

Alberta-based SF-12 summary scores

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OBJECTIVE The purpose of this paper is to summarise the population-based health status scores of adult Albertans on the SF-12 physical (PCS-12) and mental (MCS-12) component summary scales. **METHOD** Data was collected via a survey instrument mailed to 4,200 subjects in Alberta. The instrument contained the EuroQol (EQ-5D) and SF-12 health surveys, with additional questions eliciting clinical and demographic information from the respondents. PCS-12 and MCS-12 scores were calculated and summarised by demographic and clinical characteristics of the respondents. **RESULTS** Completed questionnaires were returned by 1,555 respondents; 600 questionnaires were returned undeliverable giving an overall, usable response rate of 43%. Due to missing data for items, SF-12 summary scores were calculated for 1,380 respondents. Analysis of the SF-12 composite scores by demographic variables showed significant differences among categories of age, gender, marital status, main activity/employment, education and income level. Significant differences were found between the composite scores of respondents with no medical conditions when compared to those who reported one or more chronic medical conditions. **CONCLUSIONS** The Alberta-based MCS-12 and PCS-12 scores reflected a similar trend for gender and age as the general US population, with males scoring slightly higher than females on both composite summaries, and both composite scores decreased with increasing age.

Η κλίμακα SF-12 της Alberta

Περίληψη στο τέλος του άρθρου

Key words

Health-related quality of life
Population health
SF-12

The measurement of health-related quality of life (HRQoL) is becoming an increasingly common activity of health care systems around the world. These HRQoL measurements are undertaken for a variety of reasons, including as outcome measures of specific clinical interventions as well as population health status indicators.¹ HRQoL measurements have taken on many forms, with a variety of instruments having been developed based on a wide array of intentions of the measurement, underlying theory, and background and experience of the developers. A broad classification of HRQoL instrumen-

ts identifies measures as profiles or preference-based index measures.² Both forms have inherent strengths and weaknesses.^{2,3} In contrast to preference-based index measures, profile measures provide information on any number of sub-classifications, or dimensions, of HRQoL. The dimensions are not preference weighted and are not combined, thus leaving an array of scores to be interpreted.

Perhaps the most commonly used health status profile measure is the Medical Outcomes Study Short Form 36-item Health Survey (SF-36).⁴ An abbreviated version of the SF-36 was recently introduced which contains only 12 items (SF-12 Health Survey).^{5,6} Scores produced by this shorter version closely reflect scores from the 36-item version, although they have less precision.⁵ However, the trade-off between reduced respondent burden

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and precision in measurement may be worthwhile for population surveys, and increased use of the SF-12 is expected.⁷

The SF-12 estimates scores for four of the eight health dimensions (physical functioning, role-physical, role-emotional, and mental health) using two items each. The remaining four health dimensions (pain, vitality, social functioning, and general health) are each represented by a single item. The SF-12 can be used to create an eight-dimension profile, which approximates to a SF-36 profile, although each score is estimated with less precision.^{5,6} Similarly, summary composite scores for physical and mental health status derived from the SF-12, referred to as the PCS-12 and the MCS-12, respectively, closely represent the summary scores of the SF-368. Correlations between scores from the 12-item and 36-item versions range from 0.93 to 0.97 in empirical cross-validation studies.⁶

Scores achieved on the PCS-12 and the MCS-12 are less reliable than the SF-36 based summary scores as they are based on fewer items and fewer defined levels of health. However, given that the confidence intervals for group averages are determined more by sample size, the trade-off between the reduced respondent burden (approximately 2–3 minutes to complete) and the precision in measurement may be worthwhile for large group studies of general populations.⁶

This report is intended as a resource for researchers and clinicians interested in the health status scores of Albertans on the SF-12 physical and mental component summary scales. These results were obtained as part of a larger, ongoing study which focuses on the measurement of HRQoL in an Alberta-based population.

MATERIAL AND METHOD

Sample frame

Sample frame generation, survey mailing, data entry and verification were performed by the Population Research Laboratory at the University of Alberta. The sample frame was drawn to provide a general sample of the adult Alberta population. An initial sampling frame of addresses was selected from a computerised database of residential listings based on telephone directories that contain current up-to-date information on names, addresses, postal codes and telephone numbers throughout the province. The database was deemed suitable for a mail survey project design, as it identifies an estimated 97% of households with potential subjects over the age of 18 years. A random sample of 4,200 subjects was drawn from the listings using a statistical software package (SPSS for Windows).

