# Health-Related Quality Of Life in Chronic Kidney Disease Patients: A Cross-Sectional Study

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## ABSTRACT

**Background:** Very few studies have investiga ted the factors of health-related quality of life (HRQoL) among chronic kidney disease (CKD) patients who are not on dialysis.
**Objective:** Based on our search, no published studies have assessed the influence of ch ronic kidney disease on patients' health and lifestyle in Penang, Malaysia. Therefore, this study was designed to evaluate the effect of CKD on HRQoL scores among CKD patients who are not on dialysis.
**Methods:** A total of 526 CKD patients were included to fill out the SF-36 Malay/English validated questionnaire. A cross-sectional research design was used to assess the effect of CKD on HRQoL scores among CKD patients at Penang General Hospital in Penang, Malaysia, who are not on dialysis.
**Results:** The HRQoL scores among CKD patients reduced at advanced stages. The scores are significantly affected by the severity of CKD. Female gender was associated with lower HRQoL in all scales except the pain (P) scale. Monthly income was significantly associated with role-function (RF) score. Finally, older age was associated with poor HRQoL.
**Conclusion:** These observations highlight the strong impact of CKD on HRQoL and suggest designing an effective therapeutic intervention to improve patients' health and life.

**Keywords:** quality of life, chronic kidney disease, health-related quality of life (HRQoL), Role-Function (RF), SF-36 Malay/English validated questionnaire, therapeutic.

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## INTRODUCTION

Chronic kidney disease (CKD) is defined as a glomerular filtration rate (GFR) level of 60ml/min/1.73m$^2$ for three months or a change in the kidney for three months with or without a decline in GFR level [1]. According to the National Kidney Foundation, there are five stages of CKD and GFR levels used as a basis of staging [2]. In stage I CKD, the GFR is normal with protein urea or kidney damage. Stage II is diagnosed when GFR is from 60-89ml/min/1.73m$^2$. In patients with stage III, the disease has a GFR of 30-59ml/min/1.73m$^2$, and stage IV is diagnosed as a GFR of 15-29ml/min/1.73m2. CKD stage V is defined as a GFR of 15ml/min/1.73m$^2$ [3].

In Malaysia, the prevalence of CKD is high at 9.07%, and the major risk factors are increasing age, diabetes, and hypertension [4]. As CKD is a chronic disease, it affects the health-related quality of life (HRQoL) of patients [5]. For chronic diseases, health care always focuses on quality of life (QoL) in parallel with mortality and morbidity decline [6].

HRQoL is defined as the QoL, but it focuses on factors that relate to health care professionals and the health care system. Better compliance could be achieved if patients had better QoL scores. There are many tools used to evaluate QoL in patients. The RAND-36 health survey is a general HRQoL tool [7]. In 1984, RAND started working on the Medical Outcomes Study (MOS) 36-item short form survey (SF-36). RAND-36 and SF-36 are considered equivalent; the difference is in the scoring method for two scales, general health (GH) and bodily pain (P), which does not affect the measurement results [8].

The SF-36 has been found to be an excellent tool to measure outcomes of healthcare for different diseases. This tool has been translated into over 120 languages and validated in more than 40 countries. In Malaysia, many studies have assessed the HRQoL for other diseases. Others assessed it for dialysis or transplant patients. One study assessed the role of social support personality in HRQoL in CKD stage II-V patients [9]. According to our search, there are no published data about the HRQoL of CKD patients who are not on dialysis in Penang, Malaysia. The aim is to assess the influence of CKD on HRQoL among CKD patients who are not on dialysis and to compare their mean scores with the average scores of the Malaysian general population.

## MATERIALS AND METHODS

### Study design, setting, and participants

A cross-sectional study of 526 patients diagnosed with CKD but not receiving dialysis was asked to fill out the SF-36 Malay/English questionnaire during the period from February to June 2016 at Penang General Hospital in Penang, Malaysia. All CKD patients not on dialysis who were attending the nephrology clinic for their regular visits were asked to participate in the study. The inclusion criteria were patients who were willing to participate and provided informed consent, 18 years or older, and diagnosed with CKD (stage I-V) for at least one year. Patients who were younger than 18 years, pregnant, or on dialysis; had HIV, cancer, or mental illness; and who could not read Malay or English were excluded from the study. The study was approved by the Medical Research & Ethics

Committee (MREC) and the Clinical Research Center (CRC) at Penang General Hospital.

