

The Effect of Chronic Diseases on Functional Status measured by the Care Dependency Scale in a Sample of Community-dwelling Elderly Egyptians

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Abstract

Background: The increasing number of elderly population has made it more important to focus on elderly function and independent living. Chronic diseases represent a major threat to elderly independence and the Care Dependency Scale is considered a comprehensive tool for assessment of functional status in elderly

Aim: To study the effect of chronic diseases on functional independence in elderly using the Care Dependency Scale

Methods: One-hundred twenty seven community-dwelling elderly Egyptians were enrolled in the study. Cases were selected by convenient sampling regarding age, sex, governorate, religion, educational level, socioeconomic status, marital status and working status. This was based on data supplied by the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS) report of 2013 supplied to the National Center for Social and Criminological Research (NCSCR)

Results: In the current study sample, visual impairment, hypertension and DM were the most prevalent chronic diseases with a prevalence of 53.5, 44.1, 31.5 respectively. While cerebrovascular accidents were the least prevalent recording 4.7% of the study sample. Insomnia, chronic kidney diseases (CKD), heart failure and previous hospitalization were significantly related to lower CDS scores in the current study. The mean CDS in our study sample was 74.9

Conclusions: Insomnia, CKD, heart failure and previous hospitalization are related to higher rates of care dependency in elderly Egyptians.

Keywords: Care dependency scale, Egyptian Elderly, Functional status in elderly, chronic diseases

Background

Egyptian Geriatric population demography

The report by Central Agency for Public Mobilization and Statistics (CAPMAS) in 2016 found that the Egyptian geriatric population in 2016 was 6.9% of the total population. The age group 60-64 represented 2.6% of total population, age 65-69 was 1.8%, age 70-74 was 1.2% and above 75% represented 1.3%.¹

There was an increase when comparing these figures with previous years; in 1950 it was 3% reaching 5.5% in 2010.²

In Egypt, life expectancy has been increased over the past years for both males and females. When comparing 2006 to 2015, life expectancy in males increased from 66.5 years to 70.1 years, while in females it increased from 69.1 years to 72.9 years.²

These demographic changes have made the study of elderly function and independence of increasing importance. This originates from the significant effect of comorbidities on elderly function and quality of life,

which should be a major issue of concern as people reach their late life stages.³⁻⁴

Functional disability

Functional disability is common in older adults. It is often episodic and is highly related to subsequent health decline. Disability and functional decline are multifactorial, being affected by medical conditions, social support and activity, financial support and environment. Multiple medical and health conditions interact together resulting in greater rates of functional decline and less capacity of body to compensate and face stressors.⁵

Effective evaluation of functional decline should include the course of the disability, associated symptoms, effects on specific activities, and coping mechanisms the patient uses to compensate for the functional problem. Underlying health conditions, level of functional dependence and other factors (e.g., finances, social support) should be assessed using validated screening tools.⁵

The new approach of care dependency rather than functional impairment

In recent years, the assessment of disability has been directed more towards the subject's needs rather than the simple functional limitation. The need of caregiver occurs only if a functional limitation affects a particular subjective need. For example, someone who has no desire to leave his house will not demand support to do so. If older persons reduce such needs, care dependency will decrease as well. Functional limitations should thus be perceived as a factor that influences care dependency.⁶

The relationship between chronic diseases and functional impairment is well studied, unlike the relation between chronic diseases and care dependency.

