Effectiveness of Yoga and Meditation on Quality of Life Among Patients Undergoing Hemodialysis

Abstract

The rising prevalence of chronic kidney disease poses a future challenge for healthcare and the economy. For patients diagnosed with kidney failure, hemodialysis is the sole recourse until a suitable renal donor is acquired, exerting a discernible impact on the overall quality of life. Yoga and meditation emerge as pivotal elements in enhancing quality of life (QoL), significantly influencing diverse aspects of well-being. The study aimed to identify the effectiveness of yoga and meditation on QoL among hemodialysis patients. An experimental research design with one group pretest – post-test on 100 participants was conducted in Muljibhai Patel Urology Hospital, Nadiad. Pre-tests were conducted on day 1, followed by a 12-week yoga and meditation program with a post-test. Data analysis utilised SPSS-20 software, employing descriptive and inferential statistics. Yoga and meditation effectively demonstrated improvement in QoL in each domain ($p < 0.001$.) post-intervention. These results emphasize QoL enhancement after incorporating these practices into hemodialysis care.

Keywords: *Yoga, Meditation, Quality of life, Hemodialysis patients, Chronic kidney disease*

Arpitaben Jashbhai Parekh, Anita Prakasam

[1]Department of Medical Surgical Nursing, [2]Sumandeep Nursing College, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India

***Corresponding author**: Arpitaben Jashbhai Parekh, Department of Medical Nursing, Sumandeep Vidyapeeth Deemed to be University, Pipria, Vadodara, Gujarat, India. E-mail: arpita.parekh03@gmail.com*

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Introduction

Chronic kidney disease (CKD) is a prevalent global health concern with a significant impact on the quality of life (QoL) of affected individuals. Among the therapeutic modalities for managing CKD, hemodialysis is a common intervention. Still, it is associated with various physical, psychological, and social challenges that can compromise patients' QoL.[1] As the demand for effective and holistic interventions grows, there is increasing interest in exploring complementary approaches such as yoga and meditation.[2,3,4] Yoga and meditation have been recognized for their potential benefits in improving physical and mental health across various populations. These practices emphasize the integration of mind and body, promoting relaxation, stress reduction, and overall well-being. Previous research has shown promising results regarding the positive impact of yoga and meditation on QoL in diverse medical conditions.[5-9] However, limited research has addressed their effectiveness in hemodialysis.[10] This study aims to bridge this gap by investigating the effectiveness of yoga and meditation interventions in enhancing QoL among hemodialysis patients. By delving into the multidimensional aspects of QoL, including physical function, emotional well-being, and social interaction, the research seeks to provide a comprehensive understanding of the potential benefits of these practices in hemodialysis.[11] The theoretical framework for this study draws upon established principles of mind-body medicine and psychoneuroimmunology, highlighting the intricate connections between psychological states and physiological responses.[12] This research aspires to contribute valuable insights into improving overall patient outcomes and well-being by integrating these complementary modalities into the conventional care regimen for hemodialysis patients.[13] Through a robust methodology encompassing randomized controlled trials, patient-reported outcome measures and objective physiological assessments, this study aims to generate empirical evidence that informs clinical practice and enhances our understanding of the role of yoga and meditation in promoting QoL[14] among individuals undergoing hemodialysis. The research findings can potentially guide healthcare professionals, policymakers, and

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patients in optimizing therapeutic strategies and ultimately improving the lives of those navigating the challenges of hemodialysis.[15-18]

