Comprehensive health assessment of senior citizens in Al-Karak governorate, Jordan

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تقييم صحي شامل للمواطنين من كبار السن في محافظة الكَرَك بالأردن

رندة يوسف

الخلاصة: أجري مسح مجتمعي في عام 2004 على الأشخاص البالغين من العمر ≥ 60 عاماً في محافظة الكرك بالأردن، باستخدام استبيان سبق اختبارُه، وذلك بغرض تقييم الوضع الصحي والسلامة الذهنية والقدرة الوظيفية لدى كبار السن. وقد تم تحليل المعطيات باستخدام طرق التحوُّف regression اللوجستي والتحوُّف الخطّي. ومن بين الثلاثمئة شخص الذين أدرجوا في هذه الدراسة (53.3٪ منهم من النساء)، كان 74.4٪ من هؤلاء قد أصيبوا من قبل بأمراض مزمنة، و24.3٪ كانوا مصنفين كأشخاص مكتئبين. وكانت نسبة اعتمادهم على الغير في أداء الأنشطة الفاعلة والمؤثرة في الحياة اليومية (92.0٪) أعلى منها في الأنشطة الأساسية (28.0٪). وكانت النساء أكثر عرضة للإصابة بالاكتئاب، كما أنهن عانين من ضعف الذاكرة ومن محدودية في القدرة الوظيفية. وكانت الأعراض الاكتئابية تزيد بزيادة العمر، والعيش في وحدة، وضعف القدرة الوظيفية، وضعف الذاكرة، والإدراك الصحي السلبي. كما كان البطء في أداء الأنشطة الفاعلة والأساسية يزيد كذلك بزيادة العمر، ونقص التعليم، وزيادة الأعراض المرضية التي يشكو منها الشخص، والاكتئاب، وضعف الذاكرة. وكانت عوامل الاكتئاب وضعف القدرة الوظيفية وضعف الذاكرة عوامل يقوي بعضها بعضاً بما يؤدي إلى ظهور الحاجة إلى الاعتماد على الغير.

ABSTRACT The health status, mental well-being and functional capacity of senior citizens was assessed in a community-based survey of people ≥ 60 years in 2004. Analysis was performed using logistic and linear regression analyses. Of the 300 subjects enrolled (53.3% women), 74.4% were affected by chronic diseases, 24.3% were classified as depressed and 44.0% had a negative health perception. Dependence in instrumental activities of daily living (92.0%) was more frequent than dependence in basic activities (28.0%). Women were more likely to be depressed, and suffer memory impairment and limitation of functional capacity. Increase in depressive symptoms was independently predicted by increased age, living alone, poor functional capacity, memory impairment and negative perception of health. Low summary performance in instrumental and basic activities was independently predicted by increased age, lack of education, high number of reported symptoms, depression and memory impairment. Depression, poor functional capacity and memory impairment reinforced each other resulting in a state of dependency.

Évaluation complète de la santé des citoyens âgés dans le Gouvernorat d'El Karak (Jordanie)

RÉSUMÉ L'état de santé, le bien-être mental et la capacité fonctionnelle des citoyens âgés ont été évalués dans le cadre d' une étude communautaire des personnes âgées de 60 ans et plus réalisée en 2004. L'étude a utilisé les analyses de régression logistique et linéaire. Sur les 300 sujets admis dans l'étude (53,3 % de femmes), 74,4 % souffraient de maladies chroniques, 24,3 % étaient classés comme déprimés et 44,0 % avaient une perception négative de la santé. La dépendance pour les activités instrumentales de la vie quotidienne (92,0 %) était plus fréquente que la dépendance pour les activités de base (28,0 %). Les femmes étaient plus susceptibles d'être déprimées, et de souffrir de troubles de mémoire et d'une limitation de la capacité fonctionnelle. L'augmentation des symptômes dépressifs était prédite indépendamment par un âge plus avancé, le fait de vivre seul, une mauvaise capacité fonctionnelle, des troubles de mémoire et une perception négative de la santé. Une mauvaise performance sommaire dans les activités instrumentales et de base était prédite indépendamment par un âge plus avancé, le manque d'instruction, le nombre élevé de symptômes signalés, la dépression et les troubles de mémoire. La dépression, la mauvaise capacité fonctionnelle et les troubles de mémoire cumulaient leurs effets, entraînant un état de dépendance.

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Introduction

Globally, the proportion of people aged 60 years and over is growing faster than any other age group. By the year 2025, people in this age group will reach a total of 1.2 billion and this will rise to 2 billion in the year 2050 with 80% of them living in developing countries [*1*]. In Jordan, there has been a considerable change in the age structure of the population since 1979 as the number of people above the age of 60 years has been increasing steadily and reached 5.4% of the population in 2002 [*2*]. Projections indicate that this proportion will represent 9.2% of the population in 2025 with a further increase to reach 22.1% in 2050 [*3*].

