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Population based norming of the Chinese (HK) version of the SF-36 health survey

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Summary

Objective: The aim of this study was to establish normative values of the SF-36 Health Survey of the Chinese adult population in Hong Kong so that local references for meaningful interpretation of health-related quality of life (HRQOL) measurements would be available.

Design: A cross-sectional telephone survey

Subject: Chinese adults aged 18 years or above randomly selected from the general population in Hong Kong.

Main outcome measures: The Chinese (HK) SF-36 Health survey and demographic variables. The normative values of the SF-36 of the general population and different age/sex groups.

Results: 2410 subjects completed the survey. The SF-36 scores on Physical Functioning, Role-physical, Bodily Pain and Social Functioning of the study sample were higher but the scores on General Health, Role-emotional and Mental Health were lower than those of the US norms. Age and gender had significant and substantial effects on the SF-36 scores. There was a social class gradient on the General Health, Vitality and Mental Health scores. Other demographic factors had little or no effects on the SF-36 scores.

Conclusion: The Chinese (HK) version of the SF-36 is, at present, the only HRQOL measure that has been both validated and normed on Chinese adults in Hong Kong.

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It can be used as a standard HRQOL instrument to measure the impact of illnesses and the effect of interventions on the quality of life of our Chinese population.

Keywords: Quality of life, SF-36, Chinese, Hong Kong, norm, health status

摘要

目的：建立香港成年華人「36 題簡明健康狀況調查表」(SF-36)的正常標準值，作為評估健康對生命質素影響的參照。

設計：橫切面式電話調查。

對象：隨機抽樣地接觸本地18歲及以上華人做電話調查。

測量內容：利用簡明健康狀況調查表（SF-36），研究整體人群和不同年齡、性別組的 SF-36 平均分數；深入分析年齡、性別、教育程度、婚姻狀況，職業對 SF-36 的結果影響。

結果：共有2410名人仕完成調查。香港人的體能、生理影響日常活動，身體痛楚，社交活動平均分數較美國人為高；但整體健康、心理影響日常活動、心理健康的平均分均低於美國人。年齡和性別對各 SF-36 分數均有重要影響。社會階層對整體健康、精力和心理健康平均分數有一定影響。

結論：香港簡明健康狀況調查表中文譯本適用本地成年華人，是目前唯一被確實並且有正常標準的健康對生活質(HRQOL)調查表，可以用以評估疾病對本地華人生活質素的影響。

主要詞彙：生活質素，三十六題調查表，本地華人，香港，標準，健康狀況

Introduction

There was gradual ageing of the population and change in disease pattern in Hong Kong over the last three decades.[1] Cancers, chronic diseases, behavioural

problems and functional disorders have become the most important health problems. These illnesses are often incurable but have significant impact on quality of life of the sufferers.[2-8] A major aim of care for these patients is to preserve or improve their quality of life. Health-related quality of life (HRQOL) is an important measure of the impact of chronic or disabling illnesses and the outcome of their treatments.[2-10] HRQOL has also been found to be predictive of mortality[11-12] and service utilisation.[8,13-15] It is becoming a standard for clinical trials to include HRQOL as an outcome measure.[16-17]

Two things are required in order to measure HRQOL in clinical practices and research. The first is a valid and reliable instrument. The MOS 36-item Short Form Health Survey (SF-36) developed by Ware *et al* is the most commonly used HRQOL measure in the US and worldwide.[19-21] There are evidence supporting its validity, reliability, acceptability, discriminatory power and sensitivity on a variety of patient groups.[19-22] It is generic in that it can be used on persons with different health conditions.[19,21] It can be used as an outcome measure as well as a control variable in clinical trials.[9-10,16,22] It has also been used as an indicator of quality of care and effectiveness of health services.[10,22] The SF-36 has been translated and tested in over 40 countries and general norming surveys have been completed in 13 countries.[18] A Chinese (HK) version of the SF-36 was developed and tested in a pilot study on 236 Chinese people in Hong Kong in 1996.[23] Its acceptability, feasibility, conceptual validity and construct validity were confirmed. The standard scoring algorithm for the eight SF-36 scales was found to be applicable to the Chinese in Hong Kong.

The second is a norm reference for the population studied. HRQOL is relative rather than absolute in that there is no threshold levels of good or poor quality of life. The result of any HRQOL measurements need to be interpreted in the light of what is normal for the same population.[3,18] The normative values of HRQOL are population specific in that the norm of one population may not be generalised to another because people's perception of their quality of life can depend on their cultural and social backgrounds.

