RESEARCH PAPER

Education Based Intervention on Compassion Fatigue and Quality of Life among Care givers of Hemodialysis Patients: Feasibility Study

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Abstract: Caregivers of haemodialysis patients are at high risk for emotional distress, low quality of life, and increased burden. They often experience excessive workload, social limitations, financial strain, fatigue, anger, depression, helplessness, guilt, and isolation, neglecting their own health. Research indicates that family caregivers experience similar triggers as professional caregivers, including empathetic concern, prolonged exposure to suffering, lack of satisfaction, and overwhelming life demands., and negative emotions Support interventions, including education, skills training, and self-care guidance, are essential to enhance patient adherence to treatment A pilot study using a true experimental design evaluated the impact of an education-based intervention on compassion fatigue and quality of life among caregivers. Thirty participants were selected through simple random sampling (opaque card method) and assigned to experimental (n=15) and control (n=15) groups. The caregiver education program included sessions on compassion fatigue, breathing exercises, meditation, diet, and physical activity over two weeks, followed by a 10-week digital follow-up. Assessments were conducted at end of 12 weeks post-intervention.A significant reduction was observed in compassion fatigue (t=5.48) and improvement in quality of life (t=24.99) after the intervention. Between-group analysis showed a significant effect on compassion fatigue (t=2.48) and quality of life (t=14.92). A weak negative correlation (r=-0.233) was found between compassion fatigue and quality of life. No significant association was found between compassion fatigue and demographic variables except age, whereas quality of life was significantly associated with income, gender, and occupationThe pilot study demonstrated that an education-based intervention is feasible and practical to implement in dialysis centre to reduce the compassion fatigue and enhance the quality of life among caregivers of hemodialysis patients

Key words: Compassion fatigue, Quality of life, Caregivers, Haemodialysis patients, Education program

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INTRODUCTION

The World Health Organization projects CKD to become the 5th most common chronic disease in 2040.The prevalence of CKD worldwide is 10.4% among men and 11.8% among women. AKI, experienced by 13.3 million people each year Between 5.3 and 10.5 million people require dialysis or transplantation (International Society of nephrology) Over 2 million people worldwide currently receive treatment with dialysis or a kidney transplant (Couser WG, Remuzzi G, Mendis S, Tonelli M. 2011)

Hemodialysis (HD) was introduced in India in 1962. As of 2017, Globally, an estimated 349 million people including patients with ESKD are care-dependent. Patients with ESKD depend on unpaid family caregivers for their self-care needs. .(Suri, R. S., Larive, B., Garg, A. X., et al. 2011))Unlike developed countries, in low and middle-income countries, the care giving process for HD patients is highly challenging. (.Kassa, D., Abebe, S., Kebede, A., & Gebremedhin, T. 2020)

Family caregivers play a central role in caring for frail older adults. It is estimated that 36 million adults provide unpaid care to a family member who is age 65 or older 4.(National Alliance for Caregiving, 2009). Family caregivers share more than 20 hours per week care burdens. increase in the number of ADL difficulties, depressive behaviors, memory-related problems, and disruptive behaviors .(I-Fen Lin,2015) care giving activities may interfere with caregivers' daily routines; cause physical, emotional, and financial strain; and eventually exhaust their energy(Pinquart, M., & Sörensen, S. 2005).

Compassion has been defined in terms of "awareness of the suffering of another coupled with the wish to relieve it" (Figley & Ludick, 2017, p. 574), and as "a kind of focused, action-oriented empathy" (p. 574). When a psychologist or other helper feels a demand to be compassionate and effective in helping that goes beyond his or her spontaneous resources for being of help this may result in compassion stress. If this stress increases to such an extent that it leads to exhaustion (or burnout) and the erosion of compassion, it is referred to as *compassion fatigue* (Figley, 1995; Figley & Ludick, 2017) The pleasure derived from helping others is referred to as compassion satisfaction (CS). When a psychologist feels a too heavy demand to be compassionate and effective in helping, however, this may result in compassion fatigue (CF). CF may take the form of burnout or secondary traumatic stress (STS). (Dehlin, M., & Lundh, L.-G. 2018)

