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Research Article
Haemodialysis

A study on dietary recall among the maintenance haemodialysis patients in East Godavari district.

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Introduction: Individuals with end-stage renal diseases are usually at an increased risk of nutritional disorders. Protein-energy malnutrition is observed in a significant number of maintenance haemodialysis (MHD) patients. Hence a study was conducted to find whether dietary intake meets recommended dietary allowance (RDA) among MHD individuals. **Materials and methods:** This was cross-sectional research conducted in the department of Nephrology, GSL Medical College, for 18 months. Individuals are aged 18 years or more, metabolically stable and undergoing MHD were included. Software called Dietsoft was used to know the dietary calculations. Parameters including energy, carbohydrates, proteins, fats, vitamins, minerals and essential amino acids (EAA) were evaluated. Mann Whitney U test was used to find the significant difference, and $P < 0.05$ was considered statistically significant. **Results:** Of the 31 patients, 18 were male, and 13 were female. The calorie intake was as recommended, but statistically, there was no significant difference. But the intake of the macronutrients and dietary fibre was higher than the recommended, which was statistically significant. In females, there was a considerable difference. The difference was statistically not significant in minerals intake. **Conclusion:** There was considerable malnutrition among the patients undergoing MHD. Hence regular dietary assessment is required.

Keywords: Hemodialysis, Diet, Nutrients

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Introduction

Individuals with end-stage renal diseases are usually at an increased risk of nutritional as well as metabolic disorders; this leads to not only malnutrition and but also protein-energy wasting. [1]. In the literature, protein-energy malnutrition (PEM) is observed in a significant number of individuals who are undergoing maintenance haemodialysis (MHD). [2]. Nutritional disturbances among chronic kidney disease (CKD) individuals is observed at an early stage. This act as a catalyst for increasing renal dysfunction and also increased mortality and morbidity. The strong association between malnutrition and cardiovascular diseases among dialysis individuals is reported in the literature. [3].

Inflammation is also said to be the cause of this. [4]. In dialysis individuals, proper nutrition improved not only the nutritional status but also the clinical outcome. [5]. This is possible only with regular monitoring and appropriate dietary advice. Various techniques are available to assess this among CKD. [6] The 24-hour dietary recall (DR) is reported to be one of the widely used techniques. [7]. With this, DR was used to find the dietary intake meets recommended dietary allowance (RDA) among MHD individuals.

Materials and Methods

Settings: The study was conducted in the department of Nephrology, GSL Medical College, Rajahmundry.

Duration and type of study: This was cross-sectional research. This was conducted over 18 months, from January 2018 to June 2019.

Sampling method: Random sampling was considered in this study.

Sample size calculation: All the eligible members who satisfy the inclusion criteria were considered in this study.

Inclusion criteria: Individuals aged 18 or more who were metabolically stable and those undergoing MHD were included in this study.

Exclusion criteria: Age < 18 years, who were not cooperative and those who didn't submit the informed consent were excluded from the study.

Data collection, procedure: Software called Dietsoft was used to know the dietary calculations. It was used to assess various nutritional parameters, including energy, carbohydrates, proteins, fats, vitamins, minerals and essential amino acids in the diet consumed by the patients. This involves the measurement of the quantities of nutrients present in the foods consumed by the participants. This is based on the data given by the national institute of nutrition (NIN).

The RDA for various nutrients was based on ICMR guidelines. [8] WHO guidelines were considered for essential amino acids. [9] In this, 60 and 55 kgs were the reference weights for men and women, respectively. [10]

Statistical analysis: The data were analysed using SPSS version 21. Mann Whitney U test was used to find the significant difference, and a P value less than 0.05 was considered to be statistically significant.

Results

Of the 31 patients enrolled in the present study, twenty patients had diabetes, and 11 were non-diabetics; 18 were male, and 13 were female participants. The demographic characteristics of the study population are presented in Table 1.

The prescribed intake and the dietary intake obtained through DR of the calories, carbohydrates, fats, proteins and fibre among MHD patients were given in table 2. Regarding the calorie intake, which was as recommended, but statistically, there was no significant difference. But the information of the macronutrients and dietary fibre was higher than the recommended, which was statistically significant (Table 2).