The care dependency scale

An instrument that can assess this relation is the Care Dependency Scale (CDS).⁷ It was developed in the Netherlands and is based on the nursing theory of Henderson.⁸ The instrument provides 15 items concerning care needs for assessment. It has been translated into 12 different languages. Eight of the existing translations have been psychometrically tested and showed good reliability and validity.⁹

The care dependency scale showed a good reliability and validity when tested¹⁰ and also showed high sensitivity (85%) and positive predicted value (90%) when compared to other well-established gold standard tests of function like the Barthel index.¹¹

The development of the Arabic version by Boggatz and his colleagues took two issues into consideration. First: the theory of Henderson⁸ which states that the basic human needs measured are universal. Second: the cultural differences among different communities that cause a difference in the nature of required support leading to culture-specific approach. The consideration of these two issues was used in the assessment of the 15 items used in the test worldwide.¹²

Eleven of the original 15 items were perceived as relevant for Arabian culture. Four items caused controversial reactions but were generally accepted (these items were the need for support with regard to learning something new, contact with others, directing one's behavior according to social standards and recreational activities). On the other hand, panelists suggested adding two further items on needs related to taking medication and spiritual support.¹² This resulted in 17 items in the Arabic version versus 15 in other versions.

Methods

a cross-sectional study involving 127 participants, 58 males and 69 females. A pilot study was designed. Cases were selected by convenient sampling of Egyptian elderly based on data supplied by the Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS) report of 2013 supplied to the National Center for Social and Criminological Research (NCSCR). Based on the age groups, the sample included 54 participants 60-64 years old, 38 Participants 65-69 years old, 17 participants 70-74 years old, 18 participants 75 years and above. 116 were Muslims and 11 were Christians. Regarding educational level, 54 were illiterates, 51 intermediate education, 22 high education. Regarding the marital status, 68 were married, 53 widow/er, 5 divorced and 1 not previously married. 105 were not having a current job and 22 were currently working. Regarding the socioeconomic state, 60 were of low status, 43 of middle, and 24 of high status.

Results

The sample was distributed among Egyptian governorates, taken from Metropolitan cities, upper Egypt, delta and border cities and rural areas according to prevalence of elderly population in these areas. All participants gave consent to join in the study a trained researcher geriatrician interviewed each participant focusing on personal data, social status, previously diagnosed chronic medical diseases and functional status using the Care Dependency Scale (CDS). Caregivers attended the questionnaires of participants who suffer from cognitive impairment. Data was collected, analyzed and the relationship between chronic diseases and care dependency scale was studied

Our study sample was a convenient representation of the elderly Egyptian population chosen based on data supplied by the CAPMAS report in 2013 through NCSCR chosen from seven governorates representing metropolitan cities, upper Egypt, delta, border cities and rural areas. One-hundred twenty seven (127) cases were chosen by convenience sampling while still fulfilling the previously decided demographic characteristics of age, sex, religion, marital status, education, socioeconomic status and the number of cases chosen from each governorate.

Table 1: Demographic data of the study sample

		Number of cases	Percentage of cases (%)
Age	60-64	54	42.5%
	65-69	38	29.9%
	70-74	17	13.4%
	75-99	18	14.2%
Sex	Females	69	54.3%
	Males	58	45.7%
Governorate	Cairo	31	24.4%
	Asyout	20	15.7%
	Kafr-el-Sheikh	20	15.7%
	Domiat	15	11.8%
	Menia	15	11.8%
	Alexandria	16	12.6%
	Matrouh	10	7.9%
Religion	Muslim	116	91.3%
	Christian	11	8.7%
Marital status	Married	68	53.5%
	Widow/er	53	41.7%
	Divorced	5	3.9%
	Unmarried	1	0.8%
Education	Illiterate	54	42.5%
	Middle	51	40.2%
	High	22	17.3%
Work status	Not working	105	82.7%
	Working	22	17.3%
Socioeconomic status	Low	60	47.2%
	Middle	43	33.9%
	High	24	18.9%
Care dependency scale	Mean \pm SD	75.99 \pm 13.40	
	Range	17 - 85	

The majority of the sample was in the age group 60-64, 54.3% were females, 24.4% were chosen from Cairo, 91.3% were Muslims, 53.5% were married, 41.7% were widow/ers, 42.5% were illiterate, 82.7% were still

among the working force (whether governmental or private jobs) and 47.2% were among the low socioeconomic group. The care dependency scale had a mean of 75.99, the lowest was 17, the highest was 85.