According toStamm, B. H. (2010), the care giving experience consists of both theconcept of compassion fatigue that includes components of burnout and secondary dramatization and the positive outcome of compassion satisfaction . Family caregivers can simultaneously experience two emotions caused by compassion when serving the families. Compassion satisfaction refers to the pleasure of providing care to relieve others' suffering. If family caregivers have greater compassion satisfaction, they can gain a high-quality care experience with less negative feelings. Meanwhile, some noted that compassion fatigue is a progressive and cumulative result of internalizing emotions regarding others or continual provision of one's self when caring for others. This may weaken the capacity to undertake the suffering of others, and lead to despair, distress, and isolation.Current data suggest that overall compassion fatigue and compassion satisfaction levels were moderate, thus highlighting the potential risk of compassion fatigue for family caregivers..(Liao, X., Wang, J., Zhang, F., Luo, Z., Zeng, Y., & Wang, G. 2022)
Families of patients undergoing haemodialysis must cope with numerous limitations imposed by the disease, which negatively impact their psychological well-being. Difficulties faced by family members primarily stem from dietary and fluid restrictions, challenges in going on holiday, time commitments for haemodialysis, persistent fatigue, inadequate sexual activity, frequent hospitalizations, financial strain, uncertainty about the future, reduced social interactions, changes in family roles, and limitations in physical activitiesfactor affecting 'the need for support and guidance', 'the need for individualized care' and 'the need to meet the emotional and physical needs',(Xhulia, D., Gerta, J., Dajana, Z., Koutelekos, I., Vasilopoulou, C., Skopelitou, M., & Polikandrioti, M. 2015).

Both patients and caregivers must dedicate at least three days a week to haemodialysis treatment. This significantly restricts their social life and daily activities while fostering a sense of dependence on the dialysis unit and healthcare professionals. At the onset of dialysis therapy, patients and caregivers tend to have similar mental health conditions, often experiencing an initial improvement in social interactions. However, as the illness progresses, caregivers' mental health deteriorates, with depression being the most prevalent issue Caregivers frequently face financial difficulties and experience symptoms of depression, anxiety,

fatigue, social isolation, strained relationships, and disappointment due to the demanding nature of haemodialysis treatment The heavy burden of caregiving often causes family members to neglect their own health needs (Eirini G and Georgia G. , 2017).Furthermore, both patients and their caregivers can fall into a loop of psychological ebb being affected by each other as caregivers are reported to experience anxiety and depression if the patients they tend to suffer from the same emotional statuses(Gerogianni G, Polikandrioti M, Babatsikou F et al 2019)emotional instabilities and reactions, care fatigue, distortion of caregiver's health, multiple economic and social damages are the major challenges faced by primary family caregivers. Long-term caring activities also impact the psychological state of family caregivers. Ambiguity in life status, mental and psychological problems, mental exhaustion, deprivation of basic needs, spiritual issues, adaptations and feelings that emerge from caring, and coping mechanisms(Abebe A., Arba A., Paulos K. 2022)

Patients with CKD undergoing dialysis require comprehensive care from their families. The QoL of a family caregiver is a subjective feeling experienced owing to the burden of caring for a sick family member. In this review, the caregiver's QoL dimension includes physical capacity, social relations, psychological state, and environment (Martin, M. P., McEntee, M. L., & Suri, Y..2021)caregivers reported significantly worse carer experience The supportive needs of patients undergoing dialysis are categorized into two, including external and internal components. The internal components are patient factors, disease and treatment, whereas the external components are personal living circumstances, health system and socioeconomic aspects (Nikkhah, Attieh1; Kolagari, Shohreh2; Modanloo, Mahnaz2,., 2020). The activities of taking care of patients with CKD undergoing dialysis can affect the daily activities of family caregivers, including the imbalance between caregiving and life.Ambiguity in life status including fear, loss of hope, and life satisfaction depending on care is a problem in the care of patients with CKD (Nimah L, Nursalam N, Wahyudi AS, Mariyanti H 2024Ebadi A.,2021) Four categories were developed as follows: 'care challenges', 'psychological vulnerabilities', 'the chronic nature of care 'and "care in the shade". The categories led to the development of the main theme of 'progressive exhaustion' experienced by the family caregivers during the provision of care to patients undergoing hemodialysis.Salehitali, S., Ahmadi, F., Hasanpour Dehkordi, A., Noorian, K., Fereidooni-Moghadam, M., & Zarea, K. (2018)

