Identification of Common Problems in Functioning and Disability among Patients on Maintenance Hemodialysis

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Abstract

Background: *Hemodialysis (HD) associated problems contribute directly to further morbidity and mortality. Nurses have vital roles to play that involve wide range of activities in the prevention and management of hemodialysis related problems. These activities include continuous assessment of patients' condition as well as assuming the responsibility to carryout preventive measures and take proper actions when necessary. A significant portion of these problems fortunately may be preventable with applying the appropriate medical and nursing interventions.* ***Objective:*** *To identify common problems in functioning and disability among patients on maintenance hemodialysis.* ***Setting and subjects:*** *the study was conducted at the Hemodialysis Unit, Alexandria Fever Hospital in Egypt. (A convenience sample of 90 adult patients with end stage renal disease (ESRD) undergoing HD was selected), from the previously mentioned setting.* ***Results:*** *Significant correlations were observed between age and "activity limitations & participation restriction". A significant positive correlation was observed between age and "body function impairment" as (P < 0.018*).* ***Conclusion:*** *HD patients might experience prevalent problems during HD sessions, which need to be carefully assessed and managed.* ***Recommendations:*** *Expansion of medical services provided for hemodialysis patients in local health facilities to ensure continuity of care and follow up of patient undergoing HD health status, is highly recommended.*

<u>**Keywords:**</u> Chronic Kidney Disease, Functioning and Disability, Maintenance Hemodialysis

Introduction

Patients with significant kidney damage usually require, lifelong renal replacement therapy, this means that, the patient has progressed into the fifth or final stage of Chronic Kidney Disease (CKD), known as End Stage Renal Disease (ESRD). As renal function is impaired, the final products of protein metabolism (which are usually excreted in urine), accumulate in the blood in the form of uremia, then all body systems would be affected. The higher waste products concentration, the more pronounced the renal

function impaired symptoms. So, higher renal function impairment and ESRD progression is usually associated with underlying condition, as protein urinary excretion and hypertension. As reported, in patients who excrete large quantities of proteins or have elevated blood pressure, ESRD appears to develop more quickly (Hinkle & Cheever, 2017).

As evidenced, Saran et al. (2020) noted that ESRD prevalence in the United States continues to increase and reached 746,557 in 2017 versus 727,912 in 2016. This was reflected as 2.6 rise since 2016, which caused

death increasing rates among ESRD population. According to the 9th Annual Report of Egyptian Renal Registry provided by Egyptian Nephrology and Transplantation Society (ESNT), Egypt ESRD prevalence raised to 483 patients per million (El-Ballat et al., 2019).

Unfortunately, HD patients usually face a lot of difficulties in their daily living, largely due to therapeutic maneuver limitations. HD patients need to spend 3-4 hours in dialysis centers for 3 days a week, change their lifestyle, and strictly adhere to the therapeutic regimen (Benetou et al., 2020). They often encounter different stressors, with respect to shifting their previous positions in the family, profession and community (Polikandrioti et al., 2017; Vasilopoulou et al., 2015). As a result, patients usually experience psychological problems such as anxiety and depression, which also could adversely affect their quality of life in turn (Vasilopoulou et al., 2015).

Patient-related issues that could affect all body systems, as cardiovascular alterations, are the main leading cause of morbidity and mortality among dialysis patient, as sudden cardiac death, heart failure and atrial fibrillation (AF) (Saha & Allon, 2017). Neurological complications from hemodialysis may substantially lead to morbidity and mortality as many problems might affect central or peripheral nervous systems (Karunaratne et al., 2018). Additionally, HD is correlated with various levels of hematological parameters abnormality that require careful assessment and management (Habib et al., 2017). Machine related issues could lead to problems with the blood pump, dialyzer rupture, dialyzer reaction, and air embolism, as well as problems with ultrafiltration.

Psychological alterations, as depression, anxiety and life style-related concerns in the form of sedentariness are also frequently encountered (Norozi Firoz et al., 2017). However, constant disease burden due to physical and nutritional restrictions, drugs adverse effects, disease comorbidity prevalence, self-perception alterations, and patients fear of death often make patients vulnerable to different emotional alterations (Norozi Firoz et al., 2017).