Data collection

Data for the health status measurements was collected using a mail survey design. Two HRQoL instruments, the SF-12^{5,6} and the EuroQol EQ-5D9 were combined into one standardised questionnaire. In addition to health status, demographic and clinical data were among the information collected. The survey instrument was distributed in June 1997. In order to maximize the response rate, a follow-up reminder postcard was mailed two weeks after the initial survey packet distribution. A second questionnaire was mailed to non-responders three weeks after the first mailing. A five digit number coding scheme was used to identify the collection wave of the questionnaire and for respondent identification. In addition to multiple mailings, a cash prize incentive was offered.

Data analysis

Scoring for the PCS-12 and MCS-12 of the SF-12 Health Survey was performed using the SAS scoring program provided by Ware and colleagues (1995). PCS-12 and MCS-12 scores range from 0 to 100, with greater scores representing better health.⁶ Both the PCS-12 and MCS-12 scales are transformed into T-scores, normalised for the general US population. The score for an individual or mean score for a group of patients is thus reported relative to a mean of 50.0 and a standard deviation of 10.0 in the general US population. Consequently, the SF-12 scores for an Alberta-based population presented in this document are relative to the general US population.

As is customary, the construct validity of the SF-12 composite scores for this sample was evaluated by testing several hypothesised relationships between summary scores and demographic and clinical variables.¹⁰ First, an inverse relationship would be expected between age and the functional health status of individuals.⁵ Second, there is evidence of higher reported psychological distress among females.¹¹ Third, respondents with higher levels of education and household income have been found to report better health.¹¹ Fourth, patients with significant chronic health problems report poorer health status than subjects without. The composite SF-12 scores are considered to be interval level data, so parametric tests were used (i.e., Pearson correlations and one-way ANOVA). Only univariate relationships were considered in these analyses. All analyses were performed using SPSS for Windows, Release 7.5.1.

RESULTS

Respondent sample

A total of 1,555 questionnaires were returned out of a total sampling frame of 4,200. Six hundred survey packets were returned undeliverable, providing an adjusted response rate of 43%. Of the 1,555 respondents, 37 did not meet the age inclusion criteria because they were under the age of 18 years, resulting in 1,518 usable

questionnaires. Due to missing data on the SF-12 items, PCS-12 and MCS-12 scores could be determined for only 1,380 respondents.

The sample was predominantly male, Caucasian, married or in a partnership, and engaged in full-time employment (tabl. 1). The mean (\pm SD) age of the respondent sample was 52.1 (16.1) years of age. Respondents were asked to indicate if they had any chronic medical conditions from a selected list (tabl. 2). The prevalence of these chronic medical conditions reflects known rates in the general population (e.g., diabetes 5–6%, asthma 7–10%).

For the 138 respondents for whom PCS-12 and MCS-12 scores could not be determined due to missing data, demographic characteristics were compared with the 1,380 respondents with complete data (tabl. 1). The respondents with insufficient data to calculate SF-12 composite scores were significantly older than the usable respondent questionnaires (67.6 vs 52.1 years). The unusable questionnaires had a greater proportion of respondents who were retired, widowed, had received less than high school education, and were in lower household income strata.

Due to the gender and age distribution in the respondent sample, the PCS-12 and MCS-12 scores were calculated for gender and age strata that correspond to the summary scores for the US population.⁵

SF-12 composite scores

Mean (\pm SD) PCS-12 and MCS-12 scores for the entire sample were 47.6 (\pm 10.6) and 51.5 (\pm 9.3), respectively (tabl. 3). The distributions of both composite scores were somewhat skewed (figures 1, 2), with the median scores being greater than the mean scores, at 51.7 and 55.0 for PCS-12 and MCS-12, respectively. Male respondents had significantly higher scores for both the PCS-12 and MCS-12 when compared to female respondents (tables 4, 5).

Tables 6 to 11 show that PCS-12 and MCS-12 mean scores were slightly higher for males than females in all age groups. As expected, physical functioning scores decreased with increasing age. However, the MCS-12 scores were relatively consistent across the ages. Variability among individuals in each age-derived stratum appeared to increase with age for the PCS-12 score, but not for MCS-12 scores. PCS-12 scores were negatively correlated with age ($r=-0.46$; $P<0.001$). MCS-12 scores were also significantly correlated with age, but in a pos-

Table 1. SF-12 questionnaire-respondent characteristics (N=1,380).

