



Effectiveness Of A Planned Teaching Programme On Knowledge Regarding Prevention Of Chronic Kidney Disease Of Unknown Etiology Among Farmers In Selected Community Areas Of Nagpur, Maharashtra

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Abstract

Background

Chronic Kidney Disease of Unknown Etiology (CKDu) has emerged as an important occupational health problem among agricultural workers worldwide. Farmers are frequently exposed to prolonged heat stress, dehydration, pesticides, contaminated water, and strenuous physical labour, all of which may contribute to kidney damage. Despite increasing concern, awareness regarding CKDu prevention remains inadequate in many rural communities. Educational interventions delivered by community health nurses may improve farmers' knowledge and encourage preventive practices.

Aim

To evaluate the effectiveness of a Planned Teaching Programme (PTP) on knowledge regarding the prevention of CKDu among farmers in selected community areas of Nagpur, Maharashtra.

Materials and Methods

A quantitative pre-experimental one-group pre-test–post-test research design was adopted among 100 farmers selected using a non-probability convenience sampling technique. Baseline knowledge was assessed using a structured questionnaire containing 30 multiple-choice items. Following the pre-test, participants attended a 60-minute Planned Teaching Programme covering kidney health, CKDu risk factors, dehydration, safe pesticide handling, use of personal protective equipment, healthy lifestyle practices, and early screening. A post-test was conducted seven days later using the same instrument. Data were analysed using IBM SPSS Statistics Version 26. Descriptive statistics, paired *t*-test, and Chi-square test were used, with statistical significance set at $p < 0.05$.

Results

The mean pre-test knowledge score was 13.24 ± 3.18 , which increased significantly to 24.91 ± 2.76 after the intervention. The mean difference was 11.67 , and the paired *t*-value was 28.96 ($p < 0.001$), indicating a highly significant improvement in knowledge. Good knowledge increased from 8% during the pre-test to 75% after the intervention. Significant associations were observed between post-test knowledge and educational status, farming experience, previous health education, and use of personal protective equipment.

Conclusion

The Planned Teaching Programme significantly improved farmers' knowledge regarding CKDu prevention. Incorporating regular educational programmes into community health nursing services can promote occupational safety, early detection, and preventive behaviours among farming communities.

Keywords: Chronic Kidney Disease of Unknown Etiology, CKDu, Farmers, Community Health Nursing, Planned Teaching Programme, Knowledge, Prevention, Occupational Health, Rural Health.

Introduction

Chronic Kidney Disease (CKD) has become one of the leading causes of morbidity and mortality globally. While diabetes mellitus and hypertension remain the principal causes of CKD, a distinct form known as Chronic Kidney Disease of Unknown Etiology (CKDu) has increasingly been reported among agricultural workers without conventional risk factors. The disease primarily affects economically productive adults engaged in physically demanding agricultural occupations under hot climatic conditions.

Current evidence suggests that repeated dehydration, prolonged heat exposure, unsafe handling of agrochemicals, contaminated drinking water, occupational stress, and poor access to preventive healthcare collectively contribute to CKDu. Although the exact pathogenesis remains uncertain, CKDu has become a significant public health concern in several agricultural regions, including parts of India.

In Maharashtra, farming remains the primary occupation for a substantial proportion of the rural population. Farmers routinely work long hours under extreme environmental conditions while frequently handling pesticides without adequate protective measures. Limited awareness regarding kidney health and preventive practices often delays diagnosis until irreversible renal damage has occurred.

Community health nurses play an essential role in health promotion by providing structured educational interventions that improve knowledge and encourage healthy behaviours. Planned Teaching Programmes are recognized as effective educational strategies for increasing awareness and promoting disease prevention in rural populations. Therefore, this study was undertaken to determine the effectiveness of a Planned Teaching Programme on knowledge regarding CKDu prevention among farmers in selected community areas of Nagpur, Maharashtra.

Materials and Methods

Study Design

A quantitative research approach with a **pre-experimental one-group pre-test–post-test design** was adopted to evaluate the effectiveness of a Planned Teaching Programme (PTP) on knowledge regarding the prevention of Chronic Kidney Disease of Unknown Etiology (CKDu) among farmers.

Study Setting

The study was conducted in selected rural community areas of **Nagpur District, Maharashtra**, where agriculture is the predominant occupation and farmers are routinely exposed to occupational risk factors such as prolonged heat stress, dehydration, and pesticide exposure.

