ORIGINAL ARTICLE

# Quality of Life of the Malaysian General Population: Results from a Postal Survey Using the SF-36

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**Summary**

Population norms for Health Related Quality of Life using SF-36 are described. A national sample was canvassed in 2000 using a self-administered SF-36 in Bahasa Malaysia and English. Response rate was 30.6%, with 3072 usable data. Male: Female ratio was 1.04 and mean age was 39.8 years. Quality of life was affected by age and sex. Older population and women had a poorer quality of life. Population norms for Malaysia differed from those of US, Canada and Australia. The Malaysian general population norm described is useful as reference point for studies in Malaysia. Variability in scores by age and sex emphasize the need to use appropriate age- or sex-specific normative data.

*Key Words:* Health-related quality of life, SF-36

## Introduction

Quality of life (QOL) emerged from sociology and social psychology as a global concept encompassing aspects of physical, social, emotional and spiritual well-being. Defined in terms of cultural standards and norms, it has reference to the desires, needs, experiences and aspirations of the individual. When considered as a dimension or domain of quality of life, health is best thought of in the narrower sense of factors that are generally considered to fall under the purview of health care providers, or that are likely to be the target of a health care intervention. Thus, the term "Health-related quality of life (HRQOL)" has sometimes been preferred to that of QOL[1,2] and this can be defined as an individual's satisfaction or happiness with domains of life as far as they affect or are affected by health. It can be differentiated from QOL in that HRQOL concerns itself primarily with those factors that fall under the purview of health care providers and health care systems [3].

Instruments used in the measurements of both individual and population HRQOL are either generic, i.e. not specifically designed for patients with a particular disease or condition, or, they may be specific for a particular disease or condition but not applicable to the general population. We had chosen to use the SF-36 (Short form - 36), a generic outcome measure of sickness [4]. It is based on 36-items selected to represent eight health concepts (physical, social and role functioning, mental health, health perceptions, energy, fatigue, pain and general health)[4]. and shown to be a sensitive measure for numerous diseases, thus its use in the measurement of outcome of care [4,5]. In addition, it has been found to be sensitive to changes in health in general populations [6,7]. The developers have also

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methodically documented the validity and reliability of this instrument [8,9,10,11].

One of the many applications of HRQOL research is in making empirical statements concerning community life, urban development and social progress. This information will be of relevance to policy makers and health planners to improve the health services. However, in order to make the correct inferences in relation to the population being studied, a reference point will be needed as a yardstick for comparison.

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[4,12]. Although there already exists published norms for the United States[4], the Queensland region and Australian Capital Territory of Australia[7,13], the United Kingdom[14] and Canada[12], comparable norms do not yet exist for Malaysia. In a recent study done locally, norms for the US general population were used as a guide for reflecting deficits in the various domains because of disease, i.e. comparing the general population functioning with that of the diseased population[15]. Given the cultural and ethnic differences, not to mention the genetic differences, it is expected that the perceived HRQOL of the general population in Malaysia might differ from that of the general population of other countries.

Here, we present the population norms for Malaysia for SF-36 by age, sex and ethnicity.

## Material and Methods

A nationwide household survey was conducted throughout Malaysia with respondents who were randomly selected from living quarters sampled for the Third Round of the Labour Force Survey# in 2000. A multistage stratified (by state and urban/rural location) random sampling was done, proportionate to population size@. The sampling design excluded this institutionalised population that constituted less than 3%[16].

In total, 1,746 Enumeration Blocks* (EBs) were canvassed. Within each EB, six questionnaires were randomly given to three living quarters. A living quarters** (LQ) in the EB. Respondents must be Malaysians, aged 18 years and above and literate in either Bahasa Malaysia (BM) or English.

The enumerators for the Third Round of the Labour Force survey handed survey materials consisting of an introductory letter with accompanying explanation on the study, a bilingual questionnaire and a stamped return envelope to respondents by hand, in efforts to increase response rates. Enumerators explained to respondents that their responses were important to the Ministry of Health, and that all answers would be kept confidential. Respondents were advised to fill the questionnaires and subsequently post them back to the researchers as soon as possible. Response by proxy was not entertained.

The UK version of SF-36 had been translated to Bahasa Malaysia by a group of researchers from University of Science Malaysia##. A research team under the aegisof International Quality of Life Assessment (IQOLA) Project had developed a translated version. We have adapted and modified that translated version of SF-36. In-depth interviews were conducted for cognitive debriefing on patients and their families attending government Medical Outpatients Clinics, with quota sampling to cover diverse ethnic groups. We explored their perception, understanding and interpretation of translated items of SF-36 (BM version). Results of the cognitive debriefing were used to refine the translated BM SF-36 questionnaire further and this was used in the survey. In the process of printing, typological errors were noted in the questionnaire for questions 6 and 8 which could affect the accuracy of responses for social

# The Labour Force Survey is a survey conducted by the Department of Statistics, mainly to measure the employment status in the country. The sample selected for the survey is spread over quarterly rounds, in this case, the third quarter of 2000.

@ First stage of the sampling involved the selection of Enumeration Blocks (EB); while in the second stage of sampling living quarters** (LQ) were selected.

* An enumeration block is an artificially created contiguous geographical area with specific boundaries (either natural or artificial) that do not straddle administrative boundaries. On average, an EB covers about 100-120 living quarters.

** A living quarters (LQ) is a living unit, structurally separate (surrounded by walls, fences etc. and is covered by a roof) and independent (has direct access via a public staircase, communal passages or landing) and are meant for living.

## A research team under the aegis of International Quality of Life Assessment (IQOLA) Project had developed a translated version.

functioning (SF) and bodily pain (BP) subscales. Question 6 had one response category left out ("moderately") while question 8 had six response categories instead of the specified five. Independent raters gave levels/scores for each response category to identify which categories should be grouped together to reduce the number of response categories from 6 to 5. "Mild" and "very mild" were combined together to form one category.

Calculation of scores for all the eight domains## followed that outlined by Ware *et al*[4].

Data collection was carried out simultaneously throughout the country in September 2000. The researchers received questionnaires in the mail until 31 December 2000.

## Results

Out of 10,041 questionnaires sent out, 3072 returned in a usable form. Response rate was 30.6%.

The male to female ratio was 1.04. Mean age was 39.8 ± 12.9#; median was 39.4 and age in the sample ranged from 18 to 87 years. The majority were Malays (77.2%), followed by Chinese (16.4%). More than half (60.0%) of the sample was from urban areas.

Half (54.1%) of respondents had secondary level education, with 27.3% with primary education. 61.8% were employed, and the reported average monthly income was RM1065 ± 1224*, with a median of RM781 and a range of RM20 to RM20,000. Two thirds (77.6%) of the sample owned some form of transport, commonly a motorcycle or a car; whilst half (55.5%) owned the house they were staying in at the time of survey. Almost all (94.7%) reported to be staying with their family, with only 2.4% staying on their own, and 2.9% with friends.