As the ageing process continues, diseases and impairment become common. Chronic noncommunicable diseases are characteristic of old age and the prime causes of deterioration of physical health [*1*]. Psychological problems, mainly depression [*4*] and cognitive impairment [*1*] are also common among the elderly and pose major threats to their mental and physical well-being. Depression in this age group is characterized by physical co-morbidity and significant disability [*5*]. With the continuing increase in life expectancy [*2*] and the multitude of ailments afflicting old people, the capability of the elderly to maintain independence becomes a focus of attention. Health and functional ability are crucially important to the quality of life of old people as they determine the extent to which they can cope independently with the demands of everyday living [*6*].

In view of the vulnerability of elderly people and their growing number in the Jordan, assessment of the capability of senior citizens to maintain physical and mental well-being and a state of independence is of much relevance. Therefore a comprehensive assessment of the elderly population was conducted in Al-Karak governorate, south Jordan to determine current needs and to set future plans.

Methods

A community-based survey was conducted in Al-Karak governorate, south Jordan between January and April 2004. A cluster sample survey was used to identify subjects aged 60 years and over. A total of 30 clusters, the usual chosen number, were identified and from each cluster 10 subjects in the target age group were enrolled on the basis of a house-to-house survey. There were no refusals to participate. A comprehensive assessment was performed by the researcher in the homes of elderly using a pre-tested questionnaire, which had been piloted tested to check the appropriateness of the questions and the participants to understand them. The questionnaire consisted of the following sections.

- Section I: Sociodemographic characteristics˜, namely age, sex, marital status, educational attainment, employment, source of income and living conditions.
- Section II: Chronic health problems endured based on previous diagnosis, number of medications prescribed, pattern of health services utilization and participants' opinion of the health care services provided in the area.
- Section III: Self-reported health status which included 14 questions pertinent to symptoms and complaints common to old age experienced in the 6 months prior to the survey. Perceived health status was rated by giving a score of 1 for each complaint or symptom reported and a score of 0 if the participants did not express any complaint. Scores

ranged from zero to 14. Higher scores reflect poor self-rated physical health status.

- Section IV: Instrumental activities of daily living (IADL) [7] which reflects the capability of an elderly person to live independently in his/her own home. Activities include subjects' capability of getting around, using the telephone, shopping, preparing meals, performing household chores, taking medications and managing finances. Three possibilities were given for each area: independent (scored 0), variable degree of assistance required (scored 1), dependent and full assistance required (scored 2). Scores ranged from zero to 14. Higher scores indicate impaired activities of daily living.
- Section V: Basic activities of daily living (ADL) [8] which comprises survival tasks, namely eating, bathing, using the toilet, dressing and moving inside the house. For each task, 2 possibilities were given: capable without assistance (scored 0), not capable and assistance required (scored 1). As regards using the toilet and moving inside the house, a third possibility, which scored 2, was considered that included going to the toilet in bed and not being able to move or being paralyzed. Scores ranged from zero to 7. Higher scores indicate impaired basic activities.
- Section VI: Limitation of basic movement using the Nagi physical disability scale [9] which covers subjects' ability to squat/bend, carry 5 kg, walk for a distance of 200–300 metres, get up 3–5 stairs and use fingers for holding. Responses were dichotomized into not limited (scored 0) and limited (scored 1). Scores ranged from zero to 5. Higher scores indicate limitation of movement.
- Section VII: Evaluation of the mental status using a set of 10 questions on the participants' capabilities to know the date and day of the week, his age and year of birth, telephone number, name of the area, family name, name of the late and current king. Correct answers scored zero while wrong answer scored 1. Scores ranged from zero to 10. Higher scores indicate memory impairment.
- Section VIII: Screening for depression was performed using the short version of the geriatric depression scale [10] which includes 15 questions – 10 positive questions answered by "yes" and 5 negative questions answered by "no". Total score ranged from zero to 15. Higher scores reflect an increase in depressive symptoms and a score of e" 5 was set to indicate depression.

Data were analysed using the *SPSS*, version 10. The mean, standard deviation (SD), odds ratio (OR) and the 95% confidence interval (CI) were computed. Significance of the results was tested using the chi-squared test, logistic and linear regression analyses and judged at the 5% level.

Results

This study included 300 participants between the age of 60 and 100 years. More than half of the participants (53.3%) were women and below the age of 70 years (57.0%). The mean age of the women [68.93 (SD 8.577) years; 95% CI: 67.59–70.27] was comparable to that of the men [70.44 (SD 9.090) years; 95% CI: 68.92–71.960). The majority of participants (81.3%) had not received any formal education. Lack of a formal education was encountered among a significantly higher proportion of women than men (94.4%

compared to 66.4%, $c^2_1 = 83.410$, $P = 0.001$). At the time of the survey, 67.0% of the participants were married and only 10.7% were living alone in their home. Nearly a quarter (23.7%) of the participants reported caring for themselves while for the majority, care was provided either by the spouse (34.0%) or children and grandchildren (39.0%) (Table 1).

Retirement benefit was the source of income for 57.7% of participants while a proportion of them were supported by their children (28.7%) or social security services (14.7%). Only 12.7% of the participants were dependent on income generated from current employment. The per-capita monthly income ranged from 20 to 500 Jordanian dinars and it was less than 50 Jordanian dinars for 78.0% of the participants (1 Jordanian dinar = US$ 1.28 at the time of the study) (Table 1).

