Nutritional status of adult hemodialysis patients in Al-Najaf Al-Ashraf Governorate

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المستخلص

الهدف: تقييم الحالة التغذوية لمرضى الإنفاذ الدموي.

المنهجية: دراسة وصفية كمية مقطعية أجريت في مراكز الإنفاذ الدموي في محافظة النجف الأشرف للمدة من شباط ٢٠١١ ولغاية أيلول ٢٠١١، اختيرت عينة غرضية " غير احتمالية" ممثلة مكونة من (٧٠) مريض ومريضة من مرضى الإنفاذ الدموي في محافظة النجف الأشرف، من أولئك الذين مضى على وضعهم على جدول الإنفاذ الدموي أكثر من ستة أشهر. جُمعت المعلومات من خلال استعمال استبانه مصممة ومكونة من خمسة أجزاء، جزء شمل صفحة البيانات الديموغرافية الإجتماعية ويحتوي (٩) فقرات وجزء شمل صفحة المعلومات الطبية المكون من (٨) فقرات وجزء شمل السلوك الصحي والغذائي المكون من (١٢) فقرةفضلاً عن (٨) فقرات تخص القياسات الجسمية وجزء شمل تكرار الغذاء المكون من (٥) فقرات رئيسة وجزء شمل الفحوصات المختبرية المكون من (٩) فقرات. فضلاً عن مفكرة غذائية استعملت لتحديد مصداقية الجزء الخاص بتكرار الغذاء، وجُمعت المعلومات بطريقة المقابلة المباشرة مع مرضى الإنفاذ الدموي المصابين بعجز الكلية المزمن وكذلك عن طريق القياسات الجسمية وأخذ عينة من دم المريض لغرض الفحوصات المختبرية. حددت ثباتية استمارة الاستبانة من خلال إجراء الدراسة المصغرة وحددت مصداقيتها من خلال مجموعة مكونة من (١٨) خبيراً. استعملت إجراءات التحليل الإحصائي الوصفي (التكرارات، النسبة المئوية، الوسط الحسابي، الانحراف المعياري، والكفاية النسبية) وإجراءات التحليل الإستنتاجي (معامل الارتباط ، معامل التوافق، اختبار مربع كاي) في تحليل البيانات، وكذلك استعمل تحليل العوامل لمعرفة مدى التوافق بين مفردات الاستبانة وكفاءتها إحصائياً.

النتائج: أظهرت نتائج الدراسة أنَّ معظم مفردات العينة يعانون من نقص التغذية من النوع المتوسط طبقاً لمجموعة من الدلائل من ضمنها القياسات الجسمية، الفحوصات المختبرية ونوع وكمية الغذاء المتناول، معظم مفردات العينة كانوا أميين وانقسمت العينة بين الذكور والإناث مع تفاوت بسيط في النسب، اغلب مفردات العينة أرشدت تغذوياً ولكنها لم تظهر الإذعان المطلوب.

التوصيات: أوصت الدراسة بضرورة تكوين نموذج صحي غذائي خاص بمرضى الإنفاذ الدموي يتضمن عدة محاور منها معايرة الغذاء المتناول، زيادة التمارين حسب القدرة، السيطرة على وزن الجسم وإغناء لائحة التحاليل المختبرية. وكذلك إعداد دراسات جديدة حول موضوع الدراسة، وتفعيل دور الطبيب والممرض المختص بالتغذية في مراكز الإنفاذ الدموي، ووجوب تخصيص يوم للتوعية حول نقص التغذية لدى مرضى الإنفاذ الدموي وتخصيص الدعم المالي المناسب لتحسين الوضع ألمعاشي والمستوى الغذائي لدى الأفراد موضوع الدراسة.

Abstract:

Objective: To assess the nutritional status of hemodialysis patients.

Methodology: A descriptive quantitative cross sectional study was effectuated in hemodialysis centers from February 2011 to September 2011. A purposive "non-probability" sample of (70) male and female hemodialysis patients in al-Najaf al-Ashraf Governorate from those who have spent more than six months on maintenance hemodialysis schedule. Data collected through using of a well-designed questionnaire consist of five parts, part one consists of sociodemographic contain (9) items, and part two consists of medical data contain (8) items, and part three consists of health and nutrition behavior contain (12) items plus (8) items of anthropometric measurements, and part four consists of food frequency contain (5) major items, and part consist of laboratory investigation contain (9) items. In addition to food diary (24 hour dietary recall) used for validating the food frequency part. Data collected by direct interview method with ESRD on maintenance hemodialysis patients' also by anthropometric measurement method and blood sample for laboratory investigation. Reliability of the questionnaire was determined through pilot study and validity determined through a panel of experts consists of (18) experts. Data was analyzed by using of descriptive data analysis (frequencies, percentages, mean, standard deviation and relative sufficiency) and by using of inferential analysis (correlation coefficient, t- test and χ²).