On self-reported morbidity, 26.0% reported some type of disease, and 2.7% some form of handicap, commonest being complaint pertaining to the respiratory tract and musculoskeletal disorders.

Table I shows the characteristics of respondents compared to the Malaysian population in 2000[16]. Urban dwellers, young males, Chinese and other ethnicity were under-represented.

Tables II to VI show the means, summarised percentile proportions together with floor@ and ceiling** effects for all the 8 domains by age, sex, ethnicity and by age by sex.

Females had lower means for all domains compared to males, with the difference significant for PF, BP, VT, REE and MH. This picture is consistent, even after stratifying by age.

As expected, increasing age was associated with a reduction in mean PF for both gender, while mean REP, BP, VT and SF dropped from 60 years and above, and mean GH dropped a decade earlier, from 50 years onwards. REE and MH showed no obvious pattern with age, though young adults less than 30 years had lower means for both the domains.

Indians have lower means for PF, BP, VT, SF and MH compared to other ethnic groups, though the difference were not significant. Other Bumiputera had lower means only for BP, the level for which was similar to that of Indians.

In general, ceiling effects were seen for PF, REP, SF and REE. Older population greater than 60 years had minimal ceiling effects for PF, as expected. Floor effects were not much of a problem except for REE. Figures 1 to 3 show the variability of the subscales by age, gender and ethnicity. Each of the subscales demonstrates a similar distribution for gender and ethnicity. PF shows greater variability with increasing age. BP, GH, VT and MH do not show much difference

## Also referred to as subscales[4]. They are: physical functioning (PF), social functioning (SF), physical role functioning (REP), emotional role functioning (REE), mental health (MH), energy fatigue/vitality (VT), bodily pain (BP) and general health (GH).

# This is one standard deviation. 95% confidence limits for the mean were 39.4, 40.3 years.

* This is one standard deviation. 95% confidence limits for the mean were RM1009.8, 1120.3.

@ Proportions of subjects receiving the maximum possible score.

** Proportions of subjects receiving the minimum possible score.

in distribution of scores across age, with all ages demonstrating minimal floor and ceiling effects.

Figure 4 compares the Malaysian average# with that for the general population of United States (US)[4], the Australian Capital Territory (ACT) [7] and Canada[12]. PF and VT for Malaysians were higher than the average scores for the general population of US, though it was similar to that for Canadians. Malaysians had the lowest scores for BP and GH, significantly lower than the other countries[1]. SF, REE and MH, though comparable to the normative data for US, were lower than that for Canada (for the three subscales), and the ACT (for the last two subscales). Only REP was found to be similar across all the countries compared. Although the confidence intervals do not overlap, the differences mentioned are small, with only VT, BP and GH with a gap of 5 or more points, the level considered to be clinically and socially meaningful [17].

# Mean score with 95% confidence limits.

**Table I: Comparison of characteristics of respondents with Malaysian Population (Census 2000)**

| Characteristics | | Respondents | | Population | Test of proportions |
|---|---|---|---|---|---|
| | | Number | % | % | p value |
| **Area** | Urban | 1832 | 60.0 | 62.0 | 0.04 |
| **(n=3055)** | Rural | 1223 | 40.0 | 38.0 | 0.08 |
| **Sex** | Male | 1563 | 51.1 | 51.0 | 0.48 |
| **(n=3061)** | Female | 1498 | 48.9 | 49.0 | 0.48 |
| **Age group** | 18 - 29 years | 262 | 17.0 | 29.0 | 0.03 |
| **- All Males** | 30 - 39 years | 421 | 27.3 | 26.0 | 0.10 |
| **(n=1543)** | 40 - 49 years | 429 | 27.8 | 21.2 | 0.01 |
| | 50 - 59 years | 260 | 16.9 | 12.7 | 0.37 |
| | 60 - 69 years | 128 | 8.3 | 7.0 | 0.45 |
| | > 70 years | 43 | 2.8 | 4.0 | 0.39 |
| **Age group** | 18 - 29 years | 445 | 30.1 | 29.3 | 0.01 |
| **-All Females** | 30 - 39 years | 455 | 30.8 | 26.3 | 0.09 |
| **(n=1479)** | 40 - 49 years | 347 | 23.5 | 20.4 | 0.02 |
| | 50 - 59 years | 150 | 10.1 | 11.8 | 0.42 |
| | 60 - 69 years | 64 | 4.3 | 7.4 | 0.51 |
| | > 70 years | 18 | 1.2 | 4.8 | 0.57 |
| **Ethnic Group** | Bumiputeraa | 2373 | 77.2 | 65.1 | 0.000 |
| **(n=3072)** | Chinese | 505 | 16.4 | 26.0 | 0.000 |
| | Indian | 165 | 5.4 | 7.7 | 0.17 |
| | Others | 29 | 0.9 | 1.2 | 0.001 |

## Table II: Norms for the General Malaysian Population, Total Sample

| Total Sample (N=3072) | PF | REP | BP | GH | VT | SF | REE | MH |
|---|---|---|---|---|---|---|---|---|
| Mean | 85.98 | 82.03 | 69.96 | 66.74 | 66.79 | 83.73 | 79.23 | 74.66 |
| 25th Percentile | 80.00 | 75.00 | 62.00 | 52.00 | 55.00 | 75.00 | 66.67 | 64.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 72.00 | 67.00 | 70.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 17.91 | 32.12 | 17.59 | 19.99 | 17.68 | 19.28 | 35.92 | 17.19 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| % Ceiling | 32.3 | 70.4 | 0 | 2.4 | 4.0 | 43.2 | 71.3 | 9.2 |
| % Floor | 0.2 | 80.2 | 0.3 | 0.3 | 0.1 | 0.2 | 12.7 | 0.0 |
| Valid N | N=3072 | N=3064 | N=3070 | N=3070 | N=3071 | N=3070 | N=3060 | N=3071 |
| **Female (N=1498)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 84.52 | 81.47 | 68.96 | 66.03 | 65.10 | 82.94 | 76.92 | 73.30 |
| 25th Percentile | 75.00 | 75.00 | 62.00 | 52.00 | 50.00 | 75.00 | 66.67 | 60.00 |
| 50th Percentile (Median) | 90.00 | 100.00 | 72.00 | 67.00 | 65.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 84.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 18.52 | 32.55 | 17.56 | 20.15 | 17.54 | 19.55 | 37.25 | 17.63 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 95.00 | 100.00 | 100.00 | 100.00 |
| % Ceiling | 27.8 | 69.5 | 0 | 2.4 | 2.4 | 40.9 | 68.4 | 8.1 |
| % Floor | 0.1 | 8.6 | 0.3 | 0.3 | 0 | 0.2 | 14.1 | 0.1 |
| Valid N | N=1498 | N=1495 | N=1497 | N=1496 | N=1498 | N=1497 | N=1492 | N=1498 |
| **Male (N=1563)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 87.38 | 82.48 | 70.91 | 67.39 | 68.46 | 84.48 | 81.37 | 75.99 |
| 25th Percentile | 80.00 | 75.00 | 62.00 | 52.00 | 55.00 | 75.00 | 66.67 | 64.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 74.00 | 67.00 | 70.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 17.23 | 31.78 | 17.56 | 19.82 | 17.68 | 19.01 | 34.51 | 16.64 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 | 100.00 | 100.00 | 84.00 |
| % Ceiling | 36.7 | 71.2 | 0 | 2.4 | 5.6 | 45.5 | 74.1 | 10.2 |
| % Floor | 0.3 | 7.8 | 0.3 | 0.4 | 0.1 | 0.1 | 11.3 | 0 |
| Valid N | N=1563 | N=1558 | N=1562 | N=1563 | N=1562 | N=1562 | N=1557 | N=1562 |