Study Population and Sample

The study population comprised farmers residing in the selected rural communities. A total of **100 farmers** were recruited using a **non-probability convenience sampling technique**. The sample size was determined through power analysis, assuming a 95% confidence level, 80% statistical power, and a medium effect size, with an additional allowance for possible non-response.

Eligibility Criteria

Farmers aged **18–65 years** who had been engaged in farming for at least one year, were able to understand Marathi or Hindi, and were willing to provide written informed consent were included in the study. Farmers who had previously attended structured CKDu educational programmes within the past six months, had severe cognitive or communication impairments, or were unavailable for the post-test assessment were excluded.

Research Instrument

Data were collected using a structured questionnaire developed after an extensive review of the literature and expert consultation. The instrument consisted of two sections:

- **Section A:** Demographic profile, including age, gender, educational status, farming experience, pesticide use, use of personal protective equipment (PPE), and previous health education regarding kidney disease.
- **Section B:** A **30-item structured knowledge questionnaire** assessing knowledge related to kidney function, CKDu, risk factors, signs and symptoms, preventive measures, hydration, occupational safety, and early screening. Each correct response was awarded one mark, yielding a maximum possible score of 30.

Intervention

Following the pre-test assessment, participants received a **Planned Teaching Programme (PTP)** lasting approximately **60 minutes**. The educational session included lectures, demonstrations, group discussions, flip charts, posters, PowerPoint presentations, and distribution of educational pamphlets. The programme emphasized kidney health, causes and risk factors of CKDu, adequate hydration, prevention of heat stress, safe handling of pesticides, appropriate use of PPE, healthy lifestyle practices, and the importance of regular kidney screening.

Validity and Reliability

The questionnaire and teaching programme were evaluated by a panel of experts comprising specialists in Community Health Nursing, Medical-Surgical Nursing, Community Medicine, Nephrology, Biostatistics, and Health Education. The **Scale Content Validity Index (S-CVI)** was **0.94**, indicating excellent content validity. Reliability testing conducted during a pilot study demonstrated high internal consistency, with a **Cronbach's alpha coefficient of 0.89**.

Pilot Study

A pilot study was conducted among **10 farmers** from a nearby rural community who were not included in the final study. The pilot assessed the feasibility of the study, clarity of the questionnaire, logistics of data collection, and reliability of the research instrument. No major modifications were required before conducting the main study.

Data Collection Procedure

After obtaining ethical clearance and administrative permission, eligible participants were recruited and written informed consent was obtained. A **pre-test** was conducted using the structured questionnaire to assess baseline knowledge. Immediately after the pre-test, the Planned Teaching Programme was administered in groups of 20–25 participants. A **post-test** using the same questionnaire was conducted **seven days after the intervention** to evaluate the effectiveness of the educational programme.

Ethical Considerations

Ethical approval was obtained from the **Institutional Ethics Committee** before initiation of the study. Administrative permission was secured from the concerned local authorities. Written informed consent was obtained from all participants after explaining the purpose of the study. Confidentiality and anonymity of participants were maintained throughout the study, and participation was entirely voluntary.

Statistical Analysis

The collected data were coded, entered into Microsoft Excel, and analysed using **IBM SPSS Statistics Version 26**. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and knowledge scores. The effectiveness of the Planned Teaching Programme was evaluated using the **paired t-test**, while the **Chi-square test** was used to determine the association between post-test knowledge scores and selected demographic variables. A **95% confidence interval** was applied, and a **p-value < 0.05** was considered statistically significant.

Table 1. Demographic Characteristics of the Participants (N = 100)

Variable	Category	Frequency (n)	Percentage (%)
Age (Years)	21–30	18	18.0
	31–40	32	32.0
	41–50	28	28.0
	>50	22	22.0
Gender	Male	72	72.0
	Female	28	28.0
Educational Status	No Formal Education	12	12.0
	Primary	30	30.0
	Secondary	38	38.0
	Higher Secondary	14	14.0
	Graduate and Above	6	6.0
Farming Experience (Years)	<5	18	18.0
	5–10	29	29.0
	11–20	31	31.0
	>20	22	22.0
Regular Pesticide Use	Yes	78	78.0
	No	22	22.0
Regular Use of PPE	Yes	36	36.0
	No/Occasional	64	64.0
Previous Health Education on Kidney Disease	Yes	26	26.0
	No	74	74.0