Results: The study results indicates that the majority of study sample suffer from moderate malnutrition according to several indicators including anthropometric measurements, laboratory investigations and (type and quality) of food. Most of study sample was illiterate, and the sample divided between male and female with invisible variance between percentages, the majority of study sample was nutritionally instructed but they don't reflect the desired compliance.

Recommendations: The study recommends with the necessity of establish a nutritional health style for hemodialysis patients including several dialogist like calibrating of dietary intake, increase physical exercise as tolerated, control body weight and enrich the list of laboratory investigations. Workout anew studies about the studied phenomenon, activate the role of dietician (doctor and nurse) in hemodialysis centers, hemodialysis malnutrition alert day and initiate a proper financial support through establish a hemodialysis malnutrition foundation work for improvement of socioeconomic status and nutritional status through study subjects.

Keywords: Nutritional Status, Hemodialysis

Introduction:

Determining the nutritional status accurately in hemodialysis (HD) patients is one of the most difficult problems; because it depends on indirect methods as well as the accuracy of some nutritional markers are questionable [1].

Patients with end-stage renal disease often experience malnutrition as a result of decreased dietary intake; inadequate dialysis; loss of nutrients into the dialysate; abnormal protein, carbohydrate, and lipid metabolism; and concomitant diseases, which may contribute to an increase in morbidity and mortality [2].

Malnutrition is defined as a condition that results from a deficit or excess of nutrients or energy in relation to metabolic and tissue needs. Hence, malnutrition can be divided into either under nutrition or over nutrition. The diagnosis of malnutrition in HD patients requires careful assessment of the patients' nutritional status [3].

Forty to fifty percent of all patients with end stage kidney disease (ESKD) are malnourished. Malnutrition is associated with increased infection, poor wound healing, muscle wasting, fatigue, malaise, and increased mortality. Poor nutritional status prior to initiation of dialysis is also associated with poorer outcomes on dialysis, increasing the odds ratio of mortality 2.5 times. Malnutrition is caused by inadequate dietary intake or unmet increased nutritional requirements [4.]

Malnutrition is a relatively common problem in chronic dialysis patients, affecting approximately one-third of both HD and peritoneal dialysis patients. Malnutrition may occur secondary to poor nutritional intake, increased losses, or to an increase in protein catabolism. The sequel of malnutrition are numerous and include increased morbidity and mortality, increased hospitalization rate and susceptibility to infection, impaired wound healing, malaise, fatigue, and poor rehabilitation [5-7].

Malnutrition in ESKD patients is very common affecting ~10.0-70.0% of HD patients [8]. Malnutrition in HD patients is strongly associated with increased mortality and morbidity [9].

Protein energy malnutrition (PEM) affects more than 50% of maintenance dialysis patients and is associated with morbidity and mortality, it's also related to diminished dietary intake, adequacy of dialysis, socioeconomic factors, or a combination thereof, patients with evidence of PEM have a relative risk of death between two- and tenfold or more, depending on the severity of PEM and the interaction of PEM with other factors (age, anemia, dialysis vintage (duration and period), etc.) [10-11].

Patients on dialysis also have problems with malnutrition. Factors such as decreased dietary protein, inadequate dialysis dose, decreased caloric intake, nutrient loss during dialysis, and symptoms such as anorexia and nausea contribute to the condition known as uremic malnutrition [12].

Malnutrition in dialysis patient is associated with poor survival. The survival rate of patients with renal failure has not changed in last 20 years despite intensive treatment. The main determinants of mortality and morbidity in HD are nutritional status of the patients and dialysis adequacy index (8).

A common problem in MHD patients is protein malnutrition, which is an important factor for morbidity and mortality in such patients [13].

In a study of Jordanian prevalence of malnutrition among HD patients 56.2% were classified as (moderately malnourished), while 5.6% of patients were severely malnourished [14].

In Baghdad malnutrition was present in 63.5% of patients (moderate in 45.9% and severe in 17.6%) with no significant sex difference. Dialysis in Baghdad is below the standards with low adequacy and frequency of sessions. Malnutrition

is prevalent, especially the severe forms, and requires more attention and re-evaluation of the dialysis prescription [15].