QOL among Family Caregivers of Patients on Hemodialysis is low, compared to the general population; however, their QOL is higher than the patients under their care. Factors relevant to the QOL for caregivers including age, gender, perceived social support, perceived burden of care, withother diseases (lupus, hypertension, hypothyroidism and depression), intellectual understanding of the limitations of the patient's disease in their daily life, employment of adaptation strategies, better marital relationships, accepting self and family relationship with the patient (mother and wife).Sajadi SA, Ebadi A, Moradian ST(2017) Direct and significant relationship between hope and quality of life. However, the quality of life was significantly lower in suburban residents, the unemployed, spouses, people with lower education and income levels, caregivers who cannot leave their patients alone, those living with their patients in the same house, and those taking care of male patients (Sajadi, S.A., Farsi, Z., Akbari, R. *et al.* 2021)Because of the critical role of family caregivers in providing care to patients on hemodialysis, these caregivers experience progressive exhaustion. Thus, more attention needs to be paid to their general health, quality of life, social well-being, and satisfaction. Neglecting the mental state of family caregivers of patients with chronic diseases may also have grave consequences for the patient's health.significant improvement in total quality of life of the studied patients post implementation of intervention program with highly statistically significant-difference at (P= < 0.01) between before, immediate and three months post of intervention program.There was improvement in overall quality of life of the studied caregivers as support of caringpercentage (18.3%,56.7% and 50% respectively) in before, immediate post and three months postintervention program. (Salehitali, S., Ahmadi, F., Hasanpour Dehkordi, A., Noorian, K., Fereidooni-Moghadam, M., & Zarea, K. 2018).

Caring for hemodialysis patients threatens the psychological integrity of the caregiver, understanding the experiences of family members by nurses and other health care providers also help them provide better family-centered care as one of the primary goals of holistic care.The mental health status of the caregiver affects the quality of patient care.(Ebadi, A., Sajadi, S. A., Moradian, S. T., & Akbari, R. (2021)

Family caregiving is more intensive, complex, and long lasting than in the past and caregivers rarely receive adequate preparation for their role. A compelling body of evidence suggests that many caregivers experience negative psychological effects. Some caregivers are athigher risk than others, especially those who spend long hours caring for older adults with advanced dementia. Caregivers should have access to high-quality, evidence-based interventions designed to mitigate or prevent adverse health effects (.Schulz, R., & Eden, J. 2016)However, the caregivers of hemodialysis

patients are mostly neglected, and few studies are available on home care training for these caregivers (Mollaoglu, M., Kayatas, M., & Yürügen, B. (2013)&Khorami Markani, A., Saheli, S., Sakhaei, S., & Khalkhali, H. R. (2015)and no studies are available on the effectiveness of supportive educative on the quality of life in these caregivers. This study aimed to evaluate the effect of education based intervention onawareness of compassion fatigue, breathing exercise, meditation, diet, exercise and sleep on the quality of life in family caregivers of hemodialysis patients.

METHODS AND MATERIALS

Study design and setting

True experimental research design was adopted. A primary care centre with hemodialysis unit was selected to collect and implement the education programme among caregivers Participants were randomly assigned to either an experimental group, which received the educational program, or a control group, which did not.

Sample and sampling

The sample consisted of male and female adults who had been taking care of hemodialysis patients for more than six months and regularly accompanying them to the dialysis unit. Caregivers included first-degree relatives, such as sons, daughters, spouses, uncles, and aunts, who were responsible for the home care of the patient. Participants were required to have a willingness to participate in the study, an average to high level of compassion fatigue (a score of more than 43), and a commitment to staying with the patient for more than two hours per day for a minimum of six months. Additionally, the patients under their care had to undergo regular hemodialysis at least three times a week and have no history of kidney transplantation. The following caregivers were excluded from the study: those who were paid for care giving, individuals with known psychological or neurological disorders who were undergoing treatment, those who had previously participated in similar training courses, and caregivers who experienced a major family crisis (such as divorce, financial hardship, or the death of a first-degree family member) during the study. Participants who decided to withdraw from the study or missed even one training session were also excluded. After selection and obtaining informed consent, the investigator randomly allocated the participants who met the inclusion criteria into either the control group or the experimental group using an opaque envelope method. Each envelope contained a label indicating either ExperimentalorControl. A total of 30 caregivers were selected and asked to pick an opaque envelope, determining their assignment based on the letter inside.

