

## Dietary Adherence With Guideline Recommendations In Patients Undergoing Continuous Ambulatory Peritoneal Dialysis

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**Abstract:-** Dietary nutrient intake plays a dominant role in maintaining proper nutritional status in Continuous Ambulatory Peritoneal Dialysis (CAPD) patients. Adhering to multiple dietary restrictions imposed on CAPD patients may be difficult but crucial in maintaining proper nutritional status. The study aimed to assess the dietary adherence with renal specific European Society for Parenteral and Enteral Nutrition (ESPEN) guideline recommendations for CAPD patients. This cross-sectional study carried out engaging 102 patients (66 were male) who attended to the CAPD clinic, General Hospital Kandy from January to April 2020. Participants were selected by simple random sampling method. Interviewer administered food frequency questionnaire was used to collect dietary data. A small minority of the patients reached recommended targets of energy (30.4%) and protein (10.8%). The Number of adherents to potassium and phosphorus was also as lower as 10.8% and 17.6% respectively. Most of the participants consumed less than target recommendation in relation to potassium and phosphorus. Only 10.8% consumed sufficient fiber. Furthermore, only 26.5% were within recommended dietary sodium targets and 20.6% of participants' sodium intake was higher than recommendations. It is generally accepted that dietary intake of CAPD patients are relatively lower than target recommendations. Majority of CAPD patients participated in this study also did not meet current renal specific dietary recommendation in relation to all the selected

dietary components. Therefore, other than conventional dietary counselling, nutritionally sound, appropriate dietary interventions should be implemented in order to improve adherence to recommended dietary intake to obtain the best optimum results.

**Keywords:** CAPD, adherence, recommendations, ESPEN

### Introduction

Chronic kidney disease (CKD) is progressive loss of kidney functions which is defined as kidney damage or an estimated glomerular filtration rate (eGFR) of less than 60ml/min/1.73m<sup>2</sup> (Hajira, Samiullah and Chawla, 2013). Renal transplantation and renal replacement therapies such as Continuous Ambulatory Peritoneal Dialysis (CAPD) and hemodialysis (HD) are the only treatment modalities available to sustain and prolong the life of the final stage of CKD or End-Stage Renal Disease (ESRD) patients. CAPD has been available as an effective and safe renal replacement treatment for ESRD patients in and around the world.

CAPD patients have to adhere to multiple recommended dietary regimens related to dietary nutrient components and also fluid intake. It is said to be difficult for patients to follow the renal diet as there may be restrictions imposed on amount of protein, sodium, potassium, phosphorus, and calcium allowed in the diet. Due to this complexity of dietary modifications, majority of dialysis patients are having difficulties in adhering and continuing in the long term (Beto and

Nicholas, 2009). There is no consensus guideline available, but there are number of renal specific nutrition guidelines using around the world. There are slight differences in recommended values in each guideline. European Society for Parenteral and Enteral Nutrition (ESPEN) guideline (Cano *et al.*, 2009) is one of the most accepted guidelines among them.

Dietary intake of patients can be assessed through several methods, i.e., 24-hour dietary recall, dietary diary, food frequency questionnaires are available for epidemiological purposes. Some of these methods are complex and laborious. Population studies require simple, and reliable methods. Food frequency questionnaires often use as practical, cost-effective and efficient method for assessing dietary intake over periods of time (Biró *et al.*, 2002). FFQs are most commonly used method to assess dietary intake because of its low cost and ability to capture usual food patterns (Zang *et al.*, 2019).

Multiple dietary restrictions recommended to CAPD patients may be difficult to achieve and at the same time may result in nutritional deficiencies rendering a poor dietary quality. Adherence to a specific dietary regime is not easy. It requires individual, social, cultural and environmental adaptations too (Cupisti and Kalantar-Zadeh, 2013). It is believed that there are five associated factors which leads to dietary non-adherence according to WHO Multidimensional adherence model (Chaudri, 2004). Those are, socio-economic factors, condition-related factors, therapy-related factors, health care team and system factors and patient-related factors. As patients cannot switch into dialysis diet on their own there should be dietary counseling for them to help to change their dietary intake and it should be part of treatment for ensure they are taking adequate calorie and protein (Prasad *et al.*, 2008).

Very few studies have been done to address nutritional aspect of CAPD patients in Sri Lanka. As the previous literature was not available on similar studies in Sri Lanka, conducting this type of research will be important to understand nutritional status of this population. Assessing the adherence to the dietary recommendations in these population may be the first step towards directing appropriate nutritional interventions which is crucial to maintain proper nutritional status. Therefore, this study aimed to identify deviations of current nutrient intake from CAPD guideline recommendations in the study sample.

### Methodology

Cross-sectional study was done at CAPD clinic, Nephrology and Transplantation Unit, National Hospital, Kandy. The study was carried out engaging 102 patients who attended to CAPD clinic. Simple random sampling method was used to select patients for the study. Considering about inclusion criteria, patients who were on CAPD treatment more than one month were recruited for the study. Total number of participants attending to clinic were 135 at the time of starting data collection. Simple random sampling method used to select patients for the study. Patients were asked to pick a chit randomly among chits which were numbered from 1 to 135. Only those patients who picked numbers in between 1 to 102 included in the study. Patients who were having peritonitis and other therapy related complications were excluded from the study.

