

The impact of chronic diseases on the health-related quality of life (HRQOL) of Chinese patients in primary care

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Background. Ageing of the population results in an increasing number of people living with chronic diseases that can adversely affect their quality of life. Information on the impact of chronic diseases on quality of life can make health services more patient-centred.

Objectives. The aim of this study was to determine the impact of eight chronic diseases on the health-related quality of life (HRQOL) of Chinese patients.

Methods. A cross-sectional case–control study was carried out on 760 adult Chinese patients of a family medicine clinic in Hong Kong. Each subject answered the COOP/WONCA charts and a standard questionnaire on demographic and morbidity data. The likelihood of sub-optimal COOP/WONCA scores of each disease group was compared with that of patients without any of the surveyed diseases. The independent effects of each disease on the COOP/WONCA scores were analysed by multivariate logistic regression, controlling for demographic variables and co-morbidity.

Results. Depression increased the risks for sub-optimal scores in all but one COOP/WONCA chart with odds ratios (OR) ranging from 2.1818 to 3.8645. Hypertension increased the risk of a sub-optimal physical fitness score (OR 1.7263). Increased risk of limitations in daily activities was associated with stroke (OR = 1.8771), osteoarthritis of the knee (OR = 1.5867), diseases of joints other than the knees (OR 2.0187) and asthma/COPD (OR 2.1679). Osteoarthritis of the knees also increased the risk of sub-optimal overall health (OR = 1.7927).

Conclusions. Depression was the most disabling disease, and osteoarthritis of the knee had more impact on the HRQOL than many other chronic diseases. The lack of adverse effects of diabetes mellitus and heart disease on the HRQOL of Chinese patients deserves further studies.

Keywords. Chinese, chronic diseases, COOP/WONCA charts, primary care, quality of life.

Introduction

Advances in medicine have prolonged the life of many people with chronic diseases. Chronic diseases may not kill but they consume a lot of health care resources and threaten the quality of life of the sufferers.^{1–11} The ultimate goal of modern health care for patients with chronic disease is not only to delay death but also to promote health and quality of life. Health-related quality of life (HRQOL) has become an important measure of the outcome of care for patients with chronic diseases in the last two decades. It has also been found to be predictive of health service utilization and mortality.^{2,12–14} It

is subjective and should include the essential domains of physical, psychological, daily role and social functioning, and general health perception.^{15–17}

The aim of this study was to assess the impact of chronic diseases on the HRQOL of Chinese patients in a primary care clinic in Hong Kong. Most previous studies on the relationship between chronic diseases and quality of life were carried out in Western populations, which might not be applicable to our population, 96% of whom are Chinese.¹⁸ We wanted to know whether different diseases affected HRQOL differently and whether one aspect of HRQOL might be affected more than others. We hoped that the information could help doctors and health administrators to identify the needs of patients with chronic diseases better so that their services could be more patient-centred.

The impact of each chronic disease on HRQOL was measured in terms of the likelihood of sub-optimal

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functioning or health instead of numerical scores used by many other studies.^{4-6,8} We hoped that this would make the clinical significance of the results easier to interpret, and that doctors in primary care could use them to predict the risk for their patients.

Many earlier studies have shown that co-morbidity is common and may influence the patients' HRQOL.^{6-8,11,19-21} Demographic factors such as age, gender and socio-economic status could also affect people's health perception. Therefore, we also estimated the effect of each chronic disease and compared their relative impact independently of the effects of demographic factors and co-morbidity.

Methods

Study setting

The study was carried out in a teaching family medicine practice in Hong Kong. The practice was one of 60 Government outpatient clinics (GOPCs) which provides low-cost primary care for the public. The majority of patients with chronic diseases in Hong Kong are followed up in GOPCs for financial reason.¹⁸ At the time of the study, the practice had 5305 Chinese patients with an average of 70 persons consulting each day.

All patients aged 18 years or above consulting the practice from July 5 to August 3, 1995 were invited to take part in the study. Each patient in the study was interviewed with a structured questionnaire before the consultation with the doctor. The subject answered the questions in person unless he/she could not communicate, in which case the accompanying person (proxy) answered the questionnaire.

