Effect of a Nutritional Education Program on Quality of Life of Geriatric Patients with Chronic Kidney Diseases

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ABSTRACT

Background: Nutrition is closely related in people with chronic renal diseases. In order to reduce difficulties and enhance the quality of life for older individuals with chronic kidney disorders, nutrition is crucial. **Aim:** Evaluate the effect of a nutritional education program on quality of life of geriatric patients with chronic kidney diseases. **Setting:** This study was carried out at outpatient nephrology clinic at New Mansoura General Hospital. **Subjects:** Were selected using the purposive sampling technique which included 60 geriatric patients diagnosed with chronic kidney diseases from the above-mentioned setting who met the requirements for inclusion. **Tools:** Two tools were used in this study; Structured Interview sheet and Quality of Life Questionnaire. **Results:** A statistically significant difference was found between the four domains of quality of life among the studied geriatric patients between pre and post 1 and also between post 1 and post 2 after the program. **Conclusion:** The nutrition intervention program had a positive effect on satisfaction with current state of health, thus resulting in enhanced quality of life. **Recommendation:** Development of a health promotion interventions to improve positive thinking related to health behaviors and improve quality of life for geriatric individuals, ensuring it is easily accessible.

Key words: Chronic Kidney Diseases, Education Program, Geriatrics Patients, Quality of Life

Introduction

All human societies experience ageing, which is a necessary aspect of biological changes as well as cultural and societal norms. For the majority of human diseases, ageing is a known risk factor **(Fahmy et al., 2024).** Chronic kidney disease (CKD) is a major global health problem, marked by an increased morbidity and mortality risk, its rising incidence and prevalence make it a critical public health concern requiring urgent attention and effective strategies to manage and reduce its impact **(Cacciapuoti et al., 2024).** The progressive and irreversible loss of kidney function is the hallmark of chronic kidney disease, an increasingly prevalent health issue. Approximately 10-15% of older adults worldwide are affected by it **(Evans et al., 2020).** An estimated 600 million people worldwide are affected by CKD with its prevalence notably increasing, particularly among elderly **(Francis et al., 2024).** In line with global trends, the prevalence of CKD in Egypt has surged by 36%, Being as the nation's 5th most common cause of death between 2009 and 2019 **(The Center for Economic and Social Rights, 2021).**

A deterioration in psychological, functional, and social capacities results from the cumulative and permanent physiological changes that accompany aging, an unavoidable, time-dependent, multifaceted process. After the age of 40, around 10% of Every decade, renal parenchyma is compromised, reducing kidney weight from over 400 grams in the 30s and 40s to less than 300 grams by the 80s, this decline results from a reduction in renal epithelial cell proliferation, which leads to renal cortical thinning. By the 60s, renal tubular function declines by approximately 20%, resulting in tubular atrophy **(Figuer et al., 2021).** Physical limits, psychological and social well-being, and functional impairment are all experienced by chronic kidney disease individuals. These issues exacerbate with time and frequently have an effect on CKD patients' health-related quality of life **(Chang et al., 2020).**

Among both CKD patients and healthy individuals, there is a significant association between nutrition and physical activity. Specifically, inadequate intake of nutrient negatively impacts physical performance promoting a sedentary lifestyle, which in turn leads to loss of muscle strength and mass, limiting the

quality of life (QoL) and rehabilitation prospects of CKD patients **(Battaglia et al., 2024)**.

Subjective assessments of both good and negative elements of life are typically included in the broad, multifaceted concept of quality of life. The four domain scores that make up QOL are environment, social interactions, psychological, and physical health (CDC, 2018). Patients who develop end-stage renal illness frequently become reliant on dialysis, a laborious treatment that drastically alters their way of life. Many of these patients concentrate on the prospect of getting a kidney transplant, which would enable them to resume their regular activities and enhance their quality of life. Furthermore, between 18 and 75 percent of people with renal illness suffer from malnutrition, which frequently continues after a kidney transplant **(Visiedo et al., 2022)**.

Because poor nutrition is associated with increased morbidity, decreased functional ability, and a higher frequency and length of hospitalizations, it also negatively affects quality of life. Malnourished individuals have a worse quality of life, according to several studies, which emphasize the need of early detection and treatment of malnourished **(Ikizler et al., 2020)**.