The aim of this study was to establish the normative values of the SF-36 for Chinese adults in Hong Kong so that we could have a local reference for meaningful interpretation of HRQOL measurements. Results of this

study should enable wider use of HRQOL as an outcome measure of health care in Hong Kong.

Methods

Sample

The study was a cross-sectional telephone survey of a random sample of the Chinese population in Hong Kong. Household telephone numbers were randomly selected from the telephone directories published by Hong Kong Telecom, according to computer-generated random numbers corresponding to the directory (1 = Hong Kong and Islands, 2 = Kowloon and 3 = New Territories), page, column and row. A trained interviewer called the households in the order of the random telephone list from 5:00 p.m. to 9:00 p.m. on each weekday from June 1, 1998 to September 30, 1998. The members who were eighteen years old or above and present were sampled from each contacted household. Each sampled subject had to answer all the questions in person. Non-Cantonese speaking households, commercial numbers and telephone numbers that were not answered or no eligible subjects were available after three contacts were excluded from the study. Subjects who could not communicate by telephone were also excluded. Incomplete interviews were considered non-respondents and excluded from further analysis.

Survey instrument and data collection

The survey instrument consisted of the Chinese (HK) version of the SF-36[23] and a questionnaire on the subject's demography, morbidity data and service utilisation information. The SF-36 has 36 items. One of which measures health transition. The remaining 35 items are grouped under eight scales: ten items on physical functioning (PF), four items on role limitation due to physical problems (RP), two items on bodily pain (BP), five items on general health (GH), four items on vitality (VT), two items on social functioning (SF), three items on role limitation due to emotional problems (RE) and five items on mental health (MH). The scores of the items in each scale are summated and transformed into in a scale score that has a standardised range from zero to 100. Higher scale scores indicate better quality of life. These eight scales cover what are generally considered the essential domains of HRQOL.[3-4] A summary of the SF-36 items and their response choices is shown in **Appendix A**.

Eight trained interviewers carried out the survey in Cantonese by telephone with a standardised method. Each interviewer had a trial of at least twenty interviews before collecting data for the study. Every one in ten successfully interviewed subjects were contacted again by a research assistant who was not involved in the initial interviews to confirm that the interview had been completed. All the answered questionnaires were checked for completeness and clarity of data.

Data analysis

All data were entered twice, matched and re-entered until the two data sets were identical. The SF-36 item responses were recorded and the scale scores were calculated by computer according to the standard scoring algorithm of the SF-36.[19,24] The accuracy of the computation was checked by comparing the results between computer and manual calculations on a random sample of 10 records. Descriptive statistics included the mean, standard deviations, 95% confidence interval (CI) of mean, median, 25th and 75th percentiles, floor (proportion of subjects with the lowest possible score) and ceiling (proportion of subjects with the highest possible score) for each of the eight SF-36 scale scores for the whole sample and for different age-sex groups. The effects of age, gender, educational level, marital status and social class by occupation[25] on the SF-36 scores were analysed by stepwise linear regression. The SPSS-Windows 8.0 programme was used for the data analysis.[26]

This paper presents the normative values for the eight SF-36 scales and the effect of demographic variables on these scores. The results on the relationship between SF-36 scores and chronic diseases or service utilisation will be discussed in another paper.

Results

Sample

A total of 7185 telephone numbers were used, 2847 were successfully contacted with eligible subjects, 2512 subjects were willing to be interviewed but 102 did not complete the survey. 2410 subjects completed the survey and the response rate was 84.7% (2410/2847). We were able to contact 234 of the 240 households sampled for confirmation of interviews. We confirmed with 80.8% (189/234) of the follow-up households that interviews

had indeed been completed, lack of confirmation for 19.2% of the households occurred mainly because the respondents were not present during the follow-up calls.

Table 1 shows the demographic characteristics of the sample of 2410 subjects compared to the 1996 By-census data of the general population.[27] The gender and educational level distributions of the sample were similar to those of the general population. The study sample had a higher proportion of subjects aged 18-24 but a lower proportion of those aged 25-44 years. The study used the British Registrar General's classification to classify social class by the occupation of the head of the household.[25,28] The Hong Kong By-census classified occupations by a different system but we were able to match most of the occupational groups between the two samples. The study sample had lower proportions of professionals, associate professionals and unskilled workers but a higher proportion of semi-skilled workers.

Table 2 shows that there were subjects from all 18 districts in Hong Kong and the distribution was similar to that of the general population, except a higher proportion of people from the Eastern District in the study sample.

