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A study to assess the knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease in a selected hospital at Mangaluru

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Abstract
Background of the study: Chronic kidney disease (CKD) is a progressive condition characterized by a gradual decline in kidney function, leading to multiple systemic complications, of which anemia is one of the most common and significant. Anemia can accelerate disease progression and worsen overall prognosis in CKD patients when not managed. Preventive measures such as adequate iron and nutritional intake, regular monitoring of hemoglobin levels, adherence to prescribed medications, and early recognition of warning signs play a vital role in minimizing the severity of anemia.
Objectives of the study
- To assess the knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease.
- To find out the association between the knowledge regarding prevention of anemia with socio demographic variables such as age, gender, religion, marital status, educational level, occupation, income, type of family, place of residence, social habits, duration of CKD, stage of CKD, dialysis status, previous history of anemia, source of information and comorbid illness.

Materials and Methods: A quantitative research approach is adopted to assess the knowledge regarding prevention of anemia among patients diagnosed with CKD. The investigator selected non-experimental descriptive research design. A simple random sampling technique was used to select the 30 patients diagnosed with chronic kidney disease in a selected hospital at Mangaluru. The knowledge regarding prevention of anemia in CKD was assessed through a semi-structured knowledge questionnaire by an interview method. Data were analyzed using descriptive and inferential statistics.
Results: The study findings revealed that among 30 samples, the majority of 16(53%) of the participants had inadequate knowledge, 14(47%) had moderate knowledge and none of the participants had adequate knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease. The overall knowledge mean score and standard deviation was 10 ± 3.76 and mean percentage was 32.69% which was inadequate level of knowledge regarding the prevention of anemia among patients diagnosed with chronic kidney disease. There was no significant association between knowledge score and the selected sociodemographic variables. Hence, the research hypothesis H_1 is rejected.
Interpretation and conclusion: The study concluded that the majority of patients 16(53%) had inadequate knowledge regarding prevention of anemia among patients diagnosed chronic kidney disease.

Keywords: Assess, knowledge, anemia, prevention, chronic kidney disease

Introduction

The kidneys are vital, bean-shaped organs which regulates blood volume and acid-base balance in the body and produces hormones critical for red blood cell production. Chronic kidney disease is a progressive, long-term decline in kidney function characterized by persistent abnormalities in kidney structure or function for more than three months, which can ultimately lead to kidney failure if left unmanaged [1, 2].

According to the World Health Organization (WHO) 2025, chronic kidney disease affects around 674 million people globally, accounting for nearly 9% of the world's population. Chronic kidney disease has become an important global public health concern, creating significant financial burden for both healthcare systems and affected families worldwide. Chronic kidney disease is a progressive, long-term decline in kidney function characterized by persistent abnormalities in kidney structure or function for more than three months, which can ultimately lead to kidney failure if left unmanaged [2].

According to Global Burden of Disease report (GBD) of 2023, India was estimated to have about 138 million adults living with CKD, the second-highest number in the world after China which reported about 152 million cases. According to Screening and Early Evaluation of Kidney Disease 2020, prevalence of CKD is around 14-15% among adults, suggesting that one in seven Indian adults have some stage of CKD [3].

As chronic kidney disease progresses can lead to several complications such as cardiovascular disease, high blood pressure, metabolic acidosis, mineral and bone disorders, hyperkalemia and eventually kidney failure. Anemia is the commonest and clinically significant complications of CKD, a condition in which the blood does not contain enough healthy red blood cells to carry adequate oxygen to the body's tissues. As chronic kidney disease progresses can lead to several complications such as cardiovascular disease, high blood pressure, metabolic acidosis, mineral and bone disorders, hyperkalemia and eventually kidney failure. Anemia is the commonest and clinically significant complications of CKD, a condition in which the blood does not contain enough healthy red blood cells to carry adequate oxygen to the body's tissues [4].

Adequate iron intake significantly contributes to better hemoglobin levels and lowers the risk of anemia among patients with chronic kidney disease (CKD). Dietary sources rich in iron include green leafy vegetables, legumes, whole grains, nuts, seeds, meat, poultry, and fortified foods. Folate and vitamin B12 play an essential role in erythropoiesis and hemoglobin synthesis, among patients with chronic kidney disease (CKD) as it required for DNA synthesis and maturation of red blood cell precursors in the bone marrow [5, 6].

Adequate intake of vitamin C plays an important role in improving iron utilization and supporting hemoglobin synthesis among patients with chronic kidney disease. Prevention of blood loss plays a significant role in reducing the severity of anemia among patients with chronic kidney disease (CKD). Dietary sources rich in vitamin C such as citrus fruits, guava, tomatoes, amla, and green vegetables help enhance the bioavailability of iron obtained from plant-based foods like green leafy vegetables, legumes, and whole grains [7].