Characteristics	Respondents
<i>Mean age (years, SD)</i>	52.1 (16.1)
<i>Gender (n, %)</i>	
Female	455 (33.0)
Male	924 (67.0)
<i>Marital status (n, %)</i>	
Married/partnership	982 (71.2)
Widowed	132 (9.6)
Divorced/separated	119 (8.6)
Single	131 (9.5)
Missing	16 (1.2)
<i>Race/ethnicity (n, %)</i>	
Caucasian	1,167 (84.6)
Asian/Oriental	42 (3.0)
East Indian	12 (0.9)
Black	5 (0.4)
Native Indian	7 (0.5)
Other	120 (8.7)
Missing	27 (0.2)
<i>Education (n, %)</i>	
Less than high school	251 (18.2)
High school graduate	252 (18.3)
Some college/technical school	229 (16.6)
College degree/technical diploma	222 (16.1)
Some university	112 (8.1)
University degree	192 (13.9)
Graduate school	101 (7.3)
Missing	21 (1.5)
<i>Main activity (n, %)</i>	
Working at a job/business	813 (58.9)
Looking for work	26 (1.9)
Keeping house	67 (4.9)
Student	21 (1.5)
Unemployed/disability	37 (2.7)
Retired	352 (25.5)
Missing	64 (4.6)
<i>Income (household) (n, %)</i>	
Under \$10,000	72 (5.2)
\$10,000–\$29,999	359 (26.0)
\$30,000–\$49,999	349 (25.3)
\$50,000–\$69,999	282 (20.4)
\$70,000 and above	260 (18.8)
Missing	58 (4.2)

itive direction ($r=0.07$; $P=0.01$). However, this relationship was very weak and statistical significance is due to the large sample size.

When compared to the population norms for the US, adult Albertans in this respondent sample reported lower physical health and higher mental health. The lower PCS-

Table 2. Study sample characteristics—prevalence of chronic conditions.

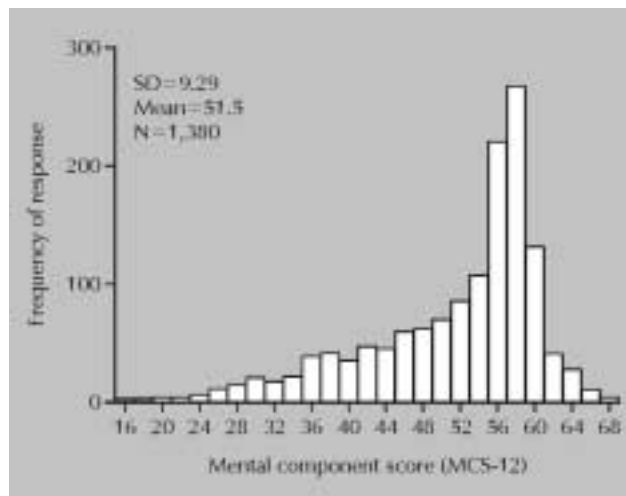
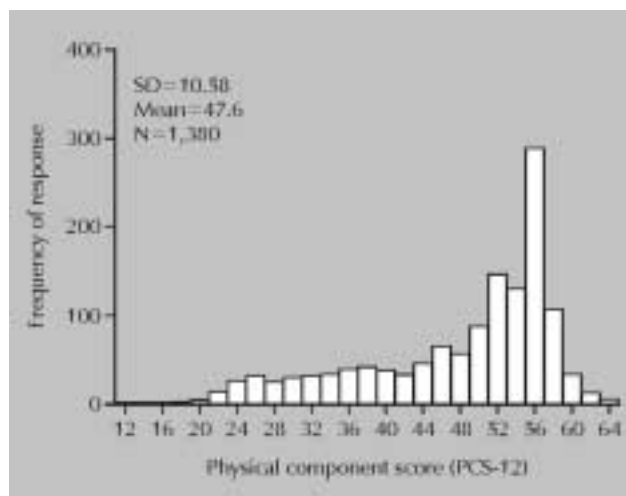
Condition	N (%)
Arthritis/Rheumatism	389 (28.9)
Asthma	95 (7.2)
Cancer	52 (4.0)
Emphysema/bronchitis	66 (5.0)
Felt depressed	
All of the time	10 (0.7)
Most of the time	47 (3.4)
Some of the time	202 (14.6)
A little of the time	536 (39.3)
None of the time	568 (41.7)
Diabetes	79 (6.0)
Glaucoma	23 (1.8)
Stomach or intestinal ulcers	108 (8.2)
High blood pressure	252 (19.0)
Heart disease	120 (9.1)
Epilepsy	8 (0.6)
No medical problem	694 (49.4)

Table 3. Norms for the general Alberta population.

