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Editorial

Dr Abdul Abyad
Chief Editor

In this issue we have papers from the region mainly Egypt , Iran and Jordan. A cross sectional study from Egypt looked at Assessment of handgrip strength variables in a population of Egyptian elderly. It was found that at 60-85 years mean values of handgrip strength in the dominant hand were found to be between [10.74-12.54 pounds per square inch (PSI)] in males and, [9.45-11.12 PSI] in females. The authors concluded that the normative values of handgrip strength in older age groups (60-85 years) were found to be between (10.74-12.54 PSI) in males and, (9.45-11.12 PSI) in females. Handgrip strength assessment using the baseline pneumatic dynamometer is easy and should be part of comprehensive geriatric assessment.

A descriptive cross-sectional study from Iran investigated concurrent changes in functional and cognitive status of the hospitalized elderly and their related factors. The sample size was 400 people chosen through the availability sampling. The 6-Item Cognitive Impairment Test (6CIT), and Barthel Index were used. The results showed significant relationships between disease diagnosis and age with cognitive status, between age and diagnosis type with functional status, and between functional decline and cognitive status in daily activities of the elderly. The authors concluded that there are concurrent changes in functional status in daily activities, and cognitive status of the hospitalized elderly. This study showed that 8 out of 10 of the hospitalized elderly patients suffered from varying degrees of undesirable cognitive status.

A paper from Jordan investigated the clinical outcome of Tympanoplasty type I (Myringoplasty) in elderly patients above the age of 60 years. A total of 30 patients aged 60 years or older who underwent type I tympanoplasty were enrolled in the study. Pre- and postoperative air- and bone-conduction thresholds were measured as an average of three speech frequencies (0.5, 1, and 2 kHz). The authors concluded that Myringoplasty is a quite successful method in appropriate elderly patients. Preoperative evaluation for surgery success is more important than the age itself. The outcomes of tympanoplasty in the elderly patients are generally not different from other age groups.

A paper from Iran looked at medication adherence that is crucial for treatment management in older adults who experience chronic illnesses. One hundred and seventy eight people with age over 60 participated in this study using convenience sampling. Participants completed the research measures including Illness Perception Questionnaire–Revised (IPQ-R) and Medication Adherence Rating Scale (MARS) alongside with the demographics questionnaire. The results showed that about fifty percent of participants were not adhere to their medication. Findings also indicated that some illness perceptions such as timeline, perceived consequences, and treatment control predicted medication adherence. Indeed, individuals who perceived their illness as a chronic condition and also believed that treatment can help them to manage their illness were more likely to adhere to prescribed medicines. While, participants with this belief that medicines have side effects were more likely to be non-adherent.

A prospective study that was conducted at King Hussein Medical Center. The aim of the study is to report features, causes, presentation and outcome of ischemic optic neuropathy in elderly patients attending neuro-ophthalmology clinic. All patients attending neuro-ophthalmology clinic diagnosed to have ischemic optic neuropathy older than 50 years were enrolled in the study. A total number of 172 patients were included in the study. Age range was 50.3 years to 91.7 years with males slightly outnumbering females. The most common presenting complaint was decreased vision. The authors concluded that non arteritic and arteritic ischemic optic neuropathies overlap in clinical picture in elderly patients. It is important to distinguish between the two conditions as they have different treatment.

Original Contribution/Clinical Investigation

Predicting medication adherence based on illness perceptions in a sample of Iranian older adults

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ABSTRACT

Medication adherence is crucial for treatment management in older adults who experience chronic illnesses. The purpose of this study is to investigate the role of illness perceptions in predicting medication adherence in a group of Iranian older adults. One hundred and seventy eight people with age over 60 participated in this study using convenience sampling. Participants were recruited from public places such as parks and retirement clubs in Shiraz-Iran. They completed the research measures including Illness Perception Questionnaire-Revised (IPQ-R) and Medication Adherence Rating Scale (MARS) alongside the demographics questionnaire. The results showed that about fifty percent of participants were not adhering to their medication. Findings also indicated that some illness perceptions such as timeline, perceived consequences, and treatment control predicted medication adherence. Indeed, individuals who perceived their illness as a chronic condition and also believed that treatment can help them to manage their illness were more likely to adhere to prescribed medicines. While, participants with the belief that medicines have side effects were more likely to be non-adherent.

Keywords: Medication adherence, illness perception, older adults, consequences, treatment control, personal control, timeline

Introduction

Becoming older is often accompanied with an increasing number of illnesses. Adults aged over 50 years often have multiple chronic diseases requiring multiple medications (1). Older adults are more likely to have chronic illnesses and to take more prescription medicines that often require complex pharmacological management involving several medicines (2, 3). Non-adherence has been regarded as an act of unwillingness to comply with medical regimens or as a failure to understand fully the benefits of such a regimen (4). Non-adherence affects all age groups, but older patients are more vulnerable to the incorrect use of medication (5). Research has shown that the prevalence of medication non-adherence varies from 8 to71% (6). Many patients fail to take some or all of the medications as prescribed (7). Several factors have been identified with regard to their influences on medication compliance in older adults, including unclear instructions, inadequate patient education, medication cost, side effects; lack of belief in benefits of treatment; the complexity of medication regimen and psychological issues (8, 9). Illness perceptions are patients' beliefs about an illness. Illness representations are central to Leventhal's Self-Regulation Theory (10). Self-regulation model assumes that illness representations determine a person's appraisal of an illness condition and health behavior (7). The model can be used to explain adherence to treatment. Illness representations are formulated around five fundamental components: identity,

cause, timeline, consequences, and curability/ controllability (4). A number of studies have applied the self-regulation model to predict health behavior (11, 12). Previous research has shown that non-adherent patients were generally younger; low educated with shorter duration of illness and an episodic course of illness (13, 14, 15). A number of studies have examined the relationship between illness beliefs and medication adherence. These studies have demonstrated that specific concerns about the side-effects of medication and the personally experienced necessity of taking medication were significant predictors of adherence in asthma patients (16, 17). There is no research on adherence with medication among Iranian older adults. Medicines management of conditions that impact older individuals is an important aspect of the care they receive. Therefore, it is important to explore the role of psychological factors such as illness perceptions on medication adherence .The purpose of this study is to predict medication adherence based on illness perceptions among a group of older adults in Shiraz.

Method

Participants

The sample consisted of 175 older adults recruited from retirement clubs in Shiraz using convenience sampling. The mean age of participants was 71.8 (SD = 4.8) and ranged from 60 to 82. The majority of participants were married and 15% percent were unmarried or widowed. The education level of 63% of respondents was lower than high school, 21% had high school education, and 16% had undergraduate and postgraduate education. Participants who took part in this study had one or more illnesses (diabetes, coronary heart disease, chronic pain, and hypertension) and take several medicines. The participants varied in terms of illness duration (M = 6.13, SD = 4.40). The demographic characteristics of participants are presented in Table 1.

Variable	Mean (%)
Age	72.8 (SD=5.8)
Marital Status	
Married	85%
Unmarried/widowed	15%
Education	
Below High School	63
High School	21
Undergraduate	13
Postgraduate	3

Table 1: Demographic Characteristics of Participants

Measures

Illness Perception Questionnaire-Revised

The illness representations component to the IPQ-R (18) consists of 32 questions on seven subscales including identity ('How much do you experience symptoms from your illness?) timeline (How long do you think your illness will continue?), consequences ('How much does your illness affect your life?), treatment control (How much do you think any treatment can help your illness?), personal control (How much control do you feel you have over your illness?'), coherence, and emotional representation ('How much does your illness affect you emotionally). For the purpose of this study, six subscales of IPQ-R (timeline, consequences, treatment control, personal control, emotional representation, illness coherence) were used. The items are rated on a five-point response scale ranging from 1(strongly disagree) to 5 (strongly agree). A Cronbach's alpha reliability analysis of the scales demonstrated satisfactory reliability from .60 to .85 for the subscales. The IPQ-R has been used in Iran and been found to have good reliability and validity (19).