**Table III: Norms for Age Groups, General Malaysian Population, Females & Males Combined.**

| Ages 18-29 | PF | REP | BP | GH | VT | SF | REE | MH |
|---|---|---|---|---|---|---|---|---|
| **Female & Males (N=709)** | | | | | | | | |
| Mean | 91.16 | 84.96 | 1.93 | 70.18 | 66.45 | 83.29 | 74.29 | 72.37 |
| 25th Percentile | 90.00 | 75.00 | 62.00 | 57.00 | 55.00 | 75.00 | 33.33 | 60.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 74.00 | 72.00 | 66.67 | 87.50 | 100.00 | 72.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 84.00 |
| Std Deviation | 13.66 | 28.51 | 16.61 | 17.40 | 16.40 | 18.71 | 38.25 | 17.16 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 90.00 | 100.00 | 100.00 | 100.00 |
| % Ceiling | 44.4 | 72.0 | 0 | 3.0 | 2.0 | 40.2 | 64.4 | 6.6 |
| % Floor | 0.1 | 5.2 | 0.1 | 0.1 | 0 | 0.1 | 15.4 | 0.1 |
| Valid N | N=709 | N=708 | N=709 | N=709 | N=709 | N=709 | N=708 | N=709 |
| **Ages 30-39** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| **Female & Male (N=877)** | | | | | | | | |
| Mean | 89.14 | 83.60 | 70.94 | 67.81 | 67.57 | 84.08 | 80.25 | 75.17 |
| 25th Percentile | 85.00 | 75.00 | 62.00 | 52.00 | 55.00 | 75.00 | 66.67 | 64.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 74.00 | 70.00 | 70.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 14.87 | 31.54 | 17.07 | 19.09 | 17.30 | 18.54 | 35.74 | 16.48 |
| Range | 95.00 | 100.00 | 90.00 | 95.00 | 95.00 | 87.50 | 100.0080.00 | |
| % Ceiling | 37.4 | 74.1 | 0 | 3.0 | 4.3 | 42.6 | 73.4 | 8.3 |
| % Floor | 0 | 7.8 | 0.1 | 0 | 0 | 0 | 12.7 | 0 |
| Valid N | N=877 | N=875 | N=876 | N=876 | N=876 | N=876 | N=871 | N=876 |
| **Ages 40-49** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| **Female & Males (N=781)** | | | | | | | | |
| Mean | 86.27 | 83.97 | 69.62 | 68.12 | 68.38 | 85.40 | 81.45 | 76.39 |
| 25th Percentile | 80.00 | 75.00 | 62.00 | 55.00 | 55.00 | 75.00 | 66.67 | 64.00 |
| 50th Percentile (Median) | 90.00 | 100.00 | 72.00 | 70.00 | 70.00 | 87.50 | 100.00 | 80.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 89.33 |
| Std Deviation | 16.51 | 29.54 | 17.42 | 19.37 | 17.86 | 17.88 | 34.33 | 16.79 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 90.00 | 87.50 | 100.00 | 80.00 |
| % Ceiling | 28.8 | 71.0 | 0 | 2.3 | 5.4 | 47.3 | 74.0 | 11.1 |
| % Floor | 0.3 | 6.0 | 0.1 | 0.1 | 0 | 0 | 10.9 | 0 |
| Valid N | N=781 | N=778 | N=780 | N=781 | N=781 | N=780 | N=778 | N=781 |

| **Ages 50-59 Female & Males (N=411)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
|---|---|---|---|---|---|---|---|---|
| Mean | 80.10 | 79.21 | 69.11 | 62.56 | 66.31 | 83.70 | 81.83 | 74.85 |
| 25th Percentile | 70.00 | 75.00 | 62.00 | 45.33 | 50.00 | 75.00 | 66.67 | 60.00 |
| 50th Percentile (Median) | 85.00 | 100.00 | 72.00 | 62.00 | 70.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 95.00 | 100.00 | 90.00 | 80.33 | 80.00 | 100.00 | 100.00 | 92.00 |
| Std Deviation | 20.73 | 34.51 | 17.87 | 22.16 | 17.80 | 20.30 | 33.80 | 18.17 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 95.00 | 100.00 | 100.00 | 80.00 |
| % Ceiling | 21.7 | 67.6 | 0 | 1.7 | 4.4 | 45.3 | 73.6 | 9.7 |
| % Floor | 0.2 | 10.7 | 0.2 | 1.2 | 0 | 0.5 | 10.8 | 0 |
| Valid N | N=411 | N=410 | N=411 | N=411 | N=411 | N=411 | N=409 | N=411 |
| **Ages 60-69 Female & Males (N=192)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 71.51 | 67.58 | 63.36 | 57.01 | 61.98 | 80.21 | 78.30 | 73.83 |
| 25th Percentile | 55.00 | 25.00 | 50.17 | 40.83 | 50.00 | 62.50 | 66.67 | 60.00 |
| 50th Percentile (Median) | 75.00 | 100.00 | 62.00 | 60.00 | 60.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 90.00 | 100.00 | 84.00 | 72.00 | 75.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 22.29 | 41.25 | 20.39 | 21.80 | 17.81 | 21.79 | 37.02 | 17.73 |
| Range | 90.00 | 100.00 | 90.00 | 92.00 | 100.00 | 100.00 | 100.00 | 84.00 |
| % Ceiling | 9.4 | 56.3 | 0 | 0 | 2.1 | 36.5 | 71.4 | 8.9 |
| % Floor | 0 | 18.8 | 1.6 | 0 | 0.5 | 0.5 | 13.5 | 0 |
| Valid N | N=192 | N=192 | N=192 | N=191 | N=192 | N=192 | N=192 | N=192 |
| **Ages 70 & over Female & Males (N=61)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 64.34 | 67.62 | 62.84 | 52.05 | 56.23 | 72.75 | 73.22 | 71.41 |
| 25th Percentile | 45.00 | 16.67 | 48.00 | 35.00 | 40.00 | 62.50 | 33.33 | 54.67 |
| 50th Percentile (Median) | 68.33 | 100.00 | 62.00 | 48.00 | 51.67 | 75.00 | 100.00 | 69.33 |
| 75th Percentile | 90.00 | 100.00 | 79.00 | 72.00 | 78.33 | 100.00 | 100.00 | 92.00 |
| Std Deviation | 26.62 | 43.38 | 19.74 | 25.89 | 25.06 | 9.27 | 41.19 | 20.33 |
| Range | 100.00 | 100.00 | 90.00 | 97.00 | 100.00 | 100.00 | 100.00 | 84.00 |
| % Ceiling | 4.9 | 60.7 | 0 | 0 | 6.6 | 36.1 | 67.2 | 16.4 |
| % Floor | 3.3 | 23.0 | 1.6 | 4.9 | 1.6 | 1.6 | 19.7 | 0 |
| Valid N | N=61 | N=61 | N=61 | N=61 | N=61 | N=61 | N=61 | N=61 |

