



## General Medicine

# BURDEN BEYOND DIALYSIS: QUALITY OF LIFE ASSESSMENT IN PATIENTS UNDERGOING HEMODIALYSIS IN A TERTIARY CARE SETTING IN GOA.

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| <b>Dr. Anar Khandeparkar</b>    | Professor and Head of Department, Department of General Medicine, Goa Medical College.               |
| <b>Dr. Jagadish Cacodkar</b>    | Professor and Head of Department, Department of Preventive and Social Medicine, Goa Medical College. |
| <b>Dr. Sheena Patel</b>         | Department of General Medicine, Goa Medical College.                                                 |
| <b>Dr. Yallaling Sannasanni</b> | MD General Medicine, Goa Medical College.                                                            |
| <b>Dr. Anish Shyadligeri</b>    | MBBS, Goa Medical College.                                                                           |
| <b>Dr. Keegan De Souza*</b>     | MBBS, Goa Medical College. *Corresponding Author                                                     |
| <b>Dr. Sharayah Pereira</b>     | MBBS, Goa Medical College.                                                                           |
| <b>Dr. Rohan Cabral</b>         | MBBS, Goa Medical College.                                                                           |

**ABSTRACT** **Aim of the Study:** This study aimed to assess the health-related quality of life (HRQoL) in patients with chronic kidney disease (CKD) undergoing hemodialysis at a tertiary care hospital in Goa, and to evaluate the influence of sociodemographic and clinical parameters on various HRQoL domains. **Materials and Methods:** A cross-sectional study was conducted at Goa Medical College over two months, using census-based sampling. Forty adult CKD patients on maintenance hemodialysis were included. Data on sociodemographic and clinical parameters were collected, and HRQoL was assessed using the KDQOL SF-36 questionnaire. Statistical analysis was performed using SPSS version 27, with significance set at  $p \leq 0.05$ . **Results:** The cohort showed reduced quality of life across multiple domains. Age, occupation, education, hemoglobin levels, and number of comorbidities significantly influenced HRQoL. Younger patients (<60 years), those with higher education, labor-intensive occupations, fewer comorbidities, and hemoglobin  $\geq 11$  g/dL reported better scores in physical function and vitality. No significant differences were noted with respect to gender or mean arterial pressure. **Conclusion:** Quality of life in CKD patients on hemodialysis is considerably impaired. Interventions targeting modifiable factors such as anemia, comorbidities, and education may improve patient outcomes and overall well-being.

## KEYWORDS :

## INTRODUCTION

Chronic kidney disease has a high prevalence, morbidity and mortality and is an important health problem in India. A cross sectional study performed, found the overall prevalence of CKD to be 17.2% in the country<sup>1</sup>. The most common cause of CKD was Diabetes with almost two-thirds of the participants from rural parts of India.<sup>2</sup>

Chronic kidney disease presents a global burden as well with the Global Burden of Disease ranking CKD as the 12<sup>th</sup> leading cause of death<sup>3</sup>. In the year 2017, 1.2 million deaths globally were due to CKD<sup>4</sup>. Along with an increase in the global prevalence of Chronic Kidney Disease by 29.3% since 1990, there was also an increase in all age mortality globally from chronic kidney disease by 41.5% from 1990<sup>4</sup>.

Kidney disease has been frequently associated with cardiovascular diseases. A high prevalence of cardiovascular diseases is seen in patients with chronic kidney disease and a decreased glomerular filtration rate is found to be an independent risk factor for the outcome of patients with Cardiovascular disease<sup>5</sup>.

Despite the disease burden on health care, there remains barriers to the access of care for CKD patients which include lack of motivation to screen, low awareness of CKD risk factors, lack of mechanisms for follow up of patients at primary health centres and financial burden<sup>6</sup>.

Assessment of quality of life has become important as addressing such issues can have a positive impact on the management of patient care. The Kidney Disease-Quality of Life Short Form 36-Items (KDQOL SF-36) which is a self reported questionnaire to assess the physical and mental well being of the participants as well as assess kidney disease and dialysis related symptoms, is demonstrated to be reliable and valid and employed in our study to collect the data<sup>7,8</sup>.