Medication Adherence Rating Scale

The MARS (20) consists of 10 dichotomous yes/no items, measuring behavioral aspects of adherence and attitudes towards medication. Total scores ranged from 0 to 10, where 0 and 10 represent low and high likelihood of adherence to medication respectively. The MARS has been used in Iran and has been reported to have good internal reliability (19).

Results

Data was analyzed by version 16 of SPSS. The data showed that participants had multiple illnesses. Findings also demonstrated that 42% of participants reported non-adherence to their prescriptions, while about 58% adhere to their medicines. In terms of illness perception, the highest score was on personal control and the lowest score was on consequences. The descriptive data are presented in Table 2. To examine the relationships between medication adherence and illness perceptions components, Pearson's correlation coefficients was used. Results indicated that a perception of not having control of treatment and that the consequences of diabetes were serious were associated with lower medication adherence. Results also showed a positive significant association between perceiving illness condition as chronic and medication adherence. Correlations coefficients are shown in Table 3. To identify the contribution of independent variables to medication adherence, a stepwise multiple regression analysis was used. All independent variables including age, education, illness duration, timeline, consequences, personal control, treatment control, illness coherence, and emotional representation were entered into the regression model. Using the stepwise method, a significant model emerged: $F(166) = 8.41$, $p < .001$. Model 1, which included only treatment control accounted for 12% of the variance (Adjusted $R^2 = .123$). The inclusion of consequences into model 2 resulted in an additional 3% of the variance being explained (R^2 change = .03). The final model 3 also included duration of illness which resulted in an additional 3% of variance explained (R^2 change = .03). This final model accounted for 18% of the variance (Adjusted $R^2 = .183$). The findings indicated that three components of illness perceptions including perceived treatment control ($\beta = .29$, $P < .01$), perceived consequences ($\beta = -.22$, $P < .05$) and timeline (acute/chronic) ($\beta = .21$, $p < .05$) predicted medication adherence significantly, but the other demographic and health-related variables such as education and illness duration and

IPQ-R	Mean	SD
Timeline	4.25	.68
Consequences	3.08	.46
Personal control	4.58	.47
Treatment control	3.61	.45
Illness coherence	4.32	.67
Emotional representation	3.79	.87

Table 2: Means and Standard Deviations on the IPQ-R Scales

IPQ-R	Medication Adherence
Timeline (acute/chronic)	.24*
Consequences	-.29**
Personal Control	-.19
Treatment Control	.36**
Illness Coherence	-.13
Emotional Representation	-.16

Table 3: Correlations between the Components of IPQ-R Scale and Medication Adherence

IPQ-R	B	SE B	β	t	p
Model 1					
Treatment Control	-.62	.16	.36	3.86	.01
Model 2					
Treatment Control	-.53	.16	.31	3.27	.01
Consequences	-.29	.13	-.23	-2.22	.05
Model 3					
Treatment Control	-.47	.16	.29	2.90	.01
Consequences	-.28	.13	-.22	-2.18	.05
Timeline (acute/chronic)	.16	.08	.21	2.04	.05

Table 4: Stepwise Regression Analysis Predicting Medication Adherence

also other components of illness perceptions such as emotional representation, personal control, and illness coherence did not predict medication adherence. Indeed, increased levels of perceived consequences and treatment control of the illness were related to adherence. Regression analysis data are presented in Table 4.

Discussion

This study investigated the role of illness perceptions on medication adherence. The results found that less than half of older persons to be non-adherent or partially adherent to their medication. Similar rates of non-adherence have been reported among older adults in other studies in developing countries (21). Some factors may reduce adherence in this sample. The majority of older adults had low level of education. The weak

relation between physician and patients may also be another explanation for non--adherence of the sample. Furthermore, the current study indicated that patients with more chronic conditions were more likely to adhere to their medication. This finding is in agreement with previous research emphasizing that individuals with chronic illness are more likely to be adherent to medication (13). Furthermore, results showed that illness perception constructs of perceived treatment control predicted medication adherence significantly. The results of this study are in many ways similar to previous work indicating that individuals who perceive they have control of their treatment comply more with regimens and medicines (20, 21). The finding on the impact of negative consequences on non-adherence is also similar to previous studies (22). Indeed, patients with beliefs that medicines have side effects are less likely to be adherent to medicines. This study supports the self-regulation theory proposed by Leventhal (10). These results highlight the significance of patients' perceptions about medication and emphasize the self-regulation model that the understanding of individuals' belief to medication is important to enable clinical practice to improve the adherence (23). Contrary to expectation and most previous research, the present study did not show that higher education increases adherence to medication. Some previous studies have reported similar findings on the effect of education (24, 25, 16), although, most research has indicated a positive impact of education on medication adherence (20). A possible explanation may be that the range of education was limited in this study. This research also did not find any significant association between illness duration and adherence. This result was inconsistent with some previous research indicating that those with long term illness are more likely to be adherent to medication (19). The data from this research can help health care systems to provide cognitive interventions for improving medication adherence in older adults. Exploring individuals' illness beliefs may be one way of addressing this problem. It should be noted that the current study is limited by a small sample size. Furthermore, there may also be some important variables influencing adherence among the elderly that are not included in this study. The future research should consider these potential important variables. Another limitation is related to the adherence measure; it should be noted that the self-reported scale of adherence might not provide an accurate index of adherence status. The Findings of this study suggest that medication adherence may be improved by educational interventions and altering patients' illness representations.

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Original Contribution/Clinical Investigation

Clinical Outcome of Tympanoplasty Type I in Elderly Patients

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ABSTRACT

Objective: to investigate the clinical outcome of Tympanoplasty type I (Myringoplasty) in elderly patients above the age of 60 years.

Patients and Methods: A total of 30 patients aged 60 years or older who underwent type I tympanoplasty were enrolled in the study. All these patients had dry central perforation.

All myringoplasties were carried out under general anesthesia by one surgeon using inlay technique. Temporalis fascia was used for grafting in all patients.

Patients were followed up at weekly intervals for 1-month fortnightly for 2-months and monthly for 6-months. In each follow up visit the ear was examined to assess whether graft had taken or not, and hearing was assessed.

Pre- and postoperative air- and bone-conduction thresholds were measured as an average of three speech frequencies (0.5, 1, and 2 kHz).

Results: The total number of patients was 30, 23 males (76.7%) and 7 females (23.3%). The age of patients ranged between 60-76 years.

The distribution of the patients according to the size of the perforation was; 13 patients (43.3%) had small central perforation, 15 patients (50%) had medium sized central perforation. Large central perforation was present in only 2 patients (6.7 %).

The overall success rate of myringoplasty in terms of graft taken was 76.7%.

In 56.7% there was an improvement in hearing of at least 10 dB of an average air bone gap.

Conclusion: Myringoplasty is a quite successful method in appropriate elderly patients. Preoperative evaluation for surgery success is more important than the age itself. The outcomes of tympanoplasty in the elderly patients are generally not different from other age groups.

Key words: Myringoplasty, Elderly, Tympanic membrane perforation

Introduction

A perforated eardrum usually resolves on its own or with the aid of antibiotics; but in certain circumstances surgery to repair the drum may be necessary (1).

Tympanoplasty is a surgical technique to repair a defect in the tympanic membrane with the placement of a graft, either medial or lateral to the tympanic membrane annulus. The goal of this surgical procedure is not only to close the perforation but also to improve hearing. The success of the operation is conditioned by the patient's age according to some authors, and more adverse at the ends of life (2).

In the elderly, the result would be conditioned by the deterioration in the healing process with the ageing of the tissues in addition to the concomitance of certain pathologies with alteration of microcirculation or microangiopathies that are most prevalent in elderly people.

Numerous studies have examined the age-related risk of otologic surgery for tympanic membrane perforations, both in terms of complications and surgical outcome, however, there is scarce bibliography defining whether there are more anatomic or functional failures in this age group (2, 3).