Therefore, it is mostly important for professional nurses to be continually reviewing, searching and developing themselves more and more to provide reliable and humanized care for HD patient with greater safety. Furthermore, nursing staff can help save patient's lives and prevent future complications. So, patients should have extreme faith in nursing practitioners, and a reciprocal relationship can be formed between them. Certainly, nursing staff, faced with their professional position, needs to be supportive, attentive to patients and should always be alert to intervene when necessary, in order to maintain patient's health, throughout HD care (Rocha et al., 2017).

The International Classification of Functioning, Disability and Health (ICF) had established in 2001, by the World Health Organization (WHO), a tool that aimed at providing a unified language to describe functioning and disability status among the individuals, defining the current relationships between social conditions and health (Antunes et al., 2019; World Health Organization [WHO], 2001). There are many ICF core sets, that have been developed for many conditions as diabetes, obesity, and osteoarthritis; however, there are no ICF core sets that had been developed to classify functioning and disability for chronic renal failure patients on hemodialysis. Thus, the current research aimed to use the ICF to classify the problems of CRF patients on hemodialysis (Tsutsui et al., 2009).

Aims of the Study

This study aims to identify common problems in functioning and disability among patients on maintenance hemodialysis.

Research Question

What are the common problems in functioning and disability among patients on maintenance hemodialysis?

Materials and Method

Materials

Design: A descriptive design was utilized to fulfill the aim of the present study.

Settings: This study was conducted at the Hemodialysis Unit of Alexandria Fever Hospital, Egypt.

Subjects: A convenience sample of 90 ESRD adult patients on HD, showing up at the previously mentioned setting, was included in the current study.

Inclusion criteria:

All ESRD patients on HD, fulfilling the following criteria were included in the study:

- Adult male and female aged between 18-65 years old, able to communicate and mentally stable.
- According to Tsutsui et al. (2009), the duration of hemodialysis was not less than five years.
- Free of associated major diseases such as cardiac, liver failure or diabetes mellitus.

Tools: One tool was used to collect data of the study:

The International Classification of Functioning and Disability Hemodialysis Patient's checklist was used for data collection. This tool was adapted from the WHO (World Health Organization [WHO], 2001). The tool was utilized to elicit and record information on the functioning and disability of ESRD patients undergoing HD. It consists of the following main three parts:

Part I: Patient socio-demographic and clinical information:

These data included: (A) Gender, age, educational level, marital status, occupation and medical diagnosis of patient's existing main health conditions and duration of hemodialysis. (B) Brief patient's health information including: patient weight, questions of patient rating of his own physical, mental and emotional health, current disease, previous hospitalization. Most of these items were checked as being "bad ", "moderate", or "good" and others were checked by "yes" and "no".

Part II: General open & closed questions about participation and activities as:

- Mobility which includes sub categories as lifting and carrying objects, fine hand use, walking, moving around and using equipment's (wheelchair, skates, etc.)
- Self-care sub categories as daily living activities.
- Domestic life which includes subcategories as "preparation of meals" and doing "housework activities".

These questions were checked regarding performance &capacity qualifier as being "complete difficulty", "moderate ", "no difficulty", "not specific" "not applicable" and others, checked by "yes" and "no".

Part III: International Classification of Functioning and Disability Checklist. This part includes categories classified as follows:

1) **Impairment of Body Functions:** These categories were checked based on impairment extent as being "complete impairment" "moderate" "no impairment" "not applicable" and "not specific".

2) **Impairment of body structures:** These categories were checked based on impairment extent. Impairment was checked as being "complete impairment" "moderate impairment" "no impairment" "not applicable" and "not specific".

3) **Activity limitations & participation restriction:** This part included individual's involved difficulties in his life situations or in execution of tasks. These categories were checked based on two qualifiers: Performance and Capacity Qualifier as being "complete difficulty" "moderate difficulty ""no difficulty" "not specific" and" not applicable".

4) **Environmental Factors:** This part comprises factors that make up physical, social and attitudinal environment in which people live and conduct their lives. Those subcategories were, checked based on two qualifiers: as being "barriers" or "facilitator" and whether being "total", "moderate "or "none".