Prevention of blood loss plays a significant role in reducing the severity of anemia among patients with chronic kidney disease (CKD). Repeated blood loss during medical procedures such as hemodialysis and laboratory investigations significantly increases anemia among patients with CKD. Proper care of arteriovenous fistula or vascular access sites reduces the risk of bleeding complications and infection. Patients are advised to avoid activities that may increase the risk of trauma or pressure on the access site, including lifting heavy objects and tightly covering or constricting the arm used for dialysis access, as excessive pressure may damage blood vessels and lead to bleeding [8].

Globally, anemia among patients diagnosed with chronic kidney disease continues to be a major public health concern due to its high prevalence and its impact on patients' quality of life and disease outcomes. Preventing anemia through screening, appropriate dietary practices, adherence to treatment, and patient education can improve overall health outcomes and reduce disease burden [9].

Statement of the Problem

"A study to assess the knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease in a selected hospital at Mangaluru."

Objectives

- To assess the knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease.
- To find out the association between the knowledge regarding prevention of anemia with socio demographic variables such as age, gender, religion, marital status, educational level, occupation, income, type of family, place of residence, social habits, duration of CKD, stage of CKD, dialysis status, previous history of anemia, source of information and comorbid illness.

Hypothesis: Hypothesis is tested at a 0.05 level of significance.

H_1: There will be a significant association between the knowledge regarding prevention of anemia among patients diagnosed with selected socio demographic variables like as age, gender, religion, marital status, educational level, occupation, income, type of family, place of residence, social habits, duration of CKD, stage of CKD, dialysis status, previous history of anemia, source of information and comorbid illness.

Methodology

A researcher selected quantitative approach with non-experimental descriptive research design was used to accomplish the stated objectives. The investigator selected 30 patients diagnosed with CKD using a simple random sampling technique by lottery method. The list of patients who met the inclusion criteria was obtained from the ward in-charge. Names of all the eligible patients were written on small, identical pieces of paper (chits) of the same size, shape and colour, folded uniformly to ensure the identity of the patient was not visible from outside, and placed in a closed container. The chits were then thoroughly mixed to ensure randomization, and the researcher, drew 3-4 chits per day from the container randomly. The patients corresponding to the drawn chits were selected as samples for the study. This process was repeated on a daily basis until the required sample size of 30 patients from nephrology ward was obtained.

The knowledge regarding prevention of anemia in CKD was assessed through a semi-structured knowledge questionnaire by an interview method and the information booklet regarding prevention of anemia was distributed to patients diagnosed with CKD.

Inclusion criteria

- aged above 18 years
- diagnosed with chronic kidney disease
- both males and females
- having other co-morbidities
- receiving dialysis
- non-dialysis patient
- able to read and understand Kannada, English.

Exclusion criteria

The patients who were

- unconscious
- on ventilator
- not willing to provide consent
- having neurological disabilities
- not present at the time of data collection
- do not understand the languages Kannada or English

Data collection procedure

The researcher selected probability simple random sampling techniques to select patients diagnosed with chronic kidney disease in a selected hospital at Mangaluru. Prior permission was obtained from the authority and informed consent was obtained from the participants. The investigator collected data through the interview method for socio demographic variables and knowledge questionnaire. The time taken by the investigator to gather the data for socio- demographic variables was about 10 minutes and for semi self-structured knowledge questionnaire was about 20 minutes from each sample followed by the distribution of an information booklet.

Statistical analysis

The collected data were analyzed by using the descriptive statistics: frequency, mean, standard deviation and percentage. Inferential statistics: chi square test.

Results and discussion

Table 1: Distribution of patients with selected socio-demographic variable N=30

SI. No.	Sociodemographic variables	Frequency	Percentage
1.	**Age in year**		
a	18-30	3	10
b	31-45	6	20
c	46-60	13	43
d	Above 61	8	27
2.	**Gender**		
a	Male	28	93
b	Female	2	7
c	Transgender	-	-
3.	**Religion**		
a	Hindu	12	40
b	Muslim	16	53
c	Christian	02	07
d	Any other	-	-
4.	**Marital status**		
a	Married	22	73
b	Unmarried	08	27
c	Divorce/separated	-	-
d	Widow	-	-
5.	**Education**		
a	Illiterate	06	20
b	Primary School	08	27
c	Higher secondary	06	20
d	Graduate/Postgraduate	10	33
6.	**Occupation**		
a	Self-employed	12	40
b	Private job	07	23
c	Government job	02	07
d	Unemployed	09	30
7.	**Monthly family income**		
a	<10000/-	23	77
b	Rs. 10001 to 20000/-	04	13
c	Rs. 20001 to 30000/-	02	07
d	More than 30000/-	01	03
8.	**Type of family**		
a	Nuclear family	13	40
b	Joint family	16	53
c	Extended family	01	07
9.	**Place of residence**		
a	Urban	06	20
b	Semi-urban	06	20
c	Rural	18	60
10.	**Social Habits**		
a	Betel chewing	03	10
b	Smoking	03	10
c	Alcohol intake	07	23
d	No significant unhealthy habits	17	57
11.	**Duration of CKD**		
a	< 6 months	13	43
b	6-12 month	09	30
c	1-3 years	06	20
d	> 3 years	02	07
12.	**Stages of CKD**		
a	Early CKD (stage 1-2)	19	63
b	Stage 3	02	07
c	Stage 4	09	30
13.	**Dialysis status**		
a	Not on dialysis	21	70
b	Hemodialysis	09	30
14.	**Previous history of anemia**		
a	Yes	19	63
b	No	11	37
15.	**Source of information**		

