

Normative data and psychometric properties of short form 36 health survey (SF-36, version 1.0) in the population of north Jordan

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المعطيات المعيارية والخصائص القياسية النفسية في الشكل المختصر من المسح الصحي 36 للسكان في شمال الأردن
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الخلاصة: هدفت هذه الدراسة إلى تقييم الخصائص القياسية النفسية في شكلها المختصر 36 بين عامة الناس في شمال الأردن. واختار الباحثون عينة منهجية من 157 عائلة من 6 مناطق في محافظة إربد شمال الأردن. وقد وافق 511 شخصاً ممن تزيد أعمارهم على 18 عاماً على المساهمة في الدراسة. وقد حازت هذه الأداة في إخراجها العربية SF-36 V 1.0 على مقبولية كاملة من حيث الموثوقية. وقد تجاوزت أحراز المسح لجميع الأحرار الثانية 0.70. واجتازت جميع البنود بنجاح اختبارات الاتساق الداخلي ومصداقية التمييز. وبناءً على ذلك وضع الباحثون معايير المسح 36 للسكان بين عامة الناس في شمال الأردن. وقد بلغت أعلى قيمة وسطية لأداء الوظائف الاجتماعية 66.8 بين الرجال ولأداء الوظائف البدنية 69.8 بين النساء. أما أقل قيمة وسطية فكانت للحياة، وبلغت 55.8 بين الرجال وللألم الجسدي، وبلغت 54.6 بين النساء. وانتهى الباحثون إلى أن المسح SF-36 أداة تتمتع بالمصدوقية والموثوقية لقياس جودة الحياة بين السكان الأردنيين.

ABSTRACT This study aimed to assess the psychometric properties of the short form 36 health survey (SF-36, version 1.0) and to establish SF-36 population norms among the general population of north Jordan. A systematic sample of 157 households was selected from 6 districts in Irbid governorate in north Jordan. A total of 511 people aged 18 years or more agreed to participate. The reliability of the instrument using the Arabic version of SF-36 was satisfactory: Cronbach alphas for all 8 SF-36 scales exceeded 0.70. All items passed the tests for item internal consistency and item discriminant validity. SF-36 population norms among the general population of north Jordan were established. The highest mean was for social functioning (66.8) among men and for physical functioning (69.8) among women. The lowest mean was for vitality (55.8) among men and bodily pain (54.6) among women. The SF-36 is a valid and reliable instrument for measuring quality of life among Jordanians.

Données normatives et propriétés psychométriques du questionnaire d'évaluation de la santé SF-36 en version courte (SF-36, version 1.0) dans la population du nord de la Jordanie

RÉSUMÉ La présente étude avait pour objectif d'évaluer les propriétés psychométriques du questionnaire d'évaluation de la santé SF-36 en version courte (SF-36, version 1.0) et d'établir des données normatives issues de la population générale du nord de la Jordanie aux moyens dudit questionnaire. Un échantillon systématique de 157 ménages a été sélectionné dans six districts du gouvernorat d'Irbid dans la partie septentrionale de la Jordanie. Au total, 511 personnes âgées d'au moins 18 ans ont donné leur accord pour participer à l'étude. La fiabilité du questionnaire SF-36 dans sa version arabe s'est révélée satisfaisante : le coefficient alpha de Cronbach était supérieur à 0,70 pour l'ensemble des huit échelles du SF-36. Tous les items ont généré des résultats concluants pour la cohérence interne et la validité discriminante. Les données recueillies en population générale aux moyens du questionnaire SF-36 dans le nord de la Jordanie ont permis d'établir des normes. L'item vie et relation avec les autres a obtenu la moyenne la plus élevée (66,8) chez les hommes. Chez les femmes, la moyenne la plus forte (69,8) concernait la fonction physique. La moyenne la plus basse (55,8) chez les hommes portait sur la vitalité alors que c'est la douleur physique qui a obtenu la moyenne la plus faible (54,6) chez les femmes. Le questionnaire SF-36 est donc un instrument valable et fiable pour mesurer la qualité de vie des Jordaniens.

