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## ORIGINAL ARTICLE

# The impact of multidisciplinary rehabilitation on the quality of life of hemodialysis patients in Iran



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**KEYWORDS**

hemodialysis;  
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multidisciplinary  
rehabilitation;  
quality of life

**Background/purpose:** Hemodialysis contributes to changes in lifestyle and the health status of patients. The aim of this study was to evaluate the impact of participatory rehabilitation on the quality of life of patients.

**Methods:** This quasi-experimental before and after study was conducted on 30 patients in the hemodialysis center at Hazrat-e-Rasoul Hospital in Javanrood during 2013. The rehabilitation program was executed with participation of experts in the fields of nursing, physiotherapy, and clinical psychology for 8 weeks. The instrument used for data collection was the hemodialysis version of Ferrans and Powers Quality of Life Index (QLI) which was completed by the research assistant by interview before and after the rehabilitation program.

**Results:** The mean age of patients was  $55.8 \pm 14.3$  years, 60% were male, and 93.3% were married. The average duration of hemodialysis was  $3 \pm 2.4$  years. The quality of life score of all patients before the intervention was between 10 and 19 (moderate level), which after intervention, improved to a good level in half of the patients ( $p < 0.001$ ).

**Conclusion:** Rehabilitation programs improve the quality of life of hemodialysis patients. By this finding, implementation of rehabilitation programs is recommended in hemodialysis centers with participation of experts from different fields including nurses, physiotherapists, and clinical psychologists.

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## Introduction

Chronic kidney disease (CKD) and its treatment methods such as hemodialysis affect the lifestyle and health status of patients.<sup>1</sup> "Quality of life" is a complex and multidimensional concept and includes subjective and objective factors. Quality of life is often considered as a specific understanding of satisfaction in life, social and familial health, hope, rules, and mental health.<sup>2</sup> The results of clinical trials have shown that quality of life can be a sign of the quality of healthcare services and is part of the patients' treatment plan. Therefore, assessment of quality of life, especially for chronic diseases can be a useful guide for improving healthcare quality.<sup>3</sup> Treatment cost is a factor that affects quality of life in hemodialysis patients. However, hemodialysis treatment is paid for by the government in Iran and as such was free of charge for patients participating in this study.

Tgay et al<sup>4</sup> showed a significantly decreased quality of life among CKD patients when compared with the normal population. They found that psychological disorders are more common among patients treated with dialysis over a long period of time compared with the normal population. They also noted that this condition negatively affects patient survival as by increasing the rate of anxiety and depression, quality of life is reduced.<sup>4</sup> It has been known that hemodialysis patients suffer from great limitations due to chronic renal failure and hemodialysis therapy. These limitations are inevitable complications of treatment and include restriction in practice threshold, reduced physical capacity, and increased functional disability.<sup>5</sup> It seems that a rehabilitation program could provide positive improvements in the quality of life of hemodialysis patients.<sup>6</sup> This necessitates close participation of patients and their healthcare team where the role of nurses is outstanding. Up to now, many studies have been conducted to evaluate the efficacy of educating self-management and adjustment programs on the quality of life of hemodialysis patients,<sup>7,8</sup> and multidisciplinary studies have rarely been undertaken. With this in mind, the aim of the current study was to determine the impact of multidisciplinary rehabilitation on the quality of life of hemodialysis patients.

## Materials and methods

In this quasi-experimental, before and after study, hemodialysis patients were selected using nonprobable sampling, and experts from different disciplines including nurses, physiotherapists, and clinical psychologists were included. Thirty patients were selected from the hemodialysis center of Hazrat-e-Rasoul Hospital in Javanrood during 2013. Patients undergoing hemodialysis at least once a week for 3–4 hours, those with a history of hemodialysis >6 months, appropriate physical condition (no history of hearing or visual loss or cerebrovascular accident, without history of muscular disease or atrophy), ability to perform exercises (confirmed by a physiotherapist), and those willing to attend training classes were included in the study. Those with a history of previous or ongoing training about self-management, cognitive disorders, hearing or visual loss, severe psychological disorders (confirmed by clinical

psychologist), and those with a history of taking psychiatric medications, migration, change in treatment approach (renal transplantation, peritoneal dialysis), those without cooperation, those unable to receive the rehabilitation program completely, and acute familial and social adversities (loss of first degree relatives, loss of job, divorce, and dropping out of school) were excluded from the study.