**Table IV: Norms for Females by Age Group.**

| Ages 18-29 Female (N=445) | PF | REP | BP | GH | VT | SF | REE | MH |
|---|---|---|---|---|---|---|---|---|
| Mean | 90.44 | 85.62 | 71.99 | 70.15 | 65.61 | 82.98 | 74.25 | 72.16 |
| 25th Percentile | 85.00 | 75.00 | 62.00 | 57.00 | 55.00 | 75.00 | 33.33 | 60.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 73.33 | 72.00 | 65.00 | 87.50 | 100.00 | 72.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 84.00 |
| Std Deviation | 13.11 | 28.29 | 15.85 | 17.29 | 16.30 | 18.50 | 38.27 | 17.28 |
| Range | 80.00 | 100.00 | 90.00 | 85.00 | 90.00 | 87.50 | 100.00 | 100.00 |
| % Ceiling | 38.9 | 73.7 | 0 | 2.5 | 1.6 | 38.9 | 64.4 | 6.1 |
| % Floor | 0 | 5.2 | 0.2 | 0 | 0 | 0.4 | 15.3 | 0.2 |
| Valid N | N=445 | N=445 | N=445 | N=445 | N=445 | N=445 | N=444 | N=445 |
| **Ages 30-39 Female (N=455)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 87.01 | 82.65 | 69.65 | 66.44 | 65.76 | 83.90 | 78.10 | 74.09 |
| 25th Percentile | 80.83 | 75.00 | 62.00 | 52.00 | 50.83 | 75.00 | 66.67 | 63.33 |
| 50th Percentile (Median) | 90.00 | 100.00 | 72.00 | 67.00 | 65.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 16.04 | 32.65 | 17.24 | 19.27 | 17.37 | 18.41 | 37.27 | 16.82 |
| Range | 95.00 | 100.00 | 90.00 | 95.00 | 95.00 | 87.50 | 100.00 | 80.00 |
| % Ceiling | 28.8 | 73.3 | 0 | 2.9 | 2.6 | 41.1 | 71.0 | 7.5 |
| % Floor | 0 | 8.6 | 0.2 | 0 | 0 | 0 | 14.4 | 0 |
| Valid N | N=455 | N=454 | N=455 | N=454 | N=455 | N=455 | N=452 | N=455 |
| **Ages 40-49 Female (N=347)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 83.37 | 81.07 | 66.57 | 66.31 | 65.76 | 83.85 | 77.94 | 74.27 |
| 25th Percentile | 75.00 | 75.00 | 52.00 | 52.00 | 50.00 | 75.00 | 66.67 | 60.00 |
| 50th Percentile (Median) | 90.00 | 100.00 | 62.00 | 67.00 | 65.00 | 87.50 | 100.00 | 74.67 |
| 75th Percentile | 95.00 | 100.00 | 84.00 | 82.00 | 80.00 | 100.00 | 100.00 | 92.00 |
| Std Deviation | 17.42 | 31.61 | 18.45 | 20.03 | 18.38 | 18.84 | 36.22 | 18.18 |
| Range | 95.00 | 100.00 | 90.00 | 100.00 | 90.00 | 87.50 | 100.00 | 80.00 |
| % Ceiling | 22.5 | 66.5 | 0 | 2.3 | 3.5 | 44.8 | 68.8 | 10.7 |
| % Floor | 0 | 7.8 | 0.3 | 0.3 | 0.3 | 0 | 12.7 | 0 |
| Valid N | N=347 | N=346 | N=346 | N=347 | N=347 | N=346 | N=346 | N=347 |

| Ages 50-59 Female (N=150) | PF | REP | BP | GH | VT | SF | REE | MH |
|---|---|---|---|---|---|---|---|---|
| Mean | 73.93 | 73.99 | 66.67 | 58.93 | 62.50 | 80.17 | 78.52 | 72.75 |
| 25th Percentile | 62.08 | 50.00 | 56.17 | 45.00 | 50.00 | 67.71 | 66.67 | 60.00 |
| 50th Percentile (Median) | 80.00 | 100.00 | 68.67 | 58.50 | 62.50 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 91.25 | 100.00 | 84.00 | 77.00 | 75.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 23.74 | 37.88 | 18.73 | 22.83 | 17.93 | 23.36 | 36.57 | 19.03 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 95.00 | 100.00 | 100.00 | 80.00 |
| % Ceiling | 16.0 | 59.7 | 0 | 2.7 | 2.7 | 38.7 | 70.5 | 6.7 |
| % Floor | 0.7 | 16.1 | 0.7 | 1.3 | 0 | 1.3 | 13.4 | 0 |
| Valid N | N=150 | N=149 | N=150 | N=150 | N=150 | N=150 | N=149 | N=150 |
| **Ages 60-69 Female (N=64)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 64.14 | 68.75 | 61.59 | 54.27 | 60.00 | 79.69 | 76.04 | 70.88 |
| 25th Percentile | 50.00 | 25.00 | 41.00 | 34.17 | 45.00 | 62.50 | 41.67 | 53.00 |
| 50th Percentile (Median) | 65.00 | 100.00 | 62.00 | 59.00 | 60.00 | 87.50 | 100.00 | 72.00 |
| 75th Percentile | 83.75 | 100.00 | 74.00 | 73.50 | 75.42 | 100.00 | 100.00 | 87.00 |
| Std Deviation | 22.67 | 40.82 | 18.86 | 24.32 | 17.37 | 21.54 | 38.70 | 18.41 |
| Range | 85.00 | 100.00 | 68.00 | 92.00 | 70.00 | 100.00 | 100.00 | 76.00 |
| % Ceiling | 4.7 | 57.8 | 0 | 3.2 | 0 | 32.8 | 68.8 | 9.4 |
| % Floor | 0 | 17.2 | 0 | 0 | 0 | 1.6 | 15.6 | 0 |
| Valid N | N=64 | N=64 | N=64 | N=63 | N=64 | N=64 | N=64 | N=64 |
| **Ages 70 & over Female (N=18)** | **PF** | **REP** | **BP** | **G** | **VT** | **SF** | **REE** | **MH** |
| Mean | 60.83 | 73.61 | 63.78 | 51.50 | 55.56 | 72.22 | 77.78 | 69.56 |
| 25th Percentile | 36.25 | 31.25 | 51.92 | 35.83 | 41.25 | 40.62 | 69.44 | 56.50 |
| 50th Percentile (Median) | 70.00 | 100.00 | 62.00 | 46.00 | 51.25 | 84.37 | 100.00 | 66.00 |
| 75th Percentile | 94.17 | 100.00 | 87.5 | 90.00 | 87.50 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 30.98 | 39.73 | 20.82 | 29.89 | 24.43 | 32.24 | 39.61 | 18.82 |
| Range | 100.00 | 100.00 | 68.00 | 97.00 | 85.00 | 87.50 | 100.00 | 60.00 |
| % Ceiling | 5.6 | 66.7 | 0 | 0 | 0 | 38.9 | 72.2 | 16.7 |
| % Floor | 5.6 | 11.1 | 0 | 5.6 | 0 | 0 | 16.7 | 0 |
| Valid N | N=18 | N=18 | N=18 | N=18 | N=18 | N=18 | N=18 | N=18 |