Chronic health problems were reported by 74.4% of the participants; this was reported significantly more among women (81.3% compared to 65.7%; $c^2_1 = 9.367$, $P = 0.002$). Diagnosed conditions included hypertension (41.7%), rheumatic pains (36.0%), diabetes mellitus (23.3%), ischaemic heart disease (15.7%), renal problems (5.0%), cerebrovascular disorders (4.0%) and bronchial asthma (3.7%). In the previous 6 months, 18.0% of the participants had experienced falls, mostly inside the house. The use of medications was stated by 73.3% of the participants; 75.9% ($n = 167$) were receiving 1–3 medications while 24.1% ($n = 53$) were using 4 or more drugs.

Table 2 shows the self-rated health status in the 6 months prior to the survey based on stated symptoms. The majority of participants (84.0%) reported generalized body aches and a substantial proportion reported loss of teeth to the extent of interference with chewing of food (61.3%), dyspepsia (59.7%), loss of weight

Table 1 **General characteristics of the participants**

General characteristics of participants ($n = 300$)	No.	%
Sex		
Male	140	46.7
Female	160	53.3
Age group (years)		
60–	171	57.0
70–	80	26.7
80–	37	12.3
90–100	12	4.0
Educational attainment		
No formal education	244	81.3
Formal education	56	18.7
Marital status		
Married	201	67.0
Single[a]	99	33.0
Living arrangements		
Living alone	32	10.7
Living with spouse	82	27.3
Living with spouse, children & grandchildren	119	39.7
Living with children & grandchildren	67	22.3
Care provider		
Self	71	23.7
Spouse	102	34.0
Children & grandchildren	117	39.0
Others[b]	10	3.3
Source of income[c]		
Current work	38	12.7
Pension	173	57.7
Support from children	86	28.7
Social security	44	14.7
Private property	3	1.0
Per capita monthly income (Jordanian dinar)		
< 50	234	78.0
50–100	54	18.0
> 100	12	4.0

One Jordanian dinar = US$ 1.28.
[a]Single includes never married, widowed and divorced.
[b]Others include relatives, neighbours and helpers.
[c]Categories are not mutually exclusive.

Table 2 **Health status based on reported symptoms by elderly subjects**

Reported symptoms	Men (*n* = 140) No.	%	Women (*n* = 160) No.	%	Total (*n* = 300) No.	%	OR (95%CI)
Body aches	111	79.3	141	88.1	252	84.0	1.94 (1.03–3.64)
Loss of teeth	83	59.3	101	63.1	184	61.3	1.18 (0.74–1.87)
Dyspepsia	76	54.3	103	64.4	179	59.7	1.52 (1.00–2.42)
Loss of weight	68	48.6	97	60.6	165	55.0	1.63 (1.03–2.58)
Insomnia	64	45.7	93	58.1	157	52.3	1.65 (1.04–2.60)
Lack of energy	58	41.4	96	60.0	154	51.3	2.12 (1.34–3.37)
Frequency	60	42.9	87	54.4	147	49.0	1.59 (1.01–2.51)
Shortness of breath	57	40.7	83	51.9	140	46.7	1.57 (1.00–2.48)
Constipation	53	37.9	85	53.1	138	46.0	1.86 (1.17–2.95)
Impaired vision	30	21.4	60	37.5	90	30.0	2.20 (1.31–3.68)
Poor appetite	30	21.4	60	37.5	90	30.0	2.20 (1.31–3.68)
Dizziness	29	20.7	52	32.5	81	27.0	1.84 (1.09–3.12)
Incontinence	25	17.9	53	33.1	78	26.0	2.28 (1.32–3.92)
Impaired hearing	34	24.3	32	20.0	66	22.0	0.78 (0.45–1.35)
Poor self-perception of health	49	35.0	83	51.9	132	44.0	2.00 (1.26–3.19)
Mean (SD) no. of symptoms reported	5.56 (3.266)		7.14 (2.96)		6.40 (3.202)		1.18
95% CI	5.01–6.10		6.68–7.61		6.04–6.77		1.09–1.27

OR = odds ratio.
CI = confidence interval.
SD = standard deviation.

(55.0%), insomnia (52.3%), lack of energy to perform daily activities (51.3%), frequency (49.0%), shortness of breath (46.7%) and constipation (46.0%). Less frequently, poor appetite (30.0%), impaired vision (30.0%), dizziness (27.0%), incontinence (26.0%) and hearing impairment (22.0%) were reported. Relative to men, women were 2.0 times more likely to have a poor self-perception of health. Among them, all symptoms were 1.5 to 2.5 times more likely to be reported except for the lack of teeth and impaired hearing, which were reported by a nearly equal proportions of men and women. The mean number of symptoms reported by women was 1.18 times higher than that of men (OR = 1.18, 95% CI: 1.09–1.27).

