the study were clarified to the participants and written informed consent was provided from participants who decided to participate in the study. By using anonymous questionnaires, the authors guarantee the privacy and confidentiality of the data obtained.

Results:

The sociodemographic characteristics of the respondents is displayed in table 1. The mean age of the studied participants was 67.19±5.94. Most of the respondents were females (55.3%), currently married (68.1%), and non-employed (90.6%). Also, 57.9% of the participants had low socioeconomic status. The mean score of socioeconomic status was 29.26±11.58. Table (2) explored that 73% of the studied participants had three chronic diseases or more. Most of the respondents had diabetes mellitus (62.3%), hypertension (75.8%), musculoskeletal pain (61.3%), and eye diseases (51.7%). Regarding the prevalence of functional disability according to ADL score, 50.9% and 49.1% of the studied participants were independent and partially dependent, respectively (figure 1). Regarding the sociodemographic correlates of functional disability. Functional disability was significantly higher among older age (p=0.023), females (p=0.011), widowed (p=0.035), non-employed (p=0.002), and very low socioeconomic status participants (p<0.001) (Table 3). Functional disability was significantly higher among participants with three chronic diseases or more (p=0.000), cardiovascular diseases (p=0.003), diabetes mellitus (p=0.000), hypertension (p=0.000)

Table (1): Socio-demographic characteristics of elderly patients attending an Egyptian family practice clinic

Socio-demographic characteristics	No. (%) (N=385)
Age	
60-64	134 (34.8)
65-69	140 (36.4)
70-74	56 (14.5)
≥75	55 (14.3)
Mean±SD	67.19±5.94 years
Sex	
Male	172 (44.7)
Female	213 (55.3)
Currently married	
Yes	262 (68.1)
No	123 (31.9)
Currently employed	
Yes	36 (9.4)
No	349 (90.6)
Socio-demographic status	
Very low	104 (27.0)
Low	223 (57.9)
Middle	58 (15.1)
Mean±SD	29.26±11.58

Table (2): Pattern of self-reported chronic diseases among elderly patients attending an Egyptian family practice clinic

Chronic diseases	No. (%) (n=385)
Number of chronic diseases	
1	59 (15.3)
2	45 (11.7)
≥3	281 (73.0)
Diabetes	
Yes	240 (62.3)
No	145 (37.7)
Hypertension	
Yes	292 (75.8)
No	93 (24.2)
Cardiovascular diseases	
Yes	98 (25.5)
No	287 (74.5)
Kidney diseases	
Yes	30 (7.8)
No	355 (92.2)
Liver diseases	
Yes	69 (17.9)
No	316 (82.1)
Stroke	
Yes	9 (2.3)
No	376 (97.7)
Musculoskeletal pain	
Yes	236 (61.3)
No	149 (38.7)
Osteomalacia	
Yes	118 (30.6)
No	267 (69.4)
Eye diseases	
Yes	199 (51.7)
No	186 (48.3)

(Table 4). Besides, functional disability was significantly higher among participants who had a stroke (p=0.018), musculoskeletal pain (p=0.002), osteomalacia (p=0.014), and eye diseases (p=0.007). Logistic regression analysis revealed that age > 75 years, very low socioeconomic status, and the number of chronic diseases ≥ 3 were significant predictors of functional disability (Table 5). Participants aged > 75 years were 2.06 times more likely to have a functional disability than those aged 60-64 (odds ratio (OR): 2.06; confidence interval (CI): 1.08-3.91). Furthermore, participants with very low socioeconomic status were 2.64 times more likely to have a functional disability than participants with middle socioeconomic status (odds ratio (OR): 2.64; confidence interval (CI): 2.01–4.80). The present study also showed that participants with three chronic diseases or more were 9.62 times more likely to have a functional disability than participants with one chronic disease (odds ratio (OR): 9.62; confidence interval (CI): 4.39-21.04).

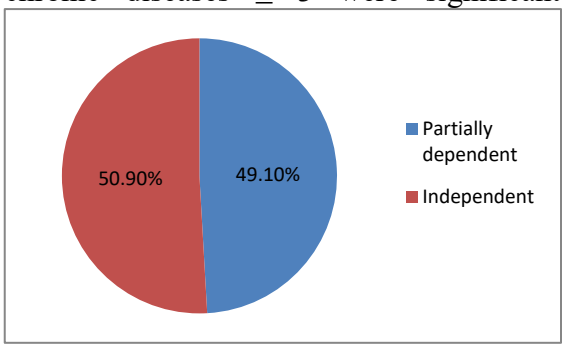

Figure (1): Prevalence of physical disability according to ADL score among elderly patients attending an Egyptian family practice clinic