**Table V: Norms for Males by Age Group.**

| Ages 18-29 Male (N=262) | PF | REP | BP | GH | VT | SF | REE | MH |
|---|---|---|---|---|---|---|---|---|
| Mean | 92.40 | 83.72 | 71.86 | 70.18 | 67.82 | 83.83 | 74.17 | 72.75 |
| 25th Percentile | 90.00 | 75.00 | 62.00 | 57.00 | 55.00 | 75.00 | 33.33 | 60.00 |
| 50th Percentile (Median) | 100.00 | 100.00 | 74.00 | 72.00 | 70.00 | 87.50 | 100.00 | 74.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 85.00 |
| Std Deviation | 14.52 | 28.98 | 17.90 | 17.65 | 16.54 | 19.08 | 38.36 | 17.00 |
| Range | 100.00 | 100.00 | 80.00 | 100.00 | 80.00 | 100.00 | 100.00 | 84.00 |
| % Ceiling | 53.8 | 69.0 | 0 | 3.8 | 2.7 | 42.4 | 64.1 | 7.6 |
| % Floor | 0.4 | 5.4 | 0 | 0.4 | 0 | 0.4 | 15.6 | 0 |
| Valid N | N=262 | N=261 | N=262 | N=262 | N=262 | N=262 | N=262 | N=262 |
| **Ages 30-39 Male (N=421)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 91.45 | 84.58 | 72.29 | 69.29 | 69.56 | 84.23 | 82.54 | 76.28 |
| 25th Percentile | 90.00 | 75.00 | 62.00 | 55.67 | 55.00 | 75.00 | 100.00 | 64.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 74.00 | 72.00 | 70.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.33 |
| Std Deviation | 13.14 | 30.34 | 16.80 | 18.83 | 17.05 | 18.69 | 33.94 | 16.02 |
| Range | 90.00 | 100.00 | 70.00 | 90.00 | 85.00 | 87.50 | 100.00 | 76.00 |
| % Ceiling | 46.8 | 74.8 | 0 | 3.1 | 6.2 | 44.0 | 75.8 | 9.0 |
| % Floor | 0 | 6.9 | 0.2 | 0 | 0 | 0 | 11.0 | 0 |
| Valid N | N=421 | N=420 | N=420 | N=421 | N=420 | N=420 | N=418 | N=420 |
| **Ages 40-49 Male (N=429)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 88.59 | 86.24 | 72.11 | 69.61 | 70.63 | 86.66 | 84.39 | 78.26 |
| 25th Percentile | 85.00 | 75.00 | 62.00 | 57.00 | 60.00 | 75.00 | 100.00 | 68.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 74.00 | 72.00 | 70.00 | 87.50 | 100.00 | 80.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 85.00 | 80.00 | 100.00 | 100.00 | 89.33 |
| Std Deviation | 15.39 | 27.72 | 16.11 | 18.63 | 17.1 | 17.02 | 32.39 | 15.26 |
| Range | 100.00 | 100.00 | 68.00 | 95.00 | 80.00 | 87.50 | 100.00 | 72.00 |
| % Ceiling | 33.8 | 74.7 | 0 | 2.3 | 7.0 | 49.4 | 78.5 | 11.7 |
| % Floor | 0.5 | 4.7 | 0 | 0 | 0 | 0 | 9.4 | 0 |
| Valid N | N=429 | N=427 | N=429 | N=429 | N=429 | N=429 | N=427 | N=429 |

| Ages 50-59 Male (N=260) | PF | REP | BP | GH | VT | SF | REE | MH |
|---|---|---|---|---|---|---|---|---|
| Mean | 83.69 | 82.12 | 70.43 | 64.55 | 68.46 | 85.77 | 83.66 | 76.09 |
| 25th Percentile | 75.00 | 75.00 | 62.00 | 52.00 | 55.00 | 75.00 | 83.33 | 61.00 |
| 50th Percentile (Median) | 90.00 | 100.00 | 74.00 | 64.50 | 70.00 | 87.50 | 100.00 | 80.00 |
| 75th Percentile | 98.75 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 92.00 |
| Std Deviation | 17.90 | 32.17 | 17.22 | 21.51 | 17.40 | 18.07 | 32.06 | 17.60 |
| Range | 85.00 | 100.00 | 70.00 | 100.00 | 85.00 | 75.00 | 100.00 | 68.00 |
| % Ceiling | 25.0 | 71.9 | 0 | 1.2 | 5.4 | 49.2 | 75.3 | 11.5 |
| % Floor | 0 | 7.7 | 0 | 1.2 | 0 | 0 | 9.3 | 0 |
| Valid N | N=260 | N=260 | N=260 | N=260 | N=260 | N=260 | N=259 | N=260 |
| **Ages 60-69 Male (N=128)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 75.20 | 66.99 | 64.24 | 58.36 | 62.97 | 80.47 | 79.43 | 75.31 |
| 25th Percentile | 65.00 | 25.00 | 51.00 | 45.00 | 50.00 | 65.63 | 66.67 | 64.00 |
| 50th Percentile (Median) | 80.00 | 100.00 | 62.00 | 61.00 | 60.00 | 87.50 | 100.00 | 76.67 |
| 75th Percentile | 93.75 | 100.00 | 84.00 | 72.00 | 75.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 21.24 | 41.61 | 21.12 | 20.41 | 18.02 | 22.00 | 36.26 | 17.27 |
| Range | 90.00 | 100.00 | 90.00 | 92.0 | 100.00 | 87.50 | 100.00 | 84.00 |
| % Ceiling | 11.7 | 55.5 | 0 | 0 | 3.1 | 38.3 | 72.7 | 8.6 |
| % Floor | 0 | 19.5 | 2.3 | 0 | 0.8 | 0 | 12.5 | 0 |
| Valid N | N=128 | N=128 | N=128 | N=128 | N=128 | N=128 | N=128 | N=128 |
| **Ages 70 & over Male (N=43)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 65.81 | 65.12 | 62.44 | 52.28 | 56.51 | 72.97 | 71.32 | 72.19 |
| 25th Percentile | 49.17 | .00 | 48.75 | 35.00 | 39.17 | 62.50 | 27.78 | 54.00 |
| 50th Percentile (Median) | 70.00 | 100.00 | 62.00 | 50.00 | 53.33 | 75.00 | 100.00 | 72.00 |
| 75th Percentile | 89.17 | 100.00 | 79.00 | 73.25 | 79.17 | 100.00 | 100.00 | 94.00 |
| Std Deviation | 24.83 | 45.03 | 19.52 | 24.41 | 25.60 | 28.34 | 42.15 | 21.09 |
| Range | 100.00 | 100.00 | 90.00 | 97.00 | 100.00 | 100.00 | 100.00 | 84.00 |
| % Ceiling | 4.7 | 58.1 | 0 | 0 | 9.3 | 34.9 | 65.1 | 16.3 |
| % Floor | 2.3 | 27.9 | 2.3 | 4.7 | 2.3 | 2.3 | 20.9 | 0 |
| Valid N | N=43 | N=43 | N=43 | N=43 | N=43 | N=43 | N=43 | N=43 |