a	Health care profession	28	94
b	Family and friends	01	03
c	Any other, specify	01	03
16.	**Co-morbid illness**		
a	Yes	23	73
b	No	07	27

Fig 1: Distribution of patients according to the level of knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease.

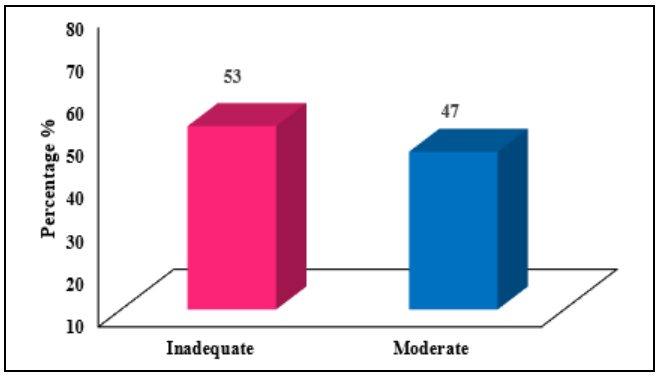

Fig 1: Distribution of overall knowledge score

Fig 1 reveals that majority of the patients 16(53%) of the participants had inadequate knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease.

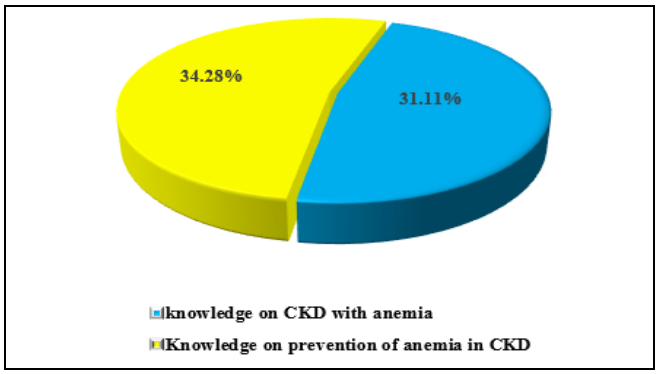

Fig 2: Area wise mean and mean percentage of knowledge score of the patients regarding prevention of anemia among patients diagnosed with chronic kidney disease

Fig 2 represents that area wise overall mean score and standard deviation are 10 ± 3.76 and mean percentage was 32.69%.

Table 1.3 Distribution of patients according to the item wise knowledge regarding chronic kidney disease among patients diagnosed with anemia

Item wise analysis shows that knowledge shows that knowledge score on chronic kidney disease with anemia among 30 samples, 15(50%) were unaware about effect of CKD, 17(53%) were did not know about early symptoms of anemia, 20 (67%) were unfamiliar about complication of CKD, 22 (73%) were had no knowledge about causes of anemia among patients diagnosed with CKD, 23 (77%) were showed poor awareness about function of erythropoietin, 24 (80%) were didn't know about effect of uremic acid in CKD, 26 (87%) were unfamiliar about consequences associated with anemia.

Item wise analysis shows that knowledge score on prevention of anemia in patients diagnosed with anemia among 30 samples. The majority 20(67%) were showed poor awareness about dietary measures to prevent anemia among patients diagnosed with CKD, 21(70%) were unaware about effect of tea and coffee on iron absorption, 22(73%) were did not know about treatment option for oral iron intolerance, 24 (80%) were unfamiliar about foods interfering with iron tablet absorption, 27 (90%) were had no knowledge about effect of milk on iron absorption, 21(70%) were showed poor awareness about first aid measures to control bleeding.

Discussion

The study aimed to assess the knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease in a selected hospital at Mangaluru. The study findings had been discussed according to the objectives and hypothesis along with the result of other studies.