Table 3 shows health care coverage and utilization by elderly people. Health insurance – military or governmental – was held by 90.0% of the participants. In the 6 months prior to the survey, 58.7% of the participants reported using governmental health services with an average of 4.5 visits while only 19.0% sought the private sector for medical care. In the 12 months prior to the survey, 24.7% had been hospitalized for a mean duration of 8 days (95% CI: 5.53–10.85). For 80.7%, the health services pro-

Table 3 **Utilization of health services by participants and their opinion of the services provided**

Participants use and opinion (n = 300)	No.	%
Health services utilization		
Coverage by health insurance	270	90.0
Use of governmental health services [a]	176	58.7
Use of private health services[a]	57	19.0
Hospitalization[b]	74	24.7
Opinion about governmental health services in the area		
Affordability		
Affordable	242	80.7
Not affordable	58	19.3
Availability		
Available	163	54.3
Not available	137	45.7
Accessibility		
Accessible	179	59.7
Not accessible	121	40.3
Waiting time		
Short	145	48.3
Long	155	51.7
Quality of services provided		
Good	202	67.3
Poor	98	32.7
Satisfaction with the services provided		
Satisfied	217	72.3
Dissatisfied	83	27.7

[a]in the past 6 months.
[b]in the past 12 months.

vided were affordable; however, about 40% reported that the type of service required was neither available in their area of residence nor accessible. Half (51.7%) the participants complained of long waiting times but 67.3% rated the services as being good and 72.3% were satisfied with the services provided.

Capability to perform instrumental activities of daily living is shown in Table 4. Only 8.0% of the elderly participants were able to carry out all these activities independently; a substantial proportion reported the need for partial or full assistance in performing household chores (70.6%) and managing their own finances (68.3%). Nearly half were in need of assistance or were totally dependent on others for shopping (56.7%), making telephone calls (55.0%), getting around (52.7%) and preparing their own meals (49.3%), while 26.6% required assistance or were totally dependent in taking their medications. Impairment of activities of daily living was more pronounced among women as their score was 1.09 times higher than that of men (OR = 1.09; 95% CI: 1.03–1.16). Women were 3–5 times more likely to need partial or full assistance in using the telephone, getting around and shopping, while they were 14 times more likely to be partially or fully dependent on others in managing their own finances. In contrast, they were less likely to be dependent in performing household chores and preparing meals.

More than a quarter of the participants (28.0%) reported impairment of activities of daily living. Dependence in moving inside the house was encountered among 20.3% of the elderly participants. Lower proportions were dependent on others for bathing and shaving (16.3%) as well as dressing (14.7%). Few required assistance for going to the toilet (8.0%) and eating (5.0%). Women were significantly more in need for assistance in bathing (OR = 3.21) while no gender difference was observed in other activities. Overall scores for activities of daily living showed women were more impaired than men although the difference was not statistically significant (OR = 1.14, 95% CI: 1.00–1.35) (Table 5).

Table 4 **State of dependence assessed using instrumental activities of daily living (IADL)**

IADL area	Men (*n* = 140) No.	%	Women (*n* = 160) No.	%	Total (*n* = 300) No.	%	OR (95%CI)
Using the phone							
Independent	89	63.6	46	28.8	135	45.0	4.32 (2.66–7.03)
Assistance required	39	27.9	88	55.0	127	42.3	
Dependent	12	8.5	26	16.2	38	12.7	
Getting around							
Independent	88	62.9	54	33.8	142	47.3	3.32 (2.07–5.34)
Assistance required	41	29.3	73	45.6	114	38.0	
Dependent	11	7.8	33	20.6	44	14.7	
Shopping							
Independent	88	62.9	42	26.2	130	43.3	4.76 (2.91–7.77)
Assistance required	29	20.7	48	30.0	77	25.7	
Dependent	23	16.4	70	43.8	93	31.0	
Preparing meals							
Independent	49	35.0	103	64.4	152	50.7	0.29 (0.19–0.48)
Assistance required	20	14.3	17	10.6	37	12.3	
Dependent	71	50.7	40	25.0	111	37.0	
Doing household chores							
Independent	22	15.7	66	41.3	88	29.3	0.27 (0.15–0.46)
Assistance required	39	27.9	52	32.5	91	30.3	
Dependent	79	56.4	42	26.2	121	40.3	
Taking medications							
Independent	98	70.0	122	76.3	220	73.3	0.73 (0.44–1.21)
Assistance required	34	24.3	21	13.1	55	18.3	
Dependent	8	5.7	17	10.6	25	8.3	
Managing finances							
Independent	81	57.9	14	8.8	95	31.7	14.32 (7.53–27.23)
Assistance required	18	12.9	28	17.4	46	15.3	
Dependent	41	29.2	118	73.8	159	53.0	
Considering all IADL items							
Independent	12	8.6	12	7.5	24	8.0	1.16 (0.50–2.66)
Assistance required	30	21.4	18	11.3	48	16.0	
Dependent	98	70.0	130	81.2	228	76.0	
Mean (SD) IADL score of impairment	5.07 (3.731)		6.37 (3.852)		5.76 (3.845)		1.09
95% CI	(4.44, 5.70)		(5.77,6.97)		(5.33, 6.20)		(1.03–1.16)

OR was computed by summing the last two categories (assistance required and dependent).
OR = odds ratio.
CI = confidence interval.
SD = standard deviation.