The researches data and information available about nutritional status of dialysis patients in developing countries, including Iraq, is very rare compared to United States America and Europe. Therefore this study was carried out to assess the nutritional status of adult HD patients in the dialysis centers in al-Najaf al-Ashraf Hospitals where the incidence rate is accelerated, also the mortality rate is accelerated too, which need more observation and research especially for nutritional status because it's the main cause of mortality and morbidity between HD patients as described in graphical presentation below.
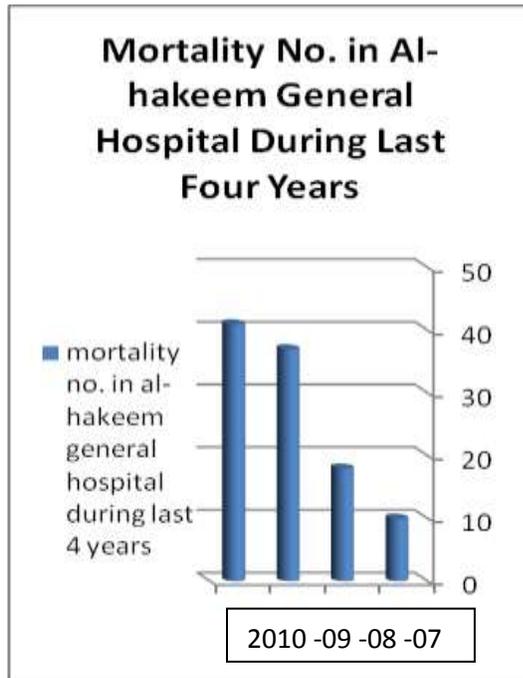

Figure 1. Graphical Presentation of Mortality Increment in Al- Hakeem General Hospital

Methodology:
Study Design:
        A descriptive quantitative cross-sectional study was carried out in order to achieve the stated objectives. The study was begun from February 8th, 2011 through September 29th, 2011.

Study Sample:
    A purposive "non-probability" (representative) sample of Seventy one (71) patients – become seventy (70) because one of the study subjects death (God bless her soul) - with ESRD who are admitted to the dialysis centers at Al-Najaf Al-Ashraf Governorate of Al-Sadr Medical City and Al-Hakeem General Hospital, dialyzed patients are grouped into three groups, first one is dialyzed on Saturday and Tuesday, the second one is dialyzed on Sunday and Wednesday, while the last group is dialyzed on Monday and Thursday. At the beginning of dialysis, patient is assigned to one of these three groups randomly. All groups are selected to be involved in the study.

Participants:
        Seventy Iraqi ESRD on MHD patients, eighteen to sixty five (18-65) years of age, receiving HD two times per week, written consent to participate in this study, the patient on regular maintenance hemodialysis at the dialysis centers of Al-Najaf Al-Ashraf Governorate for 6 months at least, free from clinical psychiatric illnesses especially clinical depression, were enrolled in the study.

Instruments:
    A literature review of previous studies relating to hemodialysis patient nutritional assessment by (ABCD) instruments which was conducted to identify potential items for the study instrument. From this review, a draft instrument was developed by the researcher which addressed the demographic socio-economic data, medical data, nutritional and health behavior, food frequency, laboratory investigation, (food diary) 24 hour dietary recall, a draft instrument was developed and pretested with (10) people (maintenance hemodialysis patient) as explained later in pilot study in details, all that were done after experts reviewed it and content validity was established. Furthermore, changes were made in the questionnaire to various terms according to recommendations and notes of experts and Ministry of Planning/Central Council of Statistics. This was done to make it understandable for such segment of community (study sample).

    The final study instrument consisted of five major parts and those parts are:

Part 1: Economic-Sociodemographic Data Form:

An economic-sociodemographic data sheet, consisted of (9) items, which included date of birth, gender, marital status, level of education, current employment status and other items used for estimating of socioeconomic status by SES .

Part 2: Nutritional and Health Behavior Form:

This part of questionnaire consisted of (20) item, (12) of them were concerned with major sources of health related knowledge focused mainly on hemodialysis nutrition if the patient put on special diet regimen, appetite, weight change, knowing of prescribed drugs and their side effects and patients physical activity.

The physical activity classification is adopted from (Ainsworth et. al. 2000) and defined as follows:

- Light: These may include reading, sitting, driving, eating, carpentry, house cleaning, childcare, ironing, cooking, sweeping, walking (4 km/hr).
- Moderate: These may include fast walking (6 km/hr), weeding and hoeing a garden, carrying a load, cycling, tennis, jumping rope, and dancing.
- Heavy: These may include bicycle race, boxing, running, jogging (10 km/hr), walking uphill with a load, heavy manual digging, basketball, climbing, swimming and soccer.

The other (8) items were put for anthropometric measurements (wt., ht., TSF, MAC, MAMC, BMI, wt. before dialysis and wt. after dialysis)

Part 3. Anthropometric Measurements:

3.1.Dry Weight (Wt.)