Survey instrument

The questionnaire consisted of questions on demographic and morbidity data and the Chinese version of the Dartmouth COOP Functional Health Assessment Charts/WONCA (COOP/WONCA charts).

Morbidity data were collected by a checklist for the presence of eight common chronic diseases that represented a wide range of problems from the asymptomatic to the potentially fatal. Each respondent was asked specifically if he/she had ever been diagnosed by a doctor as having hypertension, diabetes mellitus, asthma or chronic obstructive pulmonary disease (COPD), heart disease of any kind, stroke, osteoarthritis (OA) of the knee, joint diseases other than those of the knees (other joints) and depression. Asthma and COPD were considered as one group because there is considerable clinical overlap between them. No distinction was made for the different types of heart diseases because patients cannot always tell the difference between them. The records of the respondents were also reviewed for the presence of these diagnoses. A subject was considered to have the particular disease if he or she was sure that such

a diagnosis had been made by a doctor or the diagnosis was documented in his/her record.

The COOP/WONCA charts consist of one chart each on physical fitness, feelings, limitation in daily activities, limitation in social activities, overall health and change in health. They have been validated and tested on patients in primary care in different cultures including the Chinese.^{22,23} The first five charts cover the essential concepts of HRQOL.¹⁵⁻¹⁷ The chart on change in health does not assess HRQOL but provides additional information for the interpretation of the results of the other charts. Each chart is rated on a five-point Likert scale, with higher scores indicating worse function or health status. A summary of the questions and response choices of the COOP/WONCA charts is shown in Appendix A.

Data analysis

The scores of each of the five COOP/WONCA charts on HRQOL were grouped into two categories (optimal and sub-optimal) for further analysis. The optimal category consisted of scores 1 and 2 and the sub-optimal category consisted of scores 3, 4 and 5 for the charts on physical fitness, feelings, daily activities and social activities. Scores 1, 2 and 3 were grouped into the optimal category, while scores 4 and 5 were grouped into the sub-optimal category for the overall health chart. The proportions of sub-optimal COOP/WONCA scores for each disease group were compared with those of patients without any of the chronic diseases (control group). The difference in proportion between them was tested by the chi-square test.

The effects of diagnosis, age, social class by occupation,²⁴ marital status, education and gender on the COOP/WONCA scores were analysed by multivariate forward logistic regression. All the independent variables were fitted together into the logistic regression model, and *P*-values ≤ 0.05 were considered statistically significant. All data analyses were carried out by the SPSS for Windows 8.0 program.²⁵

Results

Seven hundred and sixty (97.8%) of 777 eligible patients completed the survey. Twenty-three (3%) of the questionnaires were answered by proxies. There were 222 (29.2%) males and 538 (70.8%) females. The mean age was 57.6 years (range 18-94 years, SD 18). One hundred and ninety-one (25.1%) people were not known to have any of the surveyed chronic diseases, 202 (26.6%) had one, 188 (24.7%) had two, 89 (11.7%) had three, 28 (3.7%) had four, three (0.4%) had five and one (0.1%) each had six and seven of the chronic diseases. Fifty-seven (7.5%) people were not sure if they had any of the diagnoses.

The number of persons and demographic characteristics of the sample and each disease group are shown in

TABLE 1 Demographic characteristics of subjects by disease groups

	Mean age (years)	Mean duration of illness (years)	Females (%)	Social class V (%)	No formal school (%)	Deceased spouse (%)
Overall (n = 760)	57.6	–	70.8	40.1	35.8	19.9
Control group ^a (n = 191)	43.2	–	76.4	22.0	14.1	5.2
Hypertension (n = 300)	66.3	6.4	65.0	47.7	44.7	29.3
Diabetes mellitus (n = 152)	66.2	8.0	67.8	51.3	48.7	27.6
Heart disease (n = 49)	69.9	7.3	73.5	49.0	49.0	42.9
Stroke (n = 60)	69.9	7.1	51.7	36.7	38.3	40.0
OA knee (n = 215)	65.1	7.9	77.7	56.3	54.0	29.8
Other joints (n = 88)	61.7	5.6	81.1	47.7	48.9	27.3
Asthma/COPD (n = 65)	61.9	9.6	50.8	42.9	44.4	25.4
Depression (n = 56)	62.0	5.7	80.4	50.0	51.8	35.7

^a The control group consisted of patients without any of the surveyed diagnoses.

