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Effectiveness Of Self-Instructional Module on Knowledge and Attitude Regarding "Prevention and Management of Diphtheria" among Mothers of Under Five Children in Selected Community, Banda, MP, India.

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Abstract

Introduction: Diphtheria remains a significant public health concern in many developing regions, including parts of India, where outbreaks continue to affect vulnerable populations, particularly children under five years of age. Despite the availability of preventive vaccines and effective treatment methods, a lack of awareness and proper health practices among caregivers, especially mothers, contributes to the persistence of the disease. In this context, self-instructional modules (SIMs) have emerged as a cost-effective, accessible tool for enhancing health education.

Aim: This study aims to evaluate the effectiveness of a self-instructional module on improving the knowledge and attitude of mothers regarding the prevention and management of diphtheria in a selected community in Banda, Madhya Pradesh, India, thereby contributing to community-level disease control and child health promotion.

Objectives: 1) To assess the pretest level of knowledge regarding prevention and management of diphtheria among mothers of under five children in selected community.2) To assess the pretest level of attitude regarding prevention and management of diphtheria among mothers of under five children in selected community.3) To develop the self-instructional module regarding prevention and management of diphtheria in selected community.4) To administer the self-instructional module on knowledge and attitude regarding prevention and management of diphtheria among mothers of under five children in selected community.5) To

assess the post-test level of knowledge regarding prevention and management of diphtheria among mothers of under five children in selected community.6) To assess the post-test level of attitude regarding prevention and management of diphtheria among mothers of under five children in selected community.7) To find out the effectiveness of self-instructional module on knowledge regarding prevention and management of diphtheria among mothers of under five children.8) To find out the effectiveness of self-instructional module on attitude regarding prevention and management of diphtheria among mothers of under five children.9) To determine the association between the pretest level of knowledge regarding prevention and management of diphtheria among mothers of under five children with their selected demographic variables.10) To determine the association between the pretest level of attitude regarding prevention and management of diphtheria among mothers of under five children with their selected demographic variables.

Materials and Methods: A quasi-experimental research design with a pre-test and post-test approach was adopted to assess the effectiveness of a self-instructional module (SIM) on knowledge and attitude regarding the prevention and management of diphtheria among mothers of under-five children in a selected community of Banda, Madhya Pradesh, India. The study was conducted among 60 mothers selected through purposive sampling. A structured knowledge questionnaire and a Likert-scale-based attitude assessment tool were developed and validated by experts for data collection. The self-instructional module was administered after the pre-test. After a gap of 7 days, a post-test was conducted using the same tools to evaluate changes in knowledge and attitude. Ethical approval was obtained from the institutional ethical committee, and informed consent was taken from all participants. Data were analysed using descriptive and inferential statistics, including paired t-tests and chi-square tests to assess the effectiveness of the intervention and its association with demographic variables.

Results: The results of the study indicate a significant improvement in both knowledge and attitude among mothers of under-five children following the administration of the self-instructional module on the prevention and management of diphtheria. The mean knowledge score increased markedly from 7 in the pre-test to 18.95 in the post-test, with a mean difference of 11.95. The standard deviation rose from 2.91 to 3.91, and the computed t-value was 1.0139, demonstrating a substantial gain in knowledge. Similarly, attitude scores improved significantly, with a pre-test mean of 16 rising to 40.82 post-test, yielding a mean difference of 11.34. The standard deviation increased from 4.24 to 4.66, and the computed t-value was 0.0072. These findings collectively suggest that the self-instructional module was effective in enhancing knowledge and positively modifying the attitude of mothers regarding diphtheria, with statistical significance observed at the 0.05 level.

Conclusion: Based on the findings of the study, it can be concluded that the self-instructional module on the prevention and management of diphtheria is effective in enhancing both the knowledge and attitude of mothers of under-five children in the selected community of Banda, Madhya Pradesh, India. The post-test scores indicate a significant improvement in the participants' understanding and outlook towards diphtheria after exposure to the module. This suggests that such educational interventions can play a vital role in empowering mothers with essential health information, thereby contributing to better disease prevention and child health outcomes at the community level.

Key words: Knowledge, attitude, self-instructional module, diphtheria, under five children, under five children's mother.