The SF-36 scale scores

There were no missing data on any of the SF-36 items from all 2410 subjects. The mean, standard deviation and 95% CI of the mean of the eight SF-36 scale scores of our subjects are compared to the US general population norm[19,29] in **Table 3**. Higher scores indicate better HRQOL.

The mean SF-36 scores of our subjects were higher than those of the US norms for the PF, RP, BP and SF scales but lower for the GH, RE and MH scales. The same trend of differences in the mean SF-36 scores between the two populations was found for all age/sex groups. The greatest difference observed was found in the GH scores; the low GH mean was the result of low mean scores for two GH items on global health (GH1 and GH5) for Hong Kong. The mean of GH1 was 2.6 and that of GH5 was 2.71, which were much lower than the 3.77 and 3.72 of the US norm.[29] The mean RE score was also significantly lower than the US mean. Every one in six subjects (16.4%) got the lowest score in this scale. An analysis of the responses to the individual RE items showed that, because of psychological problems, 34.7%

Table 1: Comparison between demographic characteristics of study sample and the Hong Kong general population[27]

		Sample N = 2,410	Hong Kong population ≥ 18 yrs N = 4,811,510
Age	(years)		
	18-24	17.1%	12.8%
	25-34	18.0%	24.7%
	35-44	21.6%	24.5%
	45-54	13.2%	14.2%
	55-64	10.5%	10.7%
	65-74	10.1%	8.4%
	75 or above	5.2%	4.7%
	Refuse to answer	4.2%	0
Mean age		42.9 years	42.3 years
Male		47.8%	49.5%
Female		52.2%	50.5%
Marital status			
	Now married	58.0%	60.6%
	Never married	33.8%	31.5%
	Widow/widower	5.8%	5.9%
	Divorced/separated	1.3%	1.9%
	Refuse to answer	1.1%	0
Educational level			
	No schooling	6.9%	9.5%
	Primary	22.3%	22.6%
	Secondary	52.2%	52.7%
	Tertiary	17.8%	15.2%
	Refuse to answer	0.9%	0
Social class by occupation			
	Professionals	3.1%	9.4%[a]
	Associate professional	14.7%	19.9 %[b]
	Skilled worker	35.4%	37.6%[c]
	Semi-skilled worker	24.6%	13.8%[d]
	Unskilled worker	13.4%	18.6%[e]
	Others	1.0%	0.8%
	Refuse to answer	7.7%	0

a. *This includes professionals, diplomats, Government administrators and corporate managers*
b. *This includes all the associate professionals and small company managers*
c. *This includes clerks, craft workers, plant and machine operators and assemblers*
d. *This includes service and shop sales workers*
e. *This includes all workers in elementary occupations*

Table 2: Distribution of study sample by residential areas compared to that of the Hong Kong general population[27]

	Proportion in %	
	Sample N = 2,410	Hong Kong population N = 6,217,556
Central and Western	6.3	4.2
Wan Chai	3.4	2.8
Eastern	15.5	9.6
Southern	6.6	4.6
Yau Tsim Mong	4.6	4.2
Sham Shui Po	4.9	5.9
Kowloon City	6.7	6.1
Wong Tai Sin	5.9	6.4
Kwun Tong	9.5	9.5
Kwai Tsing	6.1	7.6
Tsuen Wan	4.1	4.4
Tuen Mun	5.7	7.5
Yuen Long	3.7	5.5
North District	4.0	3.7
Tai Po	3.5	4.6
Shatin	7.4	9.4
Sai Kung	1.2	3.2
Outlying Islands	0.6	1.0

of the respondents admitted that they were not as careful in their work as before (RE3). 25.3% thought that they accomplished less than what they had wanted to (RE2) and 25.0% said that they had to cut down the amount of time on work (RE1).

The PF, RP, BP, SF and RE scales had high proportions of respondents scoring at the ceiling indicating many subjects obtained the highest possible scores in these quality of life domains. On the other hand, the proportion of respondents scoring at the floor was very small for all the scales, except for the RE scale. Sixteen percent of people scored at the bottom of the RE scale suggesting that they perceived the worst measurable limitation in their daily work and activities as a result of emotional problems.

Table 4 shows the mean, standard deviation, 95% CI of means, median, 25th and 75th percentiles of the SF-36 scale scores by different age-sex groups.