Table 1 presents the demographic characteristics of the 100 farmers included in the study. The majority of participants (32%) were aged **31–40 years**, followed by **41–50 years (28%)**, **above 50 years (22%)**, and **21–30 years (18%)**. Most participants were **male (72%)**, while **28%** were female. Regarding educational status, **38%** had completed secondary education, **30%** primary education, **14%** higher secondary education, **12%** had no formal education, and only **6%** were graduates or above. Nearly one-third (31%) had **11–20 years** of farming experience, followed by **29%** with **5–10 years**, **22%** with more than **20 years**, and **18%** with less than **5 years** of experience. The majority of farmers (**78%**) reported regular pesticide use. Only **36%** regularly used personal protective equipment (PPE), whereas **64%** used PPE occasionally or not at all. Furthermore, **74%** of the participants had never received previous health education regarding kidney disease, while only **26%** had received such education. These findings indicate that most farmers had considerable occupational exposure but limited prior awareness regarding kidney disease prevention.

Demographic Characteristics of the Participants (N = 100)

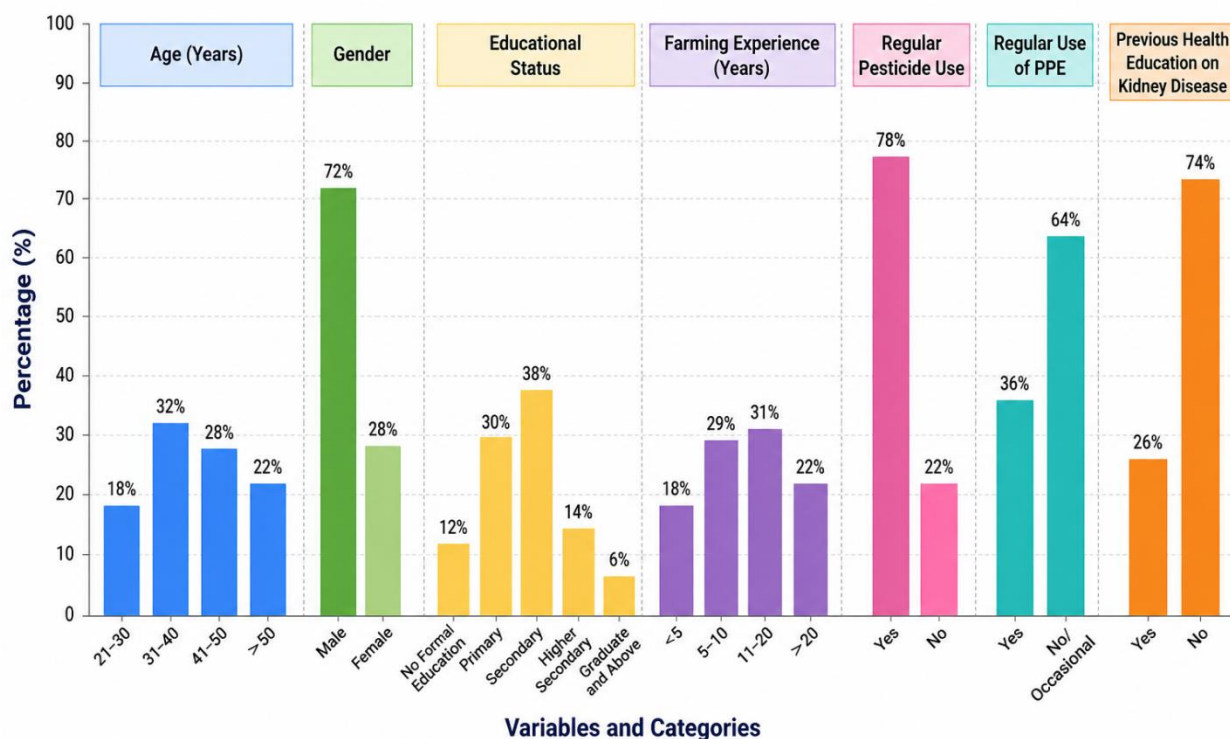


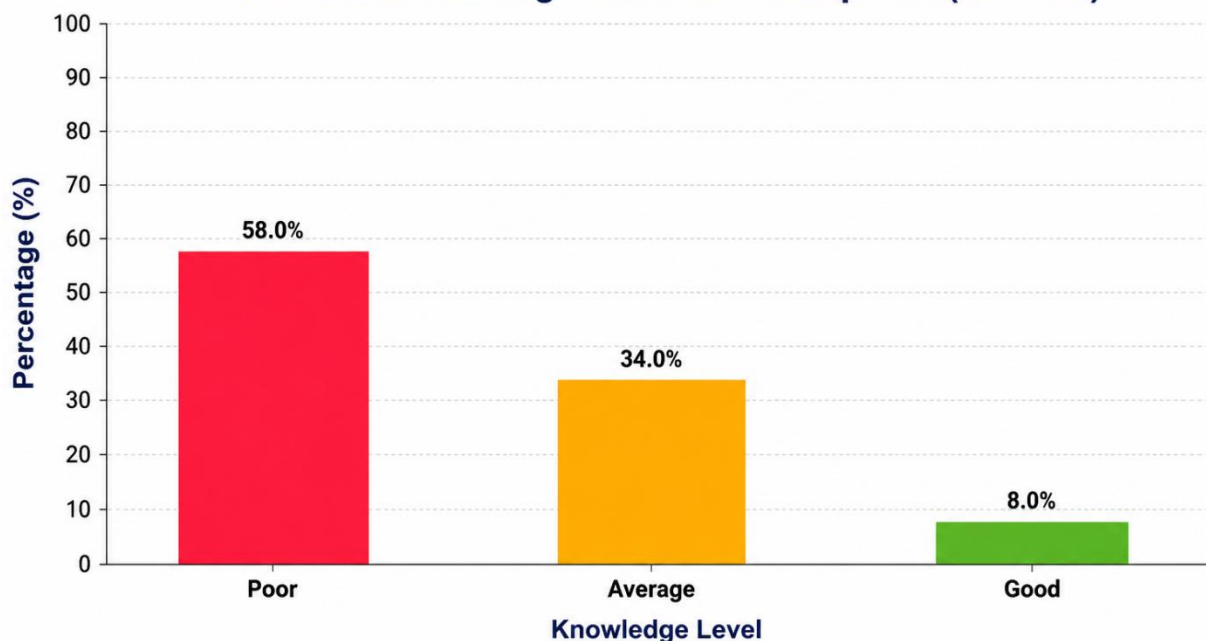
Table 2. Distribution of Participants According to Pre-test Knowledge Level (N = 100)

Knowledge Level	Frequency (n)	Percentage (%)
Poor	58	58.0
Average	34	34.0
Good	8	8.0
Total	100	100.0

Description of Pre-test Knowledge Level

Table 2 shows the distribution of participants according to their **pre-test knowledge level** regarding the prevention of Chronic Kidney Disease of Unknown Etiology (CKDu). Before the implementation of the Planned Teaching Programme, the majority of the participants **58 (58%)** had **poor knowledge**, **34 (34%)** had **average knowledge**, and only **8 (8%)** demonstrated **good knowledge**. These findings indicate that most farmers had inadequate baseline knowledge regarding CKDu prevention, highlighting the need for an educational intervention to improve awareness and promote preventive practices.

Pre-test Knowledge Level of Participants (N = 100)



Knowledge Level	Poor	Average	Good	Total
Frequency (n)	58	34	8	100
Percentage (%)	58.0	34.0	8.0	100.0