## Study tool

The RAND-36 (SF-36) health survey was used to measure HRQoL. It is widely used as a generic instrument. The tool measures eight health-related scales: Physical Functioning (PF), Role Functioning/physical (RP), Role Functioning/Emotional (RE), Energy/Fatigue (EF), Mental Health (MH), Social Functioning (SF), Pain (P), and General Health (GH). Higher mean scores infer to more health status. The number of questions for each scale ranges from two to ten. The number of response options ranges from two (yes or no) to six (none, very mild, mild, moderate, severe, and very severe). All raw scores are converted to a value from zero (worst) to 100 (best). The scoring of the questionnaire used the RAND method, which is used in MOS.

## Data analysis

All the statistical analyses of data were performed using the software package Statistical Package for Social Science (version 22.0 for Windows; SPSS, Chicago, IL, U.S.A.). Descriptive statistics for the continuous variables are reported as a mean ± standard deviation. Categorical variables are reported as frequencies and percentages. As our data were nonparametric (Kolmogorov-Smirnov and Shapiro-Wilk), for more than two groups, the Kruskal-Wallis test was used, and the Mann-Whitney U test was used to calculate significance differences between two groups. $P < 0.05$ was considered the level of statistical significance.

## RESULTS

The total number of CKD patients not on dialysis was 526. The demographic features and the disease stage of patients are described in Table 1. Females represented 66.7% of the total. The mean age of this study was 70 years (SD10.4). Nearly 47% (47.1%) were older than 70 years. A total of 459 (89.2%) were married. Most of the patients (53.2%) were Chinese. Patients with a salary less than 2000 Malaysian Ringgit (RM) constituted 59.1%. Stage III CKD was the most common stage among our population sample (42%).

**Table 1.** Characteristics of patients (N = 526).

| Variables | Frequency | % |
|---|---|---|
| **Gender** | | |
| Male | 175 | 33.3 |
| Female | 351 | 66.7 |
| **Age, years (mean ± SD= 70±10.4)** | | |
| 70 or younger | 278 | 52.9 |
| Over 70 | 248 | 47.1 |
| **Marital status** | | |
| Single | 48 | 9.1 |
| Married | 459 | 89.2 |
| Divorced | 5 | 1 |
| Widowed | 4 | 0.8 |
| **Race** | | |
| Malay | 176 | 33.6 |
| Chinese | 279 | 53.2 |
| Indian | 69 | 13.2 |
| **Monthly income (RM)** | | |
| 2000 or less | 311 | 59.1 |
| More than 2000 | 215 | 40.9 |
| **Disease stage** | | |
| Stage 2 | 121 | 23 |
| Stage 3 | 221 | 42 |
| Stage 4 | 106 | 20 |
| Stage 5 | 78 | 14.8 |

SD: Standard deviation
RM: Malaysian ringgit

The effects of age, gender, marital status, race, monthly income, and disease stage on the eight major composite scores are shown on Table 2. The Physical Functioning (PF), Role Functioning/physical (RP), Role Functioning/Emotional (RE), Energy/Fatigue (EF), Mental Health (MH), Social Functioning (SF), Pain (P), and General Health (GH). scores were all significantly higher in stage II CKD patients. The P scores were significantly higher among the female patients compared to the male patients. However, the mean score for the other scales was greater among the male patients. Patients with a higher monthly income had a significantly higher RF score than patients with a lower income. Race and marital status did not have a significant effect on the scores. Scores were lower in patients older than 70 years, but the difference was not significant.