The effects of age, gender, educational level, marital status and social class by occupation on SF-36 scores are shown in **Table 5**. We included only those who were

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	Scale	Mean	SD	% Floor	% Ceiling	95% C.I.
PF	HK (n=2,410)	91.83	12.89	0.20	46.00	91.31 - 92.34
	US (n=2,474)	84.15	23.28	0.84	38.79	
RP	HK (n=2,410)	82.43	30.97	7.50	69.10	81.19 - 83.66
	US (n=2,474)	80.96	34.00	10.33	70.85	
BP	HK (n=2,410)	83.98	21.89	0.50	54.70	83.10 - 84.85
	US (n=2,474)	75.15	23.69	0.58	31.85	
GH	HK (n=2,410)	55.98	20.18	1.00	0.50	55.17 - 56.78
	US (n=2,474)	71.95	20.34	0.00	7.40	
VT	HK (n=2,410)	60.27	18.65	0.20	1.70	59.53 - 61.02
	US (n=2,474)	60.86	20.96	0.52	1.50	
SF	HK (n=2,410)	91.19	16.49	0.10	70.80	90.53 - 91.85
	US (n=2,474)	83.28	22.69	0.64	52.32	
RE	HK (n=2,410)	71.67	38.39	16.40	58.40	70.13 - 73.19
	US (n=2,474)	81.26	33.04	9.61	71.01	
MH	HK (n=2,410)	72.79	16.57	0.00	4.50	72.12 - 73.45
	US (n=2,474)	74.74	18.05	0.00	3.91	

PF = physical functioning; RP = role limitation due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitation due to emotional problems; MH = mental health

married or single in the regression analysis because the numbers of subjects with other marital status were small and the categories of this variable were not ordinal. The final sample for linear regression analysis was 1985. Increasing age had a negative effect on PF, RP, BP and GH scores but a positive effect on SF, RE and MH. Females were significantly more likely to have lower scores in all but the SF, RE and MH scales. Social class ranking had a negative relationship with GH, VT and MH scores suggesting that lower social classes were associated with poorer status in these domains. More education was predictive of better physical functioning but did not have any effect on other domains. Marital status did not have any effect on any SF-36 scores.

Discussion

The study sample had a lower proportion of subjects aged 25-44 years than the Hong Kong By-census statistics. Adults in this age group were more likely to be working and socially more active. Therefore, they were less likely than the other age groups to be home at the time of the survey. A significant proportion of subjects in the study was not willing to disclose their occupations and this might have affected the results on the social class distribution of the study sample. The lower proportion of professionals in our study could be due to the exclusion of English speaking households, many of who were professionals. The total proportions of people from the working class (semi-skilled and unskilled workers combined) in the two samples were similar, although different within groups. This could be the result of the differences between the classification systems of our study and that of the Hong Kong By-census. We used the British Registrar's General's Classification of Occupation because it had been found to correlate well with health status.[28] In spite of these differences, we believe that the results of this study can be generalised to the Chinese adult population in Hong Kong.

The SF-36 scale scores shown in **Table 4** could be used as norm references for Chinese adults in Hong

Table 4: Normative values of the SF-36 scale scores by age/sex groups

Table 4(a): All ages

		PF	RP	BP	GH	VT	SF	RE	MH
Male: n = 1,152									
Mean		94.02	85.31	87.07	59.32	61.67	91.45	72.34	73.07
S.D.		10.88	28.38	18.98	19.43	17.59	16.00	37.88	15.93
95% C.I.	lower	93.39	83.67	85.98	58.20	60.65	90.52	70.15	72.15
	upper	94.65	86.95	88.17	60.44	62.68	92.37	74.53	73.99
Percentile	25th	90.00	75.00	74.00	50.00	50.00	87.50	33.33	64.00
	50th	100.00	100.00	100.00	60.00	60.00	100.00	100.00	76.00
	75th	100.00	100.00	100.00	72.00	75.00	100.00	100.00	84.00
Female: n = 1,258									
Mean		89.82	79.79	81.14	52.92	58.99	90.96	71.04	72.53
S.D.		14.19	32.96	23.91	20.38	19.48	17.08	38.80	17.13
95% C.I.	lower	89.03	77.97	79.82	51.79	57.92	90.01	68.89	71.58
	upper	90.60	81.61	82.47	54.05	60.07	91.90	73.18	73.48
Percentile	25th	85.00	75.00	64.00	40.00	45.00	87.50	33.33	60.00
	50th	95.00	100.00	100.00	55.00	60.00	100.00	100.00	72.00
	75th	100.00	100.00	100.00	67.00	70.00	100.00	100.00	84.00
Male and female: n = 2,410									
Mean		91.83	82.43	83.98	55.98	60.27	91.19	71.66	72.79
S.D.		12.89	30.97	21.89	20.18	18.65	16.57	38.36	16.57
95% C.I.	lower	91.31	81.19	83.10	55.17	59.53	90.53	70.13	72.12
	upper	92.34	83.66	84.85	56.78	61.02	91.85	73.19	73.45
Percentile	25th	90.00	75.00	72.00	45.00	50.00	87.50	33.33	64.00
	50th	95.00	100.00	100.00	57.00	60.00	100.00	100.00	72.00
	75th	100.00	100.00	100.00	72.00	75.00	100.00	100.00	84.00