Dry weight in dialyzed patient is the weight at the end of dialysis treatment. Mechanical weighing bed was used to obtain the weight. The scale was placed on a hard-floor surface. Participants are asked to remove their heavy outer garments; female patients were weighed with Abaya (ladies body cover) was weighed

and its weight was subtracted from the total. Weight was measured in all participants and taken to the nearest 0.1 kg using weighing scale.

The scale was calibrated at the beginning and end of each examining day. The scale is checked using the standardized weights and calibration is corrected if the error is greater than 0.1 kg.

The results of the checking and the recalibrations are recorded in a log book.

3.2.Height (Ht.)

Height was measured in all participants, with the patients bare footed and head upright. The height is measured with the measuring rod attached to the balanced beam scale. The floor surface next to the height rule was hard. The height was reported to the nearest 0.5 cm.

3.3 Body mass index (BMI).

Body mass index was calculated as following formula:

$$BMI = \frac{\text{Weight in kilograms}}{\text{Height in meters}^2}$$

Table 1. Classification of Overweight and Obesity by BMI*:

Category	BMI(kg/m²)	Obesity class
Under weight	<18.5	
Normal	18.5-24.9	
Overweight	25.0-29.9	
Obesity	30.0-34.9	I
	35.0-39.9	п
Extreme obesity	≥40	ш

- Adapted from Preventing and Managing the Global Epidemic of Obesity, Report of the world health organization consultation of obesity, WHO, Genève, June, 1997. Reprinted from the practical guide: and treatment of overweight and obesity in adults. Publication number 00-4084, October 2000.

3.4 Mid-Arm Circumference (MAC).

Mid-arm circumference was measured by using a butterfly-Tape ™ fiberglass tape. At the dry weight, patient's right or non-access arm was bent at the elbow at 90˚ angle; palm up, to locate the arm's midpoint on posterior side of the arm. With the same arm hanging loosely by side, the tape was positioned at previously marked midpoint of upper arm and the circumference was obtained.

Table 2. Mid-Arm Circumference (MAC) Standard Reference:

Adult MAC (cm)	Standard reference	60% of Standard reference – moderately malnourished	Severely malnourished
Men	29.3	26.3	17.6
Women	28.5	25.7	17.1

3.5.Mid-Arm Muscle Circumference (MAMC)

Mid-arm muscle circumference was calculated as following formula:

MAMC = MAC – (TSF X 0.314)

Table 3. Mid-Arm Muscle Circumference (MAMC) Standard Reference:

Adult MAC (cm)	Standard reference	90% of Standard reference – moderately malnourished	60% of Standard reference - Severely malnourished
Men	25.3	22.8	15.2
Women	23.5	20.9	13.9

3.6.Triceps Skinfold Thickness (TSF)

Ross Adipometer ™ skinfold caliper was used to measure TSF to the nearest 1 mm. Three readings were taken and the mean was calculated.

The approval of the ethics committee in the hospital was obtained. All patients were informed about the nature of the study. They were also informed that their participation in this study is voluntary and they have the right to withdraw at any time without any penalization and their refusal to participate and withdraw will not affect their treatment at the Center.

Table 4. Mid-Arm Circumference (TSF) Standard Reference:

Adult TSF (mm)	Standard reference	90% of Standard reference – moderately malnourished	60% of Standard reference - Severely malnourished
Men	12.5	11.3	7.5
Women	16.5	14.9	9.9

Part 4: Dietary Assessment

Part 4.1.Food Frequency Questionnaire (FFQ) Form:

FFQ included the frequency of the most common consumed food per week. The FFQ was used for semi quantitative estimate of the dietary intake and cross-checked using the 3 days food record for validating FFQ. The patient's family was often good source of information if patient is unable to do so. (Appendix B).

Part 4.2.Dietary Record

A three days dietary record was completed by the patient or one of his relatives. The patient or his relative was instructed on the recording method by using the house hold measurements. Dietary record was then reviewed with patients to check the reliability. (Appendix B).

Part 5: Laboratory Investigations Form:

This part used biochemical laboratory investigations. Blood was drawn from patients by the researcher. Lab. Investigation in our study was including Hb%, serum creatinine, blood urea, serum albumin, serum cholesterol, serum sodium, serum potassium, serum calcium, protein catabolic rate or Normalized protein catabolic rate (nPCR) was calculated based on pre and post dialysis urea sampling and according to the day of dialysis according the following equation:

PCR=0.22+((0.036*B*24)/A),Where, (PCR) Protein Metabolic Rate (B) BUN rise in mg/dL since last hemodialysis (A) Hours since last hemodialysis (Depner and Daugirdas, 1996) (easycalculation.com) and albumin creatinine ratio which excluded from the questionnaire because some of patients are anuric.

All lab. investigations were made according to the standard procedures of hospital policy.