Table 1. Patients with chronic diseases were more likely than controls to be older, less educated, unskilled workers and persons whose spouses were deceased.

Table 2 compares the unadjusted proportions of sub-optimal COOP/WONCA scores of each disease group with those of patients without any of the diagnoses (control group). Apart from hypertension and diabetes mellitus, the presence of any one chronic disease tended to increase the risk of sub-optimal scores for all the charts. The differences in physical fitness scores were statistically significant for all disease groups. The difference in the feelings scores was statistically significant for depression. The differences in daily activities scores were significant for stroke, OA of the knee, other joint diseases and asthma/COPD. The difference in social activities scores was significant for depression. The differences in the overall health scores were significant for asthma/COPD and depression.

Table 3 shows the results of multivariate forward logistic regression of the COOP/WONCA scores on each diagnosis and demographic variables. Subjects who were unsure of the diagnosis were categorized into the 'absence of the diagnosis' group for the logistic regression in order not to exclude too many cases from the analysis. All the odds ratios for sub-optimal COOP/WONCA scores shown were significant at the 5% level. Each odds ratio was the ratio between the odds of a sub-optimal score of

those with and those without the relevant diagnosis, after controlling for the effects of demographic variables and co-existing chronic diseases. Most odds ratios approximated the relative risks since the absolute risk in the unexposed was <20%, except for the physical fitness score. The odds ratios of sub-optimal physical fitness scores for hypertension and depression corresponded to relative risks of 1.3 and 1.8, respectively.²⁶

The effects of most chronic diseases on the physical fitness score became insignificant when they were controlled for demographic variables and co-morbidity. Hypertension increased the odds of sub-optimal physical fitness scores but reduced the risk of sub-optimal feelings and overall health scores. Diabetes mellitus significantly reduced the likelihood of sub-optimal scores for feelings, social activities and overall health. Heart disease did not have any significant independent effect on any COOP/WONCA scores. OA of the knee increased the risk of sub-optimal scores for daily activities and overall health. Stroke, other joint diseases and asthma/COPD each increased the risk of sub-optimal scores for daily activities. Depression was a risk factor of sub-optimal scores for all but the daily activities charts.

Age, educational level and gender had some effects on the COOP/WONCA scores but social class and marital status had no effects. Increasing age increased the risk of sub-optimal physical fitness scores. Education decreased

TABLE 2 The likelihood of sub-optimal COOP/WONCA scores by diagnosis

	Number of subjects (%)				
	Physical fitness score >2	Feelings score >2	Daily activity score >2	Social activity score >2	Overall health score >3
Control group (<i>n</i> = 191)	76 (40%)	35 (18%)	27 (14%)	17(9%)	33(17%)
Hypertension (<i>n</i> = 300)	232 (77%)*	46 (15%)	45 (15%)	28 (9%)	47 (16%)
RR	1.94	0.84	1.06	1.05	0.91
95% CI	1.62–2.34	0.56–1.25	0.68–1.65	0.59–1.86	0.60–1.36
Diabetes mellitus (<i>n</i> = 152)	107 (70%)*	18 (12%)	19 (13%)	6 (4%)	19 (13%)
RR	1.77	0.65	0.88	0.44	0.72
95% CI	1.44–2.17	0.38–1.09	0.51–1.53	0.18–1.10	0.43–1.22
Heart disease (<i>n</i> = 49)	42 (86%)*	13 (27%)	12 (24%)	7 (14%)	11 (22%)
RR	2.15	1.45	1.73	1.61	1.30
95% CI	1.75–2.65	0.83–2.52	0.95–3.17	0.71–3.65	0.71–2.38
Stroke (<i>n</i> = 60)	51 (85%)*	14 (23%)	16 (27%)*	9 (15%)	8 (13%)
RR	2.14	1.27	1.89	1.69	0.77
95% CI	1.74–2.62	0.74–2.20	1.09–3.26	0.79–3.58	0.38–1.58
OA knee (<i>n</i> = 215)	152 (71%)*	50 (23%)	50 (23%)*	28 (13%)	53 (25%)
RR	1.78	1.27	1.65	1.46	1.43
95% CI	1.46–2.16	0.86–1.87	1.07–2.52	0.83–2.59	0.97–2.10
Other joints (<i>n</i> = 88)	64 (73%)*	23 (26%)	26 (30%)*	12 (14%)	22 (25%)
RR	1.83	1.43	2.09	1.53	1.45
95% CI	1.47–2.27	0.90–2.26	1.30–3.36	0.77–3.07	0.90–2.33
Asthma/COPD (<i>n</i> = 65)	47(72%)*	17 (26%)	19 (29%)*	10 (15%)	19 (29%)*
RR1	1.82	1.43	2.07	1.73	1.69
95% CI	1.44–2.29	0.86–2.37	1.24–3.46	0.83–3.58	1.04–2.76
Depression (<i>n</i> = 56)	49 (88%)*	20 (36%)*	12 (21%)	13 (23%)*	18 (32%)*
RR	2.20	1.95	1.52	2.61	1.86
95% CI	1.80–2.69	1.23–3.09	0.82–2.79	1.35–5.04	1.14–3.04

