

Association between symptom experiences with bio-physiological parameters of haemodialysis patients during AV-fistula cannulation

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Abstract

Background: Haemodialysis patients usually have symptoms of either mentally or physically experienced before or during or after their procedure. This study evaluates the frequency of experienced symptoms, negatively effect of functioning, regardless of acuity, and well-being can be measured in terms of bio physiological parameters as BP, Pulse rate, Respiratory rate and SpO₂.

Methods: In this study convenience sampling technique was used to correlate the symptom experiences and bio-physiological parameters of 200 hemodialysis patients using one to one interview with the set of framed symptoms.

Results: During AV Fistula cannulation, the major symptoms seen were fear, anxiety, irritation, anger and sadness. The main physical symptom experiences by HD patients was pain, drowsiness, fatigue, headache, palpitations, numbness, nausea/vomiting and, breathlessness. There was increase in pulse rate, blood pressure, heart rate, and decrease in the respiratory rate in majority of patients. The most relevant and highly significant were pulse rate due to fear and irritation and increase in hear rate and respiration due to pain and breathlessness.

Conclusion: This study suggests that nursing and physicians' team should consider reducing problems of haemodialysis patients by training and counselling. More is warranted to improve the quality of life which can be resulted from exercise counselling and encouragement in hemodialysis patients.

Introduction

The kidneys are vital organs perform an incredibly wide array of functions which are essential and have obvious logical and necessary connections for life. Chronic renal failure results in serious clinical symptoms due to wide variety of diseases which results in a permanent failure of the excretory, regulatory and hormonal (metabolic) functions of the kidney [1,2]. Chronic kidney disease (CKD) is kidney damage or defective glomerular filtration rate (GFR) for 3 months or more irrespective of the cause [3]. The progressive worsening of kidney function is considered as end stage renal disease (ESRD) at that point a person requires dialysis or transplantation of a functional kidney to survive [4]. ESRD is the end stage with glomerular filtration rate coming down to less than 5% to 10% of normal [5].

Kidney failure is a chronic situation and leads to systemic complex situation in human body as it not involved itself but also slowly harms the functioning of the other body organs and thereafter the treatment relies on patient self-management including hospital aspects of care [6]. Due to decreased kidney function which affects many other body organs, dialysis patients experience numerous symptoms, including some serious in terms of medical outcomes [7,8]. Hemodialysis is the first choice of therapy for many patients as maintenance therapy otherwise patients may need a kidney transplant that needs dialysis intensely. Hemodialysis is basically require and involves fluid removal side effects by removing too much fluid and include fatigue, low blood pressure, leg-cramps, chest pains, headaches and nausea. These

symptoms can persist post treatment for long time as the dialysis is also a continuous process. Apart from theses side effect hemodialysis may expose their circulatory system to microbes, which can lead to bacteraemia which may be affecting the heart valves (endocarditis) in severe infection or affecting the bones (osteomyelitis) [9-14].

A few researchers are performed to evaluate the quality of life of those individuals coping with the stresses due to chronic and life-threatening illness such as kidney failure and haemodialysis [15]. The concept of QOL is now important aspect of health care with realization that being well is too important to consideration when patients are being treated [16]. The first attempt to visualize QOL was done by the WHO (1947) by defining health as a complete social well-being states including healthy physical and mental status and not merely the absence of disease [17]. HD patients usually have symptoms either mentally or physically experienced before or during or after their HD. Most of the patients might also resemble symptomatic changes to be associated

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with the bio-physiological parameters too as correspondingly [18]. So this associational study used self-reports of haemodialysis patients to catalogue symptoms and to correlate the bio-physiological parameters to evaluate frequently experienced symptoms, negatively effect of functioning, regardless of acuity, and well-being is measured in terms of bio physiological parameters as BP, Pulse rate, Respiratory rate and SpO₂. Study assay the association of the symptom experiences, bio-physiological parameters of haemodialysis patients with selected demographic variables.