Table 5 **Functional capacity of the participants assessed by activities of daily living (ADL)**

ADL area	Men (*n* = 140) No.	%	Women (*n* = 160) No.	%	Total (*n* = 300) No.	%	OR (95% CI)
Eating							
Independent	134	95.7	151	94.4	285	95.0	1.33 (0.46–3.84)
Dependent	6	4.3	9	5.6	15	5.0	
Going to the toilet							
Independent	132	94.3	144	90.0	276	92.0	1.83 (0.76–4.42)
Dependent	8	5.7	16	10.0	24	8.0	
Bathing/shaving							
Independent	128	91.4	123	76.9	251	83.7	3.21 (1.60–6.44)
Dependent	12	8.6	37	23.1	49	16.3	
Getting dressed							
Independent	121	86.4	135	84.4	256	85.3	1.18 (0.62–2.25)
Dependent	19	13.6	25	15.6	44	14.7	
Moving around the house							
Independent	112	80.0	127	79.4	239	79.7	1.04 (0.59–1,83)
Dependent	28	20.0	35	20.6	61	20.3	
Considering all ADL items							
Independent	102	72.9	114	71.3	216	72.0	1.08 (0.65–1.80)
Dependent	38	27.1	46	28.7	84	28.0	
Mean (SD) ADL scores of impairment	0.55 (1.237)		0.82 (1.586)		0.69 (1.437)		1.14
95% CI	(0.34–0.76)		(0.60–1.07)		(0.53–0.86)		(1.00–1.35)

OR = odds ratio.
CI = confidence interval.
SD = standard deviation.

Limitation of one or more of the basic movements was encountered by 59.7% of the participants. The movement most commonly limited was squatting/bending (47.0%), followed by carrying a weight of 5 kg (41.7%), walking for a distance of 200–300 metres (40.0%) and getting up 3–5 stairs (32.7%). These movements were 2–3.5 times more likely to be limited among women. Restriction of basic activities was more pronounced among women as their mean score on the Nagi scale of physical disability was 1.33 times higher than that of men (OR = 1.33, 95% CI: 1.16–1.53) (Table 6).

The mean scores of elderly subjects on the mental status scale was 1.92 (SD 2.12). Women exhibited marked memory deterioration as their mean score [2.67 (SD 2.15), 95% CI: 2.33–3.01] was significantly higher than that of men [1.07 (SD 1.73), 95% CI: 0.78–1.36] (OR= 1.55, 95% CI: 1.34–1.78). On the depression scale, the mean scores of the participants was 3.16 (SD 2.64). A quarter (24.3%) scored 5 or more points which indicates the presence of depression. Table 7 shows factors contributing to depression among the participants. Depression was significantly more likely

Table 6 **Limitation of basic movements based on the Nagi physical disability scale**

Basic movement items	Men (*n* = 140) No.	%	Women (*n* = 160) No.	%	Total (*n* = 300) No.	%	OR (95%CI)
Squatting/bending							
Not limited	97	69.3	62	38.8	159	53.0	3.57 (2.21–5.76)
Limited	43	30.7	98	61.3	141	47.0	
Carrying 5 kg							
Not limited	96	68.6	79	49.4	175	58.3	2.24 (1.40–3.59)
Limited	44	31.4	81	50.6	125	41.7	
Walking 200–300 m							
Not limited	99	70.7	81	50.6	180	60.0	2.36 (1.46–3.80)
Limited	41	29.3	79	49.4	120	40.0	
Getting up 3–5 stairs							
Not limited	106	75.7	96	60.0	202	67.3	2.08 (1.26–3.42)
Limited	34	24.3	64	40.0	98	32.7	
Using fingers							
Not limited	126	90.0	146	91.3	272	90.7	0.86 (0.40–1.88)
Limited	14	10.0	14	8.7	28	9.3	
Considering all Nagi items							
Not limited	79	56.4	42	26.3	121	40.3	3.63 (2.24–5.92)
Limited in one or more functions	61	43.6	118	73.8	179	59.7	
Mean (SD) Nagi scores	1.26 (1.723)		2.10 (1.702)		1.71 (1.76)		1.33
95% CI	(0.97–1.55)		(1.83–2.36)		(1.51–1.91)		(1.16–1.53)

OR = odds ratio.
CI = confidence interval.
SD = standard deviation.

among women (OR = 2.13), the uneducated (OR = 5.12), those who were single (OR = 4.04) and those who lived alone (OR = 3.70). Increase in age was associated with a significantly higher risk of depression. The mean score of subjects aged 70 years and over [5.17 (SD 2.40), 95% CI: 4.75–5.59] was significantly higher than those less than 70 years [1.64 (SD 1.59), 95% CI: 1.40–1.89]. A higher risk of depression was associated with deterioration of mental status (OR = 1.72), negative self-reported health status (greater number of reported symptoms) (OR = 1.24), poor self perception of health (OR = 2.22), limitation of movement (OR = 2.51) as well as deterioration of instrumental (OR = 1.86) and basic activities of daily living (OR = 3.63) (Table 7).