## MATERIALS AND METHODOLOGY

A prospective study was conducted in Goa Medical College after obtaining the approval of the Institutional Ethics Committee. Census based sampling was employed wherein all patients with Chronic Kidney Disease in Goa Medical College undergoing dialysis and following up the Department of Medicine as well as Department of Nephrology during the study duration of 2 months was invited to participate in the study.

The inclusion criteria comprised all patients undergoing regular hemodialysis for Chronic Kidney Disease in Goa Medical College aged 18 years and above and those consenting to participate in the study.

Patients not consenting to participate as well as data received from incomplete forms were excluded from the study.

A structured questionnaire was used to collect the data from study participants including demographic and socioeconomic data. Quality of Life assessment was done using the Kidney Disease-Quality of Life Short Form 36-Items (KDQOL SF-36). Descriptive statistics like frequency, percent, mean and standard deviation was used to summarise patients baseline characteristics.

SPSS statistical software version (version 27) Chi square test was used for data analysis with continuous variables presented as Mean and standard deviation. For categorical variables, the percentages were calculated. Unadjusted Odds Ratios and 95% CI was calculated. Variables with  $p$ -values less than or equal to 0.05 is considered significant and included in the multivariate analysis. The study protocol and consent form was approved by the Institutional ethics committee of Goa Medical College prior to the start of the study and

informed consent was taken before administering the questionnaire to the study participants.

## RESULTS

The aim of this study was to evaluate the health-related quality of life (HRQoL) in patients suffering from chronic kidney disease (CKD) using the SF-36. We analysed various socio-demographic, clinical, and laboratory parameters to determine their influence on the different domains of the SF-36. Our sample included 40 patients with CKD, with a fairly even distribution between those aged 60 and below (52.5%) and those above the age of 60 (47.5%). The majority of participants were male (57.5%), married (67.5%), and retired (57.5%). The educational background varied, with most having primary education (42.5%). The mean values of clinical and laboratory parameters were as follows: fasting blood sugar level (FBSL) 174.17 mg/dl, serum creatinine 8.31 mg/dl, blood urea nitrogen (BUN) 58.57 mg/dl, serum albumin 3.16 g/dl, haemoglobin (Hb) 9.72 g/dl, mean arterial pressure (MAP) 101.78 mmHg, and glomerular filtration rate (GFR) 10.69 ml/min/1.72m<sup>2</sup>. These values reflect the severity of CKD in the study population.

The SF-36 analysis revealed the following mean scores for different domains: Physical Function (PF):  $62.5 \pm 30.36$ , Role Limitations due to Physical Problems (RP):  $51.88 \pm 38.56$ , Pain (BP):  $56.18 \pm 21.7$ , General Health (GH):  $41.88 \pm 16.82$ , Vitality/Energy (VT):  $32.5 \pm 14.68$ , Social Function (SF):  $48.75 \pm 19.37$ , Mental Health/Emotional Well-being (MH):  $62.6 \pm 18.28$ , Role Limitations due to Emotional Problems/Mental Health (RE):  $56.67 \pm 38.63$

We further analysed the sociodemographic influences on HRQoL. No significant differences were found between males and females in any of the domains, indicating that gender did not significantly influence HRQoL in this particular cohort.

Significant differences were observed in the Physical Function (PF) and Vitality (VT) domains based on Age. Participants aged 60 and below had higher scores in Physical Function PF ( $72.38 \pm 27.87$  vs.  $51.58 \pm 29.91$ ) and Vitality/Energy VT ( $37.86 \pm 11.36$  vs.  $26.58 \pm 15.9$ ) compared to those over 60 years. This suggests that younger CKD patients may experience better physical function and vitality.