RR = the relative risk of sub-optimal COOP/WONCA scores of subjects with the diagnosis compared with control subjects without any of the diagnoses.

* $P \leq 0.001$; ** $P \leq 0.01$; *** $P \leq 0.05$ by chi-square tests on the difference in proportions between patients with the diagnosis and controls without any of the diagnoses, *df* = 1.

the likelihood of sub-optimal physical fitness scores when compared with no formal schooling (primary education OR = 0.4925, CI = 0.32–0.75; secondary education OR = 0.4096, CI = 0.25–0.68; tertiary education OR = 0.3075, CI = 0.14–0.69). Females were more likely than males to have sub-optimal feelings scores.

Discussion

This study confirmed that many chronic diseases had an adverse effect on the HRQOL of Chinese patients and that different conditions affected different aspects of life. Sixty-seven per cent of subjects had at least one of

TABLE 3 The effects of chronic diseases on COOP/WONCA scores

	Odds ratio of sub-optimal scores (95% CI)				
	Physical fitness	Feelings	Daily activities	Social activities	Overall health
Hypertension	1.7263 (1.18–2.52)	0.6489 (0.44–0.96)	NS	NS	0.6460 (0.43–0.96)
Diabetes mellitus	NS	0.5065 (0.30–0.87)	NS	0.3174 (0.13–0.75)	0.5527 (0.33–0.94)
Heart disease	NS	NS	NS	NS	NS
Stroke	NS	NS	1.8771 (1.01–3.49)	NS	NS
OA knee	NS	NS	1.5867 (1.04–2.41)	NS	1.7927 (1.20–2.67)
Other joints	NS	NS	2.0187 (1.19–3.44)	NS	NS
Asthma/COPD	NS	NS	2.1679 (1.21–3.89)	NS	NS
Depression	3.8645 (1.65–9.03)	2.4404 (1.35–4.41)	NS	3.2912 (1.66–6.51)	2.1818 (1.19–4.00)
Age	1.0402 (1.03–1.05)	NS	NS	NS	NS
Gender	NS	1.8201 (1.17–2.84)	NS	NS	NS
Education (primary versus no school)	0.4925 (0.32–0.75)	NS	NS	NS	NS

Statistical rules:

1. The COOP/WONCA chart scores were the dependent variables, the scores were grouped into two categories: optimal scores and sub-optimal scores.
2. The independent variables were age (continuous), gender (binary: male as the reference), social class (five categories: class I as the reference), marital status (four categories: married as the reference), education (four categories: no schooling as the reference) and diagnosis (binary: absence of the diagnosis as the reference)
3. Each odds ratio measured the independent effect of the diagnosis on the likelihood of a sub-optimal COOP/WONCA score, controlling for demographic variables and the presence of other chronic diseases.
4. NS = not significant at the 5% level.

the eight chronic diseases, and 41% had more than one. These prevalences were relatively high compared with those reported in the literature.^{3,19,21} This was because the study practice was a GOPC, which had a high proportion of elderly patients with chronic diseases.