Methodology

This study was conducted at the F2 dialysis ward out-patient department of Sri Ramachandra Medical Centre, Porur, Chennai-116. Ethical permission was obtained from the Institutional Ethical Committee (students) of Sri Ramachandra Medical College and Research Institute. The physical setting of the f2 dialysis ward is situated in the 2nd floor of Sri Ramachandra Medical Centre and per day <50 are admitted in the ward for hemodialysis procedure. It has 80 bed and 4 bays.

Sampling technique

In this study convenience sampling technique was used to select 200 samples for Sri Ramachandra Medical Centre. The sample was those who attended in F2 dialysis ward out-patient department.

Sample

Hemodialysis patients who fulfilled the inclusion criteria and admitted for hemodialysis in the F2 dialysis ward of Sri Ramachandra Medical Centre, Porur, Chennai-116

Criteria for selection of samples

Inclusion criteria: Patients admitted for hemodialysis, aged between 21-60 years able to communicate in English and Tamil and willing to participate in the study

Exclusion criteria: Patients who are not willing to participate in the study and on temporary vascular access

Description of the tool

The tool consists of three sections, such as

Part 1 Demographic variables of women-It consists of age, sex, education, occupation, family income per month, period of AV fistula, number of HD per week, sources of psychological support, use of diversional therapy, duration of illness. Each of the demographic variables is marked according to patient's verbalisation.

Part 2 Symptom experiences of HD patients- Structured, validated schedule interview by the researcher with a set of framed symptoms reviewed from literature. It consists of two parts, the first part comprising of mental symptoms such as fear, anxiety, irritation, anger, sadness, uncertainty. The second part comprising of physical symptoms such as pain, drowsiness, fatigue, headache, palpitations, numbness, nausea/vomiting, breathlessness. Each of the symptoms is marked either with a yes or no verbalization of the patients that they experience during the cannulation.

Part 3 Bio-physiological parameters

During the time of AV Fistula cannulation of HD patients, the bio-physiological parameters like Pulse rate, Respiratory rate, Blood pressure, SpO₂ will be assessed before dialysis, during dialysis and after

Table 1. Interpretation of bio-physiological parameters

Bio-physiological parameters	Normal level	Increase level	Decrease level
Pulse rate	70-99 bpm	<100 bpm	>69 bpm
Blood pressure	110/70-120/80 mmhg	<130/90 mmhg	>100/60 mmhg
Heart rate	70-99 bpm	<100 bpm	>69 bpm
Respiration rate	18-20 breaths/mt	<21 breaths/mt	>17 breaths/mt
SpO ₂	90-100%	-	>89%

dialysis. Here increased levels of the bio-physiological parameters are assessed. Bio-physiological parameters were evaluated as given in Table 1.

Data collection procedure

The researcher planned to collect information from the subjects by using one to one interview with the set of framed symptoms reviewed from literature. The questions were formulated, and options were determined under each question. Data collection was done in July 2017. Each day 15 study subjects were administered the set of framed questionnaires to correlate the symptom experiences and bio-physiological parameters and their doubts were clarified. During data collection, the investigator introduced herself to the HD patients first then selected the patients according to the inclusion criteria. Proper and detailed explanation was done in either Tamil or English regarding the study and its benefits. HD patients were assured that no harm will occur during the study. Informed consent was obtained from the HD patients and further their doubts were clarified. Privacy was ensured throughout the study. Each day 15 study subjects were administered the set of framed questionnaires and 4hrs was spent to find the symptom experiences and bio-physiological parameters.

Statistical data analysis

The plan was analysed on the basis of objectives. Descriptive statistics namely frequency, percentage, mean and standard deviation were used to describe the data and inferential statistics such as chi-square were used to draw inferences of the data.