Study instrument

A structured interview schedule was developed by the investigator after reviewing relevant literature and consulting with experts to collect data.The demographic variables of caregivers included age, sex, marital status, education, occupation, income, relationship with the patient, and whether they lived with the patient. The patient variables included age, sex, and marital status. Intervening variables consisted of the duration of care giving (in months), the number of hours spent per week on care giving, and the duration of the patient's illness.Compassion Fatigue was assessed using the Professional Quality of Life Scale (ProQOL) Version 5, developed by B. Hudnall Stamm (2009). This scale evaluates three components: Compassion Satisfaction, Burnout, and Secondary Traumatic Stress. The scores were interpreted as low, average, or high levels of compassion fatigue. Quality of Life was measured using the WHOQOL-BREF (2012) scale, which assesses four domains: physical health, psychological well-being, social relationships, and environment. A higher score indicated a better quality of life among caregivers.

Method of data collection.

A pilot study was conducted at Chettinad Super Speciality Hospital (CSSH), Dialysis Unit**,** over a period ofthree months**.** A total of33 participants were selected using a random method**,** with17 assigned to the experimental group and 16 to the control group. Apre-test was conducted before implementing theCaregiver Education Program, which covered topics such as compassion fatigue, deep breathing exercises, meditation, diet, exercise, and sleep management**.** The program was delivered to the experimental group over a period of two weeks**,** using a laptop with PowerPoint presentations and videos. Reinforcement sessions were also included.For the next 10 weeks, caregivers were monitored through phone callsand digital messages to ensure regular practice of the techniques taught. During the follow-up period**,** two participants from the experimental group and one from the control groupdiscontinued the study. A post-test was conducted at the end of the 12th week using the same assessment instruments**.**.

Validity of the data collection instruments

Content validity was obtained with the help of experts in the field of Psychology, Psychiatry,, Physiotherapy and psychiatric nursing and Nephrology

.Ethical considerations and consent of the participants

Ethical approval for this study was obtained from the Institutional Human Ethics Committee (CARE IHEC-II**)** (Ref No**:** IHEC-II/0426/23**).** Formal permission was also obtained from the hospital authorities. Informed written consent was obtained from participants who were willing to take part in the study

Statistical analysis.

Descriptive statistics were used to analyze the levels of compassion fatigueandquality oflifeamong caregivers. The chi-square test was employed to assess the association between demographic variables and compassion fatigue and quality of life.To examine the relationship between compassion fatigue and quality of life, Karl Pearson'scorrelation coefficient was calculated at a 5% level of statistical significance. The paired t-test and independent t-test were used to evaluate the effectiveness of the education-based intervention.All data analyses were performed using Statistical Package for the Social Sciences (SPSS**)** software.

RESULTS AND DISCUSSION

Demographic Variables

The demographic data reveals that the majority of caregivers in both groups were elderly (≥61 years) (Experimental: 53%, Control: 40%), male (60% and 67%, respectively), and married (87% and 80%). Most had at least secondary education, with the highest percentage in the experimental group having higher secondary schooling (47%), while in the control group, it was high school (47%). A significant portion of caregivers were unemployed/homemakers (40% in the experimental group, 33% in the control group) and had no personal income (40% and 33%, respectively). The primary caregivers were spouses (Experimental: 66%, Control: 74%), and nearly all lived with the patient (100% and 93%, respectively). While the majority of caregivers did not report any physical illness (53% in the experimental group, 60% in the control group), care giving intensity differed between groups—40% of experimental group caregivers provided more than 20 hours of care per week, compared to 47% of control group caregivers providing less than 10 hours. Among patients, the highest percentage were elderly (≥61 years) (Experimental: 66%, Control: 73%), male (67% and 60%), married (86% and 80%), and without income (66% and 73%). Most had been receiving hemodialysis for 6 months to 1 year (Experimental: 40%, Control: 46%). These findings highlight that care giving was primarily undertaken by elderly, financially dependent spouses, with the experimental group caregivers providing more intensive care than those in the control group.

Compassion Fatigue

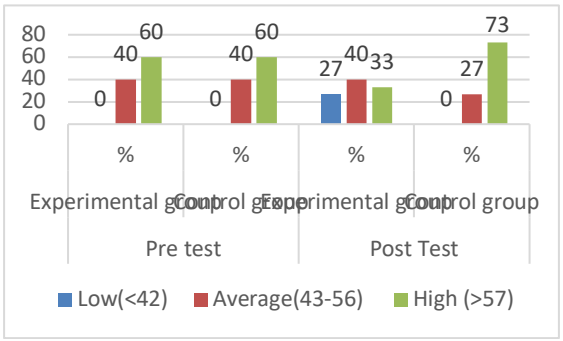

Figure.1. Level of compassion fatigue among caregivers during pre and post test in experimental and control group

Figure 1. depicts that In the Experimental Group, there was a notable improvement in compassion fatigue levels after the intervention. The number of participants in the "High" category decreased from 9 in the pre-test to 5 in the post-test, while those in the "Low" category increased from 0 to 4. This suggests a reduction in overall compassion fatigue following the intervention.In contrast, the Control Group experienced a worsening of compassion fatigue over time. The "High" category increased significantly from 9 in the pre-test to 11 in the post-test, while the "Average" category decreased. No participants fell into the "Low" category, indicating that the control group may have developed more severe compassion fatigue without any intervention.