- **Distribution of samples according to socio demographic variables**

In the present study, the distribution of 30 samples, according to sociodemographic variables with patients diagnosed with anemia depicts that were 13(43%) were between 46-60 years, 28(93%) were male, 16(53%) were Muslims, 22(73%) were married, 10(33%) were graduated/ postgraduate, 12(40%) were self-employed, 23(77%) were earning less than Rs. 10,000/-, 16(53%) were belongs to joint family, 18(60%) were belongs to rural area, 17(57%) were having significant unhealthy habit, 13(43%) had CKD since less than 6 month, 19(63%) had early stage of CKD, 27(70%) were non-hemodialysis patients, 19(63%) were having anemia, 26(43%) obtained information through health care professionals, 54(90%) had no comorbid illnesses. There was no significant association between knowledge score and the selected sociodemographic variables. Hence, the research hypothesis H_1 is rejected.

The present study supports the following study

The present study supports a cross-sectional study conducted to assess the knowledge of chronic kidney disease and anemia among undergraduate students at the University of Cape Coast, Ghana. The convenience and stratified random sampling technique was used to select 267 samples. The study results revealed that 208(77.9%) of the participants had a good level of general knowledge of chronic kidney disease, 215(80.5%) had a good level of knowledge of anemia, and 222(83.1%) demonstrated good knowledge of the relationship between the two conditions. A significant association was found between students' faculty and knowledge of chronic kidney disease ($p<0.001$), with participants in health-related faculties and in the third or fourth year of study having significantly better knowledge than those in nonhealthy-related faculties and earlier years. Students aged 20 years and above also

demonstrated better knowledge of anemia than teenage students, and a significant association was found between faculty and knowledge of anemia ($p<0.001$). The study concluded that although most students had good knowledge of chronic kidney disease and anemia, those in health-related faculties had significantly better knowledge than their non-health related counterparts, and recommended promoting health-related courses to improve awareness among students in non -health related faculties.

- **Distribution of samples according to the level of knowledge**

The present study revealed that among 30 samples, 16(53%) had inadequate knowledge, 14(47%) had moderate knowledge and none of the patient had adequate knowledge regarding prevention of anemia. The data showed that mean score with standard deviation regarding level of knowledge regarding chronic kidney disease with anemia was 2.8±1.5, with a mean percentage of 31.1%. The area wise mean score and standard deviation regarding prevention of anemia was 7.2±2.26, with a mean percentage of 34.28%.

The present study supported by a cross-sectional study conducted to evaluate the treatment of anemia among patients undergoing maintenance hemodialysis and to describe the factors associated with its effect on health-related quality of life in Palestine. The convenient and clustered sampling technique was used to select 226 samples. The study results revealed that the mean age of the patients was 57±13.9 years, more than half were male, and the majority resided in rural areas and were married. The mean hemoglobin level was 10.63±1.71 g/dl, with 34.1% of patients having a level between 10 and 11.5 g/dl, and the median number of comorbid diseases was 4, with hypertension, diabetes mellitus, and ischemic heart disease being the most common. Almost 86.7% of the patients received darbepoetin alfa intravenously, and 24% achieved a hemoglobin level above 11.5 g/dl. A statistically significant association was found between hemoglobin level and the number of comorbid diseases as well as the erythropoietin-stimulating agent received, while other sociodemographic and clinical factors, including gender, age, locality, marital status, education, employment, smoking, exercise, and family history, showed no significant association with hemoglobin level. The study concluded that more than half of the patients had hemoglobin levels below the recommended Kidney Disease Improving Global Outcomes goal, and that a significant association existed between hemoglobin level and health-related quality of life, emphasizing the need for adherence to guideline-based anemia management to improve patient outcomes.

Summary and conclusion

A study aimed to assess the knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease. Information booklet was provided to the patient regarding prevention of anemia in chronic kidney disease. The data was presented using descriptive statistics and inferential statistics. The following conclusion was drawn based on the findings of the study.

The present study revealed that the majority of 16(53%) had inadequate knowledge regarding prevention of anemia and the mean and standard deviation of knowledge was 10±3.76 and mean percentage was 32.69% which was inadequate level of knowledge.

Limitation

The study was limited to the patients:

- diagnosed with chronic kidney disease
- above 18 years of age
- both males and females
- willing to participate in the study
- able to read and understand Kannada and English.

Recommendations

Based on the present study findings it is recommended that:

- A similar study can be conducted to find out the knowledge of regarding prevention of anemia among patients diagnosed with chronic kidney disease with a large group population which may help to draw a more definite conclusion and make a generalization.
- A true experimental study can be conducted to assess the effectiveness of structured teaching programme on knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease.
- A similar study can be conducted to assess the knowledge regarding prevention of anemia among patients diagnosed with chronic kidney disease in rural setting.
- A comparative study can be conducted to assess the knowledge regarding prevention of anemia among dialysis and non-dialysis patients diagnosed with chronic kidney disease.
- A longitudinal study can be conducted to assess the long-term knowledge retention and compliance regarding prevention of anemia among patients diagnosed with chronic kidney disease.

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