Figure 1: Prevalence of chronic diseases among the study sample

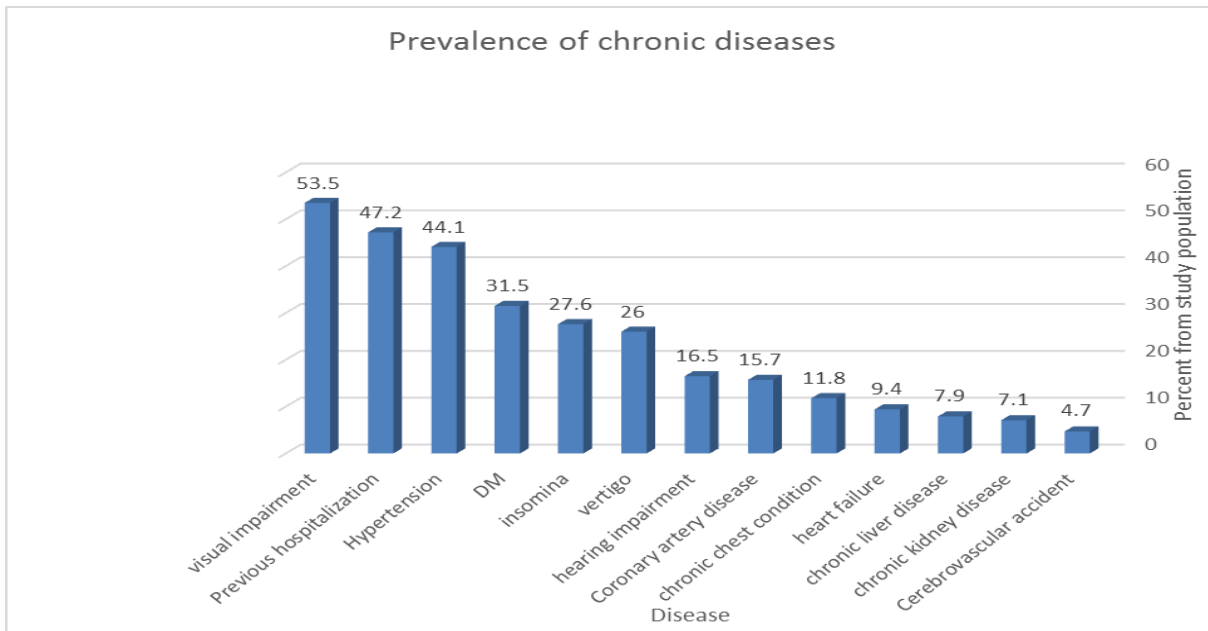


Figure 2: The statistically significant relationship between chronic diseases and CDS scores

