Hong Kong men with low incomes have worse health-related quality of life as judged by SF-36 scores

根据「整體健康調查簡短表格-36問卷」（SF-36問卷）的得分，香港低收入男性有較差的與健康有關的生活質素

Objective. To analyse the association between income and health-related quality of life using the Medical Outcome Study Short Form 36 (SF-36) Chinese version in Hong Kong Chinese working population.

Design. Cross-sectional observation study.

Setting. A commercial company in Hong Kong.

Participants. All clerical and administrative staff of a commercial company was invited to participate; 876 of the 1003 staff agreed. The subjects were categorised into three income groups according to monthly income in Hong Kong dollars (low, ≤10 000; middle, >10 000-25 000; high, >25 000). The mean age of the 288 men and 588 women was 34.9 (standard deviation, 7.9; median, 34.0; range, 18-71) years.

Main outcome measures. SF-36 scores on health-related quality of life.

Results. The distribution of income was 30% in high-, 54.8% in middle-, and 15.2% in low-income groups. Women had similar SF-36 scores among different income groups. In men, for most variables there was a significant positive linear correlation between income and SF-36 scores.

Conclusion. Low income is associated with a worse health-related quality of life in Hong Kong Chinese men.

Introduction

Hong Kong is an affluent society with an urbanised and westernised lifestyle. Chronic medical conditions such as diabetes, obesity, and hypertension are very common in many parts of Asia including Hong Kong. These chronic diseases have significant adverse impacts on the quality of life (QOL). Among others, the environment is one of the most important factors influencing health-related QOL.

In the western literature, socio-economic status such as income has also been shown to relate to QOL. However, there has been no study on any possible association between income and QOL in Hong Kong Chinese population. We...
respectively.

The subjects were invited to participate; 876 of the 1003 staff agreed. All the subjects were asked to complete a questionnaire and underwent a simple health check. The questionnaire was self-administered and included a validated Medical Outcome Study Short Form 36 (SF-36) Chinese version to assess health-related QOL. The subjects were also asked about: monthly income, occupational rank, education level, self-perception of their own health, medical history, and social background. The occupation and monthly income were verified from relevant human resources records. Other personal particulars were based on the answers from the questionnaires.

The health check included measurements of blood pressure, body weight and height. Blood pressure was measured in the right arm after at least 5 minutes of rest, using the Dinamapp machine and the Karotkoff sound V was used as the diastolic blood pressure. Body weight and height were measured with light clothing and without shoes. Body mass index (BMI) was calculated as weight (kg) divided by the square of the height (m²).

**Low income**

Low-income household or family is defined as annual (gross) income not exceeding 80% of the median income for the area, after adjustment for family size. According to the 2001 population census, the median monthly domestic household income in Hong Kong was HK$18 750 with 1.5 members per household. Low-income cut-off was therefore defined as HK$18 750 x 80%/1.5=HK$10 000. The subjects were therefore classified into low-, middle-, and high-income groups depending on whether their monthly incomes were ≤HK$10 000, >HK$10 000 to 25 000, and >HK$25 000, respectively.

**Medical Outcome Study Short Form 36**

The SF-36 consists of 36 items grouped under nine scales: ten items on physical functioning (PF), four on role limitation due to physical problems (RP), two on bodily pain (BP), five on general health (GH), four on vitality (VT), two on social functioning (SF), three on role limitation due to emotional problems (RE), five on mental health (MH), and one on health transition (HT). The scores of the items in each scale are summated and transformed into a scale score that has a standardised range from 0 to 100. The scores can be further summarised into a mean physical component score (PCS) and a mean mental component score (MCS). Mean PCS is the mean of PF, RP, BP, and GH, while mean MCS is the mean of VT, SF, RE, MH, and HT. Higher scores indicate better QOL. These scales cover the essential domains of health-related QOL.

The Chinese version of the SF-36 has been validated on Chinese adults in Hong Kong. A norm reference score for Hong Kong Chinese adults has also been reported and compared with US population norms.

**Statistics**

Statistical analysis was performed using the Statistical Package for the Social Sciences (Windows version 10.0; SPSS Inc, Chicago [IL], US). All results are expressed as mean±standard deviation or n (%) where appropriate. The Student’s t-test, and Chi squared test were used for between-group comparisons where appropriate. ANOVA with age as covariate was performed. Bonferroni post-hoc multiple comparisons were performed to assess intergroup significance. A P value of <0.05 (2-tailed) was considered significant.

**Results**

A total of 288 (33%) men and 588 (67%) women agreed to participate; the mean age was 34.9 (standard deviation, 7.9; median, 34.0; range, 18-71) years. Table 1 summarises the subjects’ clinical characteristics and categorises them according to income; there being 30% in high-, 54.8% in middle-, and 15.2% in low-income group subjects. In terms of occupation, 17.9% were managerial or professional, 73.8% were non-manual workers, and 8.4% were unskilled or manual workers. In terms of education level, 50.8% finished high school or university, 47.8% finished middle school, and 1.4% were illiterate or completed elementary schooling only.