## Table VI: Norms for Ethnic Groups, General Malaysian Population, Females & Males Combined

| Malay (N=2019) | PF | REP | BP | GH | VT | SF | REE | MH |
|---|---|---|---|---|---|---|---|---|
| Mean | 87.00 | 81.81 | 69.58 | 67.09 | 67.81 | 84.44 | 79.58 | 75.83 |
| 25th Percentile | 80.00 | 75.00 | 62.00 | 52.00 | 55.00 | 75.00 | 66.67 | 64.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 72.00 | 67.00 | 70.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 16.98 | 32.33 | 17.32 | 19.96 | 17.59 | 18.98 | 35.86 | 17.03 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| % Ceiling | 33.8 | 70.4 | 0 | 2.1 | 4.5 | 44.8 | 71.9 | 10.5 |
| % Floor | 0.1 | 8.2 | 0.3 | 0.2 | 0.1 | 0.1 | 12.8 | 0.0 |
| Valid N | N=2019 | N=2014 | N=2018 | N=2018 | N=2019 | N=2019 | N=2014 | N=2019 |
| **Chinese (N=505)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 85.52 | 85.69 | 74.52 | 67.32 | 65.37 | 82.43 | 82.67 | 73.26 |
| 25th Percentile | 80.00 | 100.00 | 62.00 | 52.00 | 55.00 | 75.00 | 100.00 | 64.00 |
| 50th Percentile (Median) | 90.00 | 100.00 | 80.00 | 67.50 | 65.00 | 87.50 | 100.00 | 73.33 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 17.50 | 29.87 | 17.27 | 19.28 | 17.36 | 19.53 | 33.54 | 16.89 |
| Range | 85.00 | 100.00 | 90.00 | 100.00 | 95.00 | 100.00 | 100.00 | 92.00 |
| % Ceiling | 28.5 | 77.2 | 0 | 3.6 | 3.2 | 39.6 | 75.9 | 6.1 |
| % Floor | 0 | 6.3 | 0.2 | 0.2 | 0 | 0.2 | 10.2 | 0 |
| Valid N | N=505 | N=505 | N=505 | N=504 | N=505 | N=505 | N=502 | N=505 |
| **Indian (N=165)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
| Mean | 78.76 | 79.24 | 66.00 | 65.02 | 61.55 | 79.73 | 74.80 | 67.85 |
| 25th Percentile | 68.33 | 75.00 | 52.00 | 52.00 | 50.00 | 65.62 | 33.33 | 56.00 |
| 50th Percentile (Median) | 85.00 | 100.00 | 68.00 | 65.00 | 65.00 | 87.50 | 100.00 | 69.33 |
| 75th Percentile | 95.00 | 100.00 | 84.00 | 82.00 | 75.00 | 100.00 | 100.00 | 80.00 |
| Std Deviation | 20.99 | 31.07 | 19.29 | 19.72 | 17.75 | 20.83 | 36.20 | 17.96 |
| Range | 100.00 | 100.00 | 90.00 | 100.00 | 90.00 | 87.50 | 100.00 | 84.00 |
| % Ceiling | 21.8 | 58.8 | 0 | 0.6 | 1.8 | 32.3 | 62.2 | 3.6 |
| % Floor | 0.6 | 7.9 | 0.6 | 1.2 | 0 | 0 | 11.6 | 0 |
| Valid N | N=165 | N=165 | N=165 | N=165 | N=165 | N=164 | N=164 | N=165 |

| **Other Bumiputera (N=354)** | **PF** | **REP** | **BP** | **GH** | **VT** | **SF** | **REE** | **MH** |
|---|---|---|---|---|---|---|---|---|
| Mean | 84.04 | 78.35 | 66.98 | 64.57 | 65.20 | 83.53 | 74.83 | 73.01 |
| 25th Percentile | 75.00 | 70.83 | 52.00 | 52.00 | 50.00 | 75.00 | 33.33 | 60.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 62.00 | 65.33 | 65.00 | 87.50 | 100.00 | 76.00 |
| 75th Percentile | 100.00 | 100.00 | 84.00 | 82.00 | 80.00 | 100.00 | 100.00 | 88.00 |
| Std Deviation | 20.72 | 34.61 | 17.63 | 21.20 | 18.18 | 19.25 | 38.58 | 17.58 |
| Range | 100.00 | 100.00 | 80.00 | 100.00 | 90.00 | 87.50 | 100.00 | 80.00 |
| % Ceiling | 33.9 | 65.0 | 0 | 3.1 | 3.7 | 44.2 | 66.1 | 9.1 |
| % Floor | 0.3 | 11.1 | 0 | 0.8 | 0 | 0 | 16.0 | 0 |
| **Valid N** | **N=354** | **N=351** | **N=353** | **N=354** | **N=353** | **N=353** | **N=351** | **N=353** |
| Others (N=29) | PF | REP | BP | GH | VT | SF | REE | MH |
| Mean | 87.24 | 93.97 | 75.69 | 68.38 | 70.52 | 81.90 | 73.56 | 76.28 |
| 25th Percentile | 82.50 | 100.00 | 62.00 | 58.50 | 57.50 | 70.83 | 44.44 | 68.00 |
| 50th Percentile (Median) | 95.00 | 100.00 | 74.00 | 70.33 | 75.00 | 91.67 | 100.00 | 77.33 |
| 75th Percentile | 100.00 | 100.00 | 90.00 | 87.00 | 80.00 | 100.00 | 100.00 | 84.00 |
| Std Deviation | 21.11 | 19.66 | 14.68 | 20.02 | 14.10 | 23.76 | 39.22 | 12.65 |
| Range | 100.00 | 100.00 | 48.00 | 85.00 | 60.00 | 100.00 | 100.00 | 48.00 |
| % Ceiling | 34.5 | 86.2 | 0 | 3.4 | 3.4 | 48.3 | 62.1 | 3.4 |
| % Floor | 3.4 | 3.4 | 0 | 0 | 0 | 3.4 | 17.2 | 0 |
| Valid N | N=29 | N=29 | N=29 | N=29 | N=29 | N=29 | N=29 | N=29 |