Results

Majority of the HD patients in this study were in the age group of 40-49 (n=61, 30.5%) & 50-59 (n=56, 28%). Male dominated the study population with ratio 2.8:1. One third of them (n=66, 33%) were in the 7-12 months period of AV Fistula. Around 86% of them had Haemodialysis twice a week and 166(83%) of them were using diversional therapy (Table 2).

During AV Fistula cannulation, 74% of study population had certain mental symptoms such as fear (n=72), anxiety (n=61), irritation (n=124), anger (n=44) and sadness (n=103). The main physical symptom experiences by HD patients during AV Fistula cannulation was pain, drowsiness, fatigue, headache, palpitations, numbness, nausea/vomiting and, breathlessness. There was increase in pulse rate for 77% of population (154), increase in blood pressure, increase in the heart rate, and decrease in the respiratory rate was observed in more than 65% of population (Table 3).

There was significant association of mental and physical symptom experiences with bio-physiological parameters of HD patients during AV Fistula cannulation. The most relevant and highly significant were pulse rate due to fear and irritation and increase in heart rate and respiration due to pain and breathlessness (Table 4).

Discussion

Renal function is vital for normal body function and its failure results in variety of diseases which results in a systemic failure of various body organs. Treatment of kidney failure heavily dependent on patient self-management of countless aspects of hospital and self-care [6]. Hemodialysis is the choice of renal replacement therapy which require extensive hospitalization, economic burden and mental stress for the patients. Such situation badly affects the QOL of individuals coping with the stresses associated with life threatening chronic illness [6,11,15]. In the study we assay the symptom experienced by HD patients during the process. In the mental symptom experiences such as fear, irritation, anger, sadness and uncertainty were prevalent among HD patients and in regard with physical symptoms like pain, drowsiness, palpitations, fatigue, nausea/vomiting, breathlessness were present. Before the procedure HD patients had markedly varied changes in their pulse rate and an increased blood pressure and heart rate seen throughout the HD procedure. Not all but few mental and

Table 2. Frequency and percentage distribution of demographic variables of HD patients

Demographic variables	Frequency (n)	Percentage (%)
Age		
20-29 years	13	6.5
30-39 years	34	17
40-49 years	56	28
50-59 years	61	30.5
60 & above	36	18
Sex		
Men	147	73.5
Woman	53	26.5
Education		
Illiterate	31	15.5
Primary education	84	42
Secondary education	59	29.5
Graduate	26	13
Occupation		
Unemployed	92	46
Permanent employee	92	46
Daily wage	16	8
Family income per month		
Rs. <3000	-	-
Rs. <3001-5000	-	-
Rs. <5001-7000	-	-
Rs. >7001	200	100
Period of AV Fistula		
1-6 months	48	24
7-12 months	66	33
13-18 months	59	29.5
19-24 months	27	13.5
No. of Haemodialysis per week		
Once	28	14
Twice	92	46
Thrice	80	40
Sources of psychological support		
Health professionals	57	28.5
Family members	101	50.5
Friends	42	21
Use of diversional therapy		
Yes	166	83
No	34	17
Duration of illness		
In months	34	17
In years	166	83

Table 3. Frequency and percentage distribution of mental symptom experiences of HD patients during cannulation

	Frequency (n)	Percentage (%)
Mental symptoms		
Fear	72	36
Anxiety	61	30
Irritation	124	62
Anger	44	22
Sadness	103	51.5
Uncertainty	52	26
Physical symptoms		
Pain	61	30
Drowsiness	88	44
Fatigue	114	57
Headache	45	22.5
Palpitations	154	77
Numbness	59	29.5
Nausea/vomiting	19	9.5
Breathlessness	168	84
Bio-physiological parameters		
↑ Pulse rate	154	77
↑ Blood pressure	130	65
↑ Heart rate	144	72
↓ Respiratory rate	168	84
↓ sp _o ₂	23	11.5

Table 4. Association between the mental symptom experiences with bio-physiological parameters of HD patients during AV Fistula cannulation