The unadjusted risks of sub-optimal COOP/WONCA scores shown in Table 2 represented what primary care doctors might expect to find in the real clinical setting. A Chinese patient with depression is likely to have an 88% chance of reporting sub-optimal physical fitness, a 36% chance of moderate to severe emotional problems, a 26% chance of limitation in his/her social activities and a 32% chance of fair or poor health. These risks were twice or more than those expected for patients without any of the common chronic diseases. Some of the observed effects might be the result of the patient's age, gender, educational level or co-existing diseases, but some demographic and morbidity characteristics tend to cluster together and it is almost impossible to separate

one effect from the other in clinical practice.²⁰ On the other hand, it is important to control for the effects of comorbidity and demographic variables in the evaluation of the effectiveness of care and medical risk adjustment so that these confounding factors will not bias the results.

The finding that heart diseases were not associated with any significant effect on any COOP/WONCA score was unexpected since previous studies showed that they adversely affected all HRQOL domains.^{4,5} There was a tendency for our cardiac patients to have a higher risk of sub-optimal scores for all the COOP/WONCA charts than the controls, although the differences did not reach statistical significance. This suggested the possibility of a type II statistical error in that the sample size of 49 subjects was too small to show a statistical significance for a small effect.²⁷ However, a statistically significant change might not be clinically important and further studies are required to determine the minimum clinically important change in quality of life rating for cardiac

patients. The other possible explanation was that 86% of the cardiac patients in this study had co-existing chronic diseases; the effects of these diseases might have 'cashed in' before heart disease could be entered into the regression model. The last, but not the least important, reason was that cardiac patients with severe disease or disability are followed up by cardiologists, thus most patients in primary care have only mild diseases with little disability. An evaluation on a larger sample of cardiac patients with different severities of illness could help to clarify the relationship between heart disease and HRQOL.

It seemed contradictory that diabetes mellitus reduced the risk of sub-optimal scores for feelings, social functioning and overall health. De Grauw *et al.* and others have shown that diabetes mellitus was associated with worse ratings in both physical fitness and overall health domains.^{5,11} Our finding was unlikely to be a confounding effect of co-morbidity because the latter was controlled for in the regression analysis and the majority of patients with diabetes mellitus did not have other chronic diseases except hypertension. Quality of life rating is subjective and relative to the person's life expectation. It has been found that successful adjustment has a positive effect on patients' perceived HRQOL.²⁸ Differences in people's adaptation to their illnesses and life expectations between the Chinese and Western cultures could be the reason for the different results. The Chinese culture promotes endurance, acceptance and adaptation to one's fate, including the presence of illnesses. Chinese patients with diabetes mellitus might down-regulate their expectations for life and would feel happy and contented as long as they remained asymptomatic and free from complications. They might even consider themselves fortunate and rate their health status more positively compared with the worst that they could expect from their illness. The promotion of a positive attitude could be as important as perfect glycaemic control in the care of diabetic patients.

Depression was the most disabling disease affecting not only the psychological well-being but also the physical and social functioning of the person. This finding reinforces the importance of recognizing and treating this disease adequately in primary care. The effect of depression on physical fitness has not been found by others.^{5,10} Physical and mental health are often considered to be two independent factors of HRQOL, and psychological diseases are not expected to affect the physical component of health.¹⁶ This unique finding in our patients could be due to a cultural tendency for Chinese patients to somatize their psychological problems.²⁹

Patients seemed to perceive OA of the knee to be more disabling than hypertension, diabetes mellitus and heart disease, although these latter three diseases are regarded as the most important chronic diseases by doctors. The amount of resources and number of research studies on hypertension, diabetes mellitus and heart diseases are countless, but those invested in the care of

patients with OA are negligible.¹⁴ There seems to be a discrepancy between how doctors and patients define the importance of an illness. OA of the knee is often ignored by doctors until the disease is very advanced because it does not kill and is often considered a 'normal' ageing process.^{14,30} This study and that by De-Bock *et al.* consistently showed that OA of the knee was a risk factor, independent of associated psychosocial factors or co-morbidity, of limitation in daily activities and poor general health.⁶ Research on the pathophysiology and mechanics of the knee joint has not advanced the care for patients with OA of the knee very far; it may be time for a paradigm shift towards a more patient-centred approach to this disabling disease.^{14,30}