Data collection:

The data were collected through the utilization of the developed questionnaire and by means of structured interview technique with the subjects who were individually interviewed in the out patients clinic, by using the Arabic version of the questionnaire and they were interviewed in a similar way, by the same questionnaire for all those subjects who were included in the study sample. The data collection process has been performed from March 15th, 2010 until the April 27th, 2010. Each subject spends approximately (15-20) minute to respond to the interview.

Data Analyses:

In order to achieve the early stated objectives, the data of the study were analyzed through the use of statistical package of social sciences (SPSS) version 10 through descriptive and inferential statistical analyses.

Results:

Table 5. Distribution of patients demographic characteristics

Demographic Variables	Group	Frequency	Percent	Cumulative Percent	C.S. ([*]) P-Value
Age Groups	20 – 29	14	20	20	χ^2= 3.571 P=0.467 NS
	30 – 39	14	20	40	
	40 – 49	14	20	60	
	50 – 59	19	27.1	87.1	
	60 – 69	9	12.9	100	
Statistics	Mean ± SD	42.23 ± 13.69 [yrs.]			
Gender	Male	40	57.1	57.1	Binomial

Table 5.Continued

	Female	30	42.9	100	P=0.282 NS
Educational Level	Illiterate	16	22.9	22.9	χ2= 4.571 P=0.467 NS
	Read and Write	12	17.1	40	
	Primary	14	20	60	
	Intermediate	12	17.1	77.1	
	Secondary	7	10	87.1	
	University	9	12.9	100	
Marital Status	Single	52	74.3	74.3	χ2= 53.171 P=0.000 HS
	Married	11	15.7	90	
	Other	7	10	100	
Socioeconomically Status	Not Sufficient	11	15.7	15.7	χ2= 65.514 P=0.000 HS
	Almost Sufficient	55	78.6	94.3	
	Sufficient	4	5.7	100	

[*]Hs=Highly Significant. at P<0.01; NS=Non-significant. at P>0.05,P=Probability value ,X^2=Chi-Squared test, C.S.=Comparative Significant

The above table shows that the majority of the study sample is within fourth category of age groups and accounted for (27.1%). also shows that the majority of the study sample (57.1%) are male and the remaining are female. Relative to subjects level of education, the greater number of them are illiterate and they are accounted for (22.9%) of the sample. Regarding to the subjects marital status, the majority of the sample are single and they accounted for (74.3%) of the whole sample.

The above table also illustrates the socioeconomically status in terms of (sufficient, insufficient, almost sufficient) and the greatest percentage of the subject responses were almost sufficient and they accounted for (78.6%) of the sample. This table mainly focuses to reveal the direction or the pattern of the data, regarding age group there is no significance between the observed frequency as there expected record highly different at (P-value < 0.467) which different that age group are mainly found at the mid of (age groups) (50-59) year. With respect to gender, we can observe that P-value is no significant of (being male) at (P-value < 0.282). This table also reveals that P-value is no significant mainly at the first level of education (illiterate) whereas (P-value < 0. 467). Regarding marital status the P-value is a highly significant mainly as (single) at (P-value < 0.000).

Concerning socioeconomically status the P-value is a highly significant mainly at (P-value < 0.000) as almost sufficient.

Table 6. Distribution of medical variables

Medical Variables	Groups	Frequency	Percent	Cum. Percent	C.S. P-Value
ER admission Annually	Non	13	18.6	18.6	χ2= 17.29 P=0.002 HS
	1 - 4 days	27	38.6	57.1	
	5 - 9 days	12	17.1	74.3	
	10 -14 days	12	17.1	91.4	
	15 > days	6	8.6	100	
No. of Hospitalization Days	Non	13	18.6	18.6	χ2= 16.86 P=0.002 HS
	1 - 9	23	32.9	51.4	
	10 - 19	17	24.3	75.7	
	20 - 39	15	21.4	97.1	
	40 >	2	2.9	100	
Beginning of Renal Problems Appearance (years)	1 - 2	21	30	30	χ2= 12.00 P=0.017 S
	3 - 4	21	30	60	
	5 - 9	11	15.7	75.7	
	10 - 20	9	12.9	88.6	
	> 20	8	11.4	100	
Hemodialysis Period	1	27	38.6	38.6	χ2= 15.57 P=0.004 HS
	(2) yrs.	12	17.1	55.7	
	(3) yrs.	12	17.1	72.9	
	(4) yrs.	10	14.3	87.1	
	(5 >) yrs.	9	12.9	100	
Hemodialysis Duration	< 5 hrs/wk.	4	5.7	5.7	χ2= 38.51 P=0.000 HS
	5 - 6 hrs/wk.	46	65.7	71.4	
	7 > hrs/wk.	20	28.6	100	

[*]Hs=Highly Significant. at P<0.01; NS=Non-significant. at P>0.05,P=Probability value ,X^2=Chi-Squared test, C.S.=Comparative Significant