Primarily, **P**roper nutrition have a significant role in preserving health status and avoiding the risk of developing chronic diseases among elderly individuals. Approximately, 85% of chronic disease and disability of older adults could be alleviated with adequate nutrition. Adequate nutrition can mitigate 85% of chronic diseases and disabilities in this population. Considering global health trends and concerns, it's essential to evaluate the effectiveness of nutritional intervention programs for the elderly (Shlisky et al., 2017; Cristina & Lucia, 2021). Nutritional support and patient education are key issues for ensuring diet plan motivation and adherence (Den Hamer‐ Jordaan et al., 2024). Therefore, the current study should look into how nutritional counselling can help geriatric patients with chronic renal failure live better lives.

Therefore, it was important to evaluate the effect of a nutritional education program on quality of life of geriatric patients with chronic kidney diseases.

Aim of the study was to

Assess the impact of a nutritional education program on quality of life of geriatric patients with chronic kidney diseases.

Research Hypothesis

Quality of life of geriatric patients with chronic kidney disease may be improved after implementation of a nutritional education program.

II. Study Design

A quasi-experimental research design (pre & post) was utilized in this study.

Setting

- It was conducted at outpatient nephrology clinic at New Mansoura General Hospital, in Mansoura city affiliated to the Ministry of Health.

- The total number of patients who attend to the clinic was approximately 50 patients every day. Their ages ranged from 18 years old and above. Most of patients were above 50 years old.

Subjects

They were determined by the purposive sampling technique which included 60 geriatric patients diagnosed with CKD from the above-mentioned setting who have the following:

- **Inclusion criteria**
- Aged 60 years and above.
- Able to communicate.
- accepting to participate in the study.
- Elderly adhering to another therapeutic dietary regimen as chronic cardiac, kidney, and hepatic diseases were excluded.
- Patients who already adhere to another therapeutic dietary regimen as chronic cardiac, kidney, and hepatic diseases were excluded.

Sample size calculation

Based on data from literature **(Magalhães et al., 2018)**, considering a significance level of 5% and a study power of 80%, the sample size was determined using the following formula**:**

$n = [(Z\alpha/2 + Z\beta)2 \times \{2(SD)2\}]/$ (mean difference between the two groups)2whereSD = standard deviation, $Z\alpha/2$: depending on the level of significance, for 5% this is 1.96, $Z\beta$: power, for 80% this is 0.84. Therefore, n= [(1.96 + 0.84)2 × {2(9.61)2}]/ (4.9)2=60.3. Depending on this formula, the sample size was 60.

Data Collection Tool

Three tools were used in this study to collect the data:

Tool I: Structured Interview Schedule: This tool was developed by the researcher based on relevant literature **(Woitok, et al., 2021)**. It included two parts: **Part 1:** demographic

characteristics of the geriatric patients as age, sex, residence place, marital status, level of education, occupation before retirement, and monthly income. **Part II:** health profile of geriatric patients, as medical history.

Tool II: The World Health Organization Quality of Life Questionnaire (WHOQOL-BREF): This tool was developed by **Oliver, 1997** and translated into Arabic by **Mohamed (2018)**. This tool is used to evaluate an elderly's perceptions within their cultural and value systems, as well as their personal goals, concerns, and standards. Four domain scores were produced for the profile: environment, social interactions, psychological well-being, and physical health. It also has two items that evaluate a person's general impression of their health and quality of life. The questionnaire comprises 26 questions. The reliability of the tool was confirmed by Spearman's correlation coefficient, which was $r=0.884$.

Scoring System

The items are scored using a 5-point Likert scale ranging from (1) to (5). The 4 domain scores are interpreted in a positive direction, the higher scores are representative for a better QoL.

Data Collection Process

I: Preparation phase:

A- Obtaining the necessary approvals:

- The Mansoura University nursing faculty formally authorized the research and the interviewing of the geriatric patients at the chosen hospital.
- Mansoura University's Faculty of Nursing's Research Ethics Committee (REC) granted approval.

- An official letter of approval was obtained from the director of New Mansoura General Hospital, following an explanation of the study's purpose and the data collection schedule.