Introduction

Diphtheria remains a significant public health concern in many developing regions, including parts of India, despite the availability of effective vaccines. It is an acute, communicable disease caused by Corynebacterium diphtheriae, primarily affecting the respiratory tract and, in severe cases, leading to serious complications and death, particularly in children under five years of age. According to the World Health Organization (WHO), periodic outbreaks of diphtheria continue to occur in areas with low immunization coverage, highlighting the critical need for ongoing health education and disease prevention strategies.

In India, diphtheria cases have been reported frequently from rural and under-resourced communities, where lack of awareness, inadequate access to healthcare, and poor immunization practices contribute to the persistence of the disease. Madhya Pradesh, including the Banda district, remains vulnerable due to its demographic, socio-economic, and infrastructural challenges. Mothers, being the primary caregivers, play a pivotal role in the health and well-being of their children. Therefore, enhancing their knowledge and attitudes regarding diphtheria prevention and management is essential to reducing morbidity and mortality in this age group.

Self-instructional modules (SIMs) have emerged as effective tools in community-based health education. They empower individuals with accurate, concise, and easily understandable information, enabling them to make informed health decisions. SIMs are especially useful in areas with limited healthcare resources, as they support self-paced learning and can be revisited as needed. When appropriately designed, these modules can significantly improve awareness, shift attitudes, and ultimately influence behaviour related to disease prevention and management.

Given this background, the present study aims to assess the effectiveness of a self-instructional module on the knowledge and attitude of mothers of under-five children in a selected community in Banda, Madhya Pradesh. By focusing on this target population, the study seeks to contribute to public health efforts aimed at controlling diphtheria through community education and engagement.

Significant and need for the study:

Diphtheria remains a significant public health concern in many parts of India, particularly in rural and underdeveloped areas where access to healthcare information and services is limited. Despite being a vaccine-preventable disease, diphtheria continues to cause morbidity and mortality among children under five due to gaps in immunization coverage, lack of awareness, and inadequate management at the community level. In areas such as Banda, Madhya Pradesh, where health literacy is often low and healthcare infrastructure is challenged, empowering mothers with accurate and practical knowledge is vital for reducing the burden of such preventable diseases.

Mothers play a crucial role in ensuring the health and well-being of their children. Their understanding and attitude towards childhood illnesses and preventive strategies directly impact immunization uptake, early detection of symptoms, and timely healthcare seeking behaviour. However, many mothers in rural communities may lack formal education or access to reliable health information. In this context, self-instructional modules (SIMs) serve as an effective educational tool. They provide structured, accessible, and easy-to-understand health information that can be used independently by individuals to enhance their knowledge and decision-making capabilities.

This study is particularly significant as it evaluates the impact of a SIM tailored to the needs of mothers in a selected community in Banda, MP, on their knowledge and attitude regarding diphtheria prevention and management. The findings of the study can contribute to the development of community-based health education strategies and may inform government and non-governmental health programs aiming to strengthen maternal and child health in similar settings. Additionally, the study supports the broader public health goal of reducing vaccine-preventable diseases through community empowerment and education, aligning with national health missions and global health initiatives.

STATEMENT OF THE PROBLEM

"A study to evaluate the effectiveness of self-instructional module on knowledge and attitude regarding "Prevention and Management of Diphtheria" among mothers of under five children in selected community, Banda, MP, India."

OBJECTIVES OF THE STUDY

- To assess the pretest level of knowledge regarding prevention and management of diphtheria among mothers of under five children in selected community.
- To assess the pretest level of attitude regarding prevention and management of diphtheria among mothers of under five children in selected community.
- To develop the self-instructional module regarding prevention and management of diphtheria in selected community.
- To administer the self-instructional module on knowledge and attitude regarding prevention and

management of diphtheria among mothers of under five children in selected community.

- To assess the posttest level of knowledge regarding prevention and management of diphtheria among mothers of under five children in selected community.
- To assess the posttest level of attitude regarding prevention and management of diphtheria among mothers of under five children in selected community.
- To find out the effectiveness of self-instructional module on knowledge regarding prevention and management of diphtheria among mothers of under five children.
- To find out the effectiveness of self-instructional module on attitude regarding prevention and management of diphtheria among mothers of under five children.
- To determine the association between the pretest level of knowledge regarding prevention and management of diphtheria among mothers of under five children with their selected demographic variables.
- To determine the association between the pretest level of attitude regarding prevention and management of diphtheria among mothers of under five children with their selected demographic variables.