Method

- Approval from the Research Ethical Committee, Faculty of Nursing, Alexandria University was obtained.
- An official permission to carry out the current study was obtained from

administrative authorities of the study's setting, after explanation of the study aim.

- Study tool was adapted and modified by the researcher after reviewing the related literature.
- Validity of the tool was tested by 5 experts in Medical Surgical Nursing and Nephrology and the necessary modifications, were introduced accordingly.
- Reliability of the tool was not tested as indicated by many statisticians. Since this study was carried out on previously tested checklists.
- A pilot study was conducted on nine patients before beginning the study to test the feasibility and applicability of the different items of the tool and to establish practical and comprehensive way for obtaining the necessary data. Some modifications were introduced, as rephrasing and adding some items. Pilot study results were excluded from the actual study.

To carry out data collection:
- Review of the study subject medical records was carried out.
- Laboratory findings as complete blood count, parathyroid serum level and diagnostic studies as chest X rays, were reviewed and documented.
- Structured interviews ,were conducted at the study setting ,while patients were connected to dialysis machines, as feasible; throughout the morning between 9.30 am-10.30am & afternoon between 1.30pm-3.30pm and 5.30 pm-7.30pm.The interview duration ranged from 35- 50 minutes, to collect the needed data based on patient's tolerance.

Ethical considerations:

Informed consent was obtained from each patient after explanation the aim of the study. Confidentiality of data was maintained. Privacy of the patients was assured

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Significance of the obtained results was judged at the 5% level. F-test (ANOVA) for normally distributed quantitative variables, to compare between more than two groups. Pearson coefficient to correlate between two normally distributed quantitative variables. Spearman coefficient to correlate between two distributed abnormally quantitative variables. P value < 0.05 was considered significant.

Results

The results revealed that, **Table (1): shows the distribution of the studied patients according to bio-socio demographic data (n = 90)**.It was observed that more than half of the studied patients were from age group of 50 to 65 years old ,the majority, were females (74.4%) and, (40%) can read and write. As regards associated medical diagnoses, it was noticed that, (66.7%) of the patients, were suffering from hypotension and more than half of them were managed by hemodialysis for 5-10 years.

Table (2-A): depicts the studied patient's major areas of participation, activities and difficulties encountered: The majority of the studied patients (80%) showed "not specific or not applicable" difficulty in "moving around using equipment as wheelchair". Also 20% of the studied patients reported "complete difficulty" in "moving around using equipment as wheelchair".

Table (2-B): depicts the studied patient's problems in participation and activities: (n = 90), it shows that (86.7%) of the studied patients were "feeling tiredness" and only (21.1) "have current problem(s) in the vascular access". Also (80%) of the studied patients reported having problems in "preparing dialysis diet", and (83, 3%), mentioned being a "burden on family "as a cause.

Table (3) illustrates correlations between the studied patients ages and the International Classification of Functioning and Disability Checklist categories (n = 90).The results shows that there were positive statistical significant correlations between the studied patients ages and body function impairment and the overall checklist score where (r=0.249, 0.228 and $P < 0.018$, 0.030) respectively.

Table (4): **displays the correlations between duration of hemodialysis and International Classification of Functioning and Disability Checklist categories (n = 90)**. A statistically significant correlations were elicited between the duration of hemodialysis and body function and structure impairment, activity limitations & participation restriction where (r_s=0.404*0.449*0.420* and $P < 0.001$*, < 0.001*, < 0.001*) respectively.

Table (5) shows **the correlations between laboratory test values and the International Classification of Functioning and Disability Checklist categories: (n = 90)** the finding showed statistical significant negative correlations were observed between serum RBCs, uric acid and phosphorus values as p values =($P < 0.001$*, < 0.001*, < 0.001*, 0.012*, 0.003*, 0.005*, 0.017*, 0.016*, 0.015*, respectively) and the International Classifications of Functioning and Disability categories of "body function impairment", " activity limitations & participations restriction", as well as the overall checklist category scores. Additionally, statistically significant positive correlations, were detected between blood urea nitrogen and respectively "body function impairment", "activity limitations & participation restriction" as well as the overall checklist categories where (Ps=0.005*, 0.001*, 0.002*) respectively.