B- Study tools:

- Following an assessment of pertinent literature, the researcher created tool I, of the structured interview sheet.

- Assessment of the study subjects started by introducing the researcher herself to the older adults and give them a brief idea about the aim of the study. Tool I (Structured interview sheet) was used to collect baseline data. A pre-intervention test by using tool II, the World Health Organization Quality of Life Questionnaire) was done to determine

participants' nutritional status and quality of life before the program.

- Study tools were tested for its validity by a jury of five experts in gerontological nursing department, Mansoura University.

C- Pilot Study

- To make sure the research methods were understandable, applicable, and feasible, a pilot study was carried out on 10% of the participants (6). They were selected from the study setting. Patients who participated in the pilot study were excluded from the study subjects.

D- Developing the proposed nursing nutritional education program:

- The proposed program was developed by the researcher which included Clarification of the nature and purpose of the study. Each participant was interviewed individually before applying the interventional program. An educational program for dissemination of information about daily nutritional requirements and a healthy balanced diet (Pereira et al., 2020: Martínez et al., 2022).

- After reviewing the elderly's record with responsible physician to determine eligible patients, the researcher used to meet the geriatric patients in the waiting room.

- The researcher started by saluting the patients, introducing herself to the elderly of the study sample, and explaining a brief idea about what she was going to do.

- To collect the required data, the researcher conducted individual interviews with each study participant in the hospital's outpatient waiting area between 9 a.m. and 2 p.m.

II: Implementation phases of the program:

- This phase started with only one meeting for each patient individually to collect the necessary data (pre-test) and give the nutritional program that covered several key topics related to nutrition: eating small meals throughout the day, proper fluid intake, understanding the potassium content in various fruits and vegetables, and how to moderate the intake of protein, fat, and sodium. Additionally, it included discussions and reflections on the main challenges and ease of adhering to a prescribed diet plan. **(Magalhães et al., 2018).**

- The researcher read each question to the elderly and marked exactly the answers.

- The researcher conducted the program for small groups (3-5) participant in each group on 4 sessions, twice a week for 3 weeks, with a period of 45- 60 minutes for every seminar, the sessions covered the following:

❖ The 1 st session participants were given an explanation of the learning objectives and the topic of instruction. They also received permission to participate. The geriatric patients with chronic kidney diseases were assessed using tools I & tool II.

❖ The 2 nd session included simple and clear knowledge about the kidney and the chronic kidney diseases as follows (functions of kidney, age related changes of kidney, definition of CKD, causes, signs and symptoms, stages, complications and management).

❖ The 3 rd session covered the nutritional guidelines for senior CKD patients, which included foods to avoid and diuretics, as well as the normal range and suggested daily requirements of phosphorus, sodium, protein, and fluid intake.

❖ The 4 th session started with revision about previous sessions and examples of foods to eat, foods to avoid, and special meals for geriatric patients with chronic kidney diseases were provided.

❖ The six-month data collection period began in October 2022 and ended in April 2023. The researcher attended the outpatient nephrology clinics three days a week in accordance with their timetable.

III: Evaluation phase:

❖ With the intention of evaluating the effectiveness of the program using the appropriate statistical analysis: The researcher evaluated the effectiveness of the proposed nutritional education program by assessing quality of life.

❖ The geriatric patients were evaluated 3 times by using tool II (the World Health Organization Quality of Life Questionnaire) at the end of the program by comparing the study variables before the program (pre), one months after the end of the program (post 1) and after three months (post 2) from initiation of the program.

Ethical Considerations of the Study

An informed written consent was obtained from study subjects after explaining the study purpose. The privacy of the study subjects and confidentiality of the collected data were obtained. The study subjects were informed that their participation in the study is voluntary and that they can withdraw at any time after explanation the potential benefits and risks as well as study aims.

Statistical Analysis

The statistical package for the social sciences (SPSS) version 21 was used to score, analyze, and tabulate the data. Frequencies and percentages were used to display the qualitative data. When comparing column proportions, the Chi-Square test and the Bonferroni technique were used to modify p-values. Quantitative data were tested for normality using the Shapiro-Wilk and Kolmogorov-Smirnov tests; if $p > 0.050$, the data was deemed normally distributed. It was represented as mean ± standard deviation (SD) if it was regularly distributed, or as median and interquartile range (IQR) if it wasn't. P-value < 0.05 was regarded as a significant threshold, and p-value ≤ 0.001 as a very significant level.