The essential amino acid (EAA) intake by patients is shown in Table 3. Gender wise, among the female, there was a significant difference, whereas among males, statistically, the difference was not effective for all EAA except histidine. Minerals intake was presented in table No: 4. The difference was statistically not significant in both gender, respectively, for Potassium, Calcium, Magnesium and Copper. Gender wise, among males, statistically, the difference was not significant for folic acid. In the female category, the difference was insignificant for Thiamine, Folic acid, vitamin B12 and vitamin C (Table 5).

Table 1: Demographic characteristics of the study population.

Parameter	Mean ± SD
Age (years)	56.22 ± 14.01
Male / female	18/13
BMI (Kg/m2)	25.2 ± 5.61
SBP (mm Hg)	147.48 ± 10.40
DBP (mm Hg)	84.27 ± 7.00
Hb (g %)	11.57 ± 13.90

BMI=body mass index; SBP= systolic blood pressure; DBP= diastolic blood pressure; Hb= haemoglobin

Table 2: Intake of energy, other macronutrients and fibre in the study members

Parameter	Male	Female	Prescribed intake	P-value	
				Male	Female
Energy (Kcal)	2042.36 ± 344.2	1908.7 ± 23	2100, 1800	0.274	0.543
Carbohydrates (g)	273.32 ± 52.05	253.48 ± 56.36	400	<0.001	<0.001
Protein (g)	65.7 ± 13.8	59.9 ± 8.4	90	<0.001	<0.001
Fat (g)	77.04 ± 30.9	72.9 ± 30.2	20	<0.001	<0.001
Fibre (g)	11.8 ± 3.91	13.88 ± 5.81	40	<0.001	<0.001

Data are shown in Mean± SD

Table 3: Essential amino (EAA) acids intake among the study members

EAA	Male	Female	RDA		P value	
			Male	Female	Male	Female
Lysine	2234.14 ± 920.32	2554.77 ± 591.13	1800	1650	0.015	<0.001
Leucine	2473.01 ± 951.03	2804.25 ± 571.32	2340	2145	1.000	<0.001
Isoleucine	1456.81 ± 629.40	1690.71 ± 379.38	1200	1100	0.068	<0.001
Valine	1634.15 ± 641.57	1891.75 ± 387.16	1560	1430	0.543	<0.001
Threonine	1183.21 ± 478.50	1371.01 ± 299.38	900	825	0.015	<0.001
Phenylalanine	1725.06 ± 663.60	1965.17 ± 392.14	1500	1375	0.068	<0.001
Tryptophan	299.72 ± 122.09	351.88 ± 73.38	240	220	0.015	<0.001
Methionine	555.66 ± 282.62	674.10 ± 172.26	600	550	0.015	0.001
Histidine	929.52 ± 365.71	958.77 ± 326.30	600	550	<0.001	<0.001

Data shown in Mean± SD

Table 4: Mineral Intake in the study participants.

Parameter (mg)	Male	Female	RDA		P value	
			Male	Female	Male	Female
Sodium	160.56 ± 53.35	185.35 ± 60.38	2500	2500	<0.001	<0.001
Potassium	1320.55 ± 444.97	1429.97 ± 314.78	2500	2500	0.015	0.075
Calcium	793.44 ± 458.95	573.32 ± 92.25	600	600	0.223	0.722
Phosphorus	1376.48 ± 302.83	1210.55 ± 165.17	600	600	<0.001	<0.001
Iron	11.94 ± 5.09	11.65 ± 3.59	17	21	<0.001	<0.001
Zinc	4.64 ± 1.10 4	.44 ± 0.58	12	10	<0.001	<0.001
Magnesium	293.08 ± 73.05	302.28 ± 55.66	340	310	0.015	0.075
Copper	1.41 ± 0.52	1.52 ± 0.37	1.35	1.35	0.223	0.075