Research Hypothesis: -

RH1: There will be a significant difference in knowledge level regarding prevention and management of diphtheria among mothers of under five children in the experimental group after the administration of the self-instructional module in the selected community, Banda, MP, India.

RH2: There will be a significant difference in attitude regarding prevention and management of diphtheria among mothers of under five children in the experimental group after the administration of the self-instructional module in the selected community, Banda, MP, India.

RH3: There will be a significant association between the pre-test level of knowledge regarding prevention and management of diphtheria and selected socio-demographic variables among mothers of under five children in the experimental group in the selected community, Banda, MP, India.

RH4: There will be a significant association between the pre-test attitude regarding prevention and management of diphtheria and selected socio-demographic variables among mothers of under five children in the experimental group in the selected community, Banda, MP, India.

Null Hypothesis

RO1: There will be no significant difference in knowledge level regarding prevention and management of diphtheria among mothers of under five children in the experimental group after the administration of the self-instructional module in the selected community, Banda, MP, India.

RO2: There will be no significant difference in attitude regarding prevention and management of diphtheria among mothers of under five children in the experimental group after the administration of the self-instructional module in the selected community, Banda, MP, India.

RO3: There will be no significant association between the pre-test level of knowledge regarding prevention and management of diphtheria and selected socio-demographic variables among mothers of under five children in the experimental group in the selected community, Banda, MP, India.

RO4: There will be no significant association between the pre-test attitude regarding prevention and management of diphtheria and selected socio-demographic variables among mothers of under five children in the experimental group in the selected community, Banda, MP, India.

ASSUMPTION: -

- Mothers of under-five children may have some baseline knowledge and attitudes about diphtheria and its prevention and management.
- A Self-Instructional Module (SIM) is an effective method for improving knowledge and attitude among mothers.
- Health education, when properly designed and delivered, can bring about a positive change in health-related behavior and awareness.
- The socio-demographic variables (such as age, education, occupation, number of children, previous exposure to information, etc.) may influence the existing knowledge and attitude of the mothers.
- Mothers are willing to participate and respond honestly in the pre-test and post-test assessments.
- The selected community provides a representative sample of the broader population of mothers with under-five children in rural/urban areas of Banda, MP.
- The environment during data collection is conducive and free from distractions, ensuring genuine responses.

OPERATIONAL DEFINITION

Evaluate: -

Evaluate refers to the identification of the difference between pre-test and post-test levels of knowledge and attitude and judging the effectiveness of the self-instructional module on prevention and management of diphtheria among mothers of under-five children between the age group of 18 to 45 years.

Effectiveness: -

Effectiveness is the degree to which the self-instructional module has achieved the desired effect on knowledge and attitude among mothers of under-five children in the study group, as measured by structured knowledge and attitude scales.

In this study, it is determined by the significant difference in mean pre-test and post-test levels of knowledge and attitude among mothers of under-five children in selected communities of Banda, MP, India.

Self-instructional module: -

In this study, Self-Instructional Module refers to a structured, self-paced, and self-explanatory educational material designed to enhance the knowledge and attitude of mothers of under-five children regarding the prevention and management of diphtheria. It is developed in simple language with illustrations and step-by-step content, allowing mothers to learn independently without direct supervision. Its effectiveness is assessed by comparing pre-test and post-test scores on knowledge and attitude scales among the study participants.

Knowledge: -

It refers to the awareness regarding prevention and management of diphtheria, as measured by the correct responses to items in the knowledge questionnaire among mothers of under-five children.

Attitude: -

It refers to the attitude regarding prevention and management of diphtheria, as measured by the Likert Scale among mothers of under-five children.

Diphtheria: -

In this study, diphtheria refers to a vaccine-preventable, contagious bacterial infection that primarily affects the throat and upper respiratory tract. It is included as the core health topic within the self-instructional module, focusing on its causes, symptoms, prevention (especially through immunization), transmission,

complications, and management. Mothers' knowledge and attitude toward diphtheria are assessed through a structured questionnaire and Likert scale, respectively.