PF = physical functioning; RP = role limitation due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitation due to emotional problems; MH = mental health

Table 4(b): 18 to 40-year-old

		PF	RP	BP	GH	VT	SF	RE	MH
Male: n = 645									
Mean		97.24	86.63	87.66	62.06	60.52	90.08	67.39	71.37
S.D.		5.45	26.63	17.33	18.72	17.00	16.33	39.49	15.16
95% C.I.	lower	96.82	84.57	86.32	60.61	59.20	88.81	64.34	70.20
	upper	97.66	88.69	89.00	63.50	61.83	91.34	70.44	72.54
Percentile	25th	95.00	75.00	74.00	52.00	50.00	87.50	33.33	64.00
	50th	100.00	100.00	100.00	65.00	60.00	100.00	100.00	72.00
	75th	100.00	100.00	100.00	77.00	70.00	100.00	100.00	84.00
Female: n = 599									
Mean		95.19	84.47	84.98	56.76	59.84	90.46	68.11	72.33
S.D.		7.57	28.72	21.35	19.65	19.57	16.09	39.24	16.03
95% C.I.	lower	94.58	82.17	83.27	55.18	58.27	89.17	64.96	71.04
	upper	95.80	86.78	86.70	58.34	61.41	91.75	71.26	73.61
Percentile	25th	95.00	75.00	72.00	45.00	50.00	87.50	33.33	64.00
	50th	100.00	100.00	100.00	60.00	60.00	100.00	100.00	72.00
	75th	100.00	100.00	100.00	72.00	75.00	100.00	100.00	84.00
Male and Female: n = 1,244									
Mean		96.25	85.59	86.37	59.51	60.19	90.26	67.74	71.83
S.D.		6.63	27.66	19.41	19.35	18.28	16.21	39.36	15.59
95% C.I.	lower	95.89	84.05	85.29	58.43	59.18	89.36	65.55	70.96
	upper	96.62	87.13	87.45	60.58	61.21	91.16	69.93	72.70
Percentile	25th	95.00	75.00	74.00	47.00	50.00	87.50	33.33	64.00
	50th	100.00	100.00	100.00	60.00	60.00	100.00	100.00	72.00
	75th	100.00	100.00	100.00	72.00	70.00	100.00	100.00	84.00

PF = physical functioning; RP = role limitation due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitation due to emotional problems; MH = mental health

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Table 4(c): 41 to 64-year-old

		PF	RP	BP	GH	VT	SF	RE	MH
Male: n = 305									
Mean		93.03	86.15	86.50	56.43	62.64	93.69	79.34	73.81
S.D.		10.80	27.56	20.38	19.72	17.02	14.27	33.55	16.84
95% C.I.	lower	91.82	83.04	84.21	54.21	60.72	92.08	75.56	71.91
	upper	94.25	89.25	88.80	58.65	64.56	95.30	83.12	75.71
Percentile	25th	90.00	75.00	74.00	45.00	50.00	100.00	66.67	64.00
	50th	95.00	100.00	100.00	60.00	60.00	100.00	100.00	76.00
	75th	100.00	100.00	100.00	70.00	75.00	100.00	100.00	84.00
Female: n = 390									
Mean		88.73	78.08	79.57	50.74	58.51	91.44	71.54	72.47
S.D.		13.16	34.25	24.30	20.08	20.04	18.06	39.15	18.15
95% C.I.	lower	87.42	74.67	77.15	48.74	56.52	89.64	67.64	70.66
	upper	90.04	81.49	81.99	52.74	60.51	93.24	75.44	74.28
Percentile	25th	85.00	75.00	62.00	36.50	45.00	87.50	33.33	60.00
	50th	92.50	100.00	84.00	52.00	60.00	100.00	100.00	72.00
	75th	95.00	100.00	100.00	65.00	71.25	100.00	100.00	84.00
Male and female: n = 695									
Mean		90.62	81.62	82.61	53.24	60.32	92.43	74.96	73.06
S.D.		12.36	31.72	22.90	20.11	18.88	16.53	36.98	17.59
95% C.I.	lower	89.70	79.26	80.90	51.74	58.92	91.20	72.21	71.75
	upper	91.54	83.98	84.32	54.74	61.73	93.66	77.72	74.37
Percentile	25th	85.00	75.00	72.00	40.00	50.00	100.00	66.67	64.00
	50th	95.00	100.00	100.00	55.00	60.00	100.00	100.00	76.00
	75th	100.00	100.00	100.00	67.00	75.00	100.00	100.00	84.00