Table (6) shows that (38.6%) of the study sample are admitted to ER for (1-4) days annually and (32.9%) are the highest percentage of (1-9) hospitalization day's annually patients which shows high significant at p. value = 0.002, (30%) of patients in both (1-2) and (3-4) years of renal problems appearance beginning

Table 7. Participants' BMI Groups

Body Mass Index	Frequency	Percent	Cumulative Percent	C.S. P-value
Under weight	22	31.4	31.4	χ2= 36.857 P=0.000 HS
Normal weight	36	51.4	82.9	
Overweight	9	12.9	95.7	
Obesity	3	4.3	100	

[*] **Hs=Highly Significant. at P<0.01; P=Probability value ,X^2=Chi-Squared test, C.S.=Comparative Significant**

Body mass index table shows that (31.4%) of ESRD patients undergoing hemodialysis are under weight with high significance at p. value = 0.000.

Table 8. Anthropometric Measures

Parameters	Gender / Groups	Male Frequency	Male Percent	Male Cum. Percent	Female Frequency	Female Percent	Female Cum. Percent	C.S. P-value
Triceps Skin Fold Thickness	Standard Reference	14	35	35	7	23.3	23.3	χ2= 4.963 P=0.084 NS
	Moderately Malnourished	23	57.5	92.5	15	50	73.3	
	Severely Malnourished	3	7.5	100	8	26.7	100	
Mid-Arm Circumference	Standard Reference	10	25	25	5	16.7	16.7	χ2= 0.759 P=0.684 NS
	Moderately Malnourished	22	55	80	19	63.3	80	
	Severely Malnourished	8	20	100	6	20	100	
Mid-Arm Muscles Circumference	Standard Reference	11	27.5	27.5	3	10	10	χ2= 3.500 P=0.174
	Moderately	21	52.5	80	21	70	80	

Table 8. Continued

								NS
	Malnourished							
	Severely Malnourished	8	20	100	6	20	100	

[*]**Hs=Highly Significant. at P<0.01; NS=Non-significant. at P>0.05,P=Probability value ,X²=Chi-Squared test, C.S.=Comparative Significant**

All major percentages in this table reveal that male and female patients undergoing hemodialysis are moderately malnourished TSF male 57.5%, female 50%; MAC male 55%, female 63.3%; MAMC male 52.5%, female 70% respectively.

Table 9. Food Group Sources

Food group	No.	Mean	SD	RS	Assessment
Proteins	70	3.7875	0.356	75.8	failure
Carbohydrate	70	3.9571	0.405	79.1	failure
Minerals	70	3.9948	0.290	79.9	failure
Sugar	70	4.5524	0.535	91.0	failure
Others	70	3.4262	0.562	68.5	failure
All sources	70	3.9436	0.2665	78.9	Failure (Once Weekly)

[*]**No. =number; SD=Standard Deviation, RS=Relative significant**

This table shows that the patients undergoing hemodialysis fail to get their requirements from all sources of food

Table 10. Coincidence's tests for parameters (variances and means) between different principal components of foods

Criteria	Test of Homogeneity of Variances		ANOVA- Test of equality of means	
	Levene Statistic	Sig.	F	Sig.
Principle Components of Foods	**5.982**	**0.000**[**]	**59.558**	**0.000**[**]

Sig. =level of Significant, F=F-statistics

This table shows a high significant for variances homogeneity and means equality between different principal component of foods at p. value 0.000.

Table 11. Participants' biochemical Indicators of malnutrition

Biochemical measures	Assessments	Frequency	Percent	Cumulative Percent
Hb%	Above Normal	0	0	0
	Normal	0	0	0
	Below Normal	70	100	100
Serum Creatinine	Above Normal	70	100	100
	Normal	0	0	100
	Below Normal	0	0	100
Blood Urea	Above Normal	70	100	100
	Normal	0	0	100
	Below Normal	0	0	100
Serum Albumin	Above Normal	6	8.6	8.6
	Normal	28	40	48.6
	Below Normal	36	51.4	100
Serum Cholesterol	Above Normal	6	8.6	8.6
	Normal	37	52.9	61.4
	Below Normal	27	38.6	100
Serum Sodium	Above Normal	0	0	0
	Normal	35	50	50
	Below Normal	35	50	100
Serum Potassium	Above Normal	20	28.6	28.6
	Normal	46	65.7	94.3
	Below Normal	4	5.7	100
Serum Calcium	Above Normal	3	4.3	4.3
	Normal	17	24.3	28.6
	Below Normal	50	71.4	100
PCR	Below Normal	70	100	100
	Normal	0	0	100
	Above Normal	0	0	100