Table (6) shows **relations between the studied patients associated medical diagnoses and International Classification of Functioning and Disability Checklist categories:** it was found that statistical significant relations, were detected between the studied patients associated medical diagnoses

and "body function impairment "(as $P<0.001$),"impairment of body structure" (p<0.001), "activity limitations and participation restrictions" (p <0.001) as well as the overall checklist categories, where p is<0.001and f values=8.290*, 7.590*, 7.749*, 8.057*, respectively.

Table (7), shows **Correlations between environmental factors of the studied patients and the International Classification of Functioning and Disability Checklist (n = 90). It was found** that there were no correlations between barriers and facilitator of environmental factors and body function, structure impairment, activity limitations and participation restriction and overall checklist.

Discussion

The present study revealed that more than half of hemodialysis patients' ages ranged from 50 to 65 years, and more than two thirds were complaining of hypotension. These results might not fit with the finding of Malhotra et al. (2021) who reported that hemodialysis participants included in their study had a mean age of 61 ± 15 years, and nearly all the studied patients, were hypertensive patients.

The study shows that more than half of the studied hemodialysis patients had moderate physical health in the last month, and more than two thirds, were complaining of moderate emotional health. These finding might reflect the hemodialysis patients complaints of bodily exhaustion and fatigue of physical health .These results are in line with Jacobson et al. (2019) who stated that hemodialysis patients felt devoid of energy, strength and motivation. These findings limited their ability to participate in all aspects of life and those patients appeared unwell, and unable to meet the expectations of others. Also, the emotionally disturbed patients always feel guilty, being unable to fulfill their responsibilities, particularly within the family and were feeling increasingly vulnerable, in having to rely on their families.

Hemoglobin level was abnormal among in the present study. This findings agrees with Saha and Allon (2017) who conducted a study of patients on maintenance

hemodialysis, in relation to hemoglobin level and stated that low Hb was most likely due to low erythropoietin (EPO) dose and the common causes of low Hb in dialysis patients, such as insufficient dialysis dose, reduced EPO dose and inflammation uremic effects, bone marrow suppression and dialysis membrane defect. All these pathological factors might be attributed also, to the lowered energy level and easily tiredness of those patients.

As regards participation and activities, the study revealed that the majority of maintenance hemodialysis patients felt tired and were complaining of difficulty in preparing dialysis diet, being a burden on families as a cause, respectively. Also, a significant relationship was detected between activity limitations and participation restriction. These may be due to the various restrictions resulting from hemodialysis therapy and scheduled sessions, also the physiological changes among them that probably had its impact on daily activity. These results are in line with Tsutsui et al. (2016), who noticed that many patients on hemodialysis had problems in sports related categories in the environmental factors, and a relatively small percentage of patients reported impairment. They reported various restrictions, and that requirement for treatment limited their everyday activities. Some patients reported giving up some of their hobbies, such as travel because of easy fatigability. Over one quarter of them revealed "lifting and carrying objects "as a problem, which can restrict "activities and participation" as well (Tsutsui et al., 2016).

Regarding functioning and disability of hemodialysis patients, the current study findings revealed that the majority of patients had "rare "body function and body structure impairment, also a significant relationship of both, regarding to duration of hemodialysis was noticed. For function impairment the study revealed that the majority of studied patients showed "no impairment "of memory and attention of mental function, taste and smell of sensory functions, heart rate and rhythm, respiratory rate and rhythm and clotting function. Also, no impairment of involuntary movement like tremors, joint mobility and range of motion of joints, were reported. These findings are not in agreement with Alidadi et al. (2020) who stated that cognitive function, in particular memory and attention, were low in their patients who underwent hemodialysis, which might lead to some limitations to attend their dialysis schedules.

In relation to 'body functions' and "body structures ", the results, depicted a high percentage of patients reporting cardiovascular system related problems, including blood pressure, general physical endurance, aerobic capacity, and fatigability.