**Occupation:** Significant differences were observed in the Physical Function (PF), Vitality (VT), and Social Function (SF) domains based on occupation. Notably, daily labourers had the highest mean scores for PF ( $90 \pm 0$ ) and VT ( $42.5 \pm 3.54$ ), while homemakers also reported better PF ( $78.33 \pm 22.78$ ) and VT ( $37.78 \pm 7.95$ ) scores compared to retired individuals (PF:  $62.5 \pm 30.36$ ; VT:  $26.74 \pm 15.57$ ). This suggests that occupations involving more physical activity or social engagement might contribute to better HRQoL in CKD patients. ( $p = 0.04$  for PF and VT).

**Education:** The education level significantly influenced several SF-36 domains. Patients with secondary education had higher scores in PF ( $71.07 \pm 31.27$ ) and BP ( $62.50 \pm 23.94$ ) compared to illiterate patients (PF:  $45 \pm 28.43$ ; BP:  $46.43 \pm 19.62$ ). Higher education was found to be associated with higher scores in Mental Health (MH) ( $80 \pm 5.6$ ) but lower scores in PF ( $25 \pm 35.35$ ), indicating a complex relationship between education and HRQoL. This suggests that education might influence both physical and mental health outcomes, potentially through improved access to healthcare information and resources ( $p = 0.07$  for PF and  $0.04$  for MH).

## Clinical and Laboratory Parameter Influences

**CKD Stage:** Differences in HRQoL domains were observed based on CKD stage. Patients in CKD Stage 5 reported significantly higher scores in Role Limitations due to Emotional Problems (RE) ( $59.65 \pm 37.29$ ) compared to Stage 2 patients (0), indicating that advanced CKD stages may have varying impacts on emotional well-being. However, other domains did not show significant differences between CKD stages ( $p = 0.19$  for PF and  $0.56$  for GH). This suggests that while some aspects of HRQoL may remain stable across CKD stages, emotional health might be more affected in advanced stages.

**Haemoglobin Levels:** Significant differences were found in the domains of Pain (BP), General Health (GH), and Physical Function (PF) based on haemoglobin levels. Patients with haemoglobin levels  $\geq 11$  g/dl reported better scores in BP ( $70.54 \pm 12.37$ ), GH ( $51.07 \pm 12.43$ ), and PF ( $77.14 \pm 17.62$ ) compared to those with haemoglobin levels  $< 11$  g/dl (BP:  $48.46 \pm 21.85$ ; GH:  $36.92 \pm 16.98$ ; PF:  $54.62 \pm$

$33.04$ ). This highlights the critical role of managing anaemia to improve HRQoL in CKD patients ( $p = 0.02$  for PF and  $0.009$  for GH).

**Number of Comorbidities:** Patients with fewer comorbidities had significantly higher scores in PF ( $71.2 \pm 23.6$ ), RP ( $62 \pm 33.17$ ), BP ( $62.3 \pm 18.94$ ), GH ( $45.6 \pm 15.43$ ), and VT ( $38.2 \pm 10.98$ ) compared to those with more than one comorbidity (PF:  $48 \pm 35.4$ ; RP:  $35 \pm 42.05$ ; BP:  $46 \pm 22.77$ ; GH:  $35.67 \pm 17.72$ ; VT:  $23 \pm 15.44$ ). This indicates that a lower number of comorbidities is associated with better overall HRQoL ( $p = 0.02$  for PF and  $0.01$  for VT).

**MAP (Mean Arterial Pressure):** No significant differences were found in SF-36 domains based on MAP levels, suggesting that blood pressure control within the study range might not have a strong impact on HRQoL in this population ( $p = 0.31$  for PF and  $0.53$  for GH).

## DISCUSSION

Chronic kidney disease is a major public health problem and is found to have an increasing prevalence in the country<sup>8</sup>. Our study focuses on the quality of life in patients with CKD receiving dialysis.

Our study found no differences between males and females CKD patients in any of the domains influencing Health related quality of life which contrasts with the study by L Manju et al as well as the study by Harichandra Kumar KT et al, where women scored lower in physical composite summary score<sup>9,10</sup>.

The patients in our study below the age of 60 years scored better in Physical Function and Vitality. A Study by Ravindran A et al<sup>11</sup> show a decline in physical functioning with increasing age however the study by L Manju et al<sup>9</sup> shows a better mental composite summary score in older patients and no significant difference in physical functioning with age.