Materials and Methods

The research adopted in this study was a quantitative research approach, focusing on the effectiveness of yoga and meditation on QoL among chronic renal failure patients undergoing hemodialysis treatment for more than six months. Utilizing a non-probable convenient sampling technique, the study investigated the independent variables across multiple levels to see the effect on the dependent variable. The study involved 100 CKD patients undergoing hemodialysis treatment for over six months. The study excluded individuals who were seriously ill, mentally ill and not able to perform yoga and meditation. The data collection instrument comprises two main sections. Section A on demographic data encompassing socio-demographic variables such as gender, age in years, religion, marital status, education, occupation, type of family, family monthly income in Rs, area of residence, duration of illness, no. of hemodialysis cycle in a week and comorbidity. Section B involved the standardized WHOQOL-BREF used to analyse the quality of life of patients with CKD undergoing hemodialysis treatment regularly. This tool encompasses a set of 26 ordinal scale items designed to assess the QoL among individuals with CKD. These items comprehensively cover general health, physical health, psychological health, social relationships, and environment. The study was approved by the Institutional Review Board at Muljibhai Patel Society for Research in Nephro-Urology, number EC/597/2019, dated 18 September 2019. The scoring methodology involves converting raw scores into transformed scores, with three items incorporating reverse anchor scores. Notably, 23 items contribute positive scores to the overall assessment. The interpretation of the scores and the computation of domain scores adhere to the guidelines outlined in the World Health Organization's Brief Version of Quality of Life (WHO-BREF), ensuring standardized and meaningful evaluation of QoL in the specified domains. A pilot study confirmed the positive impact of yoga & meditation by improving QoL among dialysis patients.

Participants were supervised three times a week during their hemodialysis sessions in the HD unit. On the other days, they remained connected through a WhatsApp group for updates and support. Individual participants were provided with video guidelines to assist them with their practice. The researcher introduced herself to eligible participants and obtained their informed consent. Participants were then instructed to sit or lie down comfortably. One-on-one sessions were conducted to demonstrate yoga and meditation, which included

- Breath work- pranayama: 5-6 minutes
- Anulom vilom-alternate nostril meditation: 5-6 minutes,
- Bhramari: 5-6 minutes
- Kapalbhati: 5-6 minutes
- Mindful meditation-mindful drinking and mindful eating activities: 12-15 minutes

Alongside their usual care. Before the intervention, a pre-test was administered to assess the demographic variables and level of QoL using the WHOQOL questionnaire for the study group. Throughout the twelve weeks, the investigator conducted three times on weekly in-person meetings to provide yoga and meditation. Video-assisted teaching sessions were also shared to facilitate daily meditation practice at home. Follow-up support was provided to the participants via a WhatsApp group every fortnight, reinforcing the importance of yoga and meditation practice for improving QoL. At the end of the twelve weeks, a post-test was conducted for participants during their regular hemodialysis sessions. Subjects were evaluated for their QoL levels in conjunction with their routine care.

All participants were examined thrice a week at a hemodialysis centre. The data collection phase spanned 12 weeks, conducted with the necessary permissions and adherence to study selection criteria. Consent from the participants was also obtained before their inclusion. The tools employed for data collection were the WHO-BREF before and after yoga and meditation activities for QoL assessment. The study collected data using the aforementioned assessment scales, aiming to analyze it using descriptive and inferential statistics, including frequency, percentage, and T-test analyses, to assess the effectiveness of the intervention.

Results

The study population had a predominance of males (75%) and individuals aged 49 years or older (55%) [Supplementary Table 1]. The majority identified as Hindu (55%), were married (70%) and lived in joint families (76%). In terms of education, a significant proportion had received primary-secondary education (45%), and most were employed (44%). Family income distribution indicated that 34% had an income greater than Rs. 30,000/- per month. The study encompassed a balanced representation of residents of rural (52%) and urban (48%). Regarding the duration of illness, a substantial number had been experiencing disease for more than three years (39%). Notably, the majority of subjects underwent three hemodialysis cycles per week (93%).

There were significant improvements in the QoL among participants following the intervention. Notably, there were substantial mean differences in various domains [Supplementary Table 2 and Figure 1]: general health improved by 5.4, physical health by 14.3, psychological health by 14.2, social relationships by 7.5, and environmental health by an impressive 6.1.