Mental symptom experiences*/ Bio-physiological Parameters	x ²	p value
Fear*pulse rate	0.112	<0.01
Fear*blood pressure	0.124	<0.001
Fear*heart rate	0.112	<0.05
Fear*respiration rate	1.788	<0.05
Fear*SpO ₂	0.369	<0.01
Irritation*pulse rate	8.954	<0.001
Irritation*heart rate	8.954	<0.01
Anger*heart rate	2.741	<0.01
Sadness*blood pressure	1.072	<0.05
Uncertainty*heart rate	2.665	<0.05
Asterisks mark the significance level: *p<0.05, **p<0.01, ***p<0.001		
Physical symptom experiences* bio-physiological parameters	x ²	p value
Pain*pulse rate	2.432	0.001
Pain*blood pressure	2.065	<0.01
Pain*heart rate	2.432	<0.001
Drowsiness*respiration rate	5.092	<0.01
Fatigue*pulse rate	0.306	<0.05
Fatigue*blood pressure	3.19	<0.01
Fatigue*respiration rate	1.282	<0.001
Palpitations*pulse rate	7.569	<0.001
Palpitations*heart rate	7.569	<0.001
Palpitations*SpO ₂	8.599	<0.01
Nausea/vomiting*pulse rate	5.073	<0.05
Nausea/vomiting*heart rate	5.073	<0.05
Breathlessness*pulse rate	4.237	<0.001
Breathlessness*blood pressure	0.688	<0.01
Breathlessness*heart rate	4.237	<0.001
Breathlessness*respiration rate	4.506	<0.001
Breathlessness*SpO ₂	2.351	<0.05

physical symptoms were highly associated with the bio-physiological parameters such as fear and blood pressure, irritation and pulse rate, pain with pulse and heart rate, fatigue and respiratory rate, palpitations with heart rate, breathlessness with pulse rate, heart rate, and respiration rate. These findings are substantiated by a study was examined in the year 2003 about the association between quality of sleep and health related QOL in hemodialysis patients. In a study quality of sleep measured by Pittsburgh Sleep Quality Index (PSQI) and HRQOL using the Medical Outcome study showed that 71% of the subjects were poor sleepers due to higher prevalence of depression and lower HRQOL. This result indicates that ESRD influences on HRQOL [19].

To examine the psychometric properties of QLI, a study in the year of 1985 found that people with higher incomes had significantly higher QLI scores on the social and economic subscale though they are suffering with chronic diseases [20]. Depression is an important factor in cognitive impairment and the exercise of personal efficacy for adolescents undergoing haemodialysis [21]. A pilot study in the year 1980 reported a fair to poor quality of life for the majority of patients in unit hemodialysis [22]. Satisfaction and happiness during hemodialysis, peritoneal dialysis and transplant patients was found higher in younger patients indicating a better quality of life. Similar findings were reported earlier which state that education, race and marital status had a significant influence on quality of life [23]. A study assessed in the year 1993 showed that the quality of hemodialysis patients was found to be highest in the family and lowest in the health domain [24].

The depressive symptoms are very common at the start of dialysis therapy; and patients were more anxious and more depressed than transplanted patients. There is profound deficiency in QLI due to hypoalbuminemia, prevalence of anaemia, and depressive symptoms arising during and after dialysis therapy suggests the need for timely high quality predialysis care. Self-care efficacy and despair are the substantial predictors of quality of life; and there is substantial reduction in the quality of life in patients on maintenance with hemodialysis. Hemodialysis patients use to have significantly poorer quality of life in the area of physical, social cognitive and emotional functioning [25,26]. Renal transplant patients and hemodialysis patients have significantly good and high scores for the physical, general health and social functioning than those of hemodialysis patients [18,21,23].

Conclusion

Improvements in physical functioning result from exercise counselling and encouragement in hemodialysis patients. Hence more attention to patient level of physical activity is warranted to improve the quality of life. The findings of this study suggest that nursing and physicians' team should consider reducing problems of haemodialysis patients by training and counselling.

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