A validated food frequency questionnaire (FFQ) which was developed for Sri Lankan adult population (Mallika Arachchige, 2013) was used to collect information about currently consuming foods on daily, weekly and monthly basis. The average frequency of food intake per week and month of the FFQ was converted to a daily intake value. In this FFQ, details about the quantity and frequency

of 90 food items were asked. Food portion sizes were obtained using standard household utensils such as cup, bowl, plate, glass, coconut spoons and other spoons; and these were clarified by demonstration using real utensils, portion size photographs and food atlas (Jayawardena and Herath, 2017). Then, all foods recorded in the FFQ were converted into grams and intake of nutrients was analyzed using NutriSurvey 2007 (EBISpro, Germany).

Finally, the actual daily intake of individuals compared to daily recommended values of ESPEN guideline.

### Results and discussion

The study population consisted with 102 participants. Among them 35.3% (n=36) were female and rest were male (64.7%). The mean age of the participants was 54.91±12.57 years. 78.4% (n=80) of the sample were Sinhalese, 6.9% (n=7) were Tamil and 14.7% (n=15) were Muslim in ethnicity. Majority were married (91.2%). 32.4% (n= 33) of patients fulfilled lowest educational qualification which was considered as below O/L while 19.6% (n=20) of patients reported highest education qualification which was up to degree/diploma level.

*Table 1 - Daily intake of nutrients and proportion of participants within recommended targets*

| Nutrients  | Daily intake    | N (%) within recommended targets | Daily recommendation |
|------------|-----------------|----------------------------------|----------------------|
| Protein    | 0.714(0.55)     | 11 (10.8)                        | 1.2-1.5 g/kg/day/BW  |
| Energy     | 20.76(11.46)    | 31 (30.4)                        | 25 kcal/kg/day/BW    |
| Phosphorus | 687.8(352.07)   | 18 (17.6)                        | 800 -1000mg          |
| Potassium  | 1321.35(589.82) | 11 (10.8)                        | 2000-2500mg          |
| Sodium     | 1755.5(1440.7)  | 27 (26.5)                        | 1800-2500mg          |
| Fiber      | 12.65(8.53)     | 11 (10.8)                        | 20-25g/day           |

Data are expressed as median (interquartile range)

In the current study dietary energy and protein intakes were under recommended levels according to the ESPEN guideline

reference ranges. Based on nitrogen studies ESPEN has proposed that CAPD patients should have a minimum of 1.2g/kg/BW daily protein intake to make sure a neutral protein balance (Akbulut *et al.*, 2013). In the current study, average daily protein intake was 0.7g/kg/BW reporting only 10.8% participants adhering to the recommendation. Apart from that recommended dietary energy intake of 25kcal/kg/BW reached by only 30.4% participants and average energy intake was only 20.7kcal/kg/BW. These findings are compatible with majority of studies where those studies also showed that most of the participants' energy and protein intake was inadequate (Luis *et al.*, 2016). A study revealed that the percentage of adherents for energy and protein recommendations is as low as 26% and 39% respectively (Wang *et al.*, 2003).

In this study reported potassium intakes were lower than target recommendations. Potassium adherence was 10.8% and 85.3% (n= 87) and most participants' intake was lower than the recommendation. Only 3.9% (n=4) consumed more than the recommended intake. This is a finding in agreement with a previous literature (Luis *et al.*, 2016). Generally, patients on CAPD should adhere to some limitations on most of the nutrients they consume. They are cautioned against excessive intake of dietary potassium as well.

Usually high protein foods contain high amount of phosphate. In this study as their dietary protein intake was low, it might lead to unintentional reduction of dietary phosphorus. In these patients, dietary phosphorus adherence was as lower as 17.6%, a finding that seems in agreement with previous literature (Luis *et al.*, 2016). Percentage of 66.7% (n=68) were below than recommendations. Meanwhile 15.7% (n=16) patients' phosphorus intake was higher than current recommendation. Fiber intake was also lower than the target recommendation (12.65g/day). The majority of individuals did

not consume sufficient fiber. Proportion of non-adherent was 85.3% (n=87). This finding is in line with a study which found that less consumption of dietary fiber. They suggest that it may be as a result of dietary advices received by patients to avoid fruits and vegetables as a measure to control potassium levels (Luis *et al.*, 2016). Constipation is a common complaint in CAPD patients and low fiber intake is a cause for constipation. Fiber-rich foods are normally high in potassium and phosphorus (Sutton, Talbot and Stevens, 2001). Advices to restrict potassium and phosphorus may adversely affect on the intake of sufficient fiber in these patients.

There are lots of uncertainties when estimating salt intake as daily consumption varies depending on their choices and preferences on daily basis. Food composition tables are also unable to consider each and every commercial product detail and exact salt amounts of regional preparation of dishes. Therefore, salt intake estimation is a difficult task (Vaz *et al.*, 2014). However, the average of sodium consumption of our participants was 1755.5(1440.7) mg/day while ESPEN recommendation proposes 1800-2500mg/day intake. Proportion of individuals consumed more than target daily sodium was 20.6% (n=21) and 52.9% (n= 54) individuals consumed less than target range.

### Conclusion

In conclusion, the majority of CAPD patients, participated in this study did not meet current renal specific dietary recommendation in relation to all the selected dietary components. Furthermore, results show that majority of the participants consumed less than recommended intake. Finally, conventional dietary counselling which has received by all the participants is not enough in order to achieve proper dietary knowledge as well as to adhere to dietary modifications to reach recommended dietary targets values.

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