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Introduction

Recognition of patients' point of view about their own health as well as the health perceptions of populations are becoming important components in health care assessment [1]. While much health research focuses on objective outcome measures such as mortality or morbidity, there is an increasing emphasis on self-reported measures of health status and health-related quality of life. As most of the available tools are in English, Arab countries are lagging behind, not only in the development of tools, but also in the translation and validation of existing tools [2–4].

A comparison of a series of generic health status measures indicated that the short form 36-item health survey (SF-36) is a psychometrically sound, reliable and valid measure in many populations [5–11] and is more responsive to clinical improvement than other instruments [12]. Normative data are the key to determining whether a group or an individual scores below or above the average for their country, age or sex [2]. This study aimed to assess the psychometric properties of the SF-36, version 1.0 and to establish SF-36 population norms among the general population of north Jordan.

Methods

Sample

A cross-sectional study was conducted in the governorate of Irbid in the north of Jordan over a period of 3 months (August–October 2007). Six districts were selected to represent all districts using a simple random sampling method. A systematic sample of households was selected from each district, with a size proportional to the number of households in that district. A total of 157 households were selected. People aged 18 years or more were informed about the purpose of the study by a team of 2 trained interviewers and were invited to

participate. A total of 511 people agreed to participate in the study, a response rate of 92%.

Data collection

Data were collected using face-to-face interview. The first part of the questionnaire consisted of sociodemographic characteristics, including age, sex, address, years of education, marital status, family size, income and health insurance. The second part consisted of the Arabic version of the SF-36 [13], which has been translated and culturally adapted in Lebanon by following the International Quality of Life Assessment (IQOLA) project methodology [14]. SF-36 questions cluster to yield 8 health status scales: physical functioning (PF), role-physical (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role-emotional (RE) and mental health (MH). Two summary measures—the physical and mental health summary scales—aggregate these status scales. Individual SF-36 items are recoded, summed and transformed, with missing values imputed as recommended [15]. The health concepts described by the SF-36 range in score from 0 to 100 as described in the *SF-36 health survey manual and interpretation guide*, with higher scores indicating higher levels of function or better health [16].

Psychometric properties

For this study, the mean and standard deviation (SD) of responses to each item and scale were calculated. The percentage of people with scores of 100 (ceiling effect) and 0 (floor effect) were calculated for each scale. On the scale level, ceiling and floor effects had to be less than 20% in order to assume that the scale was capturing the full range of potential responses [17].

The item level validity of the SF-36 was supported if the correlations between items and the hypothesized scale (item internal consistency) exceeded 0.40 and if the correlation between each

item and its hypothesized scale (corrected for overlap) were higher than the correlation between that item and the other scales (item discriminant validity). Scale level validity was supported if the reliability of scale scores was acceptable using internal consistency methods, namely Cronbach alpha 0.70 or above for group comparisons [18].

Statistical analysis

The characteristics of the respondents were described using frequencies, means and SD. Multivariate analysis was performed to test the effect of important variables on all domains of the SF-36. SPSS, version 11.0 software was used to analyse data. A P -value < 0.05 was considered statistically significant.

Results

Participants' characteristics

This study included 511 subjects (306 males and 205 females) aged between 18 and 75 years with a mean age of 35.8 (SD 12.0) years. Their sociodemographic characteristics are shown in Table 1.

Scaling assumptions, validity, and reliability

Table 2 presents the psychometric properties of the SF-36 subscales. All items passed the test for discriminant validity. The correlation between each SF-36 item and its hypothesized scale was higher than the correlations with other SF-36 scales. All correlations between each item and its hypothesized scale exceeded the criterion of 0.40. For all subscales, Cronbach alpha coefficients exceeded the minimum criterion of 0.70 and ranged from 0.71 to 0.90, indicating high internal consistency. Cronbach alpha was lowest for GH and VT and highest for PF and BP. Ceiling and floor effects were well below the cutoff of 20%, indicating that all subscales of the SF-36 captured the full range of potential responses.