PF = physical functioning; RP = role limitation due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitation due to emotional problems; MH = mental health

Table 4(d): 65-year-old or above

		PF	RP	BP	GH	VT	SF	RE	MH
Male: n = 174									
Mean		84.34	80.03	84.82	54.41	63.25	92.74	78.93	78.07
S.D.		17.19	33.36	22.79	19.69	20.43	16.69	36.59	16.36
95% C.I.	lower	81.77	75.04	81.41	51.47	60.19	90.25	73.45	75.62
	upper	86.91	85.02	88.23	57.36	66.30	95.24	84.40	80.52
Percentile	25th	80.00	75.00	74.00	45.00	50.00	100.00	66.67	68.00
	50th	90.00	100.00	100.00	55.00	65.00	100.00	100.00	80.00
	75th	95.00	100.00	100.00	67.00	80.00	100.00	100.00	92.00
Female: n = 195									
Mean		74.59	68.08	70.77	44.47	56.87	91.47	77.44	73.56
S.D.		20.63	39.61	28.22	21.46	18.84	17.87	37.89	19.27
95% C.I.	lower	71.68	62.48	66.78	41.44	54.21	88.95	72.08	70.84
	upper	77.50	73.67	74.75	47.50	59.53	94.00	82.79	76.28
Percentile	25th	65.00	25.00	51.00	27.00	45.00	100.00	66.67	64.00
	50th	80.00	100.00	72.00	45.00	60.00	100.00	100.00	76.00
	75th	90.00	100.00	100.00	60.00	70.00	100.00	100.00	88.00
Male and female: n = 369									
Mean		79.19	73.71	77.39	49.16	59.88	92.07	78.14	75.69
S.D.		19.67	37.23	26.70	21.21	19.84	17.31	37.24	18.08
95% C.I.	lower	77.17	69.90	74.66	46.99	57.85	90.30	74.33	73.84
	upper	81.20	77.52	80.13	51.33	61.91	93.85	81.95	77.54
Percentile	25th	70.00	50.00	61.00	35.00	45.00	100.00	66.67	64.00
	50th	85.00	100.00	84.00	50.00	60.00	100.00	100.00	76.00
	75th	95.00	100.00	100.00	65.00	75.00	100.00	100.00	92.00

PF = physical functioning; RP = role limitation due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitation due to emotional problems; MH = mental health

Table 5:   Effects of demographic variables on the SF-36 scale scores

				Regression coefficients by linear regression				
	PF	RP	BP	GH	VT	SF	RE	MH
N = 1,985								
Age	− .260	− .155	− .135	− .179	NS	.0701	.319	.112
Gender	− 3.202	− 4.878	− 5.683	− 5.927	− 2.143	NS	NS	NS
Social class	NS	NS	NS	− 1.742	− 1.567	NS	NS	− 1.537
Education	1.639	NS	NS	NS	NS	NS	NS	NS
Marital status	NS	NS	NS	NS	NS	NS	NS	NS
R square	.222	.014	.028	.056	.011	.005	.019	.018
Constant	103.725	97.147	98.620	78.789	68.917	88.624	58.635	73.488

PF = physical functioning; RP = role limitation due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitation due to emotional problems; MH = mental health

Statistical notes

1. *Analysis by stepwise linear regression of the SPSS-Windows 8.0 programme.*
2. *Each SF-36 scale score was used as a dependent variable.*
3. *Age (continuous), gender (1 = male, 2 = female), educational level (1 = no formal schooling, 2 = primary, 3 = secondary, 4 = tertiary), marital status (1 = married, 2 = single) and social class (1 = professional, 2 = associate professional, 3 = skilled workers, 4 = semi-skilled workers, 5 = unskilled workers) were independent variables.*
4. *Subjects with unknown or out-of-range data on any independent variables were excluded from the regression analysis resulting in a sample of 1985.*
5. *The unstandardized regression coefficients of variables that are statistically significant at the 5% level are shown.*
6. *R square is the proportion of variance in the dependent variable explained by the independent variables included in the regression model.*
7. *Each SF-36 scale score can be predicted by the sum of the constant and all the products of the coefficients and values of the significant independent variables.*
8. *NS means the effect on the SF-36 scale score is not statistically significant at the 5% level.*