Consistent with studies done previously<sup>11,12</sup>, patients with a higher education had a positive impact in their quality of life in both physical as well as mental scores.

Besides education status, the occupation was also associated with significant differences where labour workers scored higher in physical function domain than retired patients with Chronic kidney disease.

Hemoglobin levels of patients in our study were collected which depicted that hemoglobin values above 11 gm/dl was associated with a better physical function and general health of the patients. This result is in line with various studies<sup>13,14,15</sup> where patients with CKD and anemia had a lower health related quality of life. The role of Erythropoiesis stimulation agent to correct hemoglobin has been studied, however the risk of developing cardiovascular events increased if hemoglobin was over corrected<sup>16,17</sup>.

Patients with more than one comorbidity scored lower in domains of physical functioning, pain, general health and vitality which is consistent to previous studies<sup>18,19</sup> which show poor physical domains.

Although our study showed there was no significant change in quality or life in with blood pressure values, studies have shown that a higher Blood Pressure were associated with higher adverse outcomes in patients with CKD<sup>20,21</sup>.

The quality of life in CKD patients receiving dialysis is found to be impaired on multiple domains compared to healthy population and is influenced by factors like age, education, occupation, anemia and comorbidities<sup>22</sup>. Our study outlines the various parameters which affect the quality of life in patients with CKD on maintenance dialysis

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**Table1: Socio-demographic Characteristics**

| Variable         | Frequency | Percentage |
|------------------|-----------|------------|
| Age              |           |            |
| Upto 60 years    | 21        | 52.5       |
| > 60 years       | 19        | 47.5       |
| Sex              |           |            |
| Male             | 23        | 57.5       |
| Female           | 17        | 42.5       |
| Marital Status   |           |            |
| Married          | 21        | 67.5       |
| Widowed          | 12        | 30         |
| Single           | 1         | 2.5        |
| Occupation       |           |            |
| Retired          | 23        | 57.5       |
| Homemaker        | 9         | 22.5       |
| Govt. Employee   | 4         | 10         |
| Daily Labourer   | 2         | 5          |
| Farmer           | 2         | 5          |
| Education        |           |            |
| Illiterate       | 7         | 17.5       |
| Primary          | 17        | 42.5       |
| Secondary        | 14        | 35         |
| Higher education | 2         | 5          |

**Table 2: Clinical and Laboratory Parameters**

| Variable                         | Frequency | Percentage |
|----------------------------------|-----------|------------|
| No. of comorbidities             |           |            |
| ≤ 2                              | 33        | 82.5       |
| 3 or more                        | 7         | 17.5       |
| No. of complications             |           |            |
| Male                             | 39        | 97.5       |
| Female                           | 1         | 2.5        |
| Variable                         | Mean      | SD         |
| FBSL (mg/dl)                     | 174.17    | 78.88      |
| Se Creatinine (mg/dl)            | 8.31      | 1.87       |
| BUN (mg/dl)                      | 58.57     | 19.69      |
| Se Albumin (g/dl)                | 3.16      | 0.58       |
| Hb (g/dl)                        | 9.72      | 1.62       |
| MAP (mmHg)                       | 101.78    | 19.24      |
| GFR (ml/min/1.72m <sup>2</sup> ) | 10.69     | 2.58       |

**Table 3: Quality of Life Domains and Mean Summary Scores**

| Scale                                                            | No. of items | Cronbach's alpha | Mean score ± SD |
|------------------------------------------------------------------|--------------|------------------|-----------------|
| Physical Function (PF)                                           | 10           | 0.962            | 62.5 ± 30.36    |
| Role limitations caused by physical problems (RP)                | 4            | 0.765            | 51.88 ± 38.56   |
| Pain (BP)                                                        | 2            | 0.857            | 56.18 ± 21.7    |
| General health (GH)                                              | 5            | 0.727            | 41.88 ± 16.82   |
| Vitality/energy (VT)                                             | 4            | 0.568            | 32.5 ± 14.68    |
| Social function (SF)                                             | 2            | 0.689            | 48.75 ± 19.37   |
| Mental health/emotional well-being (MH)                          | 5            | 0.806            | 62.6 ± 18.28    |
| Role limitations caused by emotional problems/mental health (RE) | 3            | 0.66             | 56.67 ± 38.63   |