Table 2 summarises the scores of the nine scales of

![Table 1. Clinical characteristics and distribution of income of the 876 subjects*](image-url)
SF-36 according to income groups. Age, BMI, and blood pressure were similar among different income groups except in women; those in the high-income group were older than those with lower income. Women among different income groups had similar SF-36 scores in all scales. In men, there was a significant positive linear correlation between income and SF-36 scores for most variables. The lower the income, the worse (lower) the SF-36 scores for PF, RP, SF and MH items (even after adjusting for age). The Figure shows the mean PCS and MCS of the SF-36 scale. Men in the low-income group had the lowest mean PCS and MCS, while men in the high-income group had the highest mean PCS and MCS. Mean PCS and MCS were similar in women among different income groups.

**Discussion**

The present study has several major limitations. First, the sample population was female dominant with a low proportion of unskilled or manual workers. It is not representative of the working population in Hong Kong. Nevertheless, the income groups were relatively well distributed, half of the subjects being in the middle-income group. Second, the number of subjects recruited is

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**Table 2. Clinical characteristics and SF-36 scale scores of the 876 subjects**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Total</th>
<th>High Income</th>
<th>Middle Income</th>
<th>Low Income</th>
<th>P value for trend after adjusting for age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>34.5±7.5</td>
<td>35.8±6.1</td>
<td>35.6±5.5</td>
<td>35.7±14.1</td>
<td>-</td>
</tr>
<tr>
<td>SBP (mm Hg)</td>
<td>90.3±10.1</td>
<td>90.4±10.5</td>
<td>90.3±10.8</td>
<td>90.1±10.8</td>
<td>0.407 &lt;0.001‡</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>21.0±2.9</td>
<td>21.0±2.9</td>
<td>21.0±2.9</td>
<td>21.0±3.1</td>
<td>0.258 0.225</td>
</tr>
<tr>
<td>SF-36 scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCS</td>
<td>50±17.1</td>
<td>54.3±16.2</td>
<td>54.7±16.4</td>
<td>54.3±17.3</td>
<td>0.343 0.681</td>
</tr>
<tr>
<td>MCS</td>
<td>50±17.1</td>
<td>54.3±16.2</td>
<td>54.7±16.4</td>
<td>54.3±17.3</td>
<td>0.343 0.681</td>
</tr>
</tbody>
</table>

* Values are expressed as mean±SD
† SBP denotes systolic blood pressure, DBP diastolic blood pressure, BMI body mass index, 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, and HT health transition
‡ Significant difference between high- and low-income groups
§ Significant difference between middle- and low-income groups

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**Fig. Mean physical component score (PCS) and mean mental component score (MCS) of the 876 subjects**

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relative small. Nonetheless, the differential effect of income on QOL was markedly significant only among men, suggesting the high association between income and QOL in men. A follow-up survey using a more representative and larger sample is indicated to substantiate these findings. Third, available information on other health-related variables and their outcome such as cardiovascular diseases was limited. It is important to have such details as cardiovascular risk factors as well as related morbidity may confound the relationship between income and QOL.

The 36-item SF-36 is the most commonly used health-related QOL measurement instrument throughout the world.\textsuperscript{8,9,13} It is applicable to people with different kinds of health conditions. It can be used as an outcome measure as well as a control variable in clinical trials.\textsuperscript{14,15} This generic instrument has also been used in numerous studies investigating people from different socio-economic classes.\textsuperscript{16,17}

There is no doubt that parameters other than income have an effect on the health-related QOL such as physical and social factors. Yet, many studies in the western societies have demonstrated a strong correlation between income and a variety of indicators of physical, psychological, and social health.\textsuperscript{3,5-7} Asada and Ohkusa\textsuperscript{18} have documented a significant difference in health-related QOL due to inequality in income in a Japanese population.

To our knowledge, the present study is the first report on the association between income and health-related QOL among a Hong Kong Chinese population. We found a positive linear correlation between men’s income and many health-related QOL variables such as PF, RP, SF, MH, as well as the overall mean PCS and MCS.

Hong Kong Chinese women did not show any significant association between health-related QOL and income. This may be due to the small sample size or a cultural phenomenon; for women occupational status and income level might be less important than for men. In Chinese society, men are regarded as bread-winners of the family and high income is a symbol of success. This may adversely affect the psychological aspects of health in Chinese men and contribute to a worse QOL.

We have previously reported that a low socio-economic status (based on education level and occupation) is a risk factor for glucose intolerance in a Hong Kong Chinese population.\textsuperscript{19} Our findings, together with others, suggest that the affluence of the country, social class, and income of the population may interact with factors such as ethnicity, ageing, and family history.\textsuperscript{19,21} It is evident that the gap between rich and poor is growing in most countries. Therefore, to improve the cost-effectiveness of a health screening and prevention programme, low-income populations should be targeted.

**Conclusion**

Low income is associated with a worse health-related QOL in Hong Kong Chinese men. The association between income and QOL among Hong Kong Chinese women is unclear. Our findings indicate that subjects with low income should be targeted for health education and screening, especially in the presence of other risk factors.

**References**

15. Ware JE Jr, Bayliss MS, Rogers WH, Kosinski M, Tarlov AR. Differences in 4-year health outcomes for elderly and poor, chronically ill patients treated in HMO and fee-for-service systems. Results from the Medical Outcomes Study. JAMA 1996;276:1039-47.
20. Ware JE Jr, Bayliss MS, Rogers WH, Kosinski M, Tarlov AR. Differences in 4-year health outcomes for elderly and poor, chronically ill patients treated in HMO and fee-for-service systems. Results from the Medical Outcomes Study. JAMA 1996;276:1039-47.