After receiving ethics committee approval and permission from the Lorestan University of Medical Sciences and the Hazrat-e-Rasoul Hospital in Javanrood, the goals of the study were explained to the patients and informed consent were obtained.

Before beginning the rehabilitation program, patient demographic information (including age, gender, marital status, employment, educational level, and history of dialysis) and Ferrans and Powers Quality of Life Index (QLI) questionnaires were filled out by the research assistant by interview. During 8 consecutive weeks, patients underwent a weekly physiotherapy program for 8 sessions, weekly psychotherapy for 8 sessions, weekly nutritional therapy for 8 sessions, and a weekly self-management program for 8 sessions. After 8 weeks, the questionnaires were filled again. The dialysis version of Ferrans and Powers QLI 2 has two parts. The first part contains items for evaluating patients' satisfaction, and the second part determines the rate of importance that the patients dedicate to each item. The questionnaire, which contains 68 items (34 items for each part), is scored based on a Likert 6-item scale. The first part is scored by one point from very satisfied to very dissatisfied, and the second part is scored by six points from very unimportant to very important. The items in both parts are similar. This instrument evaluates four aspects of quality of life including health and function (14 items), socioeconomic (eight items), psychospiritual (seven items), and familial (five items) aspects. The overall quality of life score is calculated based on the standardized instrument instruction as follows: 3.5 points are subtracted from the response to each item in the satisfaction part so that the range of scores will be  $-2.5$  to  $+2.5$ ; then the score of each item in the satisfaction part is multiplied to the answers at the same expression in the importance part and, all responses obtained from the 34 questions are added to each other and the number 15 is added to each calculated value. The quality of life scores range from 0 to 30. Values from 0 to 9.9 indicate a poor quality of life; 10 to 19.9 indicate a semidesirable quality of life; and 20 to 30 indicate a desirable quality of life. The reliability of the instrument was reported by Ferrans and Powers in 1985 and 1992 as 0.90 and 0.93, respectively, using the Cronbach's alpha coefficient. Rambod et al<sup>9</sup> tested and retested the instrument in Iran and confirmed the reliability as  $R = 0.90$ .

The physiotherapy program was as follows: 1 hour physical therapy for each session including muscular rehabilitation using a shoulder bike (except for patients with fistula), stationary bicycle, lumbar and cervical traction, and seat quadriceps under supervision of a physiotherapist at a private physiotherapy clinic during the afternoon 1 day after dialysis. The psychotherapy program was used as a group discussion for cognitive therapy based on the Beck cognitive therapy in order to improve depression symptoms. Each group included 7–8 people who were mentored

by a clinical psychologist at a private psychotherapy clinic during the afternoon 1 day after dialysis.

The nutritional therapy and self-management programs were implemented by the researcher in 1-hour sessions based on the contents of the educational package. The titles of the educational program were goals of nutritional therapy, causes of anorexia and its treatment, regulating daily fluid intake and electrolytes, consuming alternative foods, controlling the factors affecting hyperlipidemia, evaluating causes and complications of malnutrition, vitamins, minerals, drug consumption, educating exercise, management of fistula and central catheters, sleep disorders, and skin care.

### Statistical analysis

For data analysis, descriptive statistical tests were applied to calculate mean (*M*), standard deviation (*SD*), and absolute and relative frequencies. Normal distribution of the data was measured using the Kolmogorov–Smirnov test ( $p > 0.05$ ), the paired *t* test was used to compare the quality of life means before and after participation in the rehabilitation program using SPSS software version 20.00 for Windows.

### Results

In this study, 30 hemodialysis patients were evaluated. The mean age of the patients was  $55.8 \pm 14.3$  years (range, 27–88 years). The most common relative frequency in the studied patients was seen in the age group of 40–59 years (46.7%). Most of the patients were male (60%) and 93.3% were married. Regarding the educational level, 70% of patients were illiterate and just 3.3% had an academic education. Regarding the employment status, the majority of patients (83.3%) were unemployed. The average duration of hemodialysis was  $3 \pm 2.4$  years (range, 6 months to 8

years). The duration of dialysis in 50% of patients was between 1 year and 5 years (Table 1).