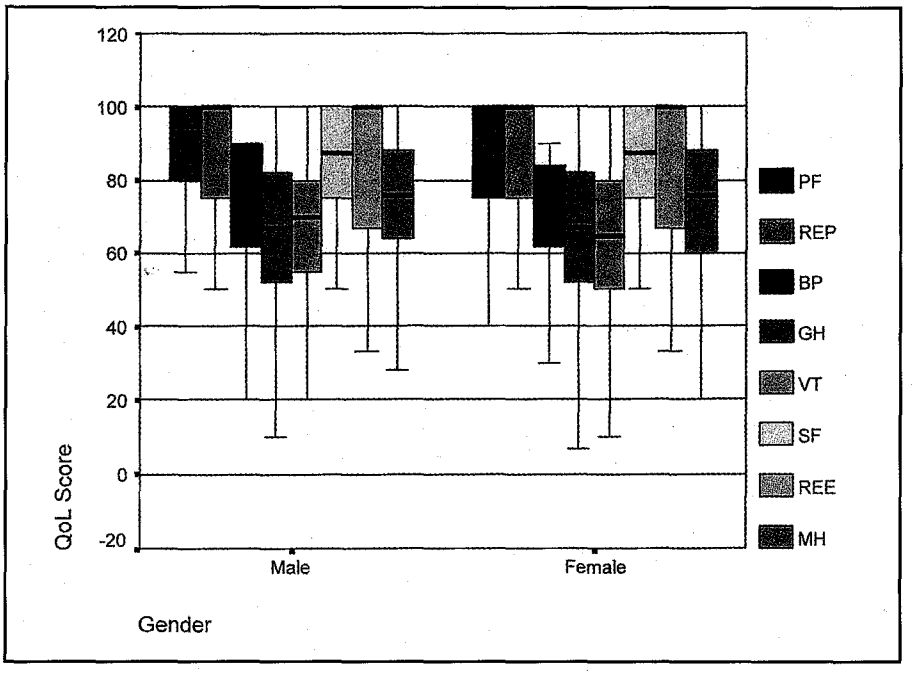


**Fig. 1: Box plot for eight subscales of SF-36, by sex**

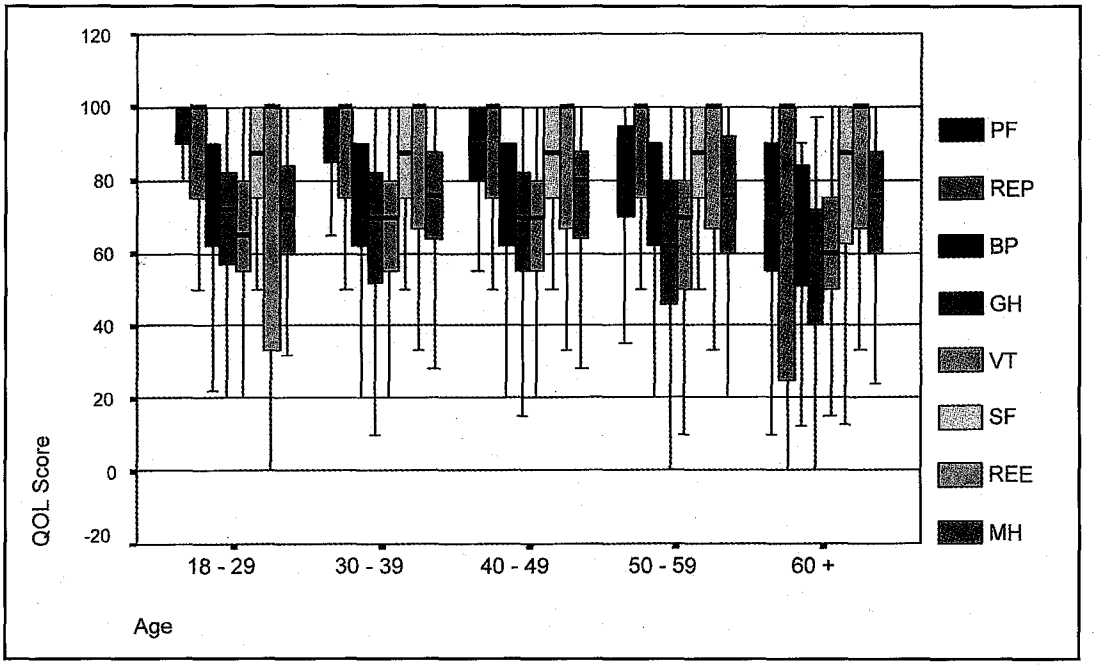


**Fig. 2: Box plot for eight subscales of SF-36, by age**

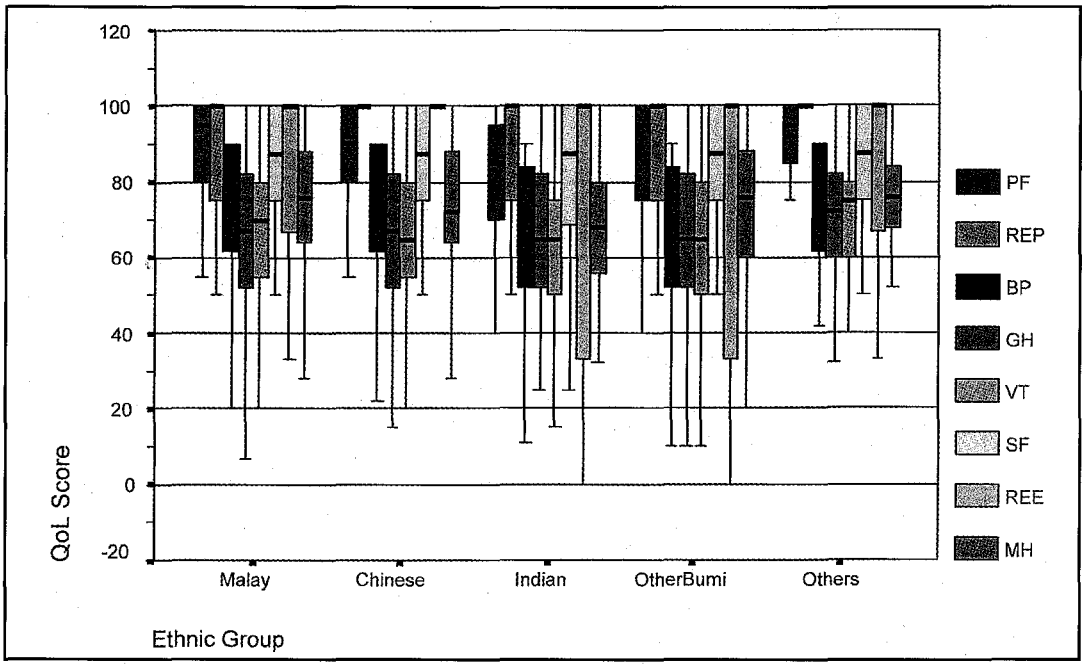


**Fig. 3: Box plot for eight subscales of SF-36, by ethnicity**

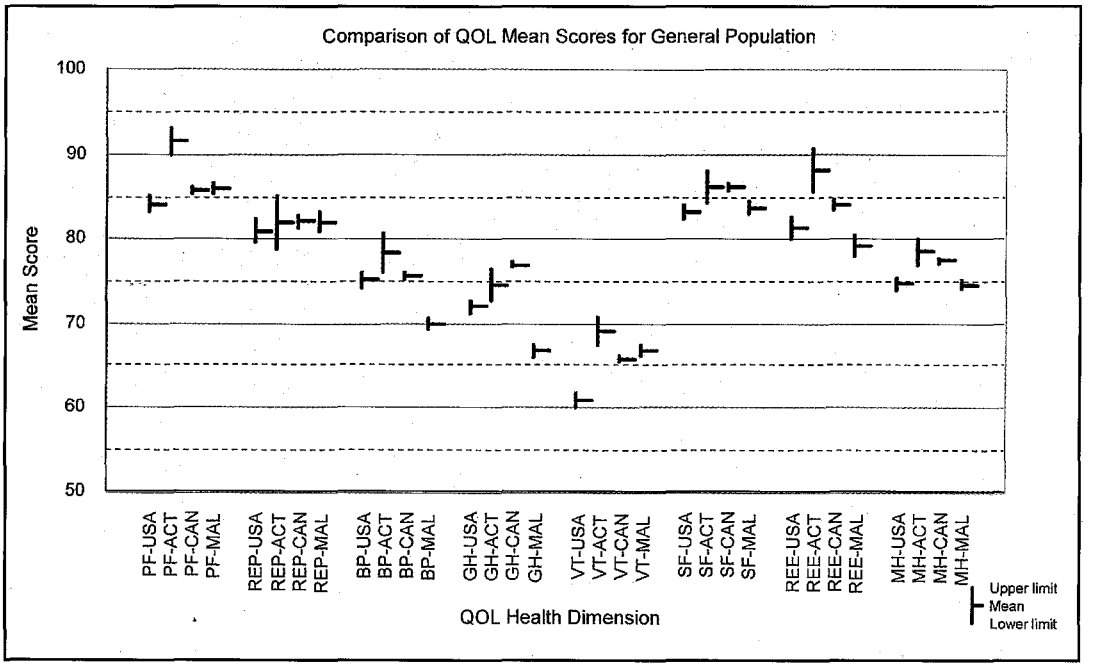


**Fig. 4: Comparison of QOL Mean Scores for General Population for some countries**

## Discussion

Health of the population in relation to functional health, well-being, and relative burden of disease are essential information to evaluate the effectiveness of any health care service across diverse populations. The dearth of such information can be attributed to difficulties in finding measurement tools that is both appropriate and practical to apply. We have used the SF-36 because of its well-established evidence that suggests the instrument to be sensitive to changes in the health of the general population[6,7].

Normative data make it possible to interpret the scale score for an individual respondent or the average score for a group of respondents in comparison to the distribution of scores for other individuals in the morning sample. For normative data to be valid, they must be based on a well-defined and representative sample of the population[4]. Though effort had been made in the sampling design to increase representativeness, with a response rate of only 30.6% and significant age-sex composition and ethnic differences between the sample and the population, readers are cautioned on the possible influence of response bias.

The means and standard deviations are presented to enable comparison of individuals or specific groups of populations' scores with the Malaysian average. Caution is advised in interpreting and using the results due to poor response rate. Furthermore, some subgroups have smaller sample sizes and estimates may not be stable. This is especially so for the Others ethnic group, and those 70 and above. Care also needs to be exercised when interpreting the results for SF and BP due to the errors in the questionnaire.

In addition, the scope of these results is limited to Malaysian adults aged 18 years and above, and those literate in either Bahasa Malaysia or English Language. Response bias may also affect the means, given the poor response rate of only 30.6%, though reported rates for postal surveys have been reported to range from a low of 24% to a high of 92%[18].

In general, the mean scores for all scales were above 65.0 QOL units. On a scale of 0-100, the higher scores may be interpreted as having achieved substantial quality in their life with the population perceiving to be in better health physically than mentally. The variability in scores by age and sex underscores the need to use the appropriate age- or sex-specific normative data whenever possible.

Our findings show that there are significant gender differences within the Malaysian population, with men scoring higher on all domains. These results are consistent with those reported for the United States, United Kingdom and Canada[12].