Results

The demographic information of the older study sample is displayed in **Table 1.** The senior patients were 73.30 ±7.06 years old on average. 40% of the elderly were between the ages of 60 and 70, while 60% were beyond 70. Of the sample under study, 53.3% were male and 46.7% were female. 51.7% of the individuals were widowed, which is more than half. Regarding educational attainment, over one-third of the participants in the study—36.7%—had completed secondary school, 31.7% were illiterate, and 28.3% had only completed basic school. Additionally, 75% of them live in rural regions.

Regarding the elder's pre-retirement profession, 50% of the group under study were employed, 43.3% were housewives, and 6.7% were unemployed. Approximately 58.3% of the participants earned enough money. Of them, 35% received their money from their sons' assistance, and half received their income from pensions. Just 23.3% of the geriatric patients in the study lived alone, while 76.7% lived with relatives.

The distribution of geriatric CKD patients based on their medical history is shown in **Figure 1.** Just 0.5% of the geriatric individuals in the study had no additional illnesses than CKD. Orthopedic diseases (21.7%), GIT diseases (13.3%), heart diseases (48.3%), respiratory diseases (25%),

diabetes mellitus (65%), and hypertension (78.3%) are the most prevalent diseases recorded.

The distribution of geriatric CKD patients based on their dietary habits is displayed **in Table 2.**

A considerable number (63.3%) of the studied geriatric patients follow a specific diet. More than half of the studied geriatric patients (51.7%) follow a renal diet, and 40% of them follow a diabetic diet. About 40% of the geriatric patients were forbidden from some kinds of food, while only 15% has a food allergy. Regarding meal intake during the day, 65% of the studied geriatric patients takes three meals per day, while 23.3% of them take only two meals per day. About 61.7% of the studied geriatric patients receives milk products; 75% of them eat around a cup of legumes per day; 36.3% of them eat animal protein per day; and 48.3% eat fruits and vegetables regularly. Most of the elderly 71.7% take around 1000 to 2000 cc of liquids per day.

Table 3 shows that there was a statistically significant difference between the four domains of quality of life among the studied elderly between pre and post 1 and also between post 1 and post 2 after the program.

Table 1: Distribution of The Geriatric Patients with Chronic Kidney Disease According to Demographic Characteristics

|	N=60	%
Age		
60-70	24	40.0
>70	36	60.0
Mean ±SD	73.30±7.06	
Sex		
Male	32	53.3
Female	28	46.7
Marital status		
Single	3	5.0
Married	23	38.3
Widow	31	51.7
Divorced	3	5.0
level of Education		
Illiterate	19	31.7
Basic education	17	28.3
Secondary education	22	36.7
University	2	3.3
Residence		
Rural	45	75.0
Urban	15	25.0
Occupation before retirement		
Yes	30	50.0
No	4	6.7
Housewife	26	43.3
Monthly Income		
Enough	35	58.3
Not enough	25	41.7
Source of Income		
Pension	30	50.0
Sons help	21	35.0
Social affairs	9	15.0
Housing condition		
Alone	14	23.3
With family	46	76.7
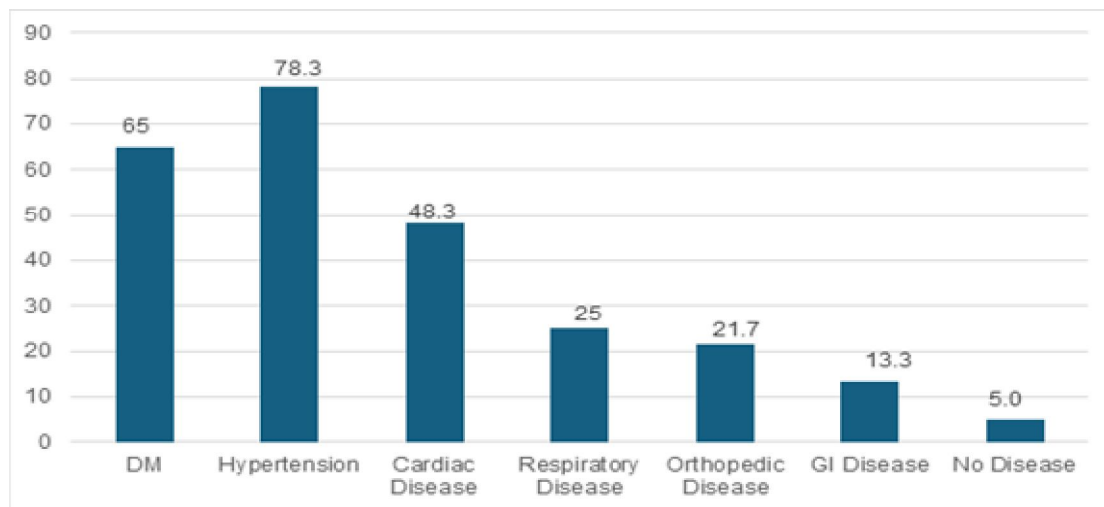
Figure (1): Distribution of geriatric patients with CKD according to their medical history.