Total sample (N=1,380)	PCS-12	MCS-12
Mean	47.63	51.48
25th percentile	40.92	46.42
50th percentile	51.70	55.04
75th percentile	55.63	57.89
Standard deviation	10.58	9.29
Range	13–65	15–69

12 scores in the Alberta sample may be the result of a generally older population in this respondent sample, compared to the general US population normal scores. Male and female respondents had mean PCS-12 scores that were lower than the general US population norms. Males respondents had higher MCS-12 scores than the general US population, but female respondents were approximately the same. When the Alberta sample was stratified by age, the age groups continued to display slightly lower PCS-12 and higher MCS-12 scores in comparison to the general US population based norms.

Significant differences were observed in both composite scores across the distributions of the demographic variables (tabl. 12). Higher PCS-12 scores were associated with having a higher level of education, being active in school or work, and having a higher income. Factors associated with lower PCS-12 scores appeared to be: being widowed, a lower level of education, unemployment due to disability, and a lower income. It is highly likely

**Figure 1.** Distribution of mental component score (MCS-12).**Figure 2.** Distribution of physical component score (PCS-12).

that the association between SF-12 scores and marital status is confounded by age. Likewise, the relationship with household income may be confounded by employment status.

Lower MCS-12 scores were associated with a lower income, lack of employment, being single, and belonging to the youngest adult age category. MCS-12 scores were greater for adults above the age of 24. Educational level did not demonstrate any significant impact on MCS-12 scores. Again, these univariate relationships may be confounded by other demographic factors.

SF-12 summary scores were also summarized by self-reported presence of any of the selected chronic conditions (tabl. 13). Respondents not reporting any of the

Table 4. Norms for the general Alberta population, males.

Total sample (N=924)	PCS-12	MCS-12
Mean	48.06	52.13
25th percentile	41.69	47.91
50th percentile	51.90	55.59
75th percentile	55.50	57.89
Standard deviation	10.27	8.84
Range	14–64	15–68

Table 5. Norms for the general Alberta population, females.

Total sample (N=455)	PCS-12	MCS-12
Mean	46.78	50.15
25th percentile	38.47	43.39
50th percentile	50.68	53.21
75th percentile	55.78	57.89
Standard deviation	11.15	10.04
Range	13–65	19–69

Table 6. Norms for the general Alberta population, age 18–34 years.

Total sample (N=184)	PCS-12	MCS-12
Mean	52.70	50.45
25th percentile	50.66	46.59
50th percentile	55.19	53.72
75th percentile	56.68	56.11
Standard deviation	6.78	9.30
Range	24–64	15–63

Norms for the general Alberta population, age 18–34 years, males.

Total sample (N=99)	PCS-12	MCS-12
Mean	52.82	51.16
25th percentile	51.39	47.05
50th percentile	55.48	53.89
75th percentile	56.61	57.10
Standard deviation	6.74	9.01
Range	24–62	15–63

Norms for the general Alberta population, age 18–34 years, females.

Total sample (N=85)	PCS-12	MCS-12
Mean	52.56	49.63
25th percentile	48.76	44.68
50th percentile	54.64	52.99
75th percentile	56.86	55.98
Standard deviation	6.85	9.62
Range	28–64	21–62

selected chronic conditions had PCS-12 and MCS-12 scores significantly higher than respondents with one or more chronic medical condition. The difference between those with and those without chronic medical conditions

Table 7. Norms for the general Alberta population, age 35–44 years.

Total sample (N=317)	PCS-12	MCS-12
Mean	50.70	50.68
25th percentile	47.76	45.99
50th percentile	53.30	54.73
75th percentile	56.09	57.83
Standard deviation	8.20	9.53
Range	22–65	17–63

Norms for the general Alberta population, age 35–44 years, males.

Total sample (N=212)	PCS-12	MCS-12
Mean	51.14	51.42
25th percentile	49.27	47.67
50th percentile	53.53	55.17
75th percentile	56.91	57.83
Standard deviation	7.68	8.94
Range	22–64	17–63

Norms for the general Alberta population, age 35–44 years, females.

Total sample (N=105)	PCS-12	MCS-12
Mean	49.84	49.17
25th percentile	45.73	44.17
50th percentile	52.95	52.99
75th percentile	56.28	57.84
Standard deviation	9.14	10.50
Range	73–65	19–63

was greater for the PCS-12 than the MCS-12 summary scores.

Table 14 was constructed with the intention of examining the impact of a single disease state on the mental and physical composite scores by excluding respondents with multiple comorbidities from the comparison to respondents with no reported medical condition. While a small sample size should be noted for several of the conditions, arthritis was the only disease state which demonstrated a significantly lower PCS-12 score from those without a chronic illness. Respondents with depression predictably demonstrated significantly lower MCS-12 scores, however, it is interesting to note that respondents with high blood pressure, arthritis, asthma, cancer, diabetes and stomach ulcers all possessed significantly higher MCS-12 scores than those with no medical problems.