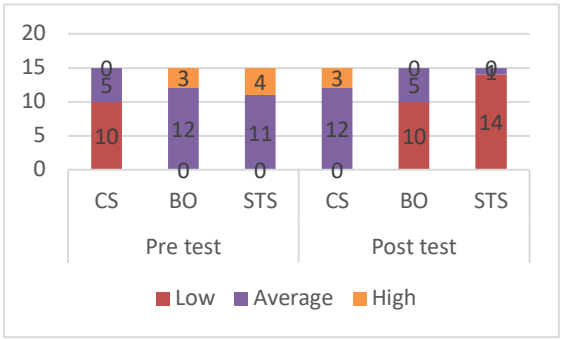

Figure.2. Level of components of compassion fatigue among caregivers during pre and posttest in both groups

Figure 2. shows that In the pre-test, 10 individuals were at a low level for CS, while none were at a low level for BO or STS.In the post-test, the number of

low-level CS cases dropped to 0, while BO increased to 10 and STS increased significantly to 14.In the pre-test, 5 individuals were at an average level of CS, 12 for BO, and 11 for STS.In the post-test, CS cases increased to 12, BO decreased to 5, and STS dropped drastically to 1.In the pre-test, 3 individuals were at a high level for BO and 4 for STS, while none were in the high category for CS.

Table.1. Comparison of mean ,SD and paired t Value of pre and post test compassion fatigue among caregivers of hemodialysis patients in both groups

Variable	Experimental group					Control group				
	Pre test		Post test		Paired t value	Pre test		Post test		Paired t value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
CS	15.27	7.36	28.87	8.32	6.697	16.13	7.96	15.27	7.17	1.427
BO	29.2	8.9	16.13	7.25	9.906	30.6	9.49	32.4	9.53	1.338
STS	28.93	8.88	13	4.5	6.743	29.73	9.93	31.07	10.3	0.998
CF	73.4	19.05	58	16.04	5.482	76.47	19.6	76.93	19.12	1.348

Table.1. depicts that With regard to Compassion Fatigue Experimental Group: The mean score significantly improved from 15.27 (SD = 7.36) to 28.87 (SD = 8.32) with a paired t-value of 6.697, indicating a statistically significant improvement.In Control Group: The mean score remained nearly the same (16.13 to 15.27), with a paired t-value of 1.427, suggesting no significant change.With Burnout (BO):Experimental Group: The mean decreased significantly from 29.2 (SD = 8.9) to 16.13 (SD = 7.25), with a highly significant paired t-value of 9.906, suggesting a major reduction in burnout.Control Group: The mean slightly increased from 30.6 to 32.4, with a paired t-value of 1.338, indicating no significant change.With regard to Secondary Traumatic Stress (STS):Experimental Group: The mean decreased from 28.93 (SD = 8.88) to 13 (SD = 4.5) with a paired t-value of 6.743, indicating a significant reduction in STS.Control Group: The mean slightly increased from 29.73 to 31.07, with a paired t-value of 0.998, indicating no significant change.Regarding Compassion Fatigue Experimental Group: The mean decreased from 73.4 (SD = 19.05) to 58 (SD = 16.04) with a paired t-value of 5.482, suggesting a significant improvement.Control Group: The mean remained almost unchanged (76.47 to 76.93), with a paired t-value of 1.348, indicating no significant change.