Independent predictors of instrumental and basic activities of daily living are given in Table 8. Lower performance in instrumental and basic activities of daily living was independently predicted by increase in age, high frequency of physical and depressive symptoms, memory impairment and lack of formal education. In addition, lower performance in basic activities of

Table 7 **Univariate logistic regression of predictors of depression status among the participants**

Predictor	Depressed (*n* = 73) No.	%	Not depressed (*n* = 227) No.	%	OR (95% CI)
Sex					
Male[a]	24	32.9	116	51.1	2.13
Female	49	67.1	111	48.9	(1.22–3.71)
Marital status					
Married[a]	31	42.5	170	74.9	4.04
Single	42	57.5	57	25.1	(2.32–7.02)
Educational status					
Formal education[a]	4	5.5	52	22.9	5.12
No formal education	69	94.5	175	77.1	(1.79–14.71)
Living arrangements					
With family members[a]	57	78.1	211	93.0	3.70
Alone	16	21.9	16	7.0	(1.74–7.85)
Chronic diseases					
Absent[a]	15	20.5	63	27.8	1.49
Present	58	79.5	164	72.2	(0.79–2.81)
Self-perceived health					
Good[a]	30	41.1	138	60.8	2.22
Poor	43	58.9	89	39.2	(1.29–3.80)
	Mean (SD)	**CI**	**Mean (SD)**	**CI**	
Age in years	66.87 (6.783)	65.98–67.76	78.24 (8.993)	76.13–80.33	1.18 (1.13–1.23)
Self-reported health status[b]	7.96 (2.965)	7.96–7.27	5.90 (3.119)	5.49–6.31	1.24 (1.13–1.37)
Instrumental activities of daily living	10.21 (2.619)	9.59–10.82	4.33 (2.991)	3.94–4.72	1.86 (1.61–2.16)
Activities of daily living	2.25 (2.107)	1.76–2.74	0.19 (0.538)	0.12–0.26	3.63 (2.53–5.22)
Basic movement	3.51 (1.324)	3.20–3.82	1.13 (1.468)	0.94–1.32	2.51 (2.02–3.11)
Mental status	3.68 (2.390)	3.13–4.25	1.36 (1.672)	1.14–1.58	1.72 (1.48–2.00)

[a]Baseline category.
[b]Scores based on the number of symptoms or complaints reported.
OR = odds ratio.
CI = confidence interval.
SD = standard deviation.

daily living was independently predicted by the presence of chronic health problemI:s, while living alone independently predicted a better performance in instrumental activities of daily living. Increase in depressive symptoms was independently predicted by living alone, negative perception of health, deterioration of mental status, impairment in instrumental and basic activities of daily living and limitation of movement. These variables contributed to 69.6% of the variance in the depression score (Table 8).

Table 8 **Independent predictors of instrumental and basic activities of daily living and depression among the participants**

Independent predictors	Standardized coefficient (β)	Computed *t* for β	*P*-value
Instrumental activities of daily living			
Age (years)	0.145	3.166	0.002
Self-reported health status	0.132	3.534	0.000
Mental status	0.153	3.519	0.001
Depression	0.503	10.210	0.000
Living arrangements (with family = 1; living alone = 2)	–0.074	2.078	0.039
Education (educated = 1; uneducated = 2)	0.162	4.296	< 0.001
Adjusted $R^2 = 0.642$			
Basic activities of daily living			
Age (years)	0.183	3.373	0.001
Self-reported health status	0.140	2.877	0.004
Mental status	0.200	3.870	< 0.001
Depression	0.394	6.787	< 0.001
Chronic health problems (absent = 1; present = 2)	0.147	3.224	0.001
Education (educated = 1; uneducated = 2)	–0.141	3.137	0.002
Adjusted $R^2 = 0.499$			
Depression			
Self-perceived health (good =1; poor = 2)	0.318	8.240	< 0.001
Basic movements	0.222	5.090	< 0.001
Instrumental activities of daily living	0.268	4.893	< 0.001
Basic activities of daily living	0.135	3.038	0.003
Mental status	0.091	2.268	0.024
Living arrangements (with family = 1; alone = 2)	0.077	2.353	0.019
Adjusted $R^2 = 0.696$			

Discussion

Traditionally, research on ageing has been concerned with health but recently the concept of functional capacity has been attracting growing attention [*6*]. This study explored the health status of senior citizens based on medical diagnosis, symptoms of diseases and capacity to perform activities necessary for independent living.

Among the studied population, body movement and basic activities were less likely to be restricted compared to instrumental activities of daily living as only 8% were capable of performing activities that enabled them to live independently. Laukkanen et al. [*11*] and Sauvaget et al. [*12*] indicated that independent life in instrumental activities of daily living is much shorter than independent life in basic activities or mobility. Among the studied population, whatever the pattern or extent of assistance required, none of the elderly had an unmet

need (R. Youssef, unpublished data, 2004). This is a characteristic of Arab society, especially small rural and Bedouin communities where children assume full responsibility of their elderly parents whether they are living with them or in their own home. In the Bedouin community in this study, almost two-thirds of the elderly were living with their children and grandchildren. A longitudinal study from Japan provides evidence of the progressive deterioration in instrumental activities of daily living among the elderly living with their children simply because they rely on them even if they have no strong need for their help [*13*]. In this respect, the role of children should be strengthened and oriented toward encouraging old people to maintain independence. Such a role could alleviate much of the social burden on the government and contribute to the mental well-being of old people. It is worth mentioning that this study as well as that of Schulman et al. [5] demonstrated that old people living alone were at a much higher risk of depression although they are able to maintain independence.