**Table 2.** Demographic characteristics of the study patients with differences in SF-36 scales (N=526).

| | N | Mean (SD) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PF | RP | RE | EF | MH | SF | P | GH |
| **Gender [a]** | | | | | | | | | |
| Male | 175 | 59.2 (27.7) | 59 (35.7) | 60 (39.1) | 59.1 (18) | 60.3 (16.3) | 59.7 (22.5) | 61 (24.8)* | 53.8(15.5) |
| Female | 351 | 57 (26.2) | 54.7 (38.4) | 54.6 (40) | 57.5 (17.6) | 60 (17.5) | 59.4 (21) | 68 (24.3) | 52.1(16.3) |
| **Age, years [a]** | | | | | | | | | |
| 70 or younger | 278 | 57 (26.2) | 53.7 (36.6) | 54 (39.9) | 58.3 (17.7) | 59.8 (17.2) | 59.2 (23.3) | 63.9 (23.7) | 51.7(16.7) |
| Over 70 | 248 | 58.5 (27.2) | 58.9 (38.4) | 59.1 (39.5) | 58.8 (17.9) | 60.2 (17) | 60 (20.3) | 67.7 (23.4) | 53.8(15.3) |
| **Marital status [b]** | | | | | | | | | |
| Single | 48 | 55.2 (24.3) | 57.3 (37.5) | 56.3 (41.3) | 53.3 (14) | 57 (13.2) | 51.8 (18) | 61.9 (25) | 49.4(12.7) |
| Married | 459 | 57.8 (26.9) | 55.8 (37.6) | 55.8 (39.7) | 59.1 (18.2) | 60.4 (17.5) | 60.3 (22.3) | 66.0 (24.6) | 53(16.4) |
| Divorced | 5 | 68 (20.8) | 65 (41.8) | 80 (29.8) | 57 (16.8) | 54.4 (15.6) | 57.5 (14.3) | 55 (18.6) | 55(10) |
| Widowed | 4 | 68.8 (42.7) | 75 (28.9) | 91.7 (16.7) | 56.3 (11.8) | 57 (8.3) | 68.8 (16.1) | 88.8 (22.5) | 65.3(11.1) |
| **Race [b]** | | | | | | | | | |
| Malay | 176 | 57.9 (27.8) | 58.2 (37.6) | 58 (39.8) | 60.5 (18.8) | 60.8 (17.7) | 60.2 (22.1) | 65 (25) | 54(16.7) |
| Chinese | 279 | 57.3 (26.5) | 54.7 (37.5) | 55.9 (39.7) | 57.4 (17.7) | 59.6 (16.5) | 60.1 (21.4) | 66 (24.4) | 52.8(15.6) |
| Indian | 69 | 60.3 (24) | 57.6 (37.5) | 55.6 (40.3) | 58.7 (15.3) | 60.1 (18.1) | 56 (24) | 66.1 (25.2) | 49.1(15.5) |
| **Monthly income (RM) [a]** | | | | | | | | | |
| 2000 or less | 311 | 57.7 (24.5) | 53.3 (38.1)* | 54.3 (41.1) | 58.9 (17.9) | 60.1 (16.5) | 59.9 (22.2) | 67.3 (24) | 53.3(15.2) |
| More than 2000 | 215 | 57.8 (29.6) | 60.3 (36.3) | 59.3 (37.8) | 58.1 (17.8) | 59.8 (17.9) | 59 (21.7) | 63.3 (22.5) | 51.7(17.2) |
| **Disease stage [b]** | | | | | | | | | |
| Stage 2 | 121 | 92.3 (6.9)* | 68.8 (28)* | 71.9 (29.8)* | 63.7 (20.7)* | 67.1 (19.1)* | 71.3 (23.1)* | 76.9 (23.7)* | 59.1(17.3)* |
| Stage 3 | 221 | 51.6 (16.9) | 55 (39.7) | 52.6 (41.8) | 56.7 (17.5) | 57.7 (16) | 54.5 (20.8) | 62.4 (23.9) | 50(13.4) |
| Stage 4 | 106 | 44.2 (19.8) | 45.3 (39.2) | 49.9 (39.3) | 55.8 (15.7) | 58.9(14.4) | 58.8 (20.6) | 61.6 (23.7) | 50.4(16.5) |
| Stage 5 | 78 | 39.9 (29.6) | 54.5 (36.9) | 51.7 (42.5) | 59.6 (15) | 57 (17.3) | 56.6 (18.7) | 63 (25.1) | 53.4(17.7) |

*Statistically significant; [a] Mann-Whitney U; [b] Kruskal-Wallis

Table 3 shows the scores of SF-36 instrument eight scales in this study compared to the scores of the same scales of the Malaysian general population. The mean scores of all domains for CKD patients were significantly lower than scores reported from the Malaysian general population: 58.1±3.2 and 76.1±7.7, respectively.