Table.2. Comparison of mean ,SD and Independent t value post test compassion fatigue among caregivers of hemodialysis patients in experimental group and control group

Variables	Experimental group		Control group		Table value	Independent t value
	Mean	SD	Mean	SD		
CS	28.87	8.32	15.27	7.17	2.048	2.658
BO	16.13	7.25	32.41	9.53	2.048	2.728
STS	13.00	4.50	31.07	10.3	2.048	3.865
CF	58’00	16.04	76.93	19.12	2.048	2.589

Table.2. shows that Regarding compassion fatigue The experimental group had a significantly higher mean score (28.87, SD = 8.32) than the control group (15.27, SD = 7.17).The independent t-value (2.658) is greater than the table value (2.048), indicating a statistically significant difference between the two groups.Regarding Burnout (BO):The experimental group had a much lower mean (16.13, SD = 7.25) compared to the control

group (32.41, SD = 9.53).The independent t-value (2.728) is greater than the table value (2.048), confirming a significant reduction in burnout for the experimental group.Regarding Secondary Traumatic Stress (STS):The experimental group showed a much lower mean (13.00, SD = 4.50) than the control group (31.07, SD = 10.3).The independent t-value (3.865) is much higher than the table value (2.048), indicating a highly significant difference.Regarding Compassion Fatigue (CF):The experimental group had a lower mean (58.00, SD = 16.04) compared to the control group (76.93, SD = 19.12).The independent t-value (2.589) is greater than the table value (2.048), indicating a statistically significant reduction in compassion fatigue The experimental group had significantly better outcomes in all four variables compared to the control group.Since the independent t-values exceed the table value (2.048) in all cases, the differences between the groups are statistically significant.Martin C. Delaney (2018) did study on Evaluation of the effect of an eight-week pilot mindful self compassion (MSC) training program on nurses' compassion fatigue and resilience The Pre- to Post- scores of secondary trauma and burnout declined significantly and were negatively associated with self-compassion (r = -.62, p = .02) (r = -.55, p = .05) and mindfulness (r = -.54, p = .05). (r = -.60, p = .03), respectively Resilience and compassion satisfaction scores increased. All variables demonstrated a large effect size: Mean (M) Cohen's d = 1.23.

Quality of Life

Table.3. Comparison of mean ,SD and paired t Value of pre and post test quality of life among caregivers of hemodialysis patients in both groups

	Experimental group					Control group				
Domains of QOL	Pre test		Post test		Paired t test value	Pre test		Post test		Paired t test value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Physical health	15.06	4.25	29.5	2.97	17.24	15.7	4.35	15.1	3.59	1.281
psychological	13.66	4.06	23	2.33	8.03	12.5	2.8	12.2	2.88	1.0788
Social relationship	6.57	1.3	12.8	1.32	16.33	6.92	1.19	6.4	1.72	0.9866
Environmental	17.13	2.64	35	2.42	22.04	18.9	3.84	17.4	3.78	1.4556
QOL	52.46	7.27	100.3	4.58	24.99	54.1	6.91	51.1	7.12	1.6522

Table.3 presents the Quality of Life (QOL) domains for the Experimental and Control Groups before and after an intervention. The Experimental Group showed significant improvements across all domains, with Physical Health increasing from 15.06 to 29.5 (t = 17.24), Psychological Well-being from 13.66 to 23 (t = 8.03), Social Relationships from 6.57 to 12.8 (t = 16.33), and Environmental Factors from 17.13 to 35 (t = 22.04). The overall QOL score in this group significantly improved from 52.46 to 100.3 (t = 24.99). In contrast, the Control Group showed minimal changes, with Physical Health, Psychological Well-being, Social Relationships, and Environmental Factors remaining nearly the same, and all paired t-values falling below significance levels. The overall QOL score in the Control Group slightly decreased from 54.1 to 51.1 (t = 1.652). These results indicate that the intervention applied to the Experimental Group was highly effective in improving Quality of Life across physical, psychological, social, and environmental domains, whereas the Control Group showed no significant improvementsGhane, G.et., (2015) conducted study on Effect of Educational Program on the "Quality of Life" of Family Caregivers of Patients Undergoing Hemodialysis found that there was no significant difference was found between the baseline mean "quality of life" scores of the 2 groups before the intervention (P=0.039). However, the mean "quality of life" score in the intervention group increased at the end of the study and the 2 groups were significantly different in this regard ((63.51±11.55 vs. 41.74±10.51, P<0.001)P<0.001).