Discussion

More older people are at increased risk of disability as the world's population ages steadily, leading to greater demand for healthcare facilities and rising costs of healthcare costs.[14] The global disease burden among elderly people is expected to rise by the increase in the elderly population, aligned with population aging being one of the most significant elements of the epidemic of chronic disease.[15]

In Egypt, elderly is expected to begin at the age of 60, and 7.2 percent of the population is considered elderly.[16] It is estimated that the elderly population in Egypt will increase by 10.9 percent in 2026.[17]

The burden of communicable diseases has fallen because of the epidemiological change, at the expense of a growing burden of chronic diseases. Large vaccine programs initiated in the last few years have helped the transition.[18] This explains the finding in the present study in which all the respondents reported having one or more chronic diseases and that most of them have 3 or more chronic conditions. In a study in Banha city, Egypt, the authors found that all elderly participants in the studied sample suffered from at least one of the chronic diseases.[19]

In the present study, hypertension, diabetes, and musculoskeletal diseases were found to be the most preventable among the study population. The most prevalent illnesses among the elderly are arthritis and hypertension, as more than one-fifth of them suffer from these diseases in a study carried out by Keshari et al. in India.[20]

Regarding the prevalence of physical disability according to the ADL scale, 49.1% of the respondents were partially dependent while 50.9% were independent in the present study and this can be due to the study setting as the study population was recruited from the family practice clinic attendees and it is expected not to find very dependent elderly. Vaish et al. reported that the prevalence of functional disability was found to be 25.6% in a community bases study in India.[21]

Whereas the prevalence of functional disability was 46.8 percent in another community-based research.[22] The disparity in the prevalence between different studies could be attributed to the fact that different meanings were used by these researchers to describe a functional disability. The steepest increase in ADL impairment was among the oldest age group of elderly people aged 85 and over, with a predicted increase in the prevalence from 33.5 percent in 2014 to 40.4 percent in 2050.[14] In the present study, functional disability was significantly higher among older age (≥75years). A similar finding was reported by Gupta et.al[23]) and Vaish et.al.[21]

Table (3): Association of socio-demographic characteristics and functional disability among elderly patients attending an Egyptian family practice clinic

Socio-demographic characteristics	Partially dependent (n=189)	Independent (n=196)	P-value
Age			
• 60-64	58 (43.3%)	76 (56.7%)	
• 65-69	63 (45.0%)	77 (55.0%)	0.023*
• 70-74	33 (58.9%)	23 (41.1%)	
• ≥75	35 (63.6%)	20 (36.4%)	
Sex			
• Male	72 (41.9%)	100 (58.1%)	0.011*
• Female	117 (54.9%)	96 (45.1%)	
Marital status			
• Married	119 (45.4%)	143 (54.6%)	0.035*
• Widowed	70 (56.9%)	53 (43.1%)	
Currently employed			
• Yes	9 (25.0%)	27 (75.0%)	0.002*
• No	180 (51.6%)	169 (48.4%)	
Socio-demographic status			
• Very low	72 (69.2%)	32(30.8%)	0.000*
• Low	108 (48.4%)	115 (51.6%)	
• Middle	9 (15.5%)	49 (84.5%)	

**Statistically significant*

This study showed that disabilities were significantly associated with the female gender, which is similar to other studies conducted in Egypt.[24]

High overall fertility can increase the risk of disability among females in Arab countries, including Egypt.[24] Also, in their later years, men frequently remain family providers and continue to participate in the labor force.[25]

In this study, functional disability was significantly greater among participants who were widowed. However, marital status was not significant when applying logistic regression analysis. Gupta et al.[23] and Gureje et al. in Nigeria[26] reported that people who are still married have lower disability rates than those who are separated, divorced, or widowed.

It has been widely reported that the correlation between elderly health and socioeconomic status (SES) is significant. Low SES directly affects health through a lack of sufficient services and adversely affects health by adding to unhealthy behaviors.[27] On the application of logistic regression analysis in the present study,

functional disability was significantly higher among participants with very low socioeconomic level. This is like the research conducted in Minia, Egypt where disability was associated with age and low income.[28]

Elderly people are more likely to have chronic illnesses.[29] Usually, physical disorders arise from chronic illnesses. In the current study, a significant positive correlation was observed between multimorbidity and functional disability. Participants with three chronic diseases or more were 3.29 times more likely to have a physical disability than participants with one chronic disease. A correlation between self-reported multimorbidity and functional impairment has also been found in recent studies in India and America; they have found that the multimorbidity levels are correlated with a loss of functional capability.[21, 30] The present study observed that diabetes, hypertension, cardiovascular diseases, musculoskeletal diseases, stroke, and eye diseases were significantly associated with functional disability. Fong in his recent study in

Table (4): Association of self-reported chronic diseases and functional disability among elderly patients attending an Egyptian family practice clinic