DISCUSSION

The Alberta-based sample generally reflected the same relationships between respondent demographic characteristics and SF-12 composite scores as the general US population, although the scores differ slightly between Alberta and the US. The mean and quartile PCS-12

Table 8. Norms for the general Alberta population, age 45–54 years.

Total sample (N=310)	PCS-12	MCS-12
Mean	50.41	51.42
25th percentile	46.54	47.07
50th percentile	53.18	55.68
75th percentile	56.09	57.89
Standard deviation	8.81	9.49
Range	13–64	18–65

Norms for the general Alberta population, age 45–54 years, males.

Total sample (N=221)	PCS-12	MCS-12
Mean	50.91	51.99
25th percentile	47.23	48.18
50th percentile	53.43	55.87
75th percentile	56.37	57.89
Standard deviation	8.32	9.08
Range	22–64	18–65

Norms for the general Alberta population, age 45–54 years, females.

Total sample (N=89)	PCS-12	MCS-12
Mean	49.22	49.93
25th percentile	44.74	42.28
50th percentile	52.71	53.89
75th percentile	55.91	57.85
Standard deviation	9.93	10.38
Range	13–63	23–63

Table 9. Norms for the general Alberta population, age 55–64 years.

Total sample (N=223)	PCS-12	MCS-12
Mean	47.06	52.53
25th percentile	39.56	48.31
50th percentile	51.07	55.87
75th percentile	55.50	57.89
Standard deviation	10.46	8.54
Range	19–62	25–68

Norms for the general Alberta population, age 55–64 years, males.

Total sample (N=166)	PCS-12	MCS-12
Mean	47.00	52.67
25th percentile	39.55	48.21
50th percentile	51.03	55.87
75th percentile	55.50	57.89
Standard deviation	10.49	8.39
Range	22–62	26–68

Norms for the general Alberta population, age 55–64 years, females.

Total sample (N=57)	PCS-12	MCS-12
Mean	34.98	50.55
25th percentile	25.61	41.59
50th percentile	33.80	52.50
75th percentile	42.09	58.89
Standard deviation	11.09	10.20
Range	20–59	28–69

Table 10. Norms for the general Alberta population, age 65–74 years.

Total sample (N=203)	PCS-12	MCS-12
Mean	42.84	52.35
25th percentile	34.17	46.68
50th percentile	44.22	55.60
75th percentile	52.73	58.98
Standard deviation	11.04	8.93
Range	17–60	25–68

Norms for the general Alberta population, age 65–74 years, males.

Total sample (N=149)	PCS-12	MCS-12
Mean	43.36	52.94
25th percentile	34.50	48.06
50th percentile	45.82	55.93
75th percentile	53.01	58.83
Standard deviation	11.10	8.40
Range	17–60	17–63

Norms for the general Alberta population, age 65–74 years, females.

Total sample (N=54)	PCS-12	MCS-12
Mean	41.40	50.73
25th percentile	32.85	41.65
50th percentile	40.65	50.08
75th percentile	51.07	59.52
Standard deviation	10.85	10.14
Range	24–59	32–66

Table 11. Norms for the general Alberta population, age 75+ years.

Total sample (N=142)	PCS-12	MCS-12
Mean	35.88	51.88
25th percentile	26.83	44.32
50th percentile	34.66	54.16
75th percentile	43.22	59.51
Standard deviation	11.04	9.76
Range	14–61	28–69

Norms for the general Alberta population, age 75+ years, males.

Total sample (N=77)	PCS-12	MCS-12
Mean	36.63	53.00
25th percentile	27.22	47.08
50th percentile	35.80	51.16
75th percentile	44.56	60.74
Standard deviation	11.01	9.29
Range	14–61	29–66

Norms for the general Alberta population, age 75+ years, females.

Total sample (N=65)	PCS-12	MCS-12
Mean	34.98	50.55
25th percentile	25.61	41.59
50th percentile	33.80	52.50
75th percentile	42.09	58.89
Standard deviation	11.09	10.20
Range	20–59	28–69

Table 12. Summary of mean (\pm SD) SF-12 composite scores by demographic characteristics.