**Table 4: Comparative Statistical Analysis of Mean Scores of SF-36 Domains Among Patients with Chronic Kidney Disease**

|         | PF            | RP            | BP            | GH            | VT            | SF            | MH            | RE            |
|---------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Sex     |               |               |               |               |               |               |               |               |
| Male    | 63.04 ± 29.91 | 56.52 ± 41.43 | 55.98 ± 23.95 | 41.09 ± 18.77 | 33.48 ± 13.43 | 48.37 ± 21.09 | 65.04 ± 18.46 | 59.42 ± 40.17 |
| Female  | 61.76 ± 31.87 | 45.59 ± 34.5  | 56.47 ± 18.94 | 42.94 ± 14.26 | 31.18 ± 16.54 | 49.26 ± 17.38 | 59.29 ± 18.07 | 52.94 ± 37.37 |
| p value | 0.89          | 0.38          | 0.95          | 0.74          | 0.63          | 0.89          | 0.33          | 0.6           |
| Age     |               |               |               |               |               |               |               |               |

|                  |               |               |               |               |               |               |               |               |
|------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Upto 60 years    | 72.38 ± 27.87 | 55.95 ± 33.45 | 60.24 ± 23.04 | 44.29 ± 16.83 | 37.86 ± 11.36 | 48.81 ± 20.5  | 64.76 ± 18.66 | 60.32 ± 37.47 |
| > 60 years       | 51.58 ± 29.91 | 47.37 ± 44.01 | 51.71 ± 19.74 | 39.21 ± 16.85 | 26.58 ± 15.9  | 48.68 ± 18.59 | 60.21 ± 18.06 | 52.63 ± 40.54 |
| p value          | 0.03          | 0.49          | 0.22          | 0.35          | 0.01          | 0.98          | 0.44          | 0.54          |
| Occupation       |               |               |               |               |               |               |               |               |
| Retired          | 62.5 ± 30.36  | 43.48 ± 42.12 | 49.89 ± 21.33 | 36.52 ± 17.99 | 26.74 ± 15.57 | 45.11 ± 21.23 | 59.83 ± 20.63 | 47.83 ± 39.98 |
| Homemaker        | 78.33 ± 22.78 | 61.11 ± 39.9  | 65.83 ± 14.52 | 48.33 ± 10    | 37.78 ± 7.95  | 55.56 ± 12.67 | 62.67 ± 18.11 | 70.37 ± 35.14 |
| Govt. employee   | 77.5 ± 18.93  | 50 ± 35.35    | 63.13 ± 35.73 | 56.25 ± 17.97 | 46.25 ± 13.15 | 53.13 ± 27.72 | 73 ± 3.8      | 66.67 ± 47.14 |
| Daily labourer   | 90 ± 0        | 87.5 ± 17.68  | 72.5 ± 7.07   | 40 ± 14.14    | 42.5 ± 3.54   | 56.25 ± 8.84  | 62 ± 8.49     | 83.33 ± 23.57 |
| Farmer           | 77.5 ± 3.54   | 75 ± 35.36    | 55 ± 17.68    | 47.5 ± 3.54   | 37.5 ± 3.54   | 43.75 ± 8.84  | 74 ± 8.49     | 50 ± 23.57    |
| p value          | 0.04          | 0.42          | 0.27          | 0.14          | 0.04          | 0.65          | 0.65          | 0.48          |
| Education        |               |               |               |               |               |               |               |               |
| Illiterate       | 45 ± 28.43    | 39.29 ± 40.46 | 46.43 ± 19.62 | 41.43 ± 10.29 | 22.86 ± 17.76 | 48.21 ± 16.82 | 49.71 ± 18.02 | 33.33 ± 38.49 |
| Primary          | 67.07 ± 25.98 | 58.82 ± 38.47 | 59.12 ± 16.84 | 40.29 ± 16.44 | 31.76 ± 13.91 | 50 ± 17.68    | 62.35 ± 15.9  | 66.67 ± 35.36 |
| Secondary        | 71.07 ± 31.27 | 57.14 ± 35.93 | 62.50 ± 23.94 | 47.14 ± 18.58 | 36.07 ± 12.43 | 52.68 ± 19.72 | 66.86 ± 20.54 | 64.29 ± 35.72 |
| Higher education | 25 ± 35.35    | 0             | 21.25 ± 15.91 | 20 ± 14.14    | 47.5 ± 10.61  | 12.5 ± 0      | 80 ± 5.6      | 0             |
| p value          | 0.07          | 0.16          | 0.04          | 0.18          | 0.11          | 0.04          | 0.11          | 0.03          |