Under five children's mothers: -

Under-five children's mothers refer to women who have at least one child aged between 0 to 5 years, residing in the selected community of Banda, MP, India, and who are included in the study to assess their knowledge and attitude regarding the prevention and management of diphtheria through a self-instructional module.

DELIMITATIONS:

- The study is delimited to the selected community of Sagar.
- The study is delimited to the duration of one month.
- The sample size is limited to 40 samples.

SCOPE OF THE STUDY: -

- This study will help the under five children mother to improve their knowledge and attitude regarding prevention and management of diphtheria.
- This study will help in strengthening the nation and society by disbursing the required and useful knowledge under five children's mothers and ultimately disseminating the knowledge and attitude to them.
- The study focusses on the self-instructional module regarding prevention and management of diphtheria among mothers of under five children.
- The study will help the health care provider to save the life of children.

CONCEPTUAL FRAMEWORK

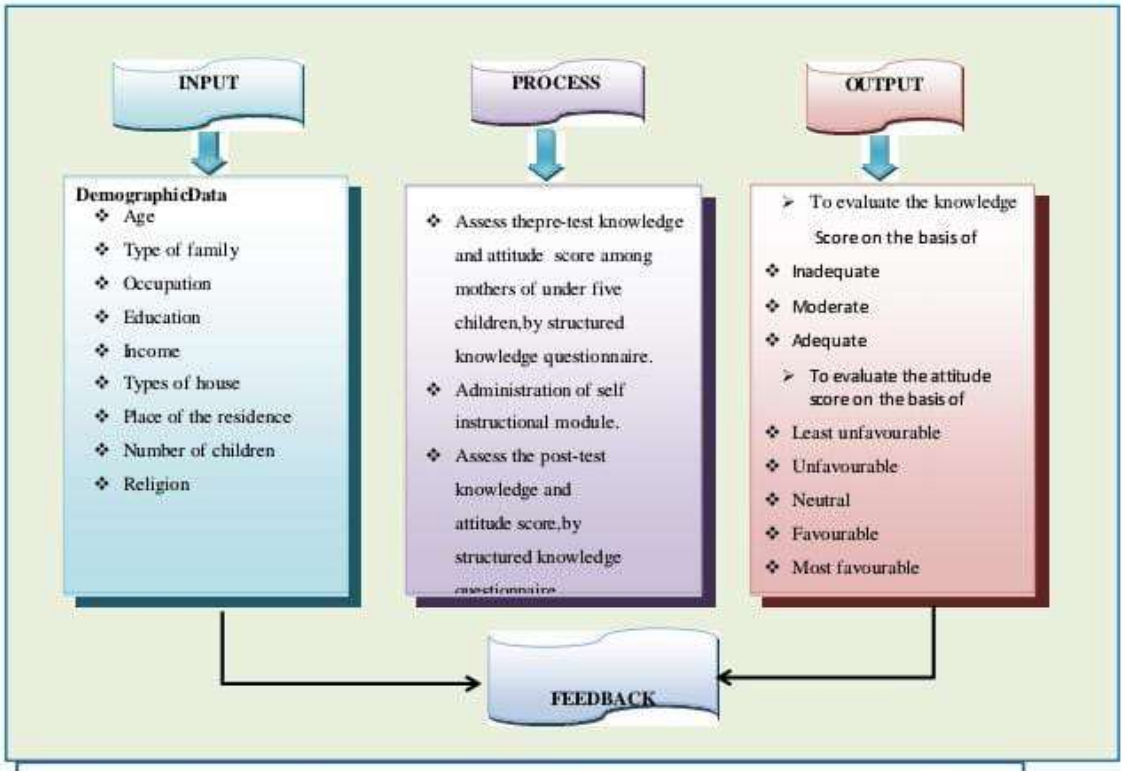

Figure-1.1:Modified conceptual framework based on general system model by Ludwing and Beter Lenffy(1968).

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RESEARCH METHODOLOGY:

Research approach: Quantitative Evaluative Research Approach.

Research design: Pre – experimental one group pre – test post – test research design.