Qualitative classification of the QLI showed that the scores of all patients (100% of cases) before intervention were between 10 and 19 in the semidesirable level; while after intervention, the quality of life for 15 people (50%) was desirable which showed an improvement in the patients' quality of life after intervention ( $p < 0.001$ ).

The other objective of this study was to compare different aspects of patients' quality of life before and after intervention. As shown in Table 2, a significant statistical difference was observed in the scores of different aspects of life quality between after rehabilitation and before rehabilitation ( $p < 0.001$ ). Also, the lowest level of satisfaction in the field of health and performance was related to life concerning the following ( $M = 2.3$ ,  $SD = 1.08$ ): in the field of socioeconomy it was related to financial requirements ( $M = 3.7$ ,  $SD = 1.4$ ); in the field of psychospirituality it was related to the degree of happiness ( $M = 3.6$ ,  $SD = 1.5$ ), and finally, in the field of family it was related to the family happiness ( $M = 4.82$ ,  $SD = 1.7$ ). The quality of life of the hemodialysis patients in terms of age was statistically significant; in lower age groups (20–39 years), all patients had a good quality of life after the intervention ( $p = 0.008$ ). Statistically significant relationships were not observed between desirability of quality of life and marital status, gender, educational level, employment status, and duration of hemodialysis among the evaluated patients.

### Discussion

In this study, the mean quality of life for the majority of patients was semidesirable. Rehabilitation programs improved the quality of life in hemodialysis patients significantly. Patients underwent hemodialysis for 12 hr/wk

**Table 1** The distribution of absolute and relative frequency of demographic characteristics and duration of hemodialysis in the patients.

Type of property		Frequency	Relative frequency	Cumulative frequency
Age, y	20–39	3	10	10
	40–59	14	46.7	56.7
	≥60	13	43.3	100
Sex	Man	18	60	60
	Woman	12	40	100
Marital status	Single	2	6.7	6.7
	Married	28	93.3	100
Educational level	Illiterate	21	70	70
	Guidance school and less	5	16.7	86.7
	High school and diploma	3	10	96.7
	Academic	1	3.3	100
Employment status	Employed	5	16.7	16.7
	Unemployed	25	83.3	100
Duration of hemodialysis (y)	≤1	9	30	30
	1–5	15	50	80
	≥5	6	20	100

**Table 2** The mean and standard deviation of various aspects of quality of life in hemodialysis patients before and after intervention.

Different aspects of life	Before intervention	After intervention	<i>p</i> *
	(Mean ± SD)	(Mean ± SD)	
Health and performance	5.8 ± 0.55	8.1 ± 1.4	<0.001
Socioeconomic	3.3 ± 0.32	3.9 ± 0.49	<0.001
Psychospiritual	3.4 ± 0.5	4.4 ± 0.53	<0.001
Family	2.6 ± 0.32	3.2 ± 0.39	<0.001

Type of test: Paired *t* test.

\*Level of significance was < 0.05.

in the current study while in other countries, the same therapy lasts 20–24 hr/wk.<sup>10</sup> Therefore, the lower quality of life in this study may be attributed to a lower dialysis time, failure to comply with principles of self-management, and failure of medical staff (nurses and physicians) to properly educate patients.

After rehabilitation, the patients' quality of life significantly improved which is consistent with the Baraz et al<sup>7</sup> study that indicated improvement in the quality of life after educating hemodialysis patients' on self-management techniques. Similarly, Tsay and Lee<sup>8</sup> evaluated the effectiveness of educating hemodialysis patients in adjustment programs and showed that such an intervention had a significant effect on patients' quality of life.

CKD profoundly affects the physiological condition of patients and reduces their performance. Previous studies have shown that hemodialysis patients may experience a decrease in cognitive skills such as attention, memory, and rationale, and most patients will suffer from peripheral neuropathy.<sup>11</sup> Hemodialysis patients are individuals with poor physical performance and pass many hours a week on a hospital bed, daily activities are greatly limited and their life expectancy is reduced, all of which ultimately reduce the quality of life in these patients.<sup>12</sup> This study showed that regular exercise and muscular physiotherapy can increase muscle strength and improve power to perform daily activities which can improve the quality of life in these patients.