The results of the present study, also revealed that more than two thirds of hemodialysis patients showed that environmental factors as a "great facilitator" ,while half of them showed friends as "support relationship", "circumstances surrounding them as "attitudes towards family members", and "toward friends" as " moderate facilitators", with a significant relationship between activity limitation and duration of hemodialysis sessions.

These findings are in line with Jacquet and Trinh (2019) who reported that hemodialysis may have impact on patient's aspects life and makes it difficult to live independently, also on patients "physical function" and their "relationships with other people". Also, patients with longer duration of hemodialysis reported "functional problems "involving the gastrointestinal system, muscle, skin, and hair.

The current study, also showed statistically significant correlations between age and body function impairment specially in relation to" mental functions", "attention"," memory", "taste "," smell' and "vision". These results could be attributed to hemodialysis itself that might induce recurrent episode of acute cerebral ischemia, which in turn may contribute to acute decline in cognitive functions during dialysis. These findings are in line with Murray (2008) who stated that the high burden of cognitive impairment in hemodialysis and chronic kidney disease (CKD) were up to seventy percent of hemodialysis patients aged 55 years and older, yet it is largely undiagnosed. Also these findings are in line with Alidadi et al. (2020) who stated that hemodialysis

patients have significant impairment of cognitive functions among various domains of cognition, memory and attention reported to be frequently affected . The impairment in memory and attention in patients with kidney disease may be related to disturbed brain function secondary to uremic toxins, physiological distress and physical activity limitation, which in turn, might be related to limited joint mobility, range of motion of joints, and involuntary movement (tremors).

Nursing staff shortage, heavy workload, limited authority of the head nurse, shortage of medical staff & vascular surgery experts, lack of nurse aides and assistants, lack of clinical training, and interference with patients' caregivers, are all management problems that must be investigated and tackled. These findings are in line with the Chronic Kidney Disease Surveillance System (Centers of Disease Control and Prevention) reports which indicated that more physical limitations were reported by CKD patient, in their ability to work and carry out activities, leisure and social activities, as well as difficulties in lower extremity mobility and general physical activity (Centers for Disease Control Prevention [CDC], 2021).

Conclusion

Based upon the findings of the current study, it could be concluded that HD patients experience prevalent problems during HD sessions which need to be tackled and managed. Medical, nursing personnel, pharmacists and clinicians need to work in collaboration to improve these patients' quality of life. Significant correlations were detected between age and activity limitations & participation restriction. Also, significant positive correlations were evident between the duration of hemodialysis, body function and structure impairment, activity limitations as well as participation restriction. No correlations were revealed between barriers and facilitators of environmental factors and body function, structure impairment, activity limitations and participation restriction.

Recommendations

In line with the findings of the study, the following recommendations are made:

Recommendations for nursing staff:
- Providing an extensive orientation program for newly employed nurses to update their knowledge about hemodialysis, and its related health problems, is essential to improve the quality of care provided for patients.
- Instituting regular nursing care seminars to be held among staff nurses, would increase nursing opportunities for more effective teaching, communication and involvement of patients in their own care.

Recommendations for system and clinical authorities:
- Expansion of medical services provided for hemodialysis patients in local health facilities to ensure continuity of care and follow up of patient undergoing HD health status, is highly recommended.
- Hemodialysis unit must be supplied with comprehensive manual containing basic procedural steps for how to handle and avoid HD problems.

Recommendations for future researches:
- More studies are recommended to be done in other clinical settings, involving larger samples to draw more general conclusions.

Table (1): Distribution of the studied patients according to bio-socio demographic data (n = 90).

Part I- Patient bio socio demographic data	No.	%
A-1-Gender		
• Female	67	74.4
• Male	23	25.6
2-Age		
• 20 to less than 35 years	18	20.0
• 35 to less than50 years	23	25.6
• 50 to 65 years	49	54.4
3-Educational level		
• Illiterate	23	25.6
• Read &Write	36	40.0
• Diploma	31	34.4
4-Marital status		
• Single	24	26.7
• Married	53	58.9
• Divorced	13	14.4
5-Occupation		
• Unemployed	65	72.2
• Others	25	27.8
6-Associated medical diagnoses		
• None	6	6.7
• HTN	24	26.7
• Hypotension	60	66.7
• Systemic lupus	6	6.7
• Thalassemia	6	6.7
• Osteoporosis	12	13.3
• Bronchial asthma	6	6.7
• Rheumatoid arthritis	7	7.8
• Familial Mediterranean fever	12	13.3
• Para thyroidectomy	30	33.3
7-Duration of hemodialysis		
-5–10 years	48	53.3
- 11–16 years	29	32.2
-17 and more	13	14.4