The effects of hypertension on HRQOL reported in the literature are variable.^{4,5,8} Our findings of a negative effect on physical fitness but a positive effect on feelings are similar to those of Krousel-Wood *et al.*⁸ and Nelson *et al.*⁵ Krousel-Wood *et al.* also found that females with hypertension had better overall health ratings than females seen for other conditions.⁸

This study was carried out among patients in primary care who tended to have milder diseases and more stable conditions than patients under specialist care; therefore, the results may not be applicable to the latter setting. Furthermore, the findings from patients of one clinic might not be generalizable to all primary care practices in Hong Kong. We realize that self-reported data are subject to measurement errors, but the same bias should have been present for the disease and control groups so it should not have affected the results of the relative risk estimation and regression analysis.

The numbers of patients in the heart disease, asthma/COPD and stroke groups were small; the sample sizes had enough power to detect only a medium effect of 15–20% difference in proportions.²⁷ This study could not exclude some small effects that these chronic diseases might have on the quality of life of patients. We would also like to point out that the controls in this study could have diseases other than the eight chronic conditions surveyed, which could have deflated the difference in HRQOL ratings between them and the 'disease' groups. With these limitations, the study did prove that measurement of HRQOL was feasible for Chinese patients in a busy primary care clinic and gave a different perspective on how the importance of a disease could be defined.

Conclusions

This study confirmed that many common chronic diseases adversely affected the quality of life of Chinese patients, as they did for Caucasian patients. Depression, OA of the knee, other joint diseases, stroke, asthma/COPD and hypertension were each associated with a 30–200% relative increase in the risk of disability or ill health measured by the COOP/WONCA charts. Depression was the most disabling disease and daily role functioning was the most commonly affected HRQOL domain.

OA of the knee was more disabling than hypertension and diabetes mellitus from the patients' point of view. This raised the questions of how the importance of a disease should be measured and whether doctors or patients should be the judges. We need to include HRQOL as a routine outcome measure of care for patients with chronic diseases if health services are really for the betterment of the quality of life of people.

The positive impact of diabetes mellitus on HRQOL and the negative effect of depression on physical fitness found in our Chinese patients has not been reported in other cultures. Further studies on more representative samples are required to confirm whether there are true cultural differences in how Chinese people adjust to chronic diseases. It would be useful if we could identify

the positive and negative coping behaviours in each culture so that appropriate counselling could be given to patients.

The Chinese are the world's largest ethnic group who live in all parts of the world. We hope doctors world-wide will be more aware of the possible impact of chronic diseases on the quality of life of their Chinese patients.

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Appendix A

Questions and response choices of the COOP/WONCA charts

Physical fitness—During the past 2 weeks . . . what was the hardest physical activity you could do for at least 2 min?

1. very heavy, e.g. run, at a fast pace
2. heavy, e.g. jog, at a slow pace
3. moderate, e.g. walk at a fast pace
4. light, e.g. walk at a medium pace
5. very light, e.g. walk at a slow pace or not able to walk

Feelings—During the past 2 weeks . . . how much have you been bothered by emotional problems such as feeling anxious, depressed, irritable, or downhearted and sad?

1. not at all
2. slightly
3. moderately
4. quite a bit
5. extremely

Daily activities—During the past 2 weeks . . . how much difficulty have you had doing your usual activities or tasks, both inside and outside the home, because of your physical or emotional health?

1. no difficulty at all
2. a little bit of difficulty
3. some difficulty
4. much difficulty
5. could not do

Social activities—During the past 2 weeks . . . has your physical and emotional health limited your social activities with family, friends, neighbours or groups?

1. not at all
2. slightly
3. moderately
4. quite a bit
5. extremely

Overall health—During the past 2 weeks . . . how would you rate your health in general?

1. excellent
2. very good
3. good
4. fair
5. poor

Change in health—How would you rate your overall health now compared with two weeks ago?

1. much better
2. a little better
3. about the same
4. a little worse
5. much worse

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