Table.4. Comparison of mean ,SD and Independent t Value post test-quality of life among caregivers of hemodialysis patients in both groups

Domains of Quality of life	Experimental group		Control group		Independent t test value
	Mean	SD	Mean	SD	
Physical health	29.5	2.97	15.07	3.59	9.51
psychological	23	2.33	12.2	2.88	9.76
Social relationship	12.8	1.32	6.4	1.72	10.95
Environmental	35	2.42	17.4	3.78	12.35
Quality of life	100.33	4.58	51.07	7.12	14.92

The table 4. compares the post-test Quality of Life (QOL) domains between the Experimental Group and Control Group using independent t-tests. The Experimental Group demonstrated significantly higher scores across all domains, with Physical Health (Mean = 29.5, SD = 2.97), Psychological Well-being (Mean = 23, SD = 2.33), Social Relationships (Mean = 12.8, SD = 1.32), Environmental Factors (Mean = 35, SD = 2.42), and Overall QOL (Mean = 100.33, SD = 4.58). In contrast, the Control Group had much lower scores: Physical Health (Mean = 15.07, SD = 3.59), Psychological Well-being (Mean = 12.2, SD = 2.88), Social Relationships (Mean = 6.4, SD = 1.72), Environmental Factors (Mean = 17.4, SD = 3.78), and Overall QOL (Mean = 51.07, SD = 7.12). The independent t-test values for all domains (ranging from 9.51 to 14.92) indicate statistically significant differences, confirming that the experimental intervention led to substantial improvements in Quality of Life compared to the control group. This study is consistent with the research conducted by Sotoudeh, R., & Alavi, M. (2023)The effect of educational intervention on the quality of life of family caregivers of hemodialysis patients: A randomized controlled trialThe results showed that both experimental and control groups were homogeneous in terms of demographic information and there was no significant difference between them in this regard. Analysis of data on quality of life and its four domains showed that the mean scores of quality of life (P = 0.089) and its four domains including physical health (P = 0.367), mental health (P = 0.429), community relations (P = 0.132), and environmental health (P = 0.232) increased significantly immediately after and 1 month after the intervention (P < 0.001 in all cases)

Relationship between Compassion Fatigue and quality of life

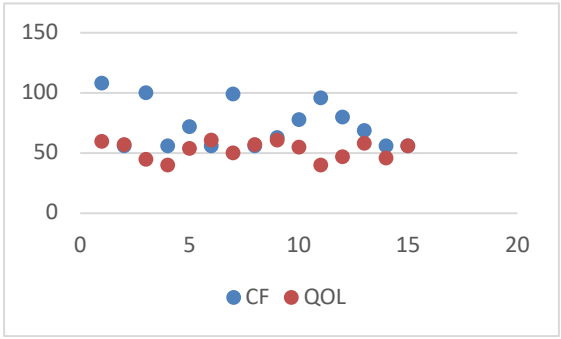

Figure.3. Relationship between compassion fatigue and quality of life among caregivers during pretest

Figure.3. shows that during pre test,the comparison reveals insights into compassion fatigue and quality of life among caregivers: The weaknegative correlation (r = -0.237) suggests an inverse relationship between compassion fatigue and another variable (possibly quality of life), meaning as one increases, the other decreases. However, the correlation is weak. The negative correlation between compassion fatigue and quality of life suggests that higher compassion fatigue may be linked to lower quality of life,

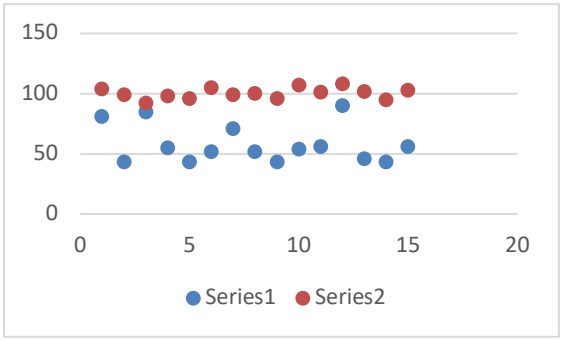

Figure.4. Relationship between compassion fatigue and quality of life among caregivers during post test

This figure deals that After the implementation of education based intervention, the comparison reveals significant differences in compassion fatigue and quality of life among caregivers. The negative correlation (r = -0.238) for the experimental group suggests an inverse relationship between compassion fatigue and another factor (possibly quality of life), meaning that as compassion fatigue increases, the other factor decreases. Although the

correlation is weak, it indicates a potential association. Quality of Life: This large difference suggests that the intervention had a strong positive effect on improving caregivers' quality of life.The results suggest that the intervention was effective in reducing compassion fatigue and significantly improving quality of life among caregivers in the experimental group. The negative correlation further supports that reducing compassion fatigue may contribute to an improved quality of life. Ghane, G., Ashghali Farahani, M., Seyedfatemi, N., & Haghani, H. (2015) In total, 37.4% of caregivers were experiencing high and very high levels of care burden and 42.7% of them were experiencing a moderate level of care burden. The mean and standard deviation of the quality of life of caregivers was 76.27 ± 13.67 out of 130. There was a significant and negative correlation between the total scores of care burden and quality of life ($r = -0.436$, $P < 0.001$).