A large body of literature has documented that women are more likely to report deterioration and the use of assistance in instrumental [*14,15*] and basic [*16*] activities of daily living as well as impairment of body movement [*14,16*]. This was also shown in the present study, except for household chores and meal preparation, which was explained by Laukkanen et al. [*11*] as cultural differences in coping with everyday activities. Previous studies have attributed the apparent greater impairment and disability among women to the fact that men experience disability at a younger age with rapid deterioration [*12*] while women live longer to very old age when multiple health problems and disability are common [*1,17*]. Consequently, they spend more time in a disabled state [*17*]. In some societies, the lower status of women, lack of education and their restricted role as family caregiver contribute to their increased risk of ill-health and disability [*1,13,18*]. In this study, men and women were of comparable age yet the women had received less formal education. It was among the women that chronic diseases, multitude of symptoms and negative perception of health were encountered more often, which could explain the gender variation in the state of dependence and limited functional capacity. In this study, chronic diseases predicted dependence in basic activities of daily living and high frequency of symptoms predicted low summary performance in both instrumental and basic activities of daily living. It is thus the burden experienced of disturbance of body systems, and the pain and discomfort rather than the disease status that predict dependence and the need for assistance, as suggested by Kiosses et al. [*15*]. Each symptom should therefore be taken seriously rather than considering it a feature of old age.

A quarter of the participants in this study were classified as depressed, which is higher than the 17.5% reported from Abha, Saudi Arabia [*19*]. Such a considerable difference could be attributed to the variation in the socioeconomic level between the two populations as well as the high prevalence of chronic diseases and the over-presentation of women in this study. This study and others point to the higher likelihood of depression among elderly women [*18–20*]. Among the studied population, depression was not found to be characteristic of female gender but a consequence of their restricted capacity in coping with the demands of daily living and the negative perception of health. Previous studies have underscored the impact of

limitation and disability [*5,15,20–22*] and poor self-rated health status [*19,23*] on the increase in depressive symptoms that is often attributed to to gender variation. Indeed, each depressive symptom increases impairment and disability and reduces the chance of recovery [21]. This study demonstrated that depression and the limited coping capacities with everyday demands reinforce each other. Such information is important for primary care physicians who tend to focus on the medical diagnosis of physical ailments. In old age, depression is often overlooked as a clinical entity as it is assumed to be the normal response to ageing and physical loss [*24*]. Public health strategies should be directed toward comprehensive assessment of geriatric populations giving equal attention to the effective management of depression, co-morbidity and functional limitation. Primary care physicians should be particularly vigilant for functional decline in old people who perceive their health negatively as further decline within a year would be expected [*25*].

During natural ageing, some cognitive capacities, particularly memory, decline [*1*]. This study demonstrated that for each depressive symptom, memory declined by 9%. Also, memory impairment was associated with a low summary performance on instrumental and basic activities of daily living. This was in accordance with other studies that have reported the role of cognitive impairment in accelerating depression [*1*] and generating a state of dependence [*26,27*]. Continuous mental stimulation can result in a deceleration of the memory loss that accompanies the ageing process with a subsequent positive impact on physical and psychological well-being of old people [*4*].

Increased life-span and the resulting ageing of populations is one of the greatest achievements of our time. Successful ageing, which implies adding life to years, can only be realized by addressing all the negative impacts of growing old collectively and simultaneously. Inevitably, this will result in a significant increase in economic and social demands [*1*]. In Jordan, rapid population growth and the growing number of old people will put considerable pressures on the health care system. Expenditure on health currently represents 9.12% of its gross domestic product [*28*]. In the future, Jordan will have to increase this expenditure. The per capita utilization of health services is 2.41 visits with much higher rate of utilization by old people [*28*]. Among the elderly of this study, more than half had paid on average 4.5 visits to health care facilities in the past 6 months. As 90% of the studied population were covered by governmental health insurance , demands are higher on the services provided by the Ministry of Health which are spread all over the country and the Royal Medical Services which are centred in the capital and provide specialized care. There are few private health care facilities in this remote area and they are used when there is a real or perceived problem with the quality of governmental services [*28*]. In this regard, it is worth mentioning that almost a third of the participants were dissatisfied with the services provided and over a quarter considered the quality was poor. Problems with the availability and accessibility of services were also reported in view of the scattered dwelling, lack of a transportation system and the need to seek services in the capital. Research is needed to assess the quality of services and patterns of delivery to old people. As old people live in the community, health care should be provided by primary health care centres as well as by outreach services which focus on the highly vulnerable, such as women and the very old. In this area, the newly launched community-oriented school of medicine ay Mu'tah Uni-

versitycould take part as well. In Jordan, medical schools should define "ageing" as a community problem and allot more time for geriatric medicine on both preventive and curative levels. In addition, community surveys of geriatric populations for health assessment and ensuring strong links to the available medical and social services could be part of the practical training of medical students.