**Table 5: Comparative Statistical Analysis of the Mean Scores of SF-36 Domains of Patients with Chronic Kidney Disease, According to the Categorical Clinical/Laboratory Parameters.**

|                      | PF            | RP            | BP            | GH            | VT            | SF            | MH            | RE            |
|----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| CKD Stage            |               |               |               |               |               |               |               |               |
| 2                    | 35 ± 14.14    | 25 ± 35.36    | 40 ± 7.07     | 35 ± 7.07     | 17.5 ± 17.68  | 43.75 ± 8.84  | 44 ± 16.97    | 0             |
| 5                    | 63.95 ± 30.38 | 53.29 ± 38.63 | 57.04 ± 21.91 | 42.24 ± 17.15 | 33.29 ± 14.34 | 49.01 ± 19.79 | 63.58 ± 18.03 | 59.65 ± 37.29 |
| p value              | 0.19          | 0.32          | 0.29          | 0.56          | 0.14          | 0.71          | 0.14          | 0.03          |
| No. of Comorbidities |               |               |               |               |               |               |               |               |
| One or less          | 71.2 ± 23.6   | 62 ± 33.17    | 62.3 ± 18.94  | 45.6 ± 15.43  | 38.2 ± 10.98  | 50 ± 18.04    | 68.32 ± 12.43 | 66.67 ± 33.33 |
| More than one        | 48 ± 35.4     | 35 ± 42.05    | 46 ± 22.77    | 35.67 ± 17.72 | 23 ± 15.44    | 46.67 ± 21.89 | 53.07 ± 22.6  | 40 ± 42.16    |
| p value              | 0.02          | 0.03          | 0.02          | 0.07          | 0.01          | 0.61          | 0.01          | 0.03          |
| No. of complications |               |               |               |               |               |               |               |               |
| One or less          | 68.33 ± 26.69 | 59.38 ± 36.72 | 58.75 ± 22.57 | 42.29 ± 16.55 | 35 ± 12.34    | 48.44 ± 17.8  | 61.83 ± 18.35 | 62.5 ± 37.19  |
| More than one        | 53.75 ± 34.18 | 40.63 ± 39.66 | 52.34 ± 20.42 | 41.25 ± 17.75 | 28.75 ± 17.37 | 49.22 ± 22.11 | 63.75 ± 18.73 | 47.92 ± 40.31 |
| p value              | 0.14          | 0.13          | 0.37          | 0.85          | 0.19          | 0.9           | 0.75          | 0.25          |
| Hemoglobin           |               |               |               |               |               |               |               |               |
| <11 g/dl             | 54.62 ± 43.27 | 43.27 ± 48.46 | 48.46 ± 36.92 | 36.92 ± 29.23 | 29.23 ± 42.31 | 42.31 ± 59.54 | 59.54 ± 50 ±  |               |