**Table 3.** Comparison between scores of the SF-36 eight domains instrument in the current study and Malaysian general population.

| Scale | CKD patients[#] | | Malaysian general population [19] | | |
|---|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** | |
| Physical functioning | 57.74 | 26.70 | 86.00 | 17.9 | |
| Role functioning/physical | 56.16 | 37.50 | 82.00 | 32.1 | |
| Role functioning/emotional | 56.37 | 39.79 | 79.20 | 35.9 | |
| Energy/fatigue | 58.57 | 17.81 | 66.80 | 17.7 | |
| Emotional well-being | 60.00 | 17.10 | 74.70 | 17.2 | |
| Social functioning | 59.55 | 21.96 | 83.70 | 19.3 | |
| Pain | 63.35 | 24.49 | 70.00 | 17.6 | |
| General health | 52.67 | 16.08 | 66.70 | 20.0 | |
| P-value [a] | | | | | 0.001* |

[#] Current study; * $p < 0.05$; [a]Mann-Whitney

## DISCUSSION

In our study, we use the Malay/English version of the SF-36 tool to explore the HRQoL score among Malaysian CKD patients who are not on dialysis. Our results can be summarized as follows. HRQoL scores among CKD patients are reduced at advanced stages. HRQoL is significantly affected by the severity of CKD. The female gender is associated with lower HRQoL on all scales except the pain scale (P). Monthly income is significantly associated with RF score. Older age is also associated with poor HRQoL.

Similar to our results, many studies found the association between the progression of CKD and HRQoL [10]. CKD could progress into a more advanced stage if the patient does not undergo a suitable treatment. With renal functions worsening, patients tried to change their lifestyles to maintain the functions of the kidneys [11-13]. On other studies, found that there is no association between CKD progression and poor HRQoL. The HRQoL was found to be poorer in older patients; this inverse relation was also reported [14]. Older age means a longer period of having a chronic disease, and this, accordingly, will affect the patient's health and lifestyle [15].

In our results, we observed an association between female gender and poor HRQoL for all scales except for the pain scale (P), for which the score was higher for females. Most studies found that low HRQoL scores are highly related to female gender [15]. Other studies reported that women suffer from chronic diseases in general, not only renal disease. A study in the UK showed lower scores for males. The UK study also found the worst total HRQoL scores were for male and Asian patients [16-18]. Therefore, it could be suggested that the association between HRQoL and gender in Malaysia may also be affected by other factors such as lifestyle and nutrition. The RF score was significantly higher among patients with a higher monthly income. This may be because they had financial support that helped them to face life's stresses. Other studies have shown that lower income is strongly related to a lower HRQoL score [19-20]. Compared to the Malaysian general population, the CKD patients in our study had lower overall HRQoL scores, which is consistent with findings in the literature [20].

The main limitation of this study is that it was a cross-sectional study. Also, we used a general QoL tool that was not specific to the kidney. However, many studies used the generic SF-36. Also, due to the language barrier, we excluded any patient who could not read Malay or English. Their answers could add value to our study.

## CONCLUSION

This study reports the HRQoL scores of a sample of CKD patients. The current study added to the literature clear information about the effects of CKD on health and life and reported the most important factors that affect the HRQoL of Malaysian patients. The impact of the disease on HRQoL is strong, so particular attention should be paid by nephrologists to slow down the progression of the disease. Future studies should focus on designing an intervention for CKD patients to improve their QoL and to measure the health change for that patient to ensure that the intervetion will be helpful.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol conformed to the ethical guidelines of the 1975 Helsinki Declaration and the approval was obtained from ethical committee of Middle East University-Amman-Jordan.

## CONSENT FOR PUBLICATION

Informed consent was obtained from all individual participants included in the study.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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