References

1. ***Active ageing: a policy framework***. Geneva, World Health Organization, 2002. 2002.
2. Jordan Department of Statistics and ORC Macro. ***Jordan Population and Family Health Survey 2002***. Calverton, Maryland, Department of Statistics and ORC Macro, 2003.
3. United States Bureau of Census. International data base. IDB population pyramids. Available at: http://www.census.gov/cgi-bin/ipc/idbpyrs.pl?cty=JO&out=s&ymax=250 (accessed 25/05.05).
4. Thapar GD. Approach to the problems of the aged. ***Journal of the Indian Medical Association***, 2004, 102(2):93–6.
5. Schulman E et al. Depression and associated characteristics among community-based elderly people. ***Journal of allied health***, 2002, 31(3):140–6.
6. ***Growing older – staying well: ageing and physical activity in everyday life***. Geneva, World Health Organization, 1998.
7. Lawton MP, Brody EM. Assessment of older people: Self-maintaining and instrumental activities of daily living. ***Gerontologist***, 1996, 9:179–86.
8. Katz S et al. Studies of illness in the aged. The index of ADL: A standardized measure of biological and psychosocial function. ***Journal of the American Medical Association***, 1963, 85:914–9.
9. Nagi SZ. An epidemiology of disability among adults in the United States. ***Milbank Memorial Fund quarterly***, 1976, 54:439–67.
10. Van Marwijk HW et al. Evaluation of the feasibility, reliability and diagnostic value of shortened versions of the geriatric depression scale. ***British journal of general practice***, 1995, 45(393):195–9.
11. Laukkanen P et al. Factors related to carrying out everyday activities among elderly people aged 80. ***Aging***, 1994, 6(6):433–43.
12. Sauvaget C et al. Health-life expectancy according to various functional levels. ***Journal of the American Geriatrics Society***, 1999, 47(11):1326–31.
13. Ishizaki T, Kobayashi Y, Kai I. Functional transitions in instrumental activities of daily living among older Japanese. ***Journal of epidemiology***, 2000, 10(4):249–54.
14. Murtagh KN, Hubert HB. Gender difference in physical disability among an elderly cohort. ***American journal of public health***, 2004, 94(8):1406–11.
15. Kiosses DN et al. Executive dysfunction and disability in elderly patients with major depression. ***American journal of geriatric psychiatry***, 2001, 9(3):269–74.
16. Beckett LA et al. Analysis of change in self–reported physical function among older persons in four population studies. ***American journal of epidemiology***, 1996, 143(8):766–78.
17. Dunlop DD, Hughes SL, Manheim LM. Disabilities in activities of daily living: patterns of change and a hierarchy of

disability. ***American journal of public health***, 1997, 87(3):378–83.

18. Bonita R. ***Women, ageing and health: achieving health across the life span***. Geneva, World Health Organization, 1998.

19. Abolfotouh MA et al. Psychosocial assessment of geriatric subjects in Abha city, Saudi Arabia. ***Eastern Mediterranean health journal***, 2001, 7(3):481–91.

20. Hybels CF, Blazer DG, Pieper CF. Toward a threshold for subthreshold depression: an analysis of correlates of depression by severity of symptoms using data from an elderly community sample. ***Gerontologist***, 2001, 41(3):357–65.

21. Cronin-Stubbs D et al. Six-year effect of depressive symptoms on the course of physical disability in community-living older adults. ***Archives of internal medicine***, 2000, 160(20):3074–80.

22. Dunlop DD et al. Arthritis and heart disease as risk factor for major depression: The role of functional limitation. ***Medical care***, 2004, 42(6):502–11.

23. Smits CH, Deeg DJ, Jonker C. Cognitive and emotional predictors of disablement in older adults. ***Journal of aging and health***, 1997, 9(2):204–21.

24. Raj A. Depression in the elderly. Tailoring medical therapy to their special needs. ***Postgraduate medicine***, 2004, 115(6):26–8, 37–42.

25. Lyness JM et al. Self-rated health, depression, and one-year health outcome in older primary care patients. ***American journal of geriatric psychiatry***, 2004, 12(1):110–3.

26. Nourhashemi F et al. Instrumental activities of daily living as potential marker of frailty: A study of 7364 community-dwelling elderly women (the EPIDOS study). ***Journals of gerontology. Series A, Biological sciences and medical sciences,*** 2001, 56(7):M448–53.

27. Ishizaki T et al. Predictors for functional decline among non-disabled older Japanese living in a community during a 3-year follow-up. ***Journal of the American Geriatrics Society***, 2000, 48(11):1424–9.

28. Brosk H et al. ***Jordan National Health Accounts. Technical Report No. 49.*** Bethesda, Maryland, Partnerships for Health Reform Project, Abt Associates Inc., 2000.