Table 1 Sociodemographic characteristics of 511 participants in north Jordan

Variable	No. of respondents	%
Age (years)		
18–24	107	20.9
25–34	144	28.2
35–44	123	24.1
45–54	97	19.0
≥ 55	40	7.8
Sex		
Male	306	59.9
Female	205	40.1
Education level		
≤ High school	228	44.6
> High school	283	55.4
Family income		
≤ 350	264	51.7
> 350	247	48.3
Family size		
≤ 5	211	41.4
> 5	299	58.6
Marital status		
Single	178	34.8
Married	333	65.2
Insurance		
Insured	388	75.9
Not insured	123	24.1

SF-36 scale scores

Table 3 presents the mean SF-36 scale scores for the population of north Jordan according to age for both sexes.

The highest total mean score was for SF (66.8) among men and for PF (69.8) among women. The lowest total mean score was for the VT scale (55.8) among

men and the BP scale (54.6) among women. For men, the mean scores of PF, RP, BP and GH decreased with increasing age. The same pattern was seen for the PF and GH scales among women. The mean score of RE increased with increasing age among women. Scores on other scales varied according to age among men and women without any apparent trend.

The mean SF-36 scale score according to the sociodemographic characteristics of participants in the multivariate analysis are shown in Table 4. Younger age, female sex, diploma or higher level of education and family size ≤ 5 members were significantly associated with increased PF scores. Single people had a significantly higher RP score. Increased age was significantly associated with decreased GH score. A higher level of education was associated with higher SF scores. RE was significantly associated with age and sex, while BP, VT and MH were not associated with any other variables.

Discussion

Cross-cultural validation studies provide standard health measures that make health status comparisons between

Table 2 Mean scores for the 8 dimensions of the short form 36 health survey (SF-36, version 1.0) and tests of scaling assumption

Dimension	No. of items	Mean (SD)	Cronbach alpha	Ceiling/floor ^a	Item internal consistency ^b	Item discriminant validity ^c	
PF	Physical function	10	66.5 (28.3)	0.90	11.4/1.0	0.73–0.84	0.02–0.30
RP	Role–physical	4	60.4 (34.8)	0.78	11.5/12.1	0.69–0.74	0.15–0.43
BP	Bodily pain	2	56.4 (26.7)	0.89	16.2/1.4	0.94–0.96	0.13–0.41
GH	General health	5	64.0 (18.5)	0.71	10.0/0.2	0.61–0.77	0.10–0.51
VT	Vitality	4	55.7 (19.5)	0.71	12.3/0.2	0.62–0.75	0.08–0.50
SF	Social functioning	2	66.4 (22.2)	0.73	13.9/0.6	0.80–0.85	0.11–0.42
RE	Role–emotional	3	58.7 (40.2)	0.75	10.9/17.0	0.80–0.84	0.03–0.39
MH	Mental health	5	61.2 (22.2)	0.81	8.6/0.4	0.69–0.80	0.06–0.50

^aCeiling/floor: % with highest score (100) / % with lowest score (0).

^bItem internal consistency: the extent to which items within the same dimension correlated with each other.

^cThe integrity of hypothesized item groupings relative to the health concepts hypothesized.

PF = physical functioning, RP = role–physical, BP = bodily pain, GH = general health, VT = vitality, SF = social functioning, RE = role–emotional and MH = mental health. SD = standard deviation.

Table 3 Mean scores for the subscales of the short form 36 health survey (SF-36, version 1.0) in north Jordan according to age and sex