Variable	n	PCS-12	MCS-12
<i>Age</i>			
18–24	33	53.6 (6.1)	45.3 (12.2)
25–34	151	52.5 (6.9)	51.6 (8.2)
35–44	317	50.7 (8.2)	50.7 (9.5)
45–54	311	50.4 (8.8)	51.4 (9.5)
55–64	223	47.1 (10.5)	52.5 (8.5)
65–74	203	42.8 (11.0)	52.4 (8.9)
75 plus	142	35.9 (11.0) ^b	51.9 (9.8) ^b
<i>Gender</i>			
Male	924	48.1 (10.3)	52.1 (8.8)
Female	455	46.8 (11.2) ^a	50.2 (10.0) ^b
<i>Marital status</i>			
Married/partnership	982	48.4 (10.1)	52.2 (8.8)
Widowed	131	39.9 (11.7)	50.3 (10.0)
Divorced/separated	119	47.8 (10.6)	49.3 (10.6)
Single	132	49.3 (10.1) ^b	48.9 (10.0) ^b
<i>Race/ethnicity</i>			
Caucasian	1167	47.7 (10.5)	51.7 (9.2)
Asian/Oriental	42	51.3 (8.2)	52.2 (8.2)
East Indian	12	48.5 (10.8)	52.7 (9.8)
Black	5	42.5 (14.4)	53.0 (8.7)
Native Indian	7	51.3 (8.2)	50.8 (14.0)
Other	120	45.3 (11.3) ^a	49.1 (9.9)
<i>Education</i>			
Less than high school	251	41.8 (11.8)	50.4 (10.0)
High school graduate	252	47.4 (10.9)	51.7 (9.7)
Some college/technical school	229	49.1 (9.4)	51.1 (9.6)
College degree/technical diploma	222	48.8 (9.7)	51.5 (8.8)
Some university	112	48.3 (9.7)	51.4 (10.2)
University degree	192	50.4 (9.2)	52.4 (7.9)
Graduate school	101	50.3 (9.4) ^b	52.8 (7.9)
<i>Main activity</i>			
Working at a job/business	813	51.2 (7.8)	52.3 (8.5)
Looking for work	26	48.3 (10.3)	40.5 (12.0)
Keeping house	67	45.9 (11.0)	49.8 (9.2)
Student	21	53.4 (6.8)	49.0 (9.7)
Unemployed/disability	37	29.7 (6.4)	41.1 (11.8)
Retired	352	41.4 (41.4) ^b	52.4 (9.1) ^b
<i>Income (household)</i>			
Under \$10,000	72	42.1 (12.6)	44.5 (11.4)
\$10,000–\$29,999	359	43.2 (11.8)	49.8 (10.2)
\$30,000–\$49,999	349	48.2 (9.7)	51.8 (9.3)
\$50,000–\$69,999	282	50.1 (8.9)	52.5 (8.0)
\$70,000 and above	260	51.9 (7.9) ^b	53.7 (7.3) ^b

a: ANOVA, $P < 0.05$; b: ANOVA, $P < 0.01$

Table 13. Mean (\pm SD) SF-12 composite score by presence of reported chronic condition.

Condition	n	PCS-12	MCS-12
Arthritis/Rheumatism	389	39.9 (11.3)	50.9 (10.3)
Asthma	95	43.2 (11.8)	49.8 (10.5)
Cancer	52	40.9 (11.8)	49.2 (10.2)
Emphysema/bronchitis	66	37.3 (11.8)	48.0 (10.6)
Felt depressed			
All of the time	10	46.1 (9.5)	29.4 (11.6)
Most of the time	47	44.5 (12.7)	32.1 (8.9)
Some of the time	202	44.6 (12.4)	41.3 (8.2)
A little of the time	536	47.0 (10.7)	51.6 (7.0)
None of the time	568	49.6 (9.2)	57.0 (4.7)
Diabetes	79	38.2 (10.6)	49.6 (10.4)
Glaucoma	23	37.2 (11.6)	48.0 (9.5)
Stomach or intestinal ulcers	108	41.6 (11.8)	46.8 (11.2)
High blood pressure	252	40.7 (11.6)	50.3 (10.0)
Heart disease	120	35.1 (10.4)	48.5 (11.0)
Epilepsy	8	38.9 (11.5)	48.6 (11.6)
≥ 1 chronic conditions	686	42.7 (11.4)	50.4 (10.1)
No medical problem	694	52.5 (6.9)	52.6 (8.2)

PCS-12 and MCS-12 mean scores for those reporting no medical problem were significantly higher than for every category of respondents who reported having one or more conditions

Note that respondents may have more than one comorbid chronic medical condition

Table 14. SF-12 composite scores for respondents with a single disease state compared to respondents with no reported medical conditions.