Many studies have shown that CKD patients can benefit from exercises and achieve improvement in their strength and stamina. Moreover, cardiac function significantly improves with aerobic exercises and the amount of oxygen consumption increases. Therefore, rehabilitation can improve performance, mood, and quality of life in hemodialysis patients.<sup>13,14</sup> Mustata et al<sup>15</sup> in a 12-week study showed that regular exercise leads to an increase in exercise capacity, reduction in mortality, and improvement in quality of life, and conceived that the main reason for this achievement is the cardiovascular and metabolic benefits of exercise.<sup>15</sup>

The current study patients had at least 6 months and a maximum of 8 years of an inactive lifestyle and therefore were unable to do normal daily activities. Taking action to increase the physical strength of hemodialysis patients who had a long-term history of dialysis revealed a positive impact on their quality of life. Current research suggests that hemodialysis patients can become active again and

there is no reason for inactivity.<sup>12</sup> Maintaining activity can effectively reduce excessive dependency and also boost the patients' mood.<sup>16</sup> Exercise is effective in kidney rehabilitation by correcting fiber atrophy, increasing transverse fibers, and improving angiogenesis in the skeletal muscle of CKD patients.<sup>17</sup> Riahi et al<sup>18</sup> evaluated the effects of exercise during hemodialysis on the fatigue and quality of life of hemodialysis patients and found that the quality of life is significantly improved after 5 months.

Regarding the education and training of hemodialysis patients, several studies have been conducted. Baraz et al<sup>19</sup> found that two sessions of 1-hour face to face training in hemodialysis patients improves quality of life and also the strength and energy of hemodialysis patients. Other studies have also indicated the benefits of rehabilitation in hemodialysis patients in an outpatient setting. Cowen et al<sup>20</sup> studied the results of rehabilitation in 45 patients. They recruited 28 hemodialysis patients, eight kidney transplant patients, and nine patients who did not require hemodialysis. They did not find a significant association between the groups. However, in the study by Forrest et al,<sup>21</sup> following a rehabilitation program, significant variations in physical, psychological, and occupational performance was noted, the duration of hospital admission reduced, and the discharge rate was similar to the duration of the nondialysis population.<sup>21</sup>

Based on the patients' reports, they were hypoactive and had an average of 25 minutes of physical activity like walking or light exercise. Ninety two percent indicated various barriers as a cause for reduced activity; 67% fatigue, 48% dyspnea, 42% lack of motivation. Other causes such as anemia and skeletal and cardiovascular problems have been introduced as factors that caused exercise to be rarely considered as a part of the treatment process for hemodialysis patients.<sup>22</sup>

In a study on 505 nephrologists in 2005, 98.6% of them agreed with regular exercise for dialysis patients with respect to its benefits.<sup>23</sup> Surprisingly, only 48% of these nephrologists answered the patients' request regarding physical activity and physical activity was recommended to only 28.5% of them. In another study of 100 personnel on a hemodialysis ward, the most common reason for not recommending exercise was lack of education; not believing that they play a role in encouraging the patients, or a role in the lack of patients motivation for exercise.<sup>24</sup> Using simple strategies such as the regular training of healthcare staff about the benefits of regular exercise, promoting

exercise in hemodialysis settings, and also informing the patients about exercise barriers, allows patients to have a group approach to promoting exercise. Using innovative methods like holding competitions, preparing posters and pamphlets in order to motivate patients, and asking the experts to put exercise as part of the treatment plan and daily work are appropriate approaches.<sup>25</sup> In a systematic review of 29 clinical trials of exercise training in hemodialysis patients, the researchers concluded that safe and useful exercise is recommended to all hemodialysis patients at any age.<sup>26</sup> In a group of elderly hemodialysis patients, a combination of exercises within the hemodialysis center and within the home was recommended and the participants reported improvement in physical performance and quality of life.<sup>27</sup> Although doctors may be doubtful about referring sick patients for exercise, these patients seem capable of daily exercise. Indeed, when daily exercise was taken, studies conducted among the elderly population with poor conditions but without kidney problems indicated a reduction in dependency and performance status.<sup>28</sup>