The aim of this study is to investigate the clinical outcome of Tympanoplasty type I (Myringoplasty) in elderly patients above the age of 60 years.

Patients and Methods

This retrospective study was carried out between March 2008 and January 2012 in the Ear, Nose and Throat (ENT) Surgery Department, King Hussein Medical Center (Amman, Jordan). A total of 30 patients aged 60 years or older who underwent type I tympanoplasty were enrolled in the study. All these patients had dry central perforation.

All patients underwent a detailed history taking and a thorough general examination, systemic examination and examination of the nose, throat and ears.

All patients had dry middle ear mucosa with good eustachian tube function. Preoperative assessment was carried out by pure tone audiometry. The air bone gap ranged from 30 to 40 dB.
All myringoplasties were carried out under general anesthesia by one surgeon using inlay technique. Temporalis fascia was used for grafting in all patients.

Patients were followed up at weekly intervals for 1-month fortnightly for 2-months and monthly for 6-months. In each follow up visit the ear was examined to assess whether graft had taken or not, and hearing was assessed.

Pre- and post-operative air- and bone-conduction thresholds were measured as an average of three speech frequencies (0.5, 1, and 2 kHz).

Results

The total number of patients was 30, 23 males (76.7%) and 7 females (23.3%). The age of patients ranged between 60-76 years.

The distribution of the patients according to the size of the perforation was; 13 patients (43.3%) had small central perforation, 15 patients (50%) had medium sized central perforation. Large central perforation was present in only 2 patients (6.7 %).

The overall success rate of myringoplasty in terms of graft taken was 76.7%.

In 56.7% there was an improvement in hearing of at least 10 dB of an average air bone gap.

Discussion

Myringoplasty is a commonly performed procedure to repair a tympanic membrane perforation. The aim of this procedure includes closure of perforation with a dry stable grafted membrane and improvement in hearing levels (4). Successful outcome following myringoplasty is thought to be dependent upon a number of factors including experience of the surgeon, the nature of the perforation and the technique. Previously, patient age was a factor that had to be taken into consideration in the prognosis of tympanoplasty because postoperative hearing results and prognoses in the elderly were thought to be worse than that in younger patients (4-7).

However, there is little literature to support this statement and poor results would be rather from the point of postoperative hearing rather than from the rate of grafts taken (5,8).

It is important to repair the tympanic membrane perforation in this elderly age group, and the advantages of this procedure have exceeded these poor prognostic factors and the medical advances have enabled better control in this age group. We must take into account the ageing population to improve the expectations of life, so in the near future we will be controlling a large volume of elderly patients.

In our study we achieved anatomical success rate in terms of grafts taken in 76.7% of patients while there was less gain in hearing level which was reported to be around 56.7%. Similar results were reported in previous studies (9).

So in the elderly age group, the presence of coexisting diseases like congestive heart failure, myocardial infarction, diabetes mellitus, coronary artery disease, hypertension, cerebral vascular disease and peripheral vascular disease is more important than age itself, although physiologic age is more important than chronological age.

Conclusion

Myringoplasty is a quite successful method in appropriate elderly patients. Preoperative evaluation for surgery success is more important than the age itself. The outcomes of tympanoplasty in the elderly patients are generally not different from other age groups.

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Original Contribution/Clinical Investigation

Changes in cognitive and functional status of the hospitalized elderly and their related factors: a cross-sectional study

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ABSTRACT

Introduction: Since desirable cognitive and physical performances are vital factors to promote and preserve the quality of life for the elderly, the present study was conducted to investigate concurrent changes in functional and cognitive status of the hospitalized elderly and their related factors.

Materials and Methods: This descriptive cross-sectional study was conducted with a sample size of 400 people chosen through availability sampling. The data was collected through two questionnaires. The first questionnaire consisted of two parts, including the demographic characteristics and the 6-Item Cognitive Impairment Test (6CIT), and the second questionnaire was the Barthel Index.

Results: The results showed significant relationships between disease diagnosis and age with cognitive status, between age and diagnosis type with functional status, and between functional decline and cognitive status in daily activities of the elderly. Moreover, the odds ratio of unhealthy cognitive status in the elderly with functional decline (or dependent functional status) was about 8 times the ratio in the independent functional status.

Conclusion: There are concurrent changes in functional status in daily activities, and cognitive status of the hospitalized elderly. This study showed that 8 out of 10 of the hospitalized elderly patients suffered from varying degrees of undesirable cognitive status.

Key words: functional status, cognitive status, elderly, hospital

Introduction

In mid-2004, about 10% of the world population, namely 606 million people, were aged 60 years or older (1), and this number will exceed 1.1 billion people by 2025 (2). According to the 2007 census in Iran, this country has become an old country, having more than 7.2% of the elderly aged over 60 (3). Determining care priorities in this group is of great importance because of their visits to emergency departments for medical treatment, and their costly health care, therapy, and rehabilitation services (4). Care and concern for the elderly cannot be limited to a single principle, but it can be implemented optimally through joint efforts (5). Demographic studies have shown that approximately 5% of people aged 65 and over suffer from significant cognitive impairments. The incidence of the disorder after the age of 65 doubles every five years, so that it exceeds 40% in the population aged 80 years old and over (6). In addition, it is estimated that the number of elderly with functional decline will nearly triple by 2050 (3). Physical and cognitive performance disorders represent two of the most frightening conditions in the elderly because they can lead to physical dependence and social isolation (7). Melzer, as mentioned in Adibhajbagheri et al., states that one-third of the elderly suffer from cognitive impairment, and more than 60% of them need help in their daily activities (8). The multidimensional nature of physical performance emphasizes the complexity of its investigation. The connected nature of physical and cognitive performances highlights the importance of cognition in investigating physical performance in the elderly (7). On the other hand, hospitalization has been identified as a critical event in the life of the elderly (9), and optimal cognitive performance is a crucial factor for improving and maintaining the mental health and life quality of the elderly (10). Psychological evaluation is performed to determine the quality of elderly people's consciousness and awareness of their environment, and the levels of their confusion, delirium, or dementia (11). In addition, patients with impaired cognition on admission have less compatibility with the risks associated with hospitalization, show less willingness for medical treatment, and tend to have more problems in reporting drug side effects (12). The risk of functional decline or disability is also higher in elderly patients because hospital environments are not often compatible with the special needs of this population (9). On the other hand, determining the overall score for daily living activities and level of independence in these activities is important, can determine the overall health status of an elderly person, and can function as an appropriate guide to provide classification and type of services for the elderly (13). The goal of nursing is to maintain and enhance the functional status of the elderly and to help them in identifying and applying their abilities in order to achieve optimum independence (5). The elderly people need constant care and supervision when they lose their abilities to perform their simple daily activities (14), and the nurse helps them to maintain their personality and maximize their independence (5). Therefore, the assessment of cognitive and physical performance in hospitalized elderly patients is essential, and it is hoped that the results of the present study will be effective in improving care programs in hospitalized elderly patients. The present study was conducted to investigate the coincident changes in functional and cognitive status in hospitalized elderly people and their related factors.

Materials and Methods

This descriptive, cross-sectional (correlational) study was conducted with a sample size of 400 persons in 2012. After the official permissions were taken from Lorestan University of Medical Sciences, Iran, for visiting the hospital, the sampling was performed through the availability sampling method. The data collection was performed with the joint help of two questioners (nurses). All the elderly patients (60 years and over) who were admitted to the hospital wards were sampled at one point of time. The two questioners, when aware of the hospitalization of an elderly patient in the hospital, attended the hospital and did the sampling through surveying the elderly patient and completing two questionnaires. The sampling was performed from the winter of 2011 and continued to the beginning of the summer of 2012. All the ethical considerations were regarded and the elderly patients unwilling to participate in the study were excluded.