Condition	n	PCS-12	MCS-12
Arthritis/Rheumatism	65	46.4 (10.1)	57.1 (5.3)
Asthma	13	49.6 (8.5)	55.9 (4.6)*
Cancer	5	47.6 (9.9)	57.4 (4.1)*
Felt depressed	363	51.9 (7.9)	48.7 (9.4)*
Diabetes	7	51.1 (4.3)	58.2 (1.3)*
Stomach or intestinal ulcers	8	54.0 (3.0)	57.5 (2.5)*
High blood pressure	29	51.5 (7.7)	56.7 (4.4)*
Heart disease	11	45.7 (13.0)	54.7 (8.2)
No medical problem	694	52.5 (6.9)	52.6 (8.2)

* $P < 0.01$, when compared to respondents reporting no chronic medical conditions

scores are lower for the Alberta population, while mean and quartile MCS-12 scores are higher. This may be partially explained by distribution of respondents by age, as the US survey elicited more responses from the youngest adult age category of 18–34 years, the age group which scores highest on the PCS-12, whereas the Alberta survey received proportionately fewer responses from this age category. The age distribution of respondents may be partially responsible for the higher MCS-12 scores of the Alberta sample.

However, when the SF-12 composite scores are stratified by age, the PCS-12 scores continue to be slightly

lower and MCS-12 slightly higher for Albertans compared to the general US population. Although the US based norms stratified by age were not further subdivided by gender, that sample was known to consist of more females than males. The Alberta sample consisted of more males than females. Since males in both the US and Alberta samples had significantly higher MCS-12 and PCS-12 scores than females, the disparity between US and Albertan PCS-12 scores would have been even greater relative to the US-based norms while making the MCS-12 scores more comparable if the same proportion of males and females had responded

to the survey. Thus, the finding that Albertans had lower PCS-12 appears to represent a real difference in reported health status between Albertans and the general US population, while higher MCS-12 scores in Alberta may be the result of a larger proportion of male respondents.

Several interesting trends were noted in the data. MCS-12 scores were significantly lower for the youngest age stratum, age 18 to 24 years (tabl. 12). When the age groups of 18–24 years and 25–34 years are collapsed, this difference becomes undetectable. The US population based norms reported the age groups together, so we could not determine whether this phenomenon was similarly reported in the US. However, a recent publication of Canadian normative data for the SF-36 stratified by age also reported mental component scale summary scores that were lower among the younger age groups,¹² similar to the findings of this study. Furthermore, it appears that the lower scores are not a consequence of the assumptions and methods used to calculate summary scores—orthogonal factor rotation and negative scoring coefficients,¹³ because the domain scores for mental health in the Canadian normative data are also lower in the younger age stratum, especially among females.¹² The observation that two independent population-based Canadian studies have found a trend towards poorer mental health among the younger age groups is disconcerting. It was not anticipated in this study and may warrant further investigation.

Another interesting finding was that a number of single disease states were associated with a significantly

higher MCS-12 score than for respondents who reported no medical problems. Interpretation of this finding is conjectural, but a possible explanation may be that people who suffer from a chronic medical condition have a greater appreciation for their mental health, tending not to report their mental health as pessimistically as those without a chronic condition.

In conclusion, while the respondent sample obtained in the study was predominantly white and male, the size of the sample allowed for adequate stratification to provide a reliable representation of the Alberta population. The scores for the SF-12 summary measures appeared to “behave” in an expected fashion, that is, generally recognised relationships between health status and demographic and clinical variables were observed in the respondent sample. This information provides further support for the use of the SF-12 as a discriminative measure of health status in the general population.

The summary of these stratifications provides benchmarks for clinicians and researchers interested in using the SF-12 instrument for HRQoL measurement. This paper has been prepared with the intention of assisting researchers who are interested in using the SF-12 to measure HRQoL. A similar approach to assessing population-based norms for the SF-12 could be employed by Greek researchers, as a means of providing further evidence of the validity of the SF-12 as a discriminative measure. In addition, this paper could serve as a basis for comparing Alberta-based SF-12 norms to scores elicited from a Greek population.