Chronic diseases	Partially dependent (n=189)	Independent (n=196)	P-value
Number of chronic diseases			
• 1	8 (13.6%)	51(86.4%)	0.000*
• 2	12 (26.7%)	33 (73.3%)	
• ≥3	169 (60.1%)	112(39.9%)	
Diabetes			
• Yes	140 (58.3%)	100 (41.7%)	0.000*
• No	49 (33.8%)	96 (66.2%)	
Hypertension			
• Yes	158 (54.1%)	134 (45.9%)	0.000*
• No	31(33.3%)	62 (66.7%)	
Cardiovascular diseases			
• Yes	61(62.2%)	37 (37.8%)	0.003*
• No	128 (44.6%)	159 (55.4%)	
Kidney diseases			
• Yes	18 (60.0%)	12 (40.0%)	0.213
• No	171(48.2%)	184 (51.8%)	
Liver diseases			
• Yes	35 (50.7%)	34 (49.3%)	0.764
• No	154 (48.7%)	162 (51.3%)	
Stroke			
• Yes	8 (88.9%)	1(11.1%)	0.018*
• No	181(48.1%)	195 (51.9%)	
Musculoskeletal diseases			
• Yes	131(55.5%)	105 (44.5%)	0.002*
• No	58 (38.9%)	91(61.1%)	
Osteomalacia			
• Yes	69 (58.5%)	49 (41.5%)	0.014*
• No	120 (44.9%)	147 (55.1%)	
Eye diseases			
• Yes	111(55.8%)	88 (44.2%)	0.007*
• No	78 (41.9%)	108 (58.1%)	

**Statistically significant*

America found that the elderly who have any of the 'big four' non-communicable diseases (cardiovascular diseases, cancer, chronic obstructive pulmonary disease, and type 2 diabetes) are at greater risk of being functionally impaired than people without those diseases.[29] The Non-communicable diseases epidemic has devastating health effects and threatens health systems especially in developing countries. Disability raises the financial burden, the likelihood of hospital admission, domestic assistance requirements, the risk of premature mortality, and the quality-of-life declines.[31]

Table (5): Logistic regression analysis showing the predictors of functional disability among elderly patients attending an Egyptian family practice clinic

Characteristics	OR (CI 95%)	P-value
Age		
• 60-64	1	
• 65-69	1.04 (0.65-1.68)	0.872
• 70-74	1.82 (0.97-3.43)	0.062
• ≥75	2.06 (1.08-3.91)	**0.028**
Sex		
• Male	1	
• Female	1.17 (0.65-2.11)	0.61
Currently married		
• Yes	1	
• No	0.73 (0.41-1.29	0.28
Currently employed		
• Yes	1	
• No	0.69 (0.28-1.69)	0.42
Socio-demographic status		
• Middle	1	
• Low	1.56 (0.95-5.37)	0.076
• Very low	2.64 (2.01-4.80)	**0.000**
Number of chronic diseases		
• 1	1	
• 2	2.32 (0.86- 6.28)	0.098
• ≥3	9.62 (4.39-21.04)	**0.000**
Diabetes		
• No	1	
• Yes	1.45 (0.79-2.65)	0.23
Hypertension		
• No	1	
• Yes	0.98 (0.51- 1.87)	0.94
Cardiovascular diseases		
• No	1	
• Yes	1.52 (0.87-2.64)	0.13
Stroke		
• No	1	
• Yes	6.75 (0.77-59.03)	0.08
Musculoskeletal pain		
• No	1	
• Yes	0.67 (0.37-1.21)	0.19
Osteomalacia		
• No	1	
• Yes	1.16 (0.67-2.02)	0.59

Eye diseases		
• No	1	
• Yes	1.47 (0.84-2.57)	0.17

The overall predicted % of the model is 71.7%

The results demonstrate a significant correlation between elderly chronic diseases and disabilities encouraging more potential initiatives and policies to overcome elderly problems.

The potential limitations of the study include its cross-sectional design, which might have resulted in biased observations, particularly in situations in which the disability may have accompanied or even preceded the disease. Furthermore, self-recall of the information may have added some bias in the results. However, what adds to the study is that all diseases of the elderly included in the study were previously diagnosed and registered in the clinic records.

Conclusion and recommendations

Advanced age, very low socioeconomic status, and an increased number of chronic diseases were found as significant predictors of functional disability among the study participants. Functional disability needs to be early recognized in the elderly population using appropriate methods so that needed approaches can be initiated to enhance the elderly quality of life. Reduction of disabilities among the elderly should be encouraged by implementing geriatric health programs that include chronic disease screening, disabilities identification, and social services to the elderly and their families.

Acknowledgment

The researchers express their thanks to the administrators of the family practice clinic at Suez Canal University Hospital for their help in carrying out the present study and to all participants for their cooperation.

Conflicts of Interest:

None declared

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