The data in this study was collected via two questionnaires. The first questionnaire consisted of two parts including the demographic characteristics, and the 6-Item Cognitive Impairment Test (6CIT), and the second questionnaire was the Modified Barthel Index. Concerning the reliability and validity of these tools, since the 6-Item Cognitive Impairment Test (6CIT) has been applied in various studies including in a study by Hatfield et al., and because it does not contain any cultural components, its reliability and validity have been confirmed (15). The maximum score for this scale is 28. Subjects with a score of 0-7 are of normal cognitive status, and those with a score of 8-28 are considered to have undesirable cognitive status or cognitive impairment. The Modified Barthel Index is applied to assess a persons' daily performance in daily activities, and their mobility. The index has 10 items, including the questions related to eating, bathing, grooming, dressing, controlling urine and feces, using the toilet, transferring from the bed to the chair and the reverse, mobility on smooth surfaces, and using the stairs. The major goal of this scale is to assess the level of independence from any physical or verbal help and for any reason, and a need for supervision in a patient's activities signifies dependence. However, the patients using aids such as crutches, etc. is not a barrier to independence. The various items of this modified scale have scores from 0 to 3, with a total of 20 scores. The Barthel Index scoring is as follows: Scores lower than or equal to 4 are evaluated as completely dependent, scores of 5-8 as highly dependent, scores of 9-11 as almost dependent and doing things with help, and scores of 12 or more as completely independent. The reliability and validity of the scale have been confirmed in several studies (4, 16). The data was analyzed by the SPSS 17 software using descriptive statistics, the chi-square, the Fisher's exact test, and the logistic regression models.

Results

In this study, out of a total of 400 elderly people who participated in the study, 175 (43.8%) were male and 225 (56.2%) were female. The mean age and standard deviation was 76.28 ± 8.3, including 10.3% in the age range of 60-64 years, 12% in the age range of 65-69, 13% in the 70-74 age group, 26.3% in the 75-79 age group, and 38.4% in the age range of 80 and over, with the highest frequency in the group of 80 and over. The study also found the reasons for the admissions to be

cardiovascular (40.3%), respiratory (26%), psychiatric (9.5%), and gastrointestinal diseases (6.5%), respectively. Moreover, 66.8% of the patients were hospitalized in the internal ward, 18.5% in the emergency department, 1.5% in the eye and ear ward, 8% in the CCU, and 5.3% in the surgical ward, with the highest number of the elderly patients in the internal ward. The data showed that 245 (61.2%) and 155 (38.8%) samples were living in urban and rural areas, respectively.

In addition, 22.8% of the hospitalized elderly patients had normal cognitive status, and 77.3% had cognitive impairment, indicating the high importance of cognitive status investigation. Additionally, 58.5% of the patients aged 60-64 years, 73.1% of those aged 70-74 years, 75.2% of those aged 75-79 years, and 93.5% of those aged 80 years and over had cognitive impairment. There was a statistically significant relationship between age and cognitive impairment (p=0.001), showing that the percentage of cognitive impairment in the higher age groups was higher than that in the lower age groups. Concerning functional status, 9.7% of the elderly patients were completely dependent, 4.8% were highly dependent, 5.6% were almost dependent, and 79.8% were completely independent.

The data presented in Table 1 shows that there were significant relationships between cognitive status and disease diagnosis, meaning that there was a significant difference at least between the percentage of cognitive impairment in the patients with cardiovascular and internal diseases, on the one hand, and the percentage in those with respiratory or psychiatric diseases, on the other hand. More investigation is required to understand the relationship between cognitive status and each type of diagnosis (Table 1). The results also showed that 79% of the patients hospitalized in the internal ward, 74.4% of those in the emergency department, 76.2% of those in the surgical ward, 71.9% of those in the CCU, and 16.7% of those in the eye and ear ward suffered from cognitive impairment, showing a statistically significant relationship (p=0.009). The prevalence rates of cognitive impairment, in descending order, were in the internal, emergency, surgical, CCU, and eye and ear wards, respectively. The chi-square test results showed that the percentage of cognitive impairment in the eye and ear ward was lower than that in the other wards (Table 1).

Moreover, 62.3% of the men and 88.9% of the women suffered from cognitive impairment, showing that the rate of cognitive impairment in the women was significantly more than that in the men (p <0.001). Also, 80.6% of the elderly patients living in rural areas and 75.1% of those living in urban areas were cognitively impaired, showing no significant difference (p=0.198).

The vast majority of the studied population (over 99%) had elementary school education or were illiterate, including 310 (77.5%) illiterate patients, 86 (21.5%) patients with elementary school degrees, 1 patient with a junior high school degree, 1 patient with a senior high school degree, and 2 with associate degrees. Therefore, assessment was not possible in terms of educational level.

		Healthy	Cognitive impairment N (%)	Level of significance
Type of diagnosis	Cardiovascular	42(26.1%)	119(73.9%)	X2=11.4 P=0.023
	Respiratory	19(18.3%)	85(81.7%)	
	Psychiatric	2 (5.1%)	37(94.9%)	
	Internal	21(29.6%)	50(70.4%)	
	Others	7(28%)	18(72%)	
Ward	Internal	56(21%)	211(79%)	X2=13.603 P=0.009
	Emergency	16(21.6%)	58(78.4%)	
	Eye and ear	5(83.3%)	1(16.7%)	
	CCU	9(28.1%)	23(71.9%)	
	Surgical	5(23.8%)	16(76.2%)	
Functional status	Completely dependent	0(0%)	38(100%)	X2=20.5 P<0.001
	Highly dependent	2(10.5%)	17(89.5%)	
	Almost dependent	1(4.5%)	21(95.5%)	
	Completely independent	85(27.2%)	228(72.8%)	

Table 1: The relationships between some characteristics and cognitive status in the hospitalized elderly

		Completely dependent	Highly dependent	Almost dependent	Completely independent	Total	Level of significance
Age	60-64	2(5.3%)	1(5.3%)	2(9.1%)	33(10.5%)	38(9.7%)	X2=28.9
	65-69	3(7.9%)	0(0%)	1(4.5%)	41(13.1%)	45(11.5%)	P=0.004
	70-74	2(5.3%)	2(10.5%)	2(9.1%)	46(14.7%)	52(13.3%)	
	75-79	6(15.8%)	4(21.1%)	3(13.6%)	91(21.9%)	104(26.5%)	
	80 ≥	25(65.8%)	12(63.2%)	14(63.6%)	102(32.6%)	153(39%)	
	Total	38(100%)	19(100%)	22(10%)	313(100%)	392(100%)	
Gender	Male	17(44.7%)	9(47.4%)	11(50%)	134(42.8%)	171(43.6%)	X2=0.57
	Female	21(55.2%)	1052.6(%)	11(50%)	179(57.2%)	221(56.4%)	P=0.902
	Total	38(100%)	19(100%)	22(100%)	313(100%)	392(100%)	
Place of residence	Rural	26(68.6%)	14(23.7%)	16(72.7%)	184(58.8%)	240(61.2%)	X2=4.08
	Urban	12(31.6%)	5(26.2%)	6(27.3%)	129(41.2%)	152(38.8%)	P=0.253
	Total	38(100%)	19(100%)	22(10%)	313(100%)	392(100%)	
Ward of hospitalization	Internal	31(81.6%)	15(78.9%)	16(72.7%)	200(63.9%)	262(66.8%)	X2=16.73
	Emergency	2(5.3%)	2(10.5%)	4(18.2%)	64(20.4%)	72(18.4%)	P=0.160
	Eye and ear	0(0%)	0(0%)	0(0%)	6(1.9%)	6(1.5%)	
	CCU	1(2.6%)	0(0%)	2(9.1%)	29(9.3%)	32(8.2%)	
	Surgical	4(10.5%)	2(10.5%)	0(0%)	14(4.5%)	20(5.1%)	
	Total	38(100%)	19(100%)	22(10%)	313(100%)	392(100%)	
Type of diagnosis	Cardiovascular	7(18.4%)	5(26.3%)	11(50%)	135(43.1%)	158(40.3%)	X2=135.5
	Respiratory	1(2.6%)	4(21.1%)	5(22.7%)	92(29.4%)	102(26%)	P<0.001
	Psychiatric	23(60.5%)	3(15.8%)	1(4.5%)	11(3.5%)	38(9.7%)	
	Internal	4(10.5%)	4(21.1%)	4(18.2%)	57(18.2%)	69(17.6%)	
	Others	3(7.9%)	3(15.8%)	1(4.5%)	18(5.8%)	25(6.4%)	
	Total	38(100%)	19(100%)	22(10%)	313(100%)	392(100%)	
Cognitive status	Healthy	0(0%)	2(10.5%)	1(4.5%)	85(27.2%)	88(22.4%)	X2=20.58
	Cognitive impairment	38(100%)	17(89.5%)	21(95.5%)	228(72.8%)	304(77.6%)	P<0.001
	Total	38(100%)	19(100%)	22(10%)	313(100%)	392(100%)	