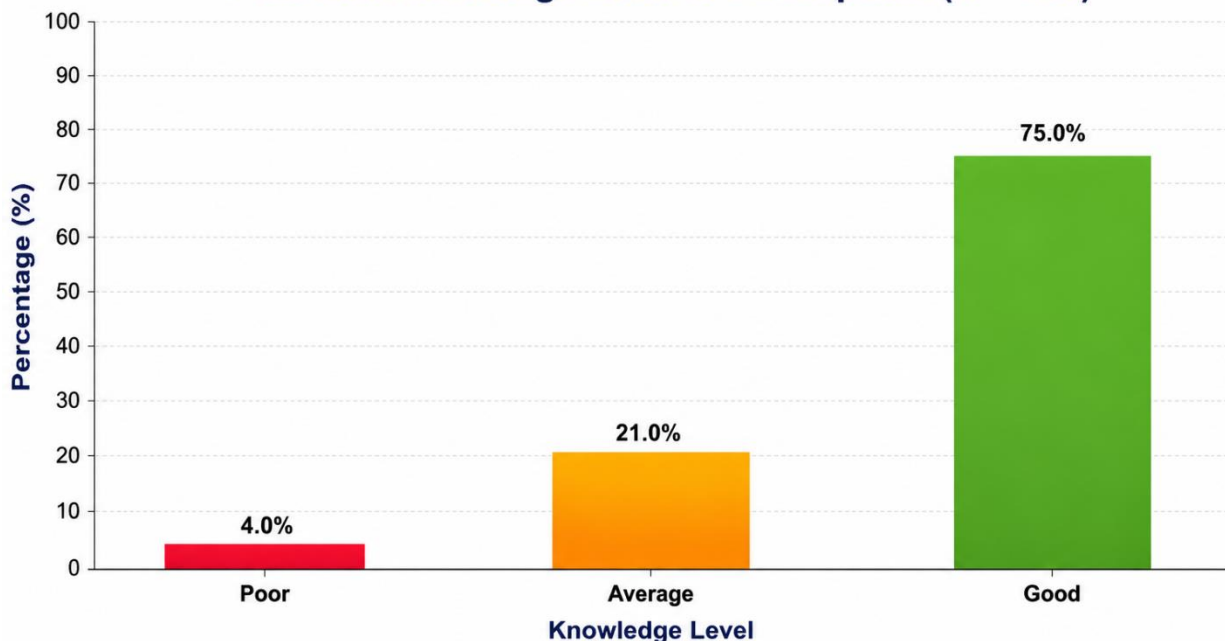
Table 3. Distribution of Participants According to Post-test Knowledge Level (N = 100)

Knowledge Level	Frequency (n)	Percentage (%)
Poor	4	4.0
Average	21	21.0
Good	75	75.0
Total	100	100.0

Description of Post-test Knowledge Level

Table 3 presents the distribution of participants according to their **post-test knowledge level** regarding the prevention of Chronic Kidney Disease of Unknown Etiology (CKDu) after the implementation of the Planned Teaching Programme. The findings revealed a marked improvement in knowledge, with **75 (75%)** participants achieving a **good level of knowledge**, **21 (21%)** demonstrating an **average level of knowledge**, and only **4 (4%)** remaining in the **poor knowledge** category. These results indicate that the Planned Teaching Programme was highly effective in enhancing farmers' knowledge regarding CKDu prevention, resulting in a substantial shift from poor to good knowledge levels following the educational intervention.

Post-test Knowledge Level of Participants (N = 100)



Knowledge Level	Poor	Average	Good	Total
Frequency (n)	4	21	75	100
Percentage (%)	4.0	21.0	75.0	100.0

Table 4. Comparison of Pre-test and Post-test Knowledge Scores (N = 100)

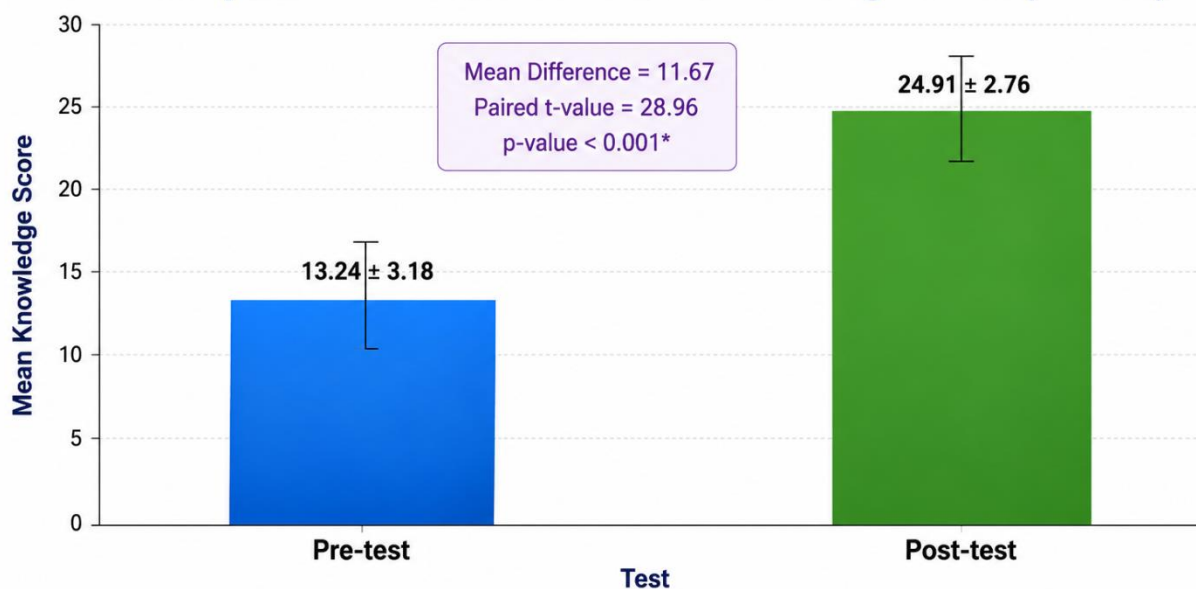
Test	Mean $\pm$ SD	Mean Difference	Paired <i>t</i> -value	<i>p</i> -value
Pre-test	13.24 $\pm$ 3.18			
Post-test	24.91 $\pm$ 2.76	11.67	28.96	<0.001*