Table (2-A): Distribution of the studied patients' according to major areas of participation and activities and difficulties encountered: (n = 90)

Major areas of participation and activities	difficulties encountered						Not specific or not applicable (0)	
	Complete Difficulty (2)		Moderate Difficulty (1)		No difficulty (0)			
	No.	%	No.	%	No.	%	No.	%
I. Mobility (capacity &performance): Having problem /or difficulty in:								
- Walking long distances without assistance?	36	40.0	30	33.3	24	26.7	-	-
- To carrying objects without assistance?	30	33.3	24	26.7	36	40.0	-	-
- Difficulty in fine hand use without assistance?	24	26.7	24	26.7	42	46.7	-	-
- Moving around using equipment as wheelchair?	18	20.0	-	-	-	-	72	80.0
II. Self-Care (capacity &performance): Having problem /or difficulty in								
- Performing hygienic care, without assistance?	18	20.0	6	6.7	66	73.3	-	-
III. Domestic Life (capacity &performance): Having problem /or difficulty								
-For cleaning the floor, without assistance?	18	20.0	48	53.3	24	26.7	-	-
Iv. Interpersonal Interactions (capacity &performance): Having problem /or difficulty in:								
- Making new friends?	54	60.0	24	26.7	12	13.3	-	-
V. Major Life Areas (capacity &performance): Having problem /or difficulty								
- Doing all work needed for his\her job?	5	5.6	18	20.0	-	-	67	74.4

Key point (2= "Complete difficulty", 1= "Moderate difficulty", 0= "No difficulty "& 0= "Not applicable or specific")

Table (2-B): Distribution of the studied patients' according to problems in participation and activities: (n = 90)

Studied patients' problems	No.	%
VI-a-Problem (s) in preparing dialysis diet.		
• No	18	20.0
• **Yes**	**72**	**80.0**
b- Reason(s) for the problem: (n = 72)		
• Physical effort	12	16.7
• Burden on family	60	83.3
VII –a-Having any current problem(s) in vascular access:		
• No	71	78.9
• **Yes**	**19**	**21.1**
b-Type of vascular problem (n =19)		
• Insufficiency	13	68.4
• Inflammation	6	31.6
VIII- Feeling tiredness:		
• No	12	13.3
• Yes	78	86.7
IX- Becoming a very nervous person:		
• No	29	32.2
• Yes	61	67.8

Table (3): Correlations between the studied patients ages and the International Classification of Functioning and Disability Checklist categories (n = 90)

International Classification of Functioning and Disability Checklist categories	Age	
	r_s	p
1) Body function impairment	0.249	0.018[*]
2)Impairment of body structure	0.157	0.139
3)Activity Limitations & Participation Restriction	0.160	0.131
Overall Checklist	0.228	0.030[*]

r_s: Spearman coefficient   *: Statistically significant at $p \leq 0.05$

Table (4): Correlations between duration of hemodialysis and International Classification of Functioning and Disability Checklist categories (n = 90)

The International Classification of Functioning and Disability Checklist categories	Duration of hemodialysis	
	r_s	P
1) Body function impairment	0.404	<0.001[*]
2)Impairment of body structure	0.449	<0.001[*]
3)Activity Limitations & Participation Restriction	0.420	<0.001[*]
Overall Checklist	0.396	<0.001[*]

r_s: Spearman coefficient   *: Statistically significant at $p \leq 0.05$

Table (5): Correlations between laboratory test values and the International Classification of Functioning and Disability Checklist categories: (n = 90)