Table 2: The relationships between demographic characteristics and cognitive status in the hospitalized elderly

		Odds ratio	Level of significance
Functional status	Independent	1 (Reference)	-
	Dependent	9.57	0.001
Age	60-64	1 (Reference)	-
	65-69	0.89	0.832
	70-74	3.75	0.017
	75-79	2.97	0.006
	80 ≥	17.5	0.001
Gender	Male	1 (Reference)	-
	Female	9.06	0.001
Place of residence	Rural	1 (Reference)	-
	Urban	2.28	0.013
Ward of hospitalization	Internal & Eye and ear	1 (Reference)	-
	Emergency	1.38	0.425
	CCU	1.08	0.884
	Surgical	5.56	0.025
Type of diagnosis	Psychiatric	1 (Reference)	-
	Cardiovascular	0.28	0.141
	Respiratory	0.61	0.565
	Internal	0.31	0.184
	Others	0.26	0.179

Table 3: Results of the analysis of the factors associated with cognitive impairment using the logistic regression model

The findings showed a significant relationship between age and functional decline (p=0.004), and the highest dependence was for the patients in the age group of 80 and over. No significant relationships were found between gender (p=0.902), rural and urban place of residence (p=0.253), and type of ward (p=0.160) with the rate of functional dependence, while a significant relationship was found between diagnosis type and functional status (p <0.001) (Table 2 - opposite page).

The results presented in Table 2 show a significant relationship between functional decline and cognitive impairment in the elderly patients' daily activities, showing 100% of cognitive impairment in the completely dependent patients, 95.5% in the almost dependent ones, 89.5% in the highly dependent ones, and only 72.6% in the completely independent patients (Table 2).

In addition, the analysis of the data showed statistically significant relationships between cognitive status and each of the items of the Barthel Index including eating, bathing, transferring from the bed to the wheelchair and the reverse, getting up from the bed, mobility, grooming (shaving, brushing, wearing make-up, combing hair, washing the face, etc.), controlling urine and feces, dressing, climbing up and down the stairs, using the toilet, and bathing (p = 0.000).

The study also showed that the odds ratio of cognitive impairment in the patients with functional decline (or dependent functional status) was approximately 9.57 times the ratio of independent functional status, and, on the contrary, the odds ratio of functional decline in the patients with cognitive impairment was 8.7 times the ratio of healthy cognitive status (Tables 3 and 4).

		Odds ratio	Level of significance
Cognitive status	Healthy	1 (Reference)	-
	Unhealthy	8.7	0.001
Age	60-64	0.57	0.327
	65-69	0.29	0.066
	70-74	0.37	0.037
	75-79	0.35	0.007
	80 ≥	1 (Reference)	-
Gender	Male	1.71	0.092
	Female	1 (Reference)	-
Place of residence	Rural	1.42	0.286
	Urban	1 (Reference)	-
Ward of hospitalization	Internal & Eye and ear	1 (Reference)	-
	Emergency	2.30	0.062
	CCU	2.29	0.220
	Surgical	1.11	0.0873
Type of diagnosis	Psychiatric	1 (Reference)	-
	Cardiovascular	0.11	0.001
	Respiratory	0.05	0.001
	Internal	0.12	0.001
	Others	0.19	0.014

Table 4: Results of the analysis of the factors associated with functional decline using the logistic regression model

Discussion

The findings showed that 91 of the subjects (22.8%) had scores lower than 7 (healthy cognitive status), and 309 patients (77.3%) had scores of 8 and over (cognitive impairment), showing the high prevalence of cognitive impairment in the hospitalized elderly patients. Based on a study by Taban et al., the relative frequency of cognitive impairment ranged from 10% preoperatively to 29.1% postoperatively (17).

Our findings showed a statistically significant relationship between age and cognitive impairment ($p<0.001$), showing a higher rate of cognitive impairment in the higher age groups than that in the lower age groups. The results of research by Abolghasemi et al. confirmed the finding, that aging can affect cognitive and meta-cognitive processes significantly and that it increases the possibility of cognitive disorders through affecting cognitive performance (18). Taban et al's study showed the effect of aging on increased incidence of postoperative cognitive disorders. Most studies have considered aging as a risk factor for cognitive impairment (17). These studies have shown that older subjects suffer from more distraction, weaker concentration, more memory problems, find it harder remembering names and contents, and more oversights (18).

The results of the present study showed that cognitive impairment in the women was significantly more than that in the men ($p=<0.001$). Taban et al. revealed that there was no significant difference preoperatively between the relative frequencies of cognitive impairment in both genders, so that they were 9.7% in the men and 10.4% in the women. However, the rate in the men was more than that in the women postoperatively, showing no consistency with the results in our study (17). In a study carried out by Nejati et al, 3.33% of the women were found to have severe cognitive impairment, and 18.33% and 62.13% of the men and the women, respectively, had moderate cognitive impairment, meaning a higher rate of cognitive impairment in the women than that in the men, and showing consistency with our results (12). The results of the study by Abolghasemi

et al showed that the mean score for cognitive impairment in the elderly men was significantly higher than that in the elderly women (18). Dirik et al's study found that the elderly men had higher cognitive performance than the elderly women (19).

Our findings found the most common diseases in the elderly hospitalized patients to be cardiovascular, respiratory, psychiatric, gastrointestinal, and musculoskeletal. The most common diseases in the elderly in Isfahan, as reported by Salarvand et al., were arthritis, visual impairment, and hypertension, respectively (20). Mohtasham Amiri et al's study showed the most common causes for admission of the elderly, to be cardiovascular diseases, trauma, respiratory diseases, eye disorders, cancers, cerebrovascular diseases, and infectious diseases. As mentioned in Mohtasham Amiri et al's study, previous studies have reported the most common causes for admission of the elderly to be cardiovascular diseases, cancers, pneumonias, and cerebrovascular events (2).

Our results also revealed that cardiovascular, musculoskeletal, respiratory, psychiatric, blood, endocrine, and obstetric diseases increased cognitive status in the elderly significantly ($p=0.049$). Conducting more studies in this regard is recommended. Gussion et al, as mentioned in Salarvand et al's study, reported osteoarthritis, strokes, heart diseases, and depressant symptoms as having the greatest impact on the performance of the elderly (20). In the present study, a significant relationship was found between cognitive impairment and ward of admission ($p=0.009$), so that the highest rates of cognitive impairment were observed in the internal, emergency, surgical, CCU, and eye and ear wards. Moreover, no significant relationship was found between urban and rural place of residence and cognitive impairment ($p=0.198$), and no relevant studies were found in this regard.

A significant relationship was found between age and type of diagnosis with cognitive impairment, with the highest rate of dependence in the age range of 80 and over. Other studies have also confirmed that aging increases the rate of severe and moderate disabilities in the elderly (8).