Our study did not show any significant differences between ethnic groups. In addition, lower scores were reported for MH among the younger population, perhaps reflecting higher expectations. Further in-depth qualitative studies are required to attempt explaining these phenomena.

Overall, means for the Malaysian population generally differ from the population norms for USA[4], Canada[12] and the ACT, Australia[13] with the exception of REE, which is noted to be a less sensitive scale[4]. The differences between countries could be due to methodological dissimilarity instead of reflecting true differences. Possibly, there may be differences in age-sex composition of the general population between the countries, differences in prevalence of co morbidity, and problems with cross-population comparability between the countries. The norms were not adjusted to a standard population composition, as norms from other countries were not presented in that manner and hence comparison would be difficult. Problems with cross population comparability include inconsistent reporting between actual and self-reported health states and differences in end-points and cut-points on the reference scale[19]. Biases in self-report of health status in non-fatal outcomes had been reported to affect comparison across populations[19]. Here, the question is whether, for example, the sexes, differ in their willingness to endorse lower end (poorer functioning) items, or whether it actually reflects poorer Quality of Life for women. We assumed that the distribution of QOL is equivalent for both sexes, and it is the reporting that differs. Hence, we have reported separate norms[20].

Most subscales of SF-36 are sensitive for the Malaysian general population, with the exception of REP and REE. Sensitivity of the subscale PF increases with age. The ceiling effects noted were most conspicuous for the REP and REE. This was not surprising as these two scales of the SF-36 are relatively coarse role disability scales[21]. Both measures have only four and five levels respectively across a restricted range and, therefore, usually have the most problems with ceiling and floor

effects. Knowing the fact that ceiling and floor effects does exist is important since the ability of an instrument to detect change is constrained by the percentage of respondent at either end of the effects.

The differences seen in the SF-36 scores across age, gender and countries confirm that these Malaysian norms are essential. It is useful for comparison with diseased state values and means in studies in Malaysia. It may be used as a measure to reflect the "shortfall" in quality of life for a diseased or handicapped state when compared to the general Malaysian population. This distribution can also be used as a baseline for comparison in future surveys looking at quality of life of the general population, especially after interventional programmes of public health nature.

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