Variables:

Dependent variables:

Knowledge regarding prevention and management of diphtheria.

Attitude towards prevention and management of diphtheria.

Independent variables:

Self-Instructional Module (SIM) on prevention and management of diphtheria.

Extraneous variables:

These are other factors that may influence the dependent variables but are not the focus of the intervention. They include: Age of the mother, educational qualification, Number of children, Family income, Type of family (nuclear/joint/extended)

Population:

Target Population:

All mothers of under-five children residing in the selected community at Banda, Sagar district.

Accessible Population:

In this study, the accessible population refers to mothers of under-five children who were available in the community at the time of the study.

Sample Size:

40 mothers of under-five children.

Sampling Technique:

Purposive sampling technique was used.

Description of Tool

Section A: Demographic Variables

This section includes items related to the demographic characteristics of the participants (e.g., age, education, number of children, family income, etc.).

Section B: Self-Structured Knowledge Questionnaire

This section consists of a self-structured questionnaire to assess the knowledge of mothers regarding the prevention and management of diphtheria.

Section C: Attitude Assessment Scale (Likert Scale)

This section uses a Likert scale to assess the attitude of mothers towards the prevention and management of diphtheria.

Section D: Self-Instructional Module

This section includes a self-instructional module designed to provide information about the prevention and management of diphtheria.

Pilot study:

The investigator was able to access an adequate number of mothers of under-five children. However, difficulty was encountered in obtaining data from illiterate participants, as they required additional explanation. The study was found to be feasible. The tool used in the pilot study was the same tool used for the main study.

Data collection: -

The data was collected in following three steps:

a) Pre-test

A pre-test was conducted among mothers of under-five children residing in Banda by administering a questionnaire to assess their knowledge on the prevention and management of diphtheria, prior to the implementation of the self-instructional module.

b) Implementation of self-instructional module

Immediately after the pre-test, the self-instructional module was implemented for the same group of participants, focusing on the prevention and management of diphtheria.

c) Post test

Evaluation was carried out by conducting a post-test 7 days after the implementation of the self-instructional module. The same questionnaire used in the pre-test was used for the post-test to assess changes in knowledge.

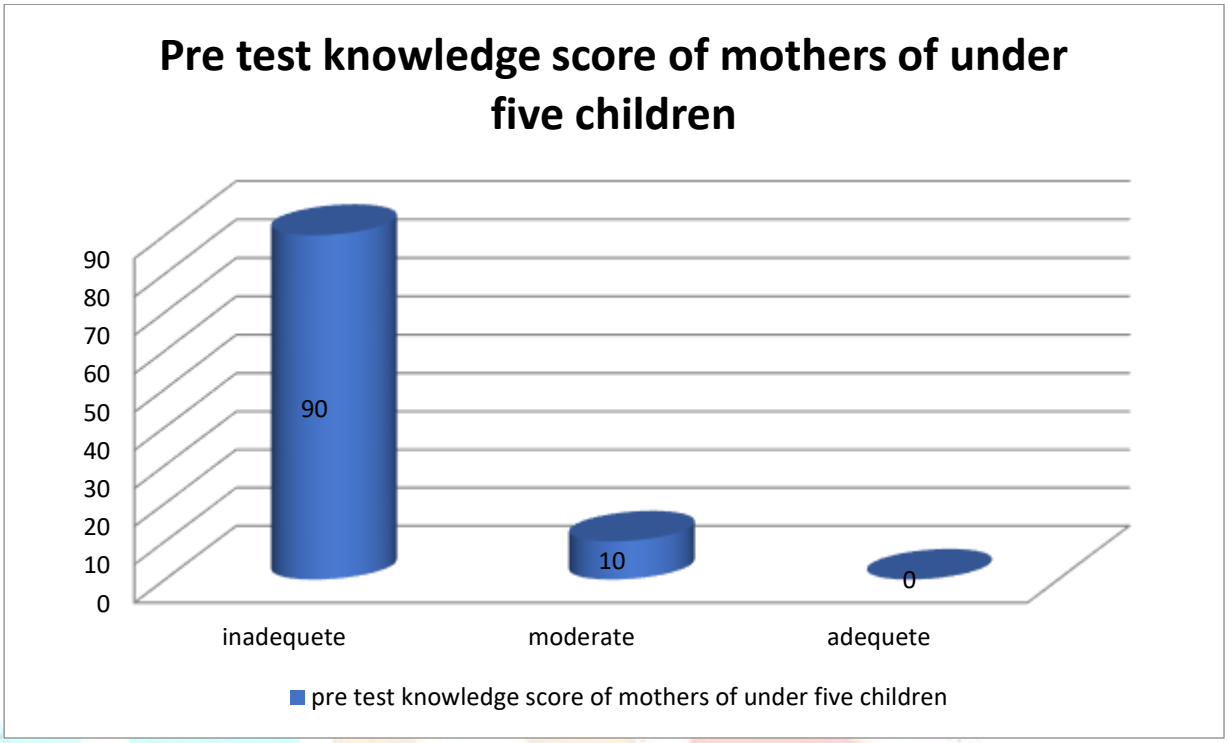
DATA ANALYSIS AND INTERPRETATION OF DATA:

Table 1: Demographic Variables with Percentage Distribution of Mothers of Under-Five Children

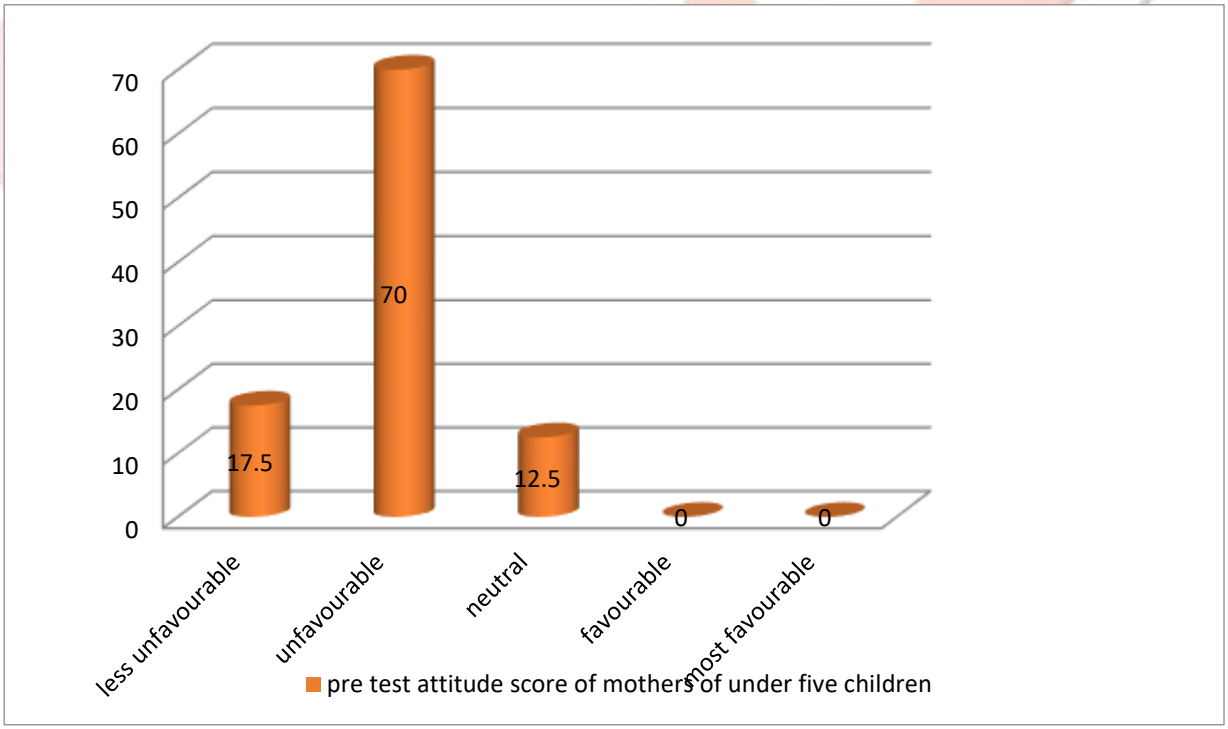
Sr. No.	Demographic variables	Categories	Frequency (f)	Percentage (%)
1.	Mother's age	a) 18-20 years	3	7.5%
		b) 21-24 years	24	60%
		c) 25-27 years	10	25%
		d) Above 27 years	3	7.5%
2.	Types of family	a) Nuclear family	7	17.5%
		b) Joint family	33	82.5%