Sex/age (years)	Mean (SD) scores on subscales:							
	PF	RP	BP	GH	VT	SF	RE	MH
Males								
18-24	73.0 (28.3)	61.6 (31.4)	59.9 (24.8)	68.0 (16.4)	60.0 (17.0)	64.5 (24.4)	56.0 (39.4)	60.6 (22.6)
25-34	71.9 (27.5)	60.7 (37.2)	58.7 (28.0)	65.8 (20.1)	53.5 (19.3)	63.6 (23.7)	53.9 (43.9)	60.6 (21.6)
35-44	67.2 (20.6)	55.9 (35.9)	45.1 (20.5)	61.6 (13.7)	53.5 (19.8)	70.6 (21.9)	55.9 (40.8)	62.4 (19.2)
45-54	65.2 (21.8)	49.1 (36.4)	46.9 (27.7)	59.7 (15.7)	52.0 (20.1)	68.1 (21.5)	53.1 (42.6)	57.3 (25.7)
≥ 55	49.3 (30.1) ^t	39.3 (40.5)	37.7 (22.9)	52.6 (13.7)	59.3 (18.1)	69.6 (20.2)	61.9 (48.8)	69.1 (21.3)
Total	64.3 (29.4)	62.1 (34.5)	57.6 (27.0)	63.6 (19.2)	55.8 (20.0)	66.8 (21.5)	61.1 (39.2)	61.4 (22.2)
Females								
18-24	73.9 (33.6)	64.5 (27.6)	64.4 (30.9)	66.2 (20.3)	56.4 (20.9)	66.8 (22.2)	47.4 (36.9)	54.7 (26.4)
25-34	65.9 (29.0)	60.5 (33.0)	56.5 (26.0)	65.6 (17.0)	58.6 (18.0)	62.8 (21.3)	51.3 (40.2)	62.4 (19.4)
35-44	63.1 (28.0)	64.6 (34.9)	55.8 (26.3)	64.0 (17.9)	51.8 (20.3)	66.6 (21.4)	67.4 (38.6)	59.3 (23.5)
45-54	64.1 (30.0)	63.2 (36.8)	56.8 (28.1)	62.1 (20.9)	56.5 (20.3)	71.1 (20.9)	68.1 (36.1)	62.7 (20.1)
≥ 55	53.5 (24.7)	53.8 (39.1)	58.8 (23.8)	58.5 (22.4)	57.3 (21.6)	67.8 (21.9)	67.7 (41.2)	69.6 (22.3)
Total	69.8 (26.4)	57.9 (35.2)	54.6 (26.3)	64.6 (17.4)	55.7 (18.8)	65.9 (23.2)	55.1 (41.5)	60.8 (22.0)

PF = physical function; RP = role-physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role-emotional; MH = mental health. SD = standard deviation.

countries possible. They provide validated instruments to monitor population health, investigate outcomes in clinical practice and evaluate treatment effects. This study provided evidence that the SF-36 is a valid measure of population health status and quality of life in Jordan. Because data were collected using face-to-face interviews, there were no missing data and the problem of illiterate individuals was eliminated. The results of this study could be considered as normative data for the SF-36 health survey in northern Jordan and could be used for comparisons with specific populations in future studies.

In general, all psychometric tests of the SF-36 Arabic version showed satisfactory results. The reliability of the questionnaire as measured by the Cronbach alpha coefficient scales exceeded 0.70 for all 8 SF-36. Cronbach alpha ranged from 0.71 for VT and GH to 0.90 for PF. Cronbach alpha for the RP and RE scales was lower and the value for the MH scale exceeded those reported in studies in Lebanon [13], Turkey [19], Islamic Republic of Iran [20] and USA [16]; values for other scales were similar to those studies. All items passed the tests for item internal consistency and item discriminant validity.

SF-36 scale scores of quality of life were lower in Jordan compared with the norms of the USA [16], Greece [21], Australia [22], Taiwan [23] and Lebanon [16]. Canadian scores [1] for the 8 scales of the SF-36 were similar to those reported in the USA [15] and the UK [24]. However, differences in standard deviations across some scales should be considered in the interpretation of the norms and in making comparisons across scales.