In the present study, gender, urban and rural residence, and ward were not found to have significant relationships with functional dependence, while Dirik et al's study indicated that the elderly women, compared to the elderly men, had a lower level of mobility and were more dependent in their daily activities (19). Also, Adibhajbagheri et al showed significant relationships for age, gender, and place of residence, showing more moderate and severe disabilities in women than in men, more severe disabilities in cities than in suburbs, and more moderate disabilities in suburbs than in city centers (8).

Our findings found a significant relationship between cognitive impairment and dependence in daily activities in the elderly, showing cognitive impairment in 100% of the completely dependent elderly, 95.5% of the almost dependent ones, 89.5% of the highly dependent ones, and only 72.8% of the completely independent patients. Other studies have confirmed this finding, including Stuck et al's study reporting a strong relationship between cognitive impairment and functional decline (21). Also, Raj et al's study reported that the elderly people with lower cognitive performance had a greater chance of failure (58% more) in the activities of daily living (ADL) (22). In Kazemi et al's study, the more cognitive impairment the subjects had, the lower functional scores they obtained. Therefore, there was a significant relationship between cognitive status and activities of daily living (23). Moreover, Arcoverde et al found that physical activity and optimal physical performance were associated with the lower prevalence and incidence of dementia and cognitive impairment (24). Stuck et al showed a strong relationship between cognitive impairment and functional status (25).

Concerning the relationship between the components of cognition scores and activities of daily living, the highest relationship was found between performance activity and activities of daily living. It confirms the finding reported by some researchers that interference with activities of daily living possibly occurs in more advanced stages of cognitive impairment. Yan Hoon et al in their study concluded that functional decline is common in nursing homes, and that more attention should be paid to the elderly with dementia right from the admission time (26). The findings of Dirik et al's study showed that functional status, cognitive status, and motility decreased in the elderly patients hospitalized in institutions (19).

Since the relationship between cognitive impairment and functional impairment was sought in the present study, the assessment of the relationship with drug type was not possible due to the consumption of multiple medications by the elderly patients, and this was one of the limitations of the present study. The second limitation of our study was the application of the availability sampling method, which made causative relationships impossible.

Conclusion and Recommendations

In this study, we investigated the concurrent changes in functional and cognitive status of the hospitalized elderly. There was a significant relationship between functional decline in daily activities and cognitive impairment. The study showed that 8 out of 10 of the hospitalized elderly patients suffered from varying degrees of undesirable cognitive status, and this disorder was associated significantly with age, gender, ward, type of diagnosis, and educational level. Improvements in performance, mobility, and cognitive status should be among the first priorities of geriatric rehabilitation, and initial evaluation of cognitive and functional status is essential in the assessment of the elderly in caring institutions. Independence in functional activities and an independent life-style should be taken into account in the elderly. Moreover, more research is needed to identify the mechanisms that increase the vulnerability of functional decline, and causative relationships between impairments in physical performance and cognitive performance.

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Original Contribution/Clinical Investigation

Assessment of handgrip strength variables in a population of Egyptian elderly

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ABSTRACT

Background and objective: Hands undergo many physiological and anatomical changes with aging, though these effects on hand function are still poorly understood. The aim was to assess several grip strength variables in a population of Egyptian elderly.

Methods: Cross-sectional study, 618 Egyptians aged 25-85 years. Handgrip strength has been measured using a hand dynamometer.

Results: At 60-85 years mean values of handgrip strength in the dominant hand were found to be between [10.74-12.54 pounds per square inch (PSI)] in males and, [9.45-11.12 PSI] in females. There was a negative significant correlation between age and grip strength in the dominant hand (P= 0.001). Grip strength peaks at the age range 25-49 and gradually declines thereafter.

Conclusion: The normative values of handgrip strength in older age groups (60-85 years) were found to be between (10.74-12.54 PSI) in males and, (9.45-11.12 PSI) in females. Handgrip strength assessment using the baseline pneumatic dynamometer is easy and should be part of comprehensive geriatric assessment.

Key words: dynamometer, elderly grip, geriatric evaluation, hand grip strength, hydraulic dynamometer

Introduction

Many daily activities involve interaction with objects that are grasped in the hand. The manipulative ability of the human hand requires effective force and dexterity. Power grip is a forceful act resulting in flexion of all finger joints [1].

Handgrip strength is an easily obtainable measure of physical health and muscle function. Reliable and valid evaluation of hand strength is very important in determining the effectiveness of various surgical or treatment procedures [2]. Grip strength testing has been used in a variety of clinical areas and for multiple purposes. It may be used as a predictor of physical functioning [3], for assessment of upper limb impairment [4] and evaluation of nutritional status [5] and also in injury prevention and rehabilitation [6].

Hands undergo many physiological and anatomical changes with aging, though the effects of normal aging on adult hand function and dysfunction are still poorly understood. The ability of older persons to carry out daily tasks independently is largely dependent on the maintenance of sufficient aerobic capacity and muscle strength [7].

Reference values are essential if informed decisions are to be made about the normality of an individual's status relative to the population [8]. Having norms considering the variables affecting the hand grip strength has been an issue of several research activities [9].

Hence, this study was aimed to assess handgrip strength of the Egyptian elderly in relation to other age groups and to try to find a mean value for this age group. The study additionally evaluated some variables that may affect handgrip strength.

Materials and Methods

Study design and population

The study is a cross-sectional study performed among 618 subjects (300 males and 318 females), aged 25 to 85 years. Subjects have been interviewed at senior citizen centers, outpatient clinic of geriatric medicine department in Ain Shams University Hospitals, Ain Shams University faculty of medicine, shopping centers, nursing homes and clubs. Each participant was subjected to medical history taking and physical examination after explaining the aim of the study and giving their consent to participate.

A sample of 162 males and females in age groups from 60-85 years old, were evaluated for a number of medical co-morbidities, including cardiovascular diseases, hypertension, diabetes mellitus, chronic obstructive pulmonary disease (COPD), renal or hepatic diseases.

Then all subjects were asked to sit on the chair with straight back, without armrest with the feet flat on the floor, shoulder adducted and neutrally rotated, elbow flexed at 90?, forearm in neutral position and wrist between 0?-30?of extension and between 0?-15? of ulnar deviation, as given by the American Society of Hand Therapy [10].

1) The subjects were instructed to initiate optimal handgrip strength (usually about 3-seconds sustained grip) and given one trial after which they rested for 10 minutes.
2) The instructions were given in the same tone and volume in order to discourage the overload of instructions [11].
3) To get maximum reliability of data collected, every subject was asked to squeeze the dynamometer three times; the mean was the reading in the study [12]. A rest of 60 seconds was given between each squeeze [13].
4) To counterbalance any order effect of the starting hand, every other subject began with the dominant hand. During the test the attempts were taken while alternating right and left hands with 60 seconds rest between any two attempts, to overcome fatigue.
5) The dynamometer was set to zero before each trial.

Statistical analysis

Mean and SD for handgrip strength in different age groups. Pearson correlation test for the effect of age and hand dominance on handgrip strength. Student's t-test for comparison of handgrip strength between males and females. The probability of error (p-value) at 0.05 was considered significant, while at 0.01 and less were highly significant.

Results

The 618 subjects (300 males and 318 females), aged 25-85 years, were divided into 12 age groups each representing (6-9) % of the total number of participants. 270 males and 268 females were right handed. Correlating age with handgrip strength revealed a significant negative correlation ($r = -0.678$, $P=0.001$).

There is a significant difference in the means of handgrip strength between males and females in all age groups (except two age groups 25-29 and 55-59). The results also show that the peak of handgrip strength in males was around 25-54 and gradually declines thereafter, as for females it was at an earlier age around 25-39 years (Table 1 - opposite page).

Comparison of handgrip strength between subjects above 60 years and those below 60 years revealed that the mean hand grip strength in the older group was 11.12+ 1.55 PSI and among those below 60 years it was 13.17+ 1.31 PSI. There was a significant difference in hand grip strength between the two groups ($t= 16.99$, $P<0.001$).