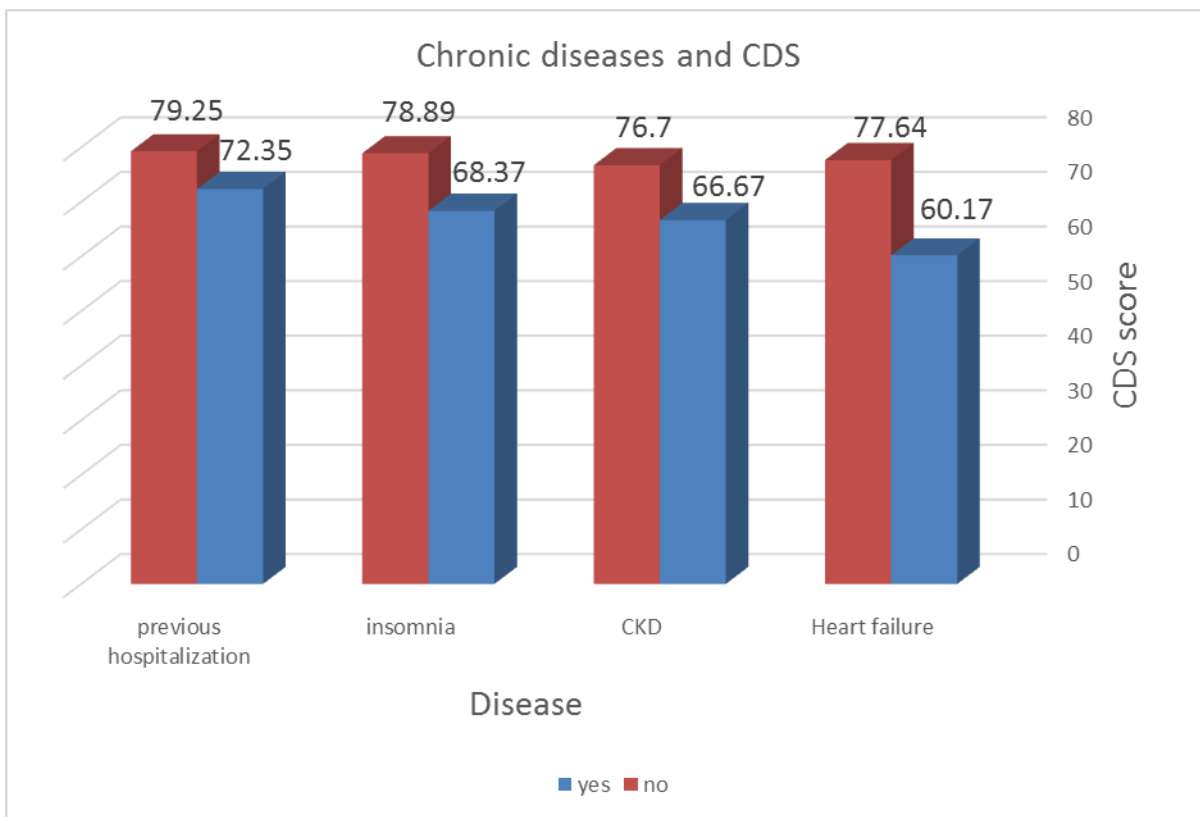


Figure 1 Shows the prevalence of chronic diseases among the study population. The most prevalent was visual impairment with 53.5% followed by hypertension (44.1%), DM (31.5%), insomnia (27.6%). The prevalence of heart failure (HF) was 9.4%, chronic kidney disease (CKD) was 7.1%. 47.2% were previously hospitalized for any cause.

Figure 2 shows the statistically significant relationship between CDS and insomnia ($p < 0.001$), CKD ($p = 0.03$), HF ($p < 0.001$) and history of previous hospitalization ($p = 0.003$). The presence of any of these was associated with lower CDS scores. The relationship between other chronic diseases and CDS score was statistically insignificant.

Discussion

The elderly population is considered one of the most vulnerable groups of population to be affected by chronic diseases and its negative consequences and complications. The current study focuses on the effect of chronic diseases on the functional status among a representative sample of elderly Egyptians.

The current study showed a mean CDS 75.99. The other study available concerned with the mean CDS in the Egyptian population was that of Boggatz and colleagues¹² showing a prevalence of 71.54. Although close, our higher CDS score can be attributed to the difference in the study sample chosen, where our sample was limited to community-dwelling elder population while Boggatz's sample was divided among nursing homes and community-dwellers.

The relationship between multiple comorbidities and function has been established in numerous previous studies.¹³

The current study aimed to assess the effect of each of the common chronic medical conditions affecting the elderly population on their functional performance level measured by the CDS score. Statistically significant correlations were found between heart failure, chronic kidney disease (CKD), insomnia and previous hospitalization with lower mean CDS scores.

Regarding heart failure, participants diagnosed with the disease had statistically significant lower mean CDS score (60.17) than those free from the disease (77.64). The effect of this particular diagnosis on function has been found in many studies, regardless of the tool used for assessment of physical function. For example, the study by [Mohammadi](#) and colleagues¹⁴ and agreeing partially with the results of the study by Bayliss and colleagues¹⁵ who used Physical Component Summary (PCS) and they found that patients with HF had lower PCS points, and they added that similar effect was found for DM, chronic respiratory conditions and 4 or more chronic medical conditions.