The results of the current study indicate that many dimensions of the SF-36 depended on age, sex, education level, number of family members and marital status. Only the PF, GH and RE scales were significantly associated with age, while sex was associated with the PF and RE scales only. In this study, men scored higher than women on the RE subscale, while women scored higher on the PF subscale. However, most previous studies

Table 4 Mean scores for the subscales of the short form 36 health survey (SF-36, version 1.0) in north Jordan according to sociodemographic characteristics

Variable	Mean (SD) scores on subscales:							
	PF	RP	BP	GH	VT	SF	RE	MH
Age (years)								
18-24	73.3 (30.2)	62.6 (30.0)	61.5 (27.0)	67.4 (17.3)	58.7 (18.4)	65.3 (23.6)	53.0 (38.6)	58.5 (24.1)
25-34	68.7 (28.4)	60.6 (34.9)	57.6 (26.9)	65.7 (18.4)	56.2 (18.7)	63.2 (22.4)	52.6 (41.8)	61.6 (20.4)
35-44	w64.2 (26.2)	62.2 (35.3)	52.9 (25.2)	63.3 (16.8)	52.3 (20.1)	67.7 (21.5)	64.2 (39.4)	60.2 (22.3)
45-54	64.4 (27.9)	59.3 (37.0)	54.0 (28.2)	61.4 (19.5)	55.3 (20.2)	70.2 (21.0)	63.9 (38.4)	61.2 (21.8)
≥ 55	52.8 (25.3)	51.3 (39.2)	55.2 (24.7)	57.4 (21.2)	57.6 (20.8)	68.1 (21.4)	66.7 (42.0)	69.5 (21.8)
<i>P</i> -value	0.010	0.459	0.126	0.018	0.145	0.145	0.025	0.112
Sex								
Male	64.3 (29.4)	62.1 (34.5)	57.6 (27.0)	63.6 (19.2)	55.8 (20.0)	66.8 (21.5)	61.1 (39.2)	61.4 (22.2)
Female	69.8 (26.4)	57.9 (35.2)	54.6 (26.3)	64.6 (17.4)	55.7 (18.8)	65.9 (23.2)	55.1 (41.5)	60.8 (22.0)
<i>P</i> -value	0.013	0.875	0.278	0.108	0.313	0.051	0.040	0.977
Education level								
≤ High school	58.2 (28.9)	54.2 (34.5)	51.4 (26.4)	60.4 (17.5)	53.4 (18.6)	65.2 (20.1)	60.8 (39.0)	59.3 (21.8)
> High school	73.2 (26.0)	65.5 (34.3)	60.4 (26.4)	66.9 (18.8)	57.6 (20.0)	67.5 (23.7)	57.0 (41.2)	62.7 (22.3)
<i>P</i> -value	0.005	0.824	0.214	0.424	0.219	0.002	0.054	0.932
Family income								
≤ 350	62.8 (28.3)	56.6 (35.1)	51.7 (26.0)	62.1 (18.9)	54.1 (19.9)	65.5 (21.6)	60.6 (40.5)	59.1 (22.8)
> 350	70.5 (27.9)	64.5 (34.1)	61.4 (26.6)	66.1 (17.9)	57.5 (19.0)	67.4 (22.8)	56.7 (40.0)	63.4 (21.2)
<i>P</i> -value	0.472	0.692	0.112	0.393	0.559	0.483	0.848	0.299
Family size								
≤ 5	69.9 (26.0)	60.6 (35.5)	57.4 (26.7)	63.5 (19.2)	55.0 (20.8)	64.9 (23.1)	60.0 (40.4)	60.8 (22.3)
> 5	64.3 (29.6)	60.2 (34.3)	55.6 (26.7)	64.3 (18.0)	56.2 (18.6)	67.5 (21.5)	57.6 (40.2)	61.3 (22.1)
<i>P</i> -value	0.001	0.449	0.868	0.449	0.145	0.421	0.918	0.597
Marital status								
Single	71.7 (29.7)	65.2 (31.4)	61.3 (26.2)	67.4 (17.2)	59.4 (18.0)	64.9 (23.8)	54.1 (39.4)	60.1 (22.9)
Married	63.8 (27.2)	57.9 (36.3)	53.8 (26.7)	62.2 (18.9)	53.8 (28.7)	67.3 (21.2)	61.2 (40.5)	61.7 (21.7)
<i>P</i> -value	0.207	0.001	0.681	0.372	0.127	0.062	0.727	0.242
Insurance status								
Insured	68.5 (28.1)	63.1 (34.2)	58.9 (26.2)	65.1 (18.6)	56.4 (19.7)	67.4 (22.8)	58.9 (40.4)	61.4 (22.3)
Not insured	60.2 (28.2)	51.8 (35.5)	48.6 (27.0)	60.7 (17.9)	53.5 (18.8)	63.3 (20.0)	58.3 (39.9)	60.5 (21.8)
<i>P</i> -value	0.596	0.718	0.579	0.974	0.630	0.058	0.784	0.631