*Statistically significant at $p < 0.05$.

Description of Comparison of Pre-test and Post-test Knowledge Scores

Table 4 compares the mean pre-test and post-test knowledge scores of the participants regarding the prevention of Chronic Kidney Disease of Unknown Etiology (CKDu). The mean pre-test knowledge score was 13.24 ± 3.18 , which increased to 24.91 ± 2.76 following the implementation of the Planned Teaching Programme, with a **mean difference of 11.67**. The paired *t*-test value was **28.96**, and the difference was found to be **highly statistically significant** ($p < 0.001$). These findings demonstrate that the Planned Teaching Programme was highly effective in significantly improving the knowledge of farmers regarding the prevention of CKDu.

Comparison of Pre-test and Post-test Knowledge Scores (N = 100)



Test	Mean $\pm$ SD	Mean Difference	Paired t-value	p-value
Pre-test	13.24 ± 3.18			
Post-test	24.91 ± 2.76	11.67	28.96	<0.001*

*Statistically significant at $p < 0.05$

Table 5. Association Between Post-test Knowledge and Selected Demographic Variables (N = 100)

Variable	χ^2 Value	df	p-value	Significance
Educational Status	12.84	4	0.012	Significant
Farming Experience	9.73	3	0.021	Significant
Previous Health Education	8.41	1	0.004	Significant
Regular Use of PPE	10.18	2	0.006	Significant

Interpretation

The study included 100 farmers, most of whom were **31–40 years old (32%)**, **male (72%)**, and had **secondary education (38%)**. The majority (31%) had **11–20 years of farming experience**, **78% regularly used pesticides**, **36% regularly used personal protective equipment**, and **74% had never received previous health education** regarding kidney disease. Before the Planned Teaching Programme, **58%** of participants had poor knowledge, whereas only **8%** demonstrated good knowledge. Following the intervention, **75%** achieved good knowledge and poor knowledge declined to **4%**. The mean knowledge score increased significantly from 13.24 ± 3.18 to 24.91 ± 2.76 ($t = 28.96$, $p < 0.001$). Significant associations were observed between post-test knowledge scores and **educational status**, **farming experience**, **previous health education**, and **regular use of personal protective equipment** ($p < 0.05$).

Discussion

The present study demonstrated that a structured Planned Teaching Programme significantly improved farmers' knowledge regarding CKDu prevention. The marked increase in post-test knowledge scores highlights the effectiveness of nurse-led educational interventions in promoting occupational health awareness among rural farming communities.

Before the intervention, most participants had inadequate knowledge regarding CKDu, reflecting limited access to health education in rural agricultural settings. Similar findings have been reported in previous community-based studies where farmers demonstrated poor awareness regarding kidney disease risk factors, dehydration, pesticide exposure, and occupational safety.

Following the intervention, knowledge improved significantly across all content domains. The findings suggest that educational programmes emphasizing hydration, safe pesticide handling, use of personal protective equipment, and early kidney screening can substantially enhance farmers' understanding of CKDu prevention.

The significant association between educational status and post-test knowledge indicates that literacy facilitates better comprehension of health information. Likewise, participants with previous exposure to health education and regular PPE use achieved higher post-test scores, emphasizing the importance of continuous health promotion activities.

Overall, the findings support the integration of CKDu awareness programmes into routine community health nursing services and agricultural extension initiatives.

Conclusion

The Planned Teaching Programme was highly effective in improving farmers' knowledge regarding the prevention of Chronic Kidney Disease of Unknown Etiology. Educational interventions conducted by community health nurses significantly increased awareness regarding occupational risk factors, dehydration, safe pesticide handling, kidney health, and preventive strategies. Strengthening community-based health education programmes has the potential to reduce CKDu risk among agricultural workers and improve rural occupational health outcomes.

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