Laboratory tests	1) Body function impairment		3)Activity Limitations & Participation Restriction		Overall Checklist	
	r	p	R	p	r	p
RBC	-0.606	<0.001*	-0.509	<0.001*	-0.593	<0.001*
HB	-0.198	0.061	-0.162	0.128	-0.199	0.061
WBC	0.048	0.652	-0.018	0.868	0.022	0.839
Platelet	-0.134	0.208	-0.089	0.403	-0.111	0.296
2.Blood Urea Nitrogen						
Before	0.088	0.407	0.143	0.180	0.112	0.293
After	0.297	0.005*	0.344	0.001*	0.321	0.002*
3.Serum Creatinine	0.173	0.103	0.115	0.279	0.171	0.107
4.Uric Acid	-0.264	0.012*	-0.305	0.003*	-0.293	0.005*
5.Parathyroid hormone (n = 84)	-0.082	0.457	0.033	0.764	-0.058	0.601
6.Serum Sodium	-0.030	0.775	-0.001	0.992	-0.028	0.794
7. Serum Potassium	-0.197	0.063	-0.155	0.144	-0.191	0.071
8. Serum Calcium	0.309	0.003*	0.150	0.157	0.271	0.010*
9.Serum Phosphorus	-0.252	0.017*	-0.253	0.016*	-0.254	0.015*

r: Pearson coefficient.   *: Statistically significant at $p \leq 0.05$

Table (6):   Relations between the studied patients associated medical diagnoses and International Classification of Functioning and Disability Checklist categories: (n = 90)

Associated medical diagnoses	No	1) Body function impairment		2)Impairment of body structure		3)Activity Limitations & Participation Restriction		Overall Checklist	
		Mean ± SD.	Median	Mean ± SD.	Median	Mean ± SD.	Median	Mean ± SD.	Median
None	6	15.83 ±0.41	16.0	1.0 ± 0.0	1.0	14.17 ±0.41	14.0	31.0 ±0.63	31.0
HTN	24	11.42 ±5.26	10.0	1.29 ± 1.76	0.50	6.58 ±8.11	3.0	19.29 ±14.90	12.50
Hypotension	60	23.08±14.85	19.50	5.75 ± 6.91	3.0	19.48±13.13	21.0	48.32 ±34.08	43.50
Systemic lupus	6	4.17 ±0.41	4.0	0.0 ± 0.0	0.0	1.0 ±0.0	1.0	5.17 ±0.41	5.0
Thalassemia	6	21.50 ±0.55	21.50	5.0 ± 0.0	5.0	24.0 ±0.0	24.0	50.50 ±0.55	50.50
Osteoporosis	12	28.67±12.58	25.0	7.67 ± 6.97	7.50	25.50 ±7.85	25.0	61.83 ±27.18	58.0
Bronchial asthma	6	19.67 ±0.52	20.0	4.17 ± 0.41	4.0	20.17 ±0.41	20.0	44.0 ±1.10	44.0
Rheumatoid arthritis	7	52.57 ±1.13	53.0	20.57 ± 1.62	21.0	39.0 ±0.0	39.0	112.14 ±2.73	113.0
Familial Mediterranean fever	12	21.42 ±8.55	20.50	3.92 ± 3.06	3.50	19.42±11.62	19.0	44.75 ±23.18	43.0
Para thyroidectomy	30	22.73±18.01	17.0	5.87 ± 8.48	1.0	17.57±15.47	18.0	46.17 ±41.15	36.0
F(p)		8.290* (<0.001*)		7.590* (<0.001*)		7.749* (<0.001*)		8.057* (<0.001*)	

F: F for ANOVA test.   *: Statistically significant at $p \leq 0.05$

Table (7): **Correlations between environmental factors of the studied patients and the International Classification of Functioning and Disability Checklist (n = 90)**

International Classification of Functioning and Disability Checklist categories		4)Environmental Factors	
		Barrier	**Facilitator**
1) Body function impairment	*r*	-0.122	-0.100
	p	0.252	0.349
2)Impairment of body structure	*r*	-0.193	-0.136
	p	0.069	0.200
3)Activity Limitations & Participation Restriction	*r*	-0.006	-0.062
	p	0.952	0.564
Overall Checklist	*r*	-0.092	-0.094
	p	0.390	0.380

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