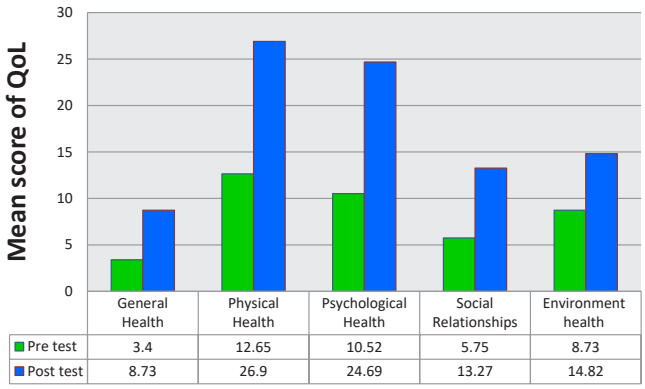

Figure 1: Bar graph showing comparison of domain wise mean score of pretest and post test QoL. QoL: Quality of Life score

The findings reveal a substantial improvement in the overall QoL among [Supplementary Table 3] participants following the intervention, as indicated by a significant mean difference of 57.760 between pre-test and post-test scores. The pre-test mean QoL score was 51.57, while the post-test mean score substantially increased to 109.4. The calculated 't' test value of 65.070 tabulated was 1.645 with a corresponding p-value of less than 0.0001.

Discussion

The present study investigated the effect of yoga and meditation on the QoL among CKD patients taking hemodialysis treatment. The intervention resulted in a significant enhancement across all aspects of quality of life among CKD patients. In general, overall health scores physical health scores and psychological health scores showed a marked improvement. Similarly, social relationships and environmental health scores also rose significantly. The study results also demonstrated a substantial increase in the overall QoL score. Furthermore, the QoL scores in each domain exhibited a significant increase post-intervention, underscoring the effectiveness of the intervention. These results are consistent with the findings of previous studies. In the study by Pandey *et al*.[18] the effect of yoga on renal functions and QoL among CKD patients indicated a mean difference of 15.38 between the experimental and control groups and a significant improvement in QoL of patients as well as improved renal functions. The study by Kashinath *et al*.,[19] concluded that yoga is a non-invasive, cost-effective therapeutic intervention with a positive effect on physical and psychological levels and selected biomarkers in patients with kidney failure. These study results are consistent with Jayrshree[20] and Chu[21] and support the findings of the previous study related to the impact of yoga in reducing anxiety among menopausal women[22] and on chronic illness[23]. These studies collectively underscore the effectiveness of yoga and meditation in enhancing various domains of QoL among CKD patients and overall improvements in their well-being. Possible mechanisms of benefit include stress reduction, improved coping, and modulation of physiological responses.

The study was primarily limited by the absence of a control group, restricting the ability to conduct comparative analysis effectively. The yoga program only lasted 12 week. The COVID-19 pandemic posed limitations in reaching out to participants, affecting the study's approach to client engagement. Another limitation arose from the unwillingness of certain participants to engage in all 12 yoga and meditation sessions. To ensure the continuation of yoga and meditation at patients' homes had to rely on their self-reporting. There was a lack of assessment and correlation of biomarkers to investigate any potential effects of yoga and meditation.

Future studies should include a control group, and include patients on peritoneal dialysis. A mixed-method study would allow for a deeper understanding of the experiences and perceptions of CKD patients regarding yoga and meditation interventions.

Conclusion

The findings underscore the positive effect of yoga and meditation: Breathwork- pranayama, anulom vilom-alternate nostril meditation, bhramari, kapalbhati and mindful meditation- mindful drinking and mindful eating activities on various domains of QoL among individuals with chronic illness undergoing hemodialysis. To enhance the QoL across diverse domains, targeted and long-term interventions should be considered, aligning with the nuanced needs of patients undergoing hemodialysis.

Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: Sample characteristics of the subjects and is explained in frequency and percentage distribution and represented (N=100)

Sample characteristics		Frequency	Percentage (%)
Gender	Male	75	75
	Female	25	25
Age	19-28	16	16
	29-38	13	13
	39-48	16	16
	>=49	55	55
Religion	Hindu	55	55
	Muslim	29	29
	Christian	11	11
	Others	5	5
Marital Status	Unmarried	22	22
	Married	70	70
	Widow/widower	8	8
Education status	Illiterate	4	4
	Primary-Secondary education	45	45
	Higher secondary education	18	18
	Graduate or above	33	33
Occupation	Employed	21	21
	Self-employed/business	23	23
	Retired	18	18
	Unemployed	38	38
Type of family	Joint Family	76	76
	Nuclear Family	24	24
Family income	<10,000	11	11
(in Rupees per month)	10,000 – 20,000	29	29
	20,000 – 30,000	26	26
	>30,000	34	34
Area of residence	Rural	52	52
	Urban	48	48
Duration of Illness	6 months – 1 year	29	29
	1 year – 3 years	32	32
	>3 years	39	39
No. of HD cycle in a week	1 cycle	1	1
	2 cycle	5	5
	3 cycle	93	93
	>3 cycle	1	1

HD: hemodialysis

Section I: Frequency and percentage distribution of participants according to social-demographic variables: Sample characteristics such as Gender, age in years, Religion, Marital status, Education, Occupation, Type of family, Family monthly Income in Rs, Area of residence, Duration of illness, No. of Hemodialysis cycle in a week and Co morbidity.

The sample characteristics of the study population revealed a predominance of males (75%) and individuals aged 49 years or older (55%). The majorities identified as Hindu (55%), were married (70%), and lived in joint families (76%). In terms of education, a significant proportion had received primary-secondary education (45%), and most were employed (44%). Family income distribution indicated that 34% had an income greater than Rs. 30,000/- per month. The study encompassed a balanced representation of rural (52%) and urban (48%) residents. Regarding the duration of illness, a substantial number had been experiencing illness for more than three years (39%). Notably, the majority of subjects underwent three hemodialysis cycles per week (93%).

Supplementary Table 2: Description domain-wise QoL scores among CKD patients undergoing hemodialysis before and after intervention (N=100)

QoL	Max Score	Pre-test		Post-test		Mean difference
		Mean	SD	Mean	SD	
General health	05	3.40	1.073	8.73	0.723	5.4
Physical health	35	12.65	4.777	26.90	2.699	14.3
Psychological health	30	10.52	3.489	24.69	1.868	14.2
Social relationships	15	5.75	2.618	13.27	0.952	7.5
Environment health	40	8.73	6.267	14.82	0.723	21.1

CKD: chronic kidney disease, QoL: quality of life, SD: standard deviation.

Section II: Findings related to assessment of quality of life in the form of mean and standard deviation of pretest score of CKD patients

There were significant improvements in the Quality of Life (QoL) among participants following the intervention. Notably, there were substantial mean differences in various domains: General Health improved by 5.4, Physical Health by 14.3, Psychological Health by 14.2, Social Relationships by 7.5, and Environmental Health by an impressive 6.1.

Supplementary Table 3: Effectiveness of yoga and meditation on QoL among CKD patients undergoing HD (N = 100)

Overall Quality of life	Mean	Mean Difference	SD	SEM	Calculated 't' test	P value
Pre-test	51.57	57.760	7.31	1.15	65.070	<0.0001
Post-test	109.4		5.01			

CKD: chronic kidney disease, QoL: quality of life, SD: standard deviation, HD: hemodialysis, SEM: standard error of the mean.

Section III: Findings related to effect of Yoga and meditation on quality of life in patients with chronic kidney disease in the form of paired t-test

The findings of Table: 3 reveal a substantial improvement in the overall Quality of Life (QoL) among participants following the intervention, as indicated by a significant mean difference of 57.760 between pre-test and post-test scores. The pre-test mean QoL score was 51.57, while the post-test mean score substantially increased to 109.4. The calculated 't' test value of 65.070, tabulated' was 1.645 with a corresponding p-value of less than 0.0001.