Data are shown in Mean± SD

Table 5: Vitamin intake in the study participants

Parameter (mg)	Male	Female	RDA		P value	
			Male	Female	Male	Female
Thiamine	1.03 ± 0.34	0.96 ± 0.18	1.2	1.0	0.002	0.722
Riboflavin	0.98 ± 0.25	0.97 ± 0.22	1.4	1.1	<0.001	0.013
Pyridoxine	0.3 ± 0.09	0.29 ± 0.08	2.0	2.0	<0.001	<0.001
Niacin	7.32 ± 3.00	6.21 ± 1.31	16	12	<0.001	<0.001
Folic Acid (µg)	190.01 ± 80.12	229.46 ± 77.64	200	200	1.000	0.285
Vitamin B12 (µg)	0.7 ± 0.40	0.88 ± 0.50	1.0	1.0	0.002	0.285
Retinol (µg)	207 ± 129.89	220.34 ± 120.44	600	600	<0.001	<0.001
Vitamin C	37.6 ± 39.88	59.88 ± 49.96	40	40	0.002	0.722

Data are shown in Mean± SD

Discussion

Diet is one of the major lifestyle-related risk factors for chronic disorders; CKD is also one. Individuals with chronic renal insufficiency and end-stage renal disease usually show a high prevalence of malnutrition. In a study by Kim et al., the investigators reported that a decrease in renal function in children with CKD is associated with a decrease in overall nutrient intake and quality of diet. [11]. Studies from India also reported a poor intake of proteins and calories in chronic renal disease. [12,13]. Malnutrition was reported among the patients undergoing haemodialysis and peritoneal dialysis, and it was said to be severe in MHD. [14]. Proper intake of a good diet is the only alternative, which not only improves the quality of life but also releases the symptoms of MHD.

Carbohydrates are the primary energy sources; for proper BMI and health, we should take optimum energy. Proteins are the building blocks of our body, help in body growth as well as replace the lost cells during the routine. In addition, the EAA have to be supplied in an external diet, as they cannot be synthesised in our body. They are coming to the essential fatty acids, which as the prime components of the cell membrane; in addition, the fats are rich energy sources. The fibre in food helps in the formation of bulk so that the waste can be removed and also reduces blood sugar and cholesterol.

The mean calorie intake of various nutrients such as carbohydrate, protein, fat and fibre intake of MHD patients in the present study showed the following features; the calorie intake was matched with the RDA in both males and females, which was statistically not significant (Table 2). However, the input was reported to be less compared to the RDA in proteins. Carbohydrates, fats and fibre; statistically, the difference was significant in both gender, respectively. The majority of this study participants were diabetic. Hence there was a restriction to take carbohydrates. Despite this, the energy intake was at par with RDA, which is because of proteins, fats. The improper information of proteins mainly ends up in PEM, as mentioned by Naini A. [15].

The EAA have to be supplied through the diet as they are not synthesised in our body. Among the female participants, the intake of EAA is at par with the RDA. Statistically, the difference was significant (Table 3). Among the male, intake of lysine, threonine, tryptophan and histidine was more than RDA, and methionine was less. In contrast, the intake of leucine, isoleucine, valine and phenylalanine was as per the RDA (Table 3). In this study, the protein intake is low among the participants compared to RDA, but the EAA are at par with RDA, which was due to intake of good quality protein. Whereas, as per Kumar et al. [16].

In the study, there should be a reduction in the EAA levels among individuals with renal pathology. But the reasons for this were not known. Micronutrients are required for protection and also different metabolic pathways in our body. It was found that the intake of sodium, potassium, iron, zinc and magnesium was found to be low compared to RDA in this report; this happened in both gender, and the difference was statistically also significant, except for potassium.

The phosphorus intake is higher than RDA, and the intake of Calcium and copper is at par with RDA (Table no: 4). When vitamins were analysed, folic acid and vitamin C intake were more than RDA among females; the other vitamins intake is less compared to RDA in both gender (Table no: 5). Similar findings were reported in the literature also. [17 – 20].

Conclusion

There was significant malnutrition among the patients undergoing MHD. Hence regular dietary assessment is required.

What this study adds to the existing knowledge

Malnutrition is common in MHD patients.

Limitations of the study: Small number of cases and the short study duration are the significant limitations of this research.

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