Moreover, it seems that a reduced performance of hemodialysis patients is associated with greater improvements with their physical performance.<sup>29</sup> Rehabilitation experts are working on a broad range of education, practice, and skill training for individuals who are unable to work. Rehabilitation of elderly people at home contributed to a gradual improvement in their ability to perform daily activities and keep their independence in their home territory.<sup>25</sup> In the current study 43.3% of participants were elderly people ( $\geq 60$  years) while in other studies this proportion was reported as 32–40%.<sup>30,31</sup> This is an alarming sign that shows the tendency of CKD to affect people in advanced age. However, 46.7% of patients were in the age group of 40–59 years and will enter the elderly group during the coming two decades. Therefore, sufficient attention and good planning are required in order to increase social participation of hemodialysis patients, improve healthcare services at hemodialysis centers, and provide advice to this population, aiming to maintain and improve their capabilities and quality of life.

This study showed that the least satisfaction in the field of health and performance was related to the rate of concerns about life. The researchers believe that hemodialysis patients with CKD are faced with numerous problems. In these patients, changes in diet and fluid intake, limitations in daily activities, patient dependency to others, financial stress, family problems, lifestyle changes, and stress lead to concerns about the future.<sup>32</sup> This study also showed that the least satisfaction in the socioeconomic field was related to financing issues which is consistent with the findings from the Rambod et al<sup>9</sup> study. Although the cost of hemodialysis is covered by the government in Iran and is free of charge to patients, due to the cost-consuming nature of hemodialysis, except for hospital costs, and the possibility of gradual or abrupt job loss by starting dialysis, patients may encounter socioeconomic problems. Also, patients' inability to compensate treatment requirements and even fundamental life requirements directly affects their quality of life.<sup>33</sup> In our study, the majority of patients were unemployed and this may have caused patient

dissatisfaction regarding finances. Aside from this, patients expressed the least satisfaction about happiness in familial aspects. The problems related to deprivation of daily activity, treatment costs, transportation to the hemodialysis center, and observing the pain and suffering of the beloved member of the family, creates a painful and gloomy atmosphere in the family.<sup>9,34</sup> As a result of a decrease in prosperity and joyful moments in the family, patient satisfaction regarding family happiness may be reduced.

In examining the concurrent effects of age, marital status, educational level, employment, and number of years under hemodialysis on the quality of life score, the interaction between independent variables were not statistically significant which is consistent with a number of other studies; but was in contrast to the results of Hadi et al.<sup>10,35–37</sup> The findings of this study also showed that there was no significant relationship between the quality of life and variables such as gender, duration of dialysis, and employment status. These findings are consistent with the results reported by Rambod et al<sup>9</sup> but contradict the results of a study by Tayyebi et al<sup>38</sup> in Iran and a study by Sayin et al<sup>39</sup> in Turkey.

We found a significant relationship between the quality of life and patients' age; in the lower age groups (20–39 years) all patients had a desirable quality of life after the intervention which was in contrast to the Rambod et al<sup>9</sup> and Tovbin et al<sup>40</sup> studies.

Rehabilitation and group therapy were found to be effective in the treatment and care of hemodialysis patients. It is suggested that in order to obtain more specific outcomes in this setting, in addition to the questionnaire, other psychological instruments such as psychiatric interviews should be applied.

One of the limitations of this study was the time at which quality of life was assessed, which was 8 weeks after intervention. Ideally this should have been performed after a longer period. Also, the possibility of receiving education through various media sources during the study was out of the control of the researchers.

As the quality of life in hemodialysis patients is affected by anemia, future studies about the calculation of Kt/V are recommended. Also, further long duration studies investigating the effects of multidisciplinary care on muscle weakness and loss of subcutaneous fat with assessment of malnutrition-inflammation scores before and after intervention, as well as the effect of multidisciplinary care on activities of daily living with the Karnofsky scale are suggested.

## Conclusion

Implementing a multidisciplinary rehabilitation program contributes to the improvement of the quality of life in hemodialysis patients. Rehabilitation of hemodialysis patients is a safe, strategic program and is considered as a secondary prevention in CKD patients. It is suggested that future studies with a focus on the biological longevity of patients are required, and also rehabilitation programs to be educated to the students, and provided to the working nurses in the format of continuing education.

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