3.	Occupational status of the mother	a) House wife	37	92.5%
		b) Business	1	2.5%
		c) Government employee	1	2.5%
		d) Private employee	1	2.5%
4.	Educational status of mother	a) primary education	25	62.5%
		b) Secondary education	8	20%
		c) Higher education	2	5%
		d) Degree holder	2	5%
		e) Illiterate	3	7.5%
5.	Educational status of husband	a) Primary education	20	50%
		b) Secondary education	17	42.5%
		c) Higher education	1	2.5%
		d) Degree holder	1	2.5%
		e) Illiterate	1	2.5%
6.	Family income	a) < Rs 3000	18	45%
		b) Rs 3001-4000	15	32.5%
		c) Rs 4001-5000	5	12.5%
		d) > Rs 5000	4	10%
7.	Type of house	a) Hut	2	5%
		b) Kacha house	11	27.5%
		c) Concrete/pukka house	27	67.5%
8.	Number of children in the family	a) One	18	45%
		b) Two	18	45%
		c) More than two	4	10%
9.	Religion	a) Hindu	35	87.5%
		b) Muslim	5	12.5%
		c) Christian	0	0
		d) Other	0	0
10.	Place of residence	a) Urban	5	12.5%
		b) Rural	35	87.5%
11.	Economic status of the family	a) Poor	6	15%
		b) Middle	32	80%
		c) Rich	2	5%
12.	Breastfeeding status of mother	a) Sometimes	36	90%
		b) Never	4	10%

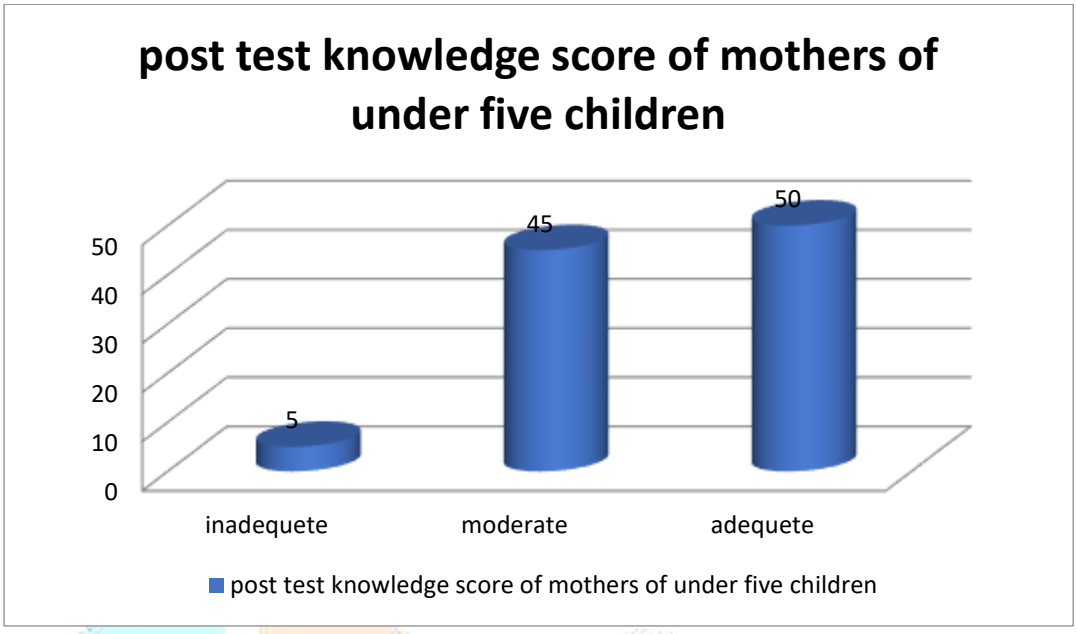
Pretest level of knowledge regarding prevention and management of diphtheria among mothers of under five children in selected community.