There is a highly significant difference between the dominant and non-dominant hands in both males and females (Figures 1a, b). In the present study, it was found that on average, grip strength in the dominant hand was 12.7 % stronger than the non-dominant hand.

When studying the difference in handgrip strength between the dominant and non-dominant hands in correlation to age, a significant negative correlation was found in the males but not in females ($r= -0.226$, $P= 0.01$ in males and $r= -0.047$, $P= 0.633$).

Categorizing the sample according to number of comorbid conditions revealed that there was no statistically significant difference between participants with one, two or multiple comorbid conditions (Table 2 - page 22).

	Males		Females			
Age Group Years	Mean	SD	Mean	SD	t-value	p-value
25-29	13.79	1.42	13.63	0.93	0.51	0.61
30-34	14.52	0.64	13.57	0.88	4.57	0
35-39	14.28	0.74	13.12	0.88	5.05	0
40-44	13.88	0.82	12.2	0.93	7.24	0
45-49	13.64	0.78	12.0	0.96	6.95	0
50-54	13.28	1.02	11.8	1.16	4.80	0
55-59	12.6	1.04	12.0	1.47	1.71	0.09
60-64	12.54	1.02	11.12	1.27	7.38	0
65-69	12.11	1.40	10.82	0.86	4.10	0
70-74	12.0	1.39	9.97	0.85	6.50	0
75-79	11.85	0.84	9.88	0.82	6.77	0
80-85	10.74	0.87	9.45	0.61	5.33	0

Table 1: Comparison of handgrip strength in dominant hand between males and females pounds per square inch (PSI)

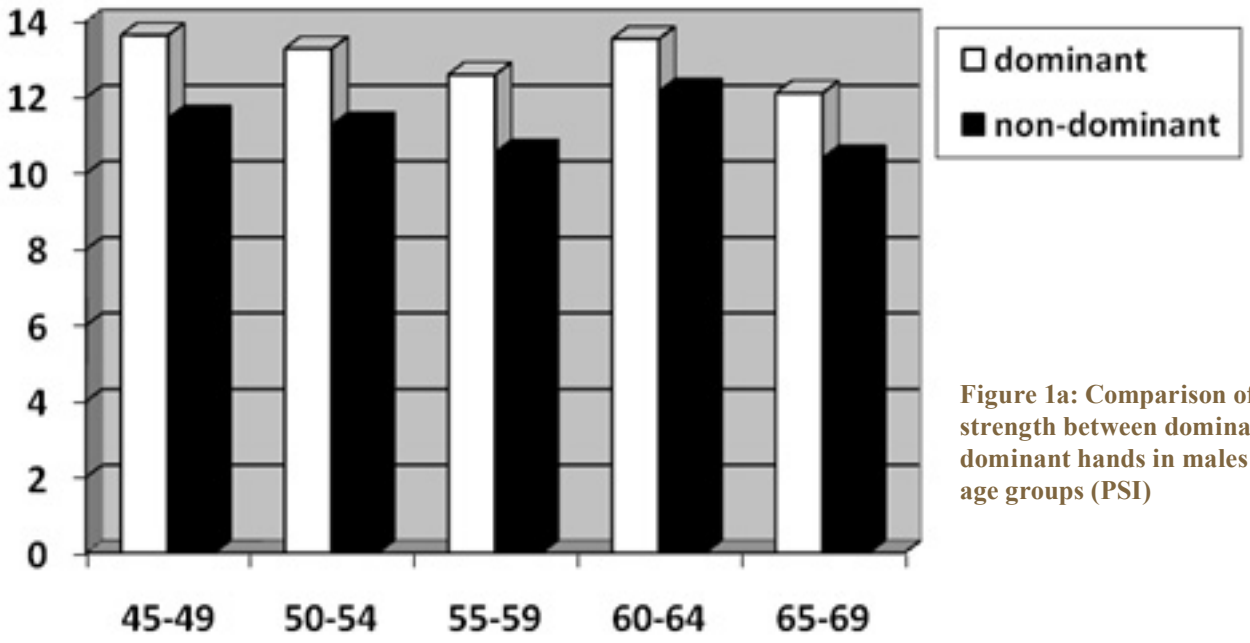

Figure 1a: Comparison of handgrip strength between dominant and non-dominant hands in males in different age groups (PSI)

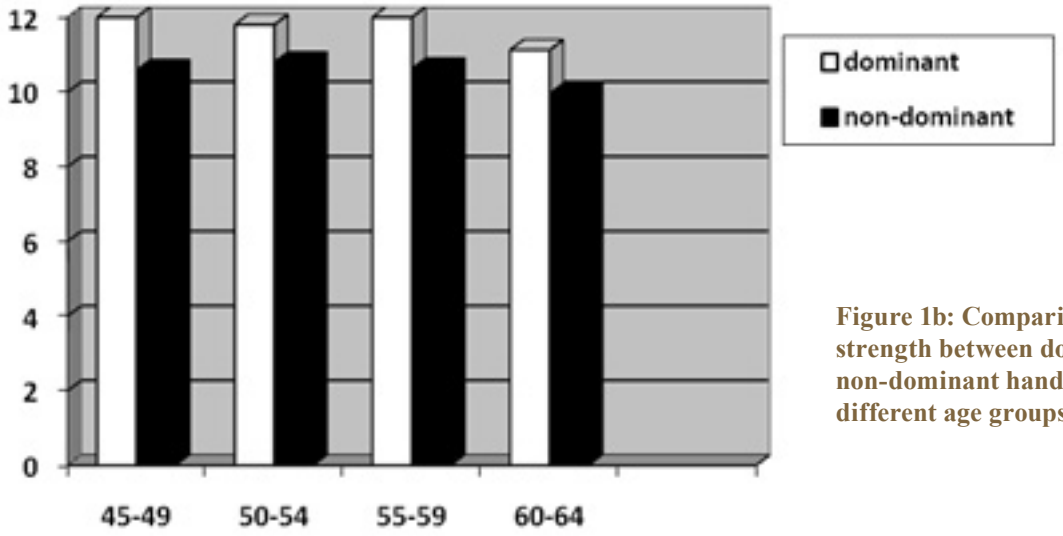

Figure 1b: Comparison of handgrip strength between dominant and non-dominant hands in females in different age groups (PSI)

Number of comorbid conditions	Number of participants	Mean value of hand grip strength (PSI)	F	P
One comorbid condition	13	10.92 ± 1.801	0.386	0.68
Two comorbid conditions	99	11.22 ± 1.555		
Multiple comorbid conditions	50	11.34 ± 1.437		
Total	162	11.23± 1.534		

Table 2: The relation between handgrip strength and number of medical co-morbidities in elderly

Discussion

Grip strength is an established predictor of untoward outcomes such as mortality, post surgical complications, and future disability. Nevertheless, judgments about whether an individual is impaired are best determined by comparing his or her performance to reference values obtained from a relevant population [8]. One of the main difficulties in evaluating the grip strength of elderly patients is the absence of valid norms [10] and also the presence of both age related changes and having multiple comorbidities may make the issue in elderly individuals more confusing. Hence, this study aimed at assessment of handgrip strength of the Egyptian elderly in relation to other age groups and some variables that may affect it.

The study found that handgrip strength peaks at 25-54 in males and 25-39 in females and gradually declines thereafter. When comparing subjects above and below 60 years the results showed better handgrip strength in those below 60 years. Similar results were presented by Kallman et al in 1990 who found that grip strength peaked between the ages of 25-35 years and then showed an accelerated decline. They explained this by the decline in muscle mass with advancing age [14]. Moreover several studies and meta-analysis confirmed the same issue (10, 15, 9).

On studying gender effect on handgrip strength, the results of the present study showed that, males had significantly higher handgrip strength than females. However, two age groups among the twelve showed an exception to this. In the age groups (25-29 years and 55-59 years). The sex difference was explained in literature by the higher levels of androgenic hormones [16], the greater muscle mass [14], greater height and weight in men [17] and greater workload that men may perform [18].