Association between Compassion fatigue and quality of life with demographic variables of caregivers

The chi-square analysis of demographic variables in relation to pre-test and post-test levels indicates that most associations were not statistically significant (NS), suggesting no strong correlation between demographic factors and the outcomes measured. However, a significant association ($p = 0.041$, S) was found between age and post-test scores, indicating that age may have influenced the intervention's effectiveness. Gender, marital status, education, occupation, income, relationship with the patient, and living status showed no significant association, suggesting that these factors did not play a major role in determining the outcomes. Similarly, patient-related variables such as age, gender, marital status, and income were not significantly associated with outcome measures. Intervening factors such as duration of care giving, caregiving hours per week, and duration of hemodialysis treatment also showed no significant influence, reinforcing that the intervention had a uniform impact regardless of these variables. The findings suggest that while age may have played a role in post-test improvements, other demographic factors did not significantly influence the intervention's effectiveness.

The chi-square analysis of demographic variables in relation to pre-test and post-test scores indicates that most associations were not statistically significant (NS), suggesting that these factors did not strongly influence the measured outcomes. However, income showed a significant association in the pre-test ($p = 0.044$, S), indicating that financial status might have played a role in initial quality of life assessments, though this effect was not observed in the post-test. Other caregiver variables such as age, gender, marital status, education, occupation, relationship with the patient, and presence of physical illness did not show significant associations, suggesting that the intervention had a uniform impact across these groups. Similarly, patient-related variables including age, gender, marital status, and income were not significantly associated with outcomes, reinforcing that individual patient characteristics did not influence the intervention's effectiveness. Additionally, intervening factors such as duration of care giving, care giving hours per week, and duration of hemodialysis treatment did not significantly affect results. Overall, the findings suggest that while income initially influenced quality of life, the intervention had a generally uniform impact across different demographic groups, with no major disparities in outcomes based on caregiver or patient characteristics.

The chi-square analysis of demographic variables in relation to pre-test and post-test scores reveals that most associations were not statistically significant (NS), indicating that these factors did not significantly impact the measured outcomes. However, gender ($p = 0.025$, S) and occupation ($p = 0.040$, S) showed statistically significant associations, suggesting that male caregivers and employment status may have influenced the outcomes. Other variables, including age, marital status, education, income, relationship with the patient, living status, presence of physical illness, patient demographics, and care giving factors, did not demonstrate significant associations, implying that the intervention was generally effective across different groups. The consistency of findings in pre-test and post-test results suggests that while gender and occupation may have played a role in caregiver outcomes, the intervention had a relatively uniform impact across the majority of demographic characteristics.

CONCLUSION

The education that caregivers receive plays a crucial role in reducing compassion fatigue and enhancing their quality of life. This study highlights a significant relationship between caregiver education and both compassion fatigue and quality of life, with education-based interventions helping to mitigate the negative effects of care giving. While there remains a weak negative correlation between compassion fatigue and quality of life, improved education appears to ease this burden. As research continues to address gaps in the caregiver transition, it is evident that caregivers who receive better education before leaving the hospital experience reduced levels of compassion fatigue. If just a few minutes of dedicated caregiver education can yield such positive outcomes, then investing more time

and resources in caregiver training could create a profound and lasting impact on the caregiver community.

LIMITATION

Despite the valuable insights gained from this study, several limitations must be acknowledged. One key limitation is the potential lack of representation among younger caregivers. The majority of participants (over 60%) were above the age of 60, which may limit the generalization of the findings to younger caregiver populations. If younger caregivers were underrepresented, the study's conclusions may not fully capture the unique challenges and experiences of a more diverse age range.Another limitation is the exclusion of caregivers who live away from the care setting. Since these individuals face different caregiving challenges compared to those providing in-home care, their absence from the study could result in an incomplete understanding of the broader caregiver experience.The population of this study was recruited from organizations where caregivers are reaching out for help or guidance. This represents a potential bias to validity, as this population may already be educated on caregiver burden which in turn could impact the results. and some that have not will additionally address the internal validity.

DECLARATION OF CONFLICT OF INTEREST

The authors have no competing interests to declare.

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AUTHOR CONTRIBUTION

All authors have accepted responsibility for the content of the manuscript, reviewed all results and approved the final version

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