Kong. The 95% confidence intervals (CI) of the mean SF-36 scores were narrow suggesting that the instrument is sensitive in detecting group differences. The chance of the mean SF-36 scores of any group of Chinese adults in Hong Kong falling outside the 95% CI of the age-sex matched norm mean is 5% if they were similar to the general population. In other words, there is a high probability that the quality of life of a group is different from that of the normal population if their mean SF-36 scores are outside the 95% CI of the age-sex matched norm mean. The variations in the SF-36 scores between subjects were quite wide as shown by the large standard deviations. The instrument is less precise in determining whether an individual's HRQOL is normal or not.

The high ceiling effects of the PF, RP, BP, SF and RE scales were expected because they measured disability and limitations; the majority of the general population living in the community should not have any problems in these domains. The low floor effects mean that the SF-36 would be able to detect any deterioration in HRQOL, e.g. during the time of an illness, of normal subjects. The ceiling effect is expected to be less and the floor effect is expected to be higher for patient groups.

The domains in which our general population had higher mean SF-36 scores than the US norms were those that had a strong physical factor loading.[19,23] On the other hand, our mean scores in domains that had a strong mental loading (RE and MH) were lower than those of the US norms. This suggested that the Chinese in Hong Kong might be physically fitter but had more psychological stress than Americans. The closer proximity of places, lower car ownership and less obesity in Hong Kong than the US could be factors contributing to more exercise and physical activities among the local population. Intense competition, long working hours, over-crowded living environment and rising unemployment in Hong Kong might be the reasons why the population had low mean RE and MH scores. The low GH score found in this study was also observed in the pilot study in Hong Kong and a study on the Chinese in the US.[23,30] The modest nature of Chinese people made them reluctant to rate their health as excellent on the two items (GH1 and GH5) on global health. It is the belief

of some Chinese people that God might punish them with illnesses if they boast about their health.

The expected differences in HRQOL between the different age/sex and socioeconomic groups were found supporting the conceptual validity and discriminatory power of the Chinese (HK) SF-36.[19,29,31-34] The negative effect of age on the physical domains was consistent with the findings of many other studies.[19,29,31-33] The positive effect of age on the mental domains was also found in the US population study.[19,29] This could be the result of a reduction in work stress as a result of retirement or an adjustment to life stresses with ageing. It is a common observation that females rate their health and quality of life lower than males.[19,31-33] We found this trend in all domains but the differences were not statistically significant for the domains with a strong psychological factor loading. This was unexpected because previous studies showed that most psychological diseases were more common in females than males.[35-36] One possible explanation was that men and women experience similar psychological impairment but women are more likely to present their psychological stress as diseases. The study by Chen et al showed that psychological morbidities were actually more common in men if tobacco dependence and pathological gambling were included.[36]

The inverse relationship between social class and quality of life has also been found in Western populations.[28,33-34] Our results supported the finding by Smith et al that social class by occupation was a stronger predictor of health status than educational level.[28] It is interesting to note that social class had an effect on only the GH, VT and MH scales. These HRQOL domains are more related to a person's life expectation and socioemotional adjustments than limitations in specific activities due to impairment. Power et al also showed that socioemotional adjustment and psychosocial work stress were the strongest contributing factors to the social gradient in self-rated health.[34] Much of a person's activities, expectations and life satisfaction was related to the occupation.[28]

Limitation of the study

As the study only included Cantonese speaking Chinese subjects, the results should not be generalised to other ethnic groups within Hong Kong. The survey sample did not include households that did not have telephones and the 10% that were not listed in the telephone directories.

The Chinese (HK) SF-36 was administered by telephone in this survey, thus, the normative values would be best used for comparison with SF-36 scores obtained by the same method. Studies in the US and Australia had found that the SF-36 scores obtained by self-completion and telephone interviews could be significantly different, especially for mental health.[37-38] We do not expect much difference between the results of face-to-face and telephone interviews but further studies to confirm this is necessary.

Conclusions

A population-based norm of the SF-36 Health Survey had been established for Chinese adults in Hong Kong. There were significant differences between the mean scores of our Chinese population and the US norm supporting the importance of norming the SF-36 before cross-cultural application. Age and gender had significant and substantial effects on SF-36 scores, therefore, normative values of the appropriate age/sex groups should be used for comparison.

The SF-36 was administered by telephone interviews in this study, so the normative values are best used for comparison with data obtained by the same method. Further studies are required to find out whether the SF-36 scores will change with a change in the administration method.