|            |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|
|            | 33.04 | 40.96 | 21.85 | 16.98 | 14.88 | 20.33 | 20.87 | 40.28 |
| ≥ 11 g/dl  | 77.14 | 67.86 | 70.54 | 51.07 | 38.57 | 60.71 | 68.29 | 69.05 |
|            | ±     | ±     | ±     | ±     | ±     | ±     | ±     | ±     |
|            | 17.62 | 28.47 | 12.37 | 12.43 | 12.62 | 9.63  | 10.58 | 33.24 |
| p value    | 0.02  | 0.05  | 0.001 | 0.009 | 0.05  | 0.003 | 0.15  | 0.14  |
| MAP        |       |       |       |       |       |       |       |       |
| ≤110 mmHg  | 65.52 | 56.03 | 58.62 | 42.93 | 32.93 | 49.14 | 63.45 | 60.92 |
|            | ±     | ±     | ±     | ±     | ±     | ±     | ±     | ±     |
|            | 29.59 | 36.99 | 22.52 | 18.59 | 14.73 | 20.85 | 18.04 | 39.91 |
| > 110 mmHg | 54.55 | 40.91 | 49.77 | 39.09 | 31.36 | 47.73 | 60.36 | 45.45 |
|            | ±     | ±     | ±     | ±     | ±     | ±     | ±     | ±     |
|            | 32.36 | 42.23 | 18.82 | 11.14 | 15.18 | 15.63 | 19.63 | 34.23 |
| p value    | 0.31  | 0.27  | 0.25  | 0.53  | 0.77  | 0.84  | 0.64  | 0.26  |