Table 2: Distribution of geriatric patients with CKD according to their nutritional behavior.

Items	n=60	%
Specific diet	38	63.3
Renal diet	31	51.7
DM diet	24	40.0
Cardiac diet	6	10.0
Decrease special food	24	40.0
Food allergy	9	15.0
Meals / day One meal Two meals Three meals > three meals	1 14 39 6	1.7 23.3 65.0 10.0
Milk products	37	61.7
Cup legumes	45	75.0
Meat / chicken / fish	22	36.7
Fruits / vegetables	29	48.3
Serving of vegetables & fruits per day One Two Three ≥four	n=29 17 10 1 1	 58.6 34.5 3.4 3.4
Amount of liquids <1000 cc 1000-2000 cc >2000 cc	 12 43 5	 20.0 71.7 8.3

Table 3: Comparison of quality of life among the older patients at different time points of evaluation

Domains	Pre	Post 1	Post2	P value
Psychological	32.07±12.02	36.02±14.80	43.56±9.33	p=0.170 p2=0.001* p3=0.001*
Social	7.93±3.45	9.32±4.53	10.75±2.99	p1=0.001* p2=0001* p3=0.119
Environmental	7.55±2.72	9.18±4.45	10.10±2.94	p1=0.043* p2=0.001* p3=0.065
Physical	18.83±7.43	23.05±9.62	24.60±5.65	p1=0.03* p2=0.001* p3=0.124
Total quality of life	66.38±24.75	77.57±33.03	87.58±20.41	p1=0.082 p2<0.001* p3=0.001*

P value based on Chi squared test,   *Statistically significant.

p1: difference between pre and post 1.

p2: difference between pre and post2.

p3: difference between post 1&2.

IV. Discussion

Chronic kidney disease can profoundly affect an elderly's nutritional status, often resulting in malnutrition. This malnutrition is linked to higher morbidity rates, increased hospital admissions, and reduced functional capacity. Such conditions negatively impact one's mental, physical, and emotional well-being, which eventually results in a worse quality of life. **(Pawlaczyk, et al., 2022).** Therefore, it is crucial for patients to adhere to a specific, healthy diet program as part of their care regimen. Proper nutrition plays a vital role in patient care **(Park, & Choi, 2023).**

Regarding, Socio demographic characteristic, the current study showed that the mean age of the elderly was 73.30 ±7.06 as a bout two thirds of elders were aged more than 70 years and more than half of them were male. In the same line with these results, **Park, and Choi, (2023)** who illustrated that more than half of patient were aged more than 70 years and more than half of them were male. In addition, **Lee and Oh (2020),** who investigated the health-related quality of life of older persons in Korea, observed that the sample's mean age was seventy-six years, with a range of sixty-five to ninety-five years, and that over half of the participants were men.

This finding was in contrast with **Moly, (2022)** who depicted that more than half of elderly were between sixty to less than seventy and more than half of the participants were female. Also, on the other hand, **Aboserea et al., (2019)** found that more than half of participant was less than seventy years old.