The Chinese (HK) SF-36 is the first and at present, the only HRQOL measure that has been both validated and normed on the general population in Hong Kong. It can be used as a standardised tool to evaluate the impact of illnesses and effects of interventions on the quality of life of our Chinese adult patients. The ability to use the world's most popular HRQOL measure provides opportunities for cross-cultural comparative studies and international clinical trials for our population.

Acknowledgement

Key message

1. Normative values of the Chinese (HK) SF-36 were established for the general adult Chinese population in Hong Kong by a random telephone survey.

2. The mean scores for scales that had a strong physical factor component were higher than those of the US population norm.

3. The mean scores for general health and scales that had a strong mental factor component were lower than those of the US population norm.

4. Age and gender had significant effects on many SF-36 scale scores.

5. The Chinese (HK) SF-36 is the first and at present the only health-related quality of the (HRQOL) measure that has been validated and normed on the Chinese in Hong Kong.

Notes

A copy of the Chinese (HK) SF-36 and normative values of the SF-36 in 10-year age intervals can be obtained from the first author upon written request. ∎

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Original Article

Appendix A: A summary of the items and response choices of the SF-36

SF-36 scale items (question number)			Response choices
PF	1 (3a)	Vigorous activities	Limited (a lot / a little / not at all)
	2 (3b)	Moderate activities	Limited (a lot / a little / not at all)
	3 (3c)	Lifting / carrying groceries	Limited (a lot / a little / not at all)
	4 (3d)	Climbing several flights	Limited (a lot / a little / not at all)
	5 (3e)	Climbing one flight	Limited (a lot / a little / not at all)
	6 (3f)	Bending, kneeling or stooping	Limited (a lot / a little / not at all)
	7 (3g)	Walking more than 1 Km	Limited (a lot / a little / not at all)
	8 (3h)	Walking several blocks	Limited (a lot / a little / not at all)
	9 (3i)	Walking one block	Limited (a lot / a little / not at all)
	10 (3j)	Bathing or dressing	Limited (a lot / a little / not at all)
RP	1 (4a)	Cut down time on work	Yes / No
	2 (4b)	Accomplished less	Yes / No
	3 (4c)	Limited in kind of work	Yes / No
	4 (4d)	Difficulty in performing work	Yes / No
BP	1 (7)	Intensity of bodily pain	None / very mild / mild / moderate / severe / very severe
	2 (8)	Extent pain interfered with work	Not at all / a little / moderately / quite a bit / extremely
GH	1 (1)	Your health is: excellent.....poor	Excellent / very good / good / fair / poor
	2 (11a)	Seem to get sick a little easier	Definitely true / mostly true / don't know / mostly false / definitely false
	3 (11b)	As healthy as anybody	Definitely true / mostly true / don't know / mostly false / definitely false
	4 (11c)	Expect health to get worse	Definitely true / mostly true / don't know / mostly false / definitely false
	5 (11d)	Health is excellent	Definitely true / mostly true / don't know / mostly false / definitely false
VT	1 (9a)	Feel full of 'pep'	(All / most / a good bit / some / a little / none) of the time
	2 (9e)	Have a lot of energy	(All / most / a good bit / some / a little / none) of the time
	3 (9g)	Feel worn out	(All / most / a good bit / some / a little / none) of the time
	4 (9i)	Feel tired	(All / most / a good bit / some / a little / none) of the time
SF	1 (6)	Extent social activity interfered	Not at all / slightly / moderately / quite a bit / extremely
	2 (10)	Frequency social activity interfered	(All / most / some / a little / none) of the time
RE	1 (5a)	Cut down amount of time on work	Yes / No
	2 (5b)	Accomplished less	Yes / No
	3 (5c)	Didn't do work as carefully	Yes / No
MH	1 (9b)	Been very nervous	(All / most / a good bit / some / a little / none) of the time
	2 (9c)	Felt down in the dumps	(All / most / a good bit / some / a little / none) of the time
	3 (9d)	Felt calm and peaceful	(All / most / a good bit / some / a little / none) of the time
	4 (9f)	Felt downhearted & blue	(All / most / a good bit / some / a little / none) of the time
	5 (9h)	Been a happy person	(All / most / a good bit / some / a little / none) of the time
HT	(2)	Health compared to 1 year ago	Much better / somewhat better / about the same / somewhat worse / much worse

PF = physical functioning; RP = role limitation due to physical problems; BP = bodily pain; GH = general health; VT = vitality; SF = social functioning; RE = role limitation due to emotional problems; MH = mental health