Hb=Hemoglobine ,PCR=Package Cell Rate

This table refers to the distribution of the study sample by their laboratory tests results; the results show that all of the study subjects (100%) are anemic with the HB percentage level below the normal level. In regarding to the S.creatinine, the results show that all the study subjects (100%) present with high level of S.creatinine above the normal level. In addition, the results show that all of the study subjects (100%) present with high level of blood urea above the normal level. While in regarding to the S. albumin, the study results indicate that the majority of the study subjects (51.4%) present with low level of S. albumin below the normal level. In addition, the study results show that the (52.9%) from the study subjects present with normal serum cholesterol. Moreover, half (50%) of the study subjects are present with normal serum sodium, and the other half (50%) present with low serum sodium. Table (11) also shows that hemodialysis period of (1 year) accounted for (38.9%) of the study sample. While finally, the hemodialysis duration in subject mainly distributed within range of (5-6 hours) are accounted for (65.7%) of the study sample. In addition, the study results show that the majority of the study sample (65.7%) present with normal serum potassium. While, one-half (50) of the study subjects present with low serum calcium, and the other half distributed between normal and above normal level. Finally, in this table, the study results show that all the study subjects (100%) are present with low PCR (protein catabolic rate).

Discussion:

This study is the first effort to investigate the nutritional status of adult hemodialysis patients in al- Najaf al-Ashraf governorate and overall Iraq. Part One: Discussion Of The ESRD Undergoing Hemodialysis Patients' Nutritional Status Throughout the course of the present study, as shown in table (5), the study results show, that the majority of the study subjects (27.1%) are within the fourth age group (50-59 yrs). This finding comes along with study of Kalantar-Zadeh et. al, 1999 which reveals that the mean value of age 42.23 ± 13.69 versus 44.2 ± 19.8 years [3].

Also in regarding to the gender, the study results indicate that the majority of the study subjects (57.1%) are male.In their study (16) showed that the mean age was 57 years, 57.1% were female.

Tayyem and Mrayyan (2008) also found that (53.4%) of the hemodialysis patients were female, and (46.6%) were male. Also in their study by Asgarani (2004) showed that there were no significant differences between male and female [14, 17].

Also this table shows that the (74.3%) from the study subjects are single. And in regarding to the socio-economic status, the majority of the study subjects (78.6%) are within the almost sufficient level of the socio-economic status.

Concerning the level of education, most of them (22.9%) are illiterates. Such result is an ordinary outcome for our society as a result of the tragedy of the political events which the country had passed through, parents' neglecting of learning of their children and low governmental standards of obligation education.

In a study of nutritional status of Jordanian hemodialysis patients showed that (30.7%) were illiterate [14].

With respect to marital status, the largest proportion is single and they accounted for (60.7%) of the whole sample, this result is conflicting with many studies on hemodialysis patients where most of them show the majority

of studied sample are married like [16] when said that (42.9%) were married.

Concerning the income, the greatest percentage (more than three quadrants) of the subject responses are (almost sufficient) and they accounted for (78.6%) of the study sample. Namely, based on that and according to the hemodialysis related cost of care statistics, we can imagine the real heavy burden of hemodialysis on the macro level, country economy and micro level, individual as well, especially in our country as a developing one that lives under the shadows of the global financial crisis and unclear policy. While in our country unfortunately there's no available data regarding such important issue. we believe that the Ministry of Health in our country need to be more committed and focused to such kind of data for its vital role in planning health policies scientifically.

Table (6) shows that the majority of the study subjects (38.6%) are admitted to the emergency department for 1-4 days annually. While the number of hospitalization days, the study results indicates that the majority of the subjects (32.9%) are hospitalized for 1-9 days annually. In addition to that and in regarding to the period when the renal problems appear, the results show that the (30%) was for the both (1-2 and 3-4 years).

In concerning with the Hemodialysis period, the study results show that the majority of the study subjects (38.6%) were under hemodialysis for (one) year in the comparison of dialysis period (three) years in the study of Kalantar-Zadeh et. al, 1999. While for the hemodialysis duration, about (65.7%) from the study subjects were meeting dialysis for 5-6 hrs weekly [3].

The hours/week of HD (5-6 hours) was about half of the recommended dose (12 hours), in Jordan study it was 9.6 hours [18], and in Iran the frequency of sessions was thrice (60%), twice (38%), and once (2%) weekly [19].

Namely, we observed that HD duration was significantly better in patients who had been receiving dialysis for a longer time. So this result is disappointed with all promises from

health directory in Iraq for enhancement and development of health sectors.

Table (7) shows that the majority of the study sample (51.4%) is present with normal weight, followed by underweight persons (31.4%), followed by those with over weight (12.9%), and then those with obesity (4.3%). Vincenzo, Francesca and Bruno, 2000 said that during the observation, higher-weight patients (BMI, 26.1%), with respect to lower-weight patients (BMI, 20.8 %).