The existing results revealed that more than half of the subjects were widowed and more than one third of the study subjects achieved secondary education. This is due to the nature of the age group included in the research, as most of the participants are over the age of seventy years and lost their partners. This in the same line with **Artzi-Medvedik et al., (2023)**. Additionally, supporting this results **Park, and Choi, (2023)** who depicted that about half of patient had no partner and had middle school education.

On the other hand, this study is in incongruity with **Moly, (2022)** who found that more than two third were married and less than two third of participants were had primary education. Additionally, this result was in contrast with **Abdelnasser, et al., (2020)** who studied the impact of educational program about nutrition among older adults at Qena city, Egypt and found that most of elderly were married and illiterate .

Concerning medical history; most of the studied elderly had the most common diseases reported are hypertension. This may due to the direct relation between hypertension and chronic kidney disease as elevated blood pressure is a main cause of CKD. Over time, an elevated blood pressure damages blood vessel all over the body reducing the blood supply to vital body organs as the kidneys thus destroying the tiny filtering units in it. Consequently, the kidneys may stop removing excess fluid from the blood. Moreover, chronic diseases, including hypertension is associated with being 60 years old and above **(Mavrogeni, et al., 2022).**

This result with the same line with **Artzi-Medvedik et al., (2023)** noted that most of the studied elderly had the commonest diseases reported are hypertension. This also agrees with **Govind, et al., (2020)** who studied malnutrition among older adults in South India and stated that more than half of studied participant had a medical history of hypertension. On the contrary, **Pérez-Torres et al., (2017)** noted that more than half of studied participant had a medical history of diabetes mellitus.

According to the current study, there is a statistically significant difference between the four QoL domains among the older participants before and after the program, as well as between post 1 and post 2 months later. This could be as a result of the significant impact that nutritional education initiatives have on all aspects of the geriatric patient's quality of life. This outcome supported the findings of **Kadhim et al., (2016)**, who showed that the four QoL dimensions among the geriatric patients in the study differed statistically significantly before and after the implementation of the educational program.

The current study's findings showed a statistically significant strong positive correlation between nutritional status and quality of life (QoL) at various evaluation points, particularly at three months. This suggests that older patients with normal or good nutritional status had higher quality of life. This is because geriatric patients' nutritional status, dietary consumption, mobility, and stress levels have improved, all of which have improved their quality of life. Malnutrition also has a detrimental effect on day-to-day functioning and cognitive capacities, and it is a major independent factor that lowers quality of life in all WHOQoL BREF domains **(Tański et al., 2021).**

This is consistent with the findings of **Li et al., (2023),** who found a highly significant correlation between the quality-of-life score and nutritional literacy score. Additionally, **Almulhim et al., (2022)** shown that there is a statistically significant difference between nutritional indicators and quality of life in Al-Ahsa, Saudi Arabia. Furthermore, **Tański et al., (2021),** who investigated the relationship between malnutrition and quality of life in senior patients in Poland, provided confirmation for our findings by observing that geriatric patients who were malnourished had significantly lower quality of life and a statistically significant difference between their MNA and QoL ratings.

Furthermore, **Megawati et al., (2019**) in Bandung, Indonesia, discovered a high correlation between the quality of life (QoL) of patients with chronic renal failure and their nutritional state. Additionally, Rasheed and Woods (2014) observed a strong correlation between the Mini Nutritional Assessment and QoL ratings in the United Kingdom.

V. Conclusion

The study's elementary finding was that, at various evaluation points, particularly at three months, there was a statistically significant difference between the four QoL domains among the older participants before and after the program, as well as between post 1 and post 2 months later. This could be as a result of the significant impact that nutritional education initiatives have on all aspects of the geriatric patient's quality of life. This suggests that older patients with normal or good nutritional status had higher quality of life, indicating that the nutritional intervention program had a positive effect on nutritional status, removing the risk of developing chronic kidney disease and increasing satisfaction with current health status, both of which contributed to improved quality of life.

VI. Recommendations

1. Creation of a readily available health promotion intervention to enhance elderly people's quality of life and encourage positive thinking about healthy behaviors

2. Make use of the study's results as a starting point for further investigations into geriatric patients' health-promoting practices.

3. To evaluate the long-term viability of dietary education initiatives on the health outcomes of geriatric patients with CKD, conduct longitudinal studies.

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