PF = physical function; RP = role-physical; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role-emotional; MH = mental health.
SD = standard deviation.

have shown that males had better health than females [1,16,20–22,24,25]. The quality of life of Lebanese women was poorer than men [16], and Canadian men scored substantially higher than women on all scales of the SF-36 [1]. In the USA data showed that men scored higher than women on all the domains of the SF-36 health survey [15]. In the UK, men scored higher than women on all but the GH domain [24].

For men, the mean scores of PF, RP, BP and GH decreased with increasing age. The same pattern was seen for the PF and GH scales among women. The mean score of RE increased with increasing age among women. Scores on other scales varied according to age among men and women without any apparent trend. In other studies older people reported more satisfaction with some domains of life than younger people, except for physical function [2,13,26]. The age effects in an Australian survey were also consistent with expectations; while those in the older age groups reported poorer levels of health across most SF-36 scales, the decline was most pronounced in the measures related to physical health (physical health, bodily pain) [22]. Moreover, age was an important health

status factor in a Greek population and it affected physical health relatively more than mental health [21]. The young age groups in Lebanon too had better quality of life than the older ages [16]. Older respondents in the USA and UK scored substantially lower than their younger counterparts, particularly across the first 4 scales, which are the most sensitive to differences in physical functioning and well-being (PF, RP, BP and GH scales). For the younger age groups, virtually identical profiles of scores across the 2 countries were apparent for 7 of the 8 scales [15,24]. Younger aged respondents in the UK reported higher levels of social functioning. Elderly respondents in the UK scored higher than elderly respondents in the USA on 5 of 8 scales (RP, BP, GH, SF and RE). Differences between countries were much smaller for the PF, VT and MH scales. Studies in the USA, Greece, Australia and Lebanon reported higher mean scores for younger people than older people on the physical domains. Old people tend to have higher rates of chronic disease and disability than young people, and young people tend to have less stable emotional feelings and lower mental ability [16].

We found that single people had a significantly higher RP score than married people. Studies in Jordan, Lebanon and Greece found that single respondents scored higher mean SF-36 scores than their married counterparts. In our study, a higher level of education was significantly associated with increased PF and SF scores and family size ≤ 5 members was significantly associated with increased PF scores. These findings are in agreement with the findings of other studies that showed the impact of socioeconomic status on the perceived quality of life and that there was some tendency for those who had the most educational qualifications to have higher self-reported health status on at least some of the scales [21].

In conclusion, the SF-36 is a valid and reliable instrument to measure quality of life among the population of the north of Jordan and could be used for monitoring the quality of life of Jordanians. The results of this study can be considered as normative data for north Jordanians for the SF-36 health survey and are suitable for use for comparisons with specific populations in future studies.

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Maternal, child and adolescent mental health: challenges and strategic directions for the Eastern Mediterranean Region

Maternal, child and adolescent mental disorders constitute a public health problem. The estimated prevalence of 15%-36% for maternal mental disorders and 10%-36% for child and adolescent mental disorders in the WHO Eastern Mediterranean Region is significantly higher than the estimates for developed countries. Mental disorders among mothers, children and adolescents are inextricably linked, at the causal as well as at the intervention level, making it imperative to address the issue in an integrated manner. *Maternal, child and adolescent mental health: challenges and strategic directions for the Eastern Mediterranean Region* provides an overview of the situation globally and regionally, identifies the major challenges and suggests strategic directions and actions to promote maternal, child and adolescent mental health in the Region.

The publication is aimed at policy-makers, health system managers, mental health professionals and others interested in mental health in general, and maternal, child and adolescent mental health issues in particular.

The full text of this publication is available at: <http://www.emro.who.int/dsaf/dsa1214.pdf>