ΠΕΡΙΛΗΨΗ

Η κλίμακα SF-12 της Alberta

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ΣΚΟΠΟΣ Σκοπός της έρευνας αυτής είναι η παρουσίαση των αποτελεσμάτων μέτρησης της υγείας γενικού πληθυσμού ενήλικων στην κλίμακα SF-12 και στις παραμέτρους της σωματικής διάστασης PCS-12 και της ψυχολογικής διάστασης MCS-12. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Τα δεδομένα συλλέχθηκαν με τη βοήθεια ερωτηματολογίων που ταχυδρομήθηκαν σε 4.200 νοικοκυριά στην Alberta. Το ερωτηματολόγιο περιελάμβανε τις ερωτήσεις των ερωτηματολογίων υγείας EQ-5D και SF-12, καθώς και επιπρόσθετες ερωτήσεις για κλινικά και δημογραφικά δεδομένα. Οι παράμετροι PCS-12 και MCS-12 υπολογίστηκαν και συνοψίστηκαν με βάση τα δημογραφικά και κλινικά χαρακτηριστικά των ερωτηθέντων. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Συνολικά, επέστρεψαν με το ταχυδρομείο 1.555 συμπληρωμένα ερωτηματολόγια. Λαμβάνοντας υπόψη ότι 600 ερωτηματολόγια επέστρεψαν από το ταχυδρομείο χωρίς να έχουν διανεμηθεί, το συνολικό ποσοστό ανταποκρισιμότητας ανήλθε στο 43%. Λόγω ελλείψεων

σε ορισμένα ερωτηματολόγια, τα αποτελέσματα του SF-12 τελικά υπολογίστηκαν με βάση 1.380 απαντήσαντες. Η ανάλυση των αποτελεσμάτων του SF-12 σε σχέση με τις δημογραφικές μεταβλητές έδειξε στατιστικά σημαντικές διαφορές ανά κατηγορία ηλικίας, φύλου, οικογενειακής κατάστασης, κύριας δραστηριότητας, εκπαίδευσης και εισοδήματος. Σημαντικές διαφορές βρέθηκαν επίσης μεταξύ των ατόμων χωρίς προβλήματα υγείας και των ατόμων που ανέφεραν ένα ή περισσότερα χρόνια προβλήματα υγείας. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Τα αποτελέσματα των MCS-12 και PCS-12 για την Alberta παρουσίασαν παρόμοιες τάσεις με το γενικό πληθυσμό των ΗΠΑ σε σχέση με το φύλο και την ηλικία. Οι άνδρες είχαν υψηλότερη βαθμολογία από τις γυναίκες και στις δύο διαστάσεις, με προοδευτική μείωση της βαθμολογίας σε σχέση με την αύξηση της ηλικίας.

Λέξεις ευρετηρίου: SF-12, Υγεία πληθυσμού, Υγεία σε σχέση με την ποιότητα ζωής

References

- GOLD M, FRANKS P, ERICKSON P. Assessing the health of the nation: The predictive validity of a preference-based measure and self-rated health. *Med Care* 1996, 34:163–177
- GUYATT GH, FEENY DH, PATRICK DL. Measuring health-related quality of life. *Ann Intern Med* 1993, 118:622–629
- MACKELIGAN LD, PATHAK DS. Overview of health-related quality of life measures. *Am J Hosp Pharm* 1992, 49:2236–2245
- WARE JE Jr, SHERBOURNE CD. The MOS 36-item Short-Form Health Survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992, 30:473–483
- WARE JE, KOSINSKI M, KELLER SD. *SF-12: How to Score the SF-12 Physical and Mental Health Summary Scales*. Boston, MA. The Health Institute, New England Medical Center, 1995
- WARE JE, KOSINSKI M, KELLER SD. A 12-item short-form health survey: Construction of scales and preliminary test of reliability and validity. *Med Care* 1996, 4:220–226
- WARE JE, KOSINSKI M, KELLER SD. SF-12: An even shorter health survey. *Med Outcomes Trust Bull* 1996, 4:2
- WARE JE, KOSINSKI M, KELLER SD. *SF-36 Physical and Mental Health Summary Scales: A User's Manual*. Boston, MA. The Health Institute, New England Medical Center, 1994
- KIND P. The EuroQol Instrument: An index of health-related quality of life. In: Silker B (ed) *Quality of Life and Pharmacoeconomics in Clinical Trials*. 2nd ed. Philadelphia, PA, Lippincott-Raven, 1996:191–201
- HAYS RD, ANDERSON R, REVICKI D. Psychometric considerations in evaluating health-related quality of life. *Qual Life Res* 1993, 2:441–449
- BRAZIER J, JONES N, KIND P. Testing the validity of the EuroQol and comparing it with the SF-36 health survey questionnaire. *Qual Life Res* 1993, 2:169–180
- HOPMAN WM, TOWHEED T, ANASTASSIADES T, TENENHOUSE A, POLIQUIN S. Canadian normative data for the SF-36 health survey. *CMAJ* 2000, 163:265–271
- SIMON GE, REVICKI DA, GROTHAUS L, VONKORFF M. SF-36 Summary Scores: are physical and mental health truly distinct? *Med Care* 1998, 36:567–572

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