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## REFERENCES

- 1) Singh AK, Farag YM, Mittal BV, Subramanian KK, Reddy SR, Acharya VN, et al. Epidemiology and risk factors of chronic kidney disease in India - results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. *BMC Nephrol.* 2013;14:114.
- 2) Vivek Kumar, Ashok Kumar Yadav, Jasmine Sethi, et al. The Indian Chronic Kidney Disease (ICKD) study: baseline characteristics, *Clinical Kidney Journal*, Volume 15, Issue 1, January 2022, Pages 60–69.
- 3) GBD 2017 DALYs and HALE Collaborators (2018). Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet (London, England)*, 392(10159), 1859–1922..
- 4) Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Bikbov, Boris et al. The Lancet*, Volume 395, Issue 10225, 709–733.
- 5) Sarnak, M. J. (2003). Kidney Disease as a Risk Factor for Development of Cardiovascular Disease: A Statement From the American Heart Association Councils on Kidney in Cardiovascular Disease, High Blood Pressure Research, Clinical Cardiology, and Epidemiology and Prevention. *Circulation*, 108(17), 2154–2169.
- 6) Jafar, T.H., Ramakrishnan, C., John, O. et al. Access to CKD Care in Rural Communities of India: a qualitative study exploring the barriers and potential facilitators. *BMC Nephrol* 21, 26 (2020).
- 7) Chen, J. Y., Choi, E. P., Wan, E. Y., Chan, A. K., Tsang, J. P., Chan, K. H., Lo, W. K., Lui, S. L., Chu, W. L., & Lam, C. L. (2016). Validation of the Disease-Specific Components of the Kidney Disease Quality of Life-36 (KDQOL-36) in Chinese Patients Undergoing Maintenance Dialysis. *PloS one*, 11(5), e0155188. Yang, F., Wang, V. W., Joshi, V. D., Lau, T. W., & Luo, N. (2013). Validation of the English version of the Kidney Disease Quality of Life questionnaire (KDQOL-36) in haemodialysis patients in Singapore. *The patient*, 6(2), 135–141. <https://doi.org/10.1007/s40271-013-0015-2>
- 8) Trends in prevalence of Chronic Kidney Disease and Cardiovascular Risk Factors in Rural India: Analysis of Three Cross-Sectional Studies. *Kidney International Reports*, Volume 8, Issue 3, Supplement, 2023.
- 9) Health-related quality of life among patients undergoing hemodialysis in a tertiary center in South Kerala Manju, L. et al. *Clinical Epidemiology and Global Health*, Volume 26, 101547
- 10) Manavalan M, Majumdar A, Harichandra Kumar KT, Priyamvada PS. Assessment of health-related quality of life and its determinants in patients with chronic kidney disease. *Indian J Nephrol.* 2017 Jan-Feb;27(1):37-43. doi: 10.4103/0971-4065.179205. PMID: 28182041; PMCID: PMC5255988.
- 11) Ravindran A, Sunny A, Kunnath RP, Divakaran B. Assessment of quality of life among end-stage renal disease patients undergoing maintenance hemodialysis. *Indian J Palliat Care* 2020;26:47-53.
- 12) Gebrie, M.H., Asfaw, H.M., Bilchut, W.H. et al. Health-related quality of life among patients with end-stage renal disease undergoing hemodialysis in Ethiopia: a cross-sectional survey. *Health Qual Life Outcomes* 21, 36 (2023)..
- 13) Van Haalen H, Jackson J, Spinowitz B, Milligan G, Moon R. Impact of chronic kidney disease and anemia on health-related quality of life and work productivity: analysis of multinational real-world data. *BMC Nephrol.* 2020 Mar 7;21(1):88. doi: 10.1186/s12882-020-01746-4. PMID: 32143582; PMCID: PMC7060645.
- 14) Eriksson, D., Goldsmith, D., Teitsson, S., Jackson, J., & van Nooten, F. (2016). Cross-sectional survey in CKD patients across Europe describing the association between quality of life and anaemia. *BMC nephrology*, 17(1), 97. <https://doi.org/10.1186/s12882-016-0312-9>
- 15) Michalopoulos, S. N., Gauthier-Loiselle, M., Aigbogun, M. S., Serra, E., Bungay, R., Clynes, D., Cloutier, M., Kahle, E., Guérin, A., Farag, Y. M. K., & Wish, J. B. (2022). Patient and Care Partner Burden in CKD Patients With and Without Anemia: A US-Based Survey. *Kidney medicine*, 4(4), 100439..
- 16) Singh, A. K., Szczec, L., Tang, K. L., Barnhart, H., Sapp, S., Wolfson, M., Reddan, D., & CHOIR Investigators (2006). Correction of anemia with epoetin alfa in chronic kidney disease. *The New England journal of medicine*, 355(20), 2085–2098..
- 17) Singh, A. K., Szczec, L., Tang, K. L., Barnhart, H., Sapp, S., Wolfson, M., Reddan, D., & CHOIR Investigators (2006). Correction of anemia with epoetin alfa in chronic kidney disease. *The New England journal of medicine*, 355(20), 2085–2098..
- 18) Cruz, M. C., Andrade, C., Urrutia, M., Draibe, S., Nogueira-Martins, L. A., & Sesso, R. de C. C. (2011). Quality of life in patients with chronic kidney disease. *Clinics*, 66(6), 991–995. doi:10.1590/s1807-59322011000600012
- 19) Cha J, Han D. Health-Related Quality of Life Based on Comorbidities Among Patients with End-Stage Renal Disease. *Osong Public Health Res Perspect.* 2020 Aug;11(4):194-200. doi: 10.24171/j.phrp.2020.11.4.08. PMID: 32864310; PMCID: PMC7442444.
- 20) Bell, E. K., Gao, L., Judd, S., Glasser, S. P., McClellan, W., Gutiérrez, O. M., Safford, M., Lackland, D. T., Warnock, D. G., & Muntner, P. (2012). Blood pressure indexes and end-stage renal disease risk in adults with chronic kidney disease. *American journal of hypertension*, 25(7), 789–796.
- 21) Lee, Y.B., Lee, J.S., Hong, Sh. et al. Optimal blood pressure for patients with chronic kidney disease: a nationwide population-based cohort study. *Sci Rep* 11, 1538 (2021). <https://doi.org/10.1038/s41598-021-81328-y>
- 22) Sathvik BS, Parthasarathi G, Narahari MG, Gurudev KC. An assessment of the quality of life in hemodialysis patients using the WHOQOL-BREF questionnaire. *Indian J Nephrol.* 2008 Oct;18(4):141-9. doi: 10.4103/0971-4065.45288. PMID: 20142925; PMCID: PMC2813538