While the results of the current study did not conclude a significant effect for DM, chronic respiratory conditions and the other stated medical conditions in Bayliss's study on function level. This partial

disagreement in our results with Bayliss's study (concerning the effect of chronic diseases other than CHF on functional level) can be explained by the difference in the selected sample where Bayliss's study had no medically free cases (the sample was chosen to have baseline hypertension with or without other chronic diseases) while the current study had 11 medically free participants representing around 8.6% of the study sample. Moreover, the sample in Bayliss's study was recruited from primary and specialty health care centers, while our sample was enrolled from the community-dwelling elderly population, which favors our sample to have better functional level and less effect of chronic diseases on functional dependence.

Regarding CKD, the mean CDS for the participants with CKD was 66.67 vs 76.7 for those not affected with the disease, and the difference between the two groups was statistically significant. When compared to other studies, similar results were found even when adopting more comprehensive measures for functional assessment. The study by Padilla and colleagues¹⁶ used objective laboratory tests (VO₂peak), physical performance measures (gait speed, sit-to-stand and 6-minute walk) and self-reported functioning (SF-36 Health Status Questionnaire (physical functioning scale [PF] and physical composite scale [PCS])). All measures of functional level were reduced in their study when compared with sedentary age-predicted norms. Moreover, they found that maximal gait speed and PCS correlated significantly with eGFR.

Regarding insomnia, participants with insomnia had a lower mean CDS of 68.37 compared to a higher mean CDS (78.89) for the unaffected group. This can be attributed to the various health hazards related to insomnia causing effect of functional status in elderly like increased risk of depression¹⁷ and acute myocardial infarction¹⁸. It was also associated with greater risk of limitations in mobility¹⁹.

Also, when insomnia measured objectively by wrist actigraphy, both shorter sleep duration and spending a smaller proportion of time in bed asleep (i.e., poorer sleep efficiency) were associated with a greater risk of incident difficulty with household activities and with significant decline in grip.²⁰

A large community-based study had similar results, showed decreased physical function and increased functional dependency associated with insomnia represented by receiving help or having difficulty with selected household activities (laundry, shopping) and restricted participation in specific valued activities (attending religious services, going out for enjoyment).²¹

In the current study, we also found a significant relation between increased care dependency and history of previous hospitalization, whether recent or old history. The mean CDS for previously hospitalized participants was 72.35 vs 79.25 for those without history of previous hospitalization. Our findings can be explained by considering the risk factors for functional

decline occurring during hospitalization and liable to continue after hospital discharge depending on the quality of care given after discharge from hospital. These risk factors are the high level of immobility caused by the acute illness itself; tethers like Foley catheters, nasal cannulas, and IV drips; restrictive activity orders; lack of assistive mobility devices; lack of assistance by hospital personnel; the traditional hospital design which encourages bed rest; state of malnutrition and loss of muscle mass associated with hospital stay. Same results linking history of hospitalization to constantly increasing level of care dependency was found by Kato and colleagues, one third of patients hospitalized with pneumonia failed to regain functional independence and developed higher levels of care dependency²². Similar results by Solverson et al. showed that when hospitalization was due to critical illness, a functional decline 3 months after ICU discharge occurred.²³

Conclusion

The current study concluded a significant effect for heart failure, renal insufficiency, insomnia and history of previous hospitalization on function. It also showed a relatively higher mean CDS compared to other study carried on Egyptian population

Limitations

The study was a pilot study. Every effort was done to collect valid data, However, the limited number of sample may not reflect the actual situation. We advise to apply the study on a larger sample in the future.

Declaration

The data presented in this research was obtained by a group of researchers. I declare that I played a major role in the preparation and collection of the data. Data analysis and interpretation are entirely my own work. I also confirm that all sections of the paper that use quotes or describe an argument or concept developed by another author have been referenced, including all secondary literature used, to show that this material has been adopted to support our thesis. I also declare no conflict of interest

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