Table (8) refers to the distribution of the study sample (males and females) by their anthropometric measures in three anthropometric parameters (triceps skin fold thickness, mid-arm circumference, and mid-arm muscle circumference). In regarding to the triceps skin fold thickness, the study results indicate that the majority of the study sample are present as moderately malnourished (57.5%) for males, and (50%) for females. Also in regarding to the mid-arm circumference, the study results show that the majority of the study subjects are present as moderately malnourished (55%) for males and (63.3%) for females. And in regarding to the mid-arm muscle circumference, the study results show that the majority of the study sample also present as moderately malnourished (52.5%) for males, and (70%) for females. Also this table shows that there are non significant relationships between the gender and the observed anthropometric measures at p-value more than 0.05. So, all anthropometric parameters indicate that study subjects are moderately malnourished. Our point of view can be summarized through table (9) which shows in simple assessment that the patient with ESRD undergoing hemodialysis had failed to get their requirement of all food resources, such result may be due to bad prognosis of such diseases, malpractice in all procedures related to hemodialysis and absence of dietitian in all hemodialysis centers all around the country, Based on that we need to be more cautious with practices that have a relative with HD nutritional status and make a policy make sure that every center of HD should has a dietitian

take the responsibility of care with ESRD on MHD patient's nutritional status (the researcher).

Our results lead us to the fact that all parameters used to assess of nutritional status should come parallel which means that the effect of any change in one of parameters lead to change in the other one as we found in appetite, body weight change, body activity and muscle strength, in the second place we bring into being results may reflect a conflict as we found in special diet regimen and regimen compliance, in addition we don't have to forget that our results is not an absolute fact. Table (10) shows a high significant for variances homogeneity and means equality between different principal component of foods at p. value 0.000.

Table (11) refers to the distribution of the study sample by their laboratory tests results; the results show that all of the study subjects (100%) are anemic with the HB% level below the normal level. Kausz and others, 2005 in his study shows that hemodialysis patients are unable to achieve an Hb level of 11 g/dL (110 g/L) [21]. Also Bellizzi and others (2002) shows that Hb levels at the end of the long interdialytic interval were significantly lower by 0.5 to 0.6 g/dL (5 to 6 g/L) Hb% decrement in all ESRD undergoing HD patients occur due to many factors the most significant is erythropoietin depletion and the shortage of erythropoietin (EPO) doses which are used for repletion of EPO and fear of patients and physician from blood transfusion and its complication and the low standards of nursing procedures which implement in our dialysis centers policies (the researcher). In regarding to the S. creatinine, the results show that all the study subjects (100%) are present with high level of S. creatinine above the normal level. Also the results show that the all of the study subjects (100%) are present with high level of blood urea were above the normal level. Rosenbaum and others, 2008 show in his study that the average percentage of urea was (68.7 %) While in regarding to the S. albumin, the study results indicate that the majority of the

study subjects (51.4%) are present with low level of S. albumin below the normal level [22].

In addition, the study results show that the (52.9%) of the study subjects are present with normal serum cholesterol. And half (50%) of the study subjects are present with normal serum sodium, and the other half (50%) are present with low serum sodium.

Saat and others, 2011 in his study shows that there were 78.3% patients with the hemoglobin less than 10 g/dL. In addition, all HD patients in the dialysis centre did not have the normal range of creatinine level. As for albumin, 88% of the HD patients have normal range of albumin level (>34 g/dL) and over 50% of the patients had normal range of cholesterol level [23].

The mechanism of decline in albumin may contribute to increase in the mortality rates is because the patients are malnutrition due to underdialysis or decreased in food intake [24].

Also the study results show that (28.6) of the study sample present with high serum potassium. While, (71.4%) of the study subjects are present with low serum calcium. The study results show that all the study subjects (100%) are present with low PCR (protein catabolic rate).

A study of nutritional status assessment of hemodialysis patients that 69.4% of the patients showed an PCR as protein intake are lower than 1.2 gm/kg/d [25].

Our point of view is that many indicator show deterioration in ESRD on MHD patients nutritional status including HB%, S. albumin and PCR.

Recommendations:

The study recommends with the necessity of establish a nutritional health style for hemodialysis patients including several dialogist like calibrating of dietary intake, increase physical exercise as tolerated, control body weight and enrich the list of laboratory investigations. Workout anew studies about the studied phenomenon, activate the role of dietician (doctor and nurse) in hemodialysis centers, hemodialysis malnutrition alert day and initiate a proper financial support through establish a hemodialysis malnutrition foundation work for improvement of socioeconomic status and nutritional status through study subjects.

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