Unlike the almost universal agreement regarding grip and gender there is a disagreement whether grip strength differs in the two hands. The present study found that the dominant hand shows greater handgrip strength than the non-dominant and also showed a negative significant correlation of that difference with age in males but not in females.

Several studies support this finding, such as Incel et al, 2002, Bansal, 2005 and Budziareck et al, 2008 [19,20,9].

The study also found a 12.7% difference between the two hands. This agrees with the studies of Incel et al, 2002, Bansal, 2005 (20, 21) that disagreed with the general rule of 10% that was suggested by Bechtol in 1954 [21] and later supported by Lunde et al, 1972 and Jarit, 1991 [22,23].

An important issue of concern is introduced; can hand grip strength be used as an indicator for morbidity and mortality. Ling et al (2010) studied the relationship between handgrip strength and mortality in the oldest old population. They reported low handgrip strength at ages of 85 and 89 years, and a greater decline in strength over time, are associated with increased all-cause mortality [24]. Although the current study found a non-significant relation between handgrip strength and number of medical co-morbidities in older age groups, we could not take it as a controversy since our range of age is wider and we studied younger age groups. Still we can recommend assessment of hand grip as a part of comprehensive geriatric assessment and to follow up healthy and diseased elderly.

Conclusion

- The normative values of handgrip strength among the participants in older age groups (60-85 years) was found to be between (10.74-12.54 PSI) in males and, (9.45-11.12 PSI) in females.
- Studying the Baseline hydraulic hand dynamometer, which is small and easy to use, has made using it in the clinical setting encouraging.
- Handgrip strength assessment should be included in the comprehensive geriatric assessment and considered as an indicator of upper limb function in rehabilitation programs.

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Ischemic Optic Neuropathy in Elderly People

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ABSTRACT

Objectives: The aim of the study is to report features, causes, presentation and outcome of ischemic optic neuropathy in elderly patients attending the neuro-ophthalmology clinic.

Patients and methods: A prospective study that was conducted at King Hussein Medical Center during the period between July 2009 and July 2011. All patients older than 50 years attending the neuro-ophthalmology clinic and diagnosed to have ischemic optic neuropathy were enrolled in the study. Data collected included clinical presentation, outcome, associated illness and type of ischemic optic neuropathy whether arteritic or non arteritic. Ocular examination included best corrected visual acuity, anterior and posterior segment examination and visual field assessment.

Results: A total number of 172 patients were included in the study. Age range was 50.3 years to 91.7 years with males slightly outnumbering females. The most common presenting complaint was decreased vision. Altitutidinal visual field defect was the commonest visual field abnormality. Non arteritic ischemic optic neuropathy was seen in 154 patients and arteritic in 18 patients. Systemic diseases were seen in about two thirds of cases.

Conclusions: Non arteritic and arteritic ischemic optic neuropathies overlap in the clinical picture in elderly patients. It is important to distinguish between the two conditions as they have different treatment.

Key words: ischemic optic neuropathy, elderly

Introduction

Ischemic optic neuropathy could be anterior or posterior, arteritic or non arteritic. (1-3) It occurs at adulthood and risk increases with advancing age. (4) The less common type, the arteritic, is associated with giant cell arteritis. (5) The non arteritic type is commonly associated with medical illnesses such as diabetes mellitus, hypertension and hyperlipidemia. (6) Both conditions have similarities in clinical presentation and distinction sometimes can be difficult. The arteritic type usually has more severe and profound illness. (8-9) It is important to differentiate between the two conditions as giant cell arteritis needs long standing treatment and has significant morbidity and mortality if not treated. (10)

The aim of the study is to report features, causes, presentation and outcome of ischemic optic neuropathy in elderly patients attending the neuro-ophthalmology clinic.

Patients and Methods

This was a prospective study conducted at King Hussein Medical Center during the period between July 2009 and July 2011. All patients attending the neuro-ophthalmology clinic diagnosed to have ischemic optic neuropathy, and older than 50 years, were enrolled in the study. Data collected included clinical presentation, outcome, associated illness and type of ischemic optic neuropathy whether arteritic or non arteritic. Patients were asked about symptoms such as decreased vision, headache, ocular pain, jaw claudication and myalgia. Ocular examination included Snellen's best corrected visual acuity, anterior and posterior segment examination via slit lamp and + 78 lens and Humphrey's automated visual field assessment. The course of illness and any special investigation and management was also recorded.

Results

A total number of 172 patients were included in the study. Age range was 50.3 years to 91.7 years with males slightly outnumbering females (male to female ratio of 1.1 to 1). The most common presenting complaint was decreased vision followed by headache and generalized weakness. Altitudinal visual field defect was the commonest visual field abnormality. Other field defects were arcuate, central, generalized constriction and non specific abnormalities. Non arteritic ischemic optic neuropathy was seen in 154 patients (89.5%) and arteritic in 18 patients (10.5%). Systemic diseases were seen in about two thirds of cases (Table 1).

Discussion

Ischemic optic neuropathy is a disease that is usually characterized by profound irreversible visual loss. (11) The risk of bilateral involvement is relatively high. Two thirds of patients with arteritic type and one quarter of patients with no arteritic eye develop second eye involvement. (12) As most of the damage that occurs is irreversible, it is important to work on preventing other eye involvement. (13) Medication such as steroids has an important role in preventing attack on the other eye in arteritic type as well as in preventing other vascular insults thus decreasing mortality and morbidity. (14) In non arteritic types, it is important to manage associated medical illness. (15)

Feature	Non arteritic ischemic optic neuropathy	Arteritic ischemic optic neuropathy
Number of patients	154	18
Percentage	89.5%	10.5%
Complaint		
Decreased vision	148 (96.1%)	18 (100%)
Headache	27 (17.5%)	16 (88.9%)
Generalized weakness	8 (5.2%)	14 (77.8%)
Myalgia	3 (2%)	10 (55.6%)
Visual field defects		
Altitudinal	45 (29.2%)	6 (33.3%)
Arcuate	36 (23.4%)	4 (22.2%)
Central	33 (21.4%)	4 (22.2%)
Generalized constriction	22 (14.3%)	2 (11.1%)
Non specific	18 (11.7%)	2 (11.1%)
Optic disc changes		
Swelling	52 (33.8%)	11 (61.1%)
Atrophy	131 (85.1%)	18 (100%)
Associated systemic illness	115 (74.7%)	18 (100%)
Use of steroids	41 (26.6%)	18 (100%)

Table 1: Distribution of patients

Most of the cases we had in our study were of non arteritic type (89.5% versus 10.5%). The severity of illness is usually less in this type with more chance of recovering some visual functions. Decreased vision was the leading presenting complaint. It was present in all patients with arteritic type and in the vast majority of non arteritic type (96.1%). Headache, generalized weakness and myalgia, which are systemic constitutional symptoms of giant cell arteritis, were commonly observed in arteritic type and rare in non arteritic type.

Visual field abnormalities and optic disc changes were universal in both conditions and occurred in all patients. Visual field abnormalities observed were altitudinal, arcuate, central, generalized constriction and non-specific changes. Optic disc changes observed included optic disc swelling and optic atrophy. All patients of ischemic optic neuropathy had a characterized pallid optic disc swelling. In chronic cases, optic disc swelling may subside leaving only optic atrophy.

Systemic illnesses were seen in all patients with arteritic type as it is caused by definition by giant cell arteritis. In non arteritic type, medical illnesses such as diabetes mellitus, hypertension and hyperlipidemia were evident in three quarters of cases. Steroids were used in all patients with arteritic types and only in one quarter of patients with non arteritic type who presented with severe impairment of vision or with bilateral eye involvement.

In conclusion, the clinical picture of non arteritic and arteritic ischemic optic neuropathies, overlap in elderly patients. It is important to distinguish between the two conditions as they have different treatment.

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