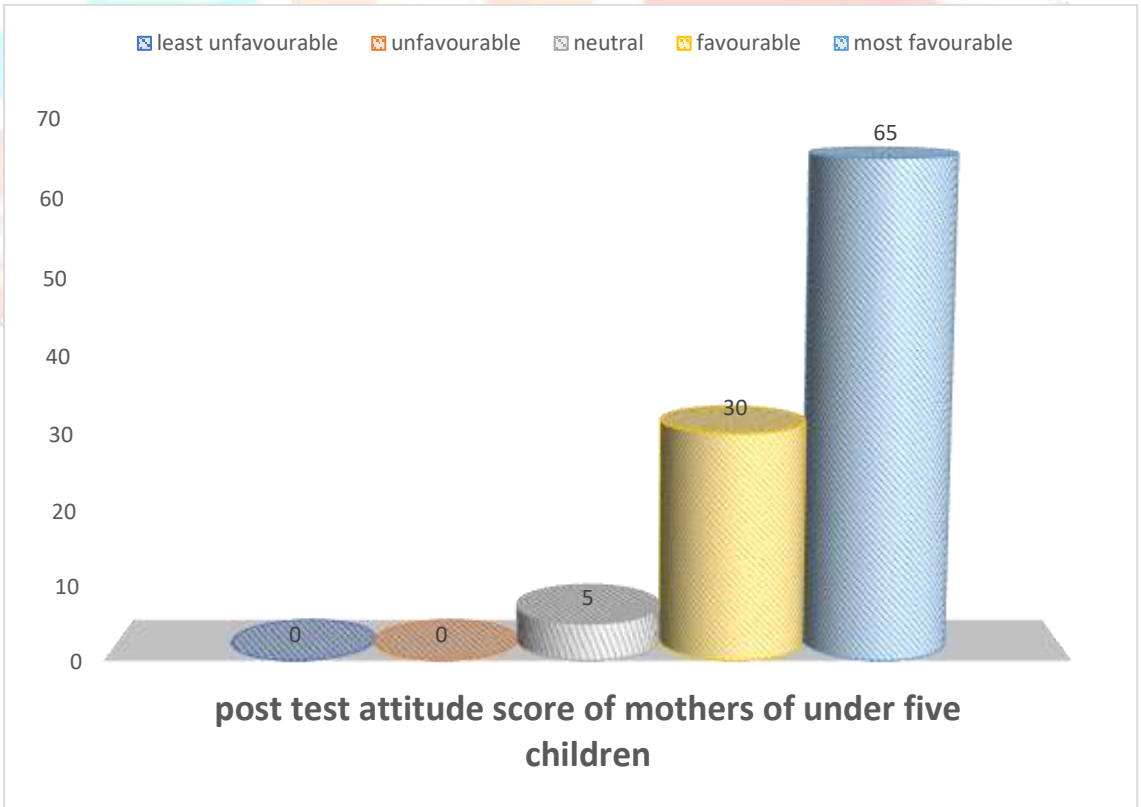
Pretest level of attitude regarding prevention and management of diphtheria among mothers of under five children in selected community



Post-test level of knowledge regarding prevention and management of diphtheria among mothers of under five children in selected community.



Post-test level of attitude regarding prevention and management of diphtheria among mothers of under five children in selected community.



Effectiveness of self-instructional module on knowledge and attitude regarding prevention and management of diphtheria among mothers of under five children.

content	Pre test		Post test		Mean improvement score	Paired 't' test value
	Mean	S.D.	Mean	S.D.		
Knowledge level	7	2.91	18.95	3.91	11.95	1.0139
Attitude level	16	4.24	40.82	4.66	11.34	0.0072
Overall	**23**	**7.15**	**59.77**	**8.57**	**23.29**	**1.0211**

Association between the pretest level of knowledge regarding prevention and management of diphtheria among mothers of under five children with their selected demographic variables.

The computed Chi-square values between the pre-test knowledge scores and the selected demographic variables revealed that there was no statistically significant association between the mothers' knowledge and their age, type of family, occupational status, educational status of the mother, educational status of the husband, family income, type of house, number of children, religion, place of residence, economic status, and breastfeeding status of the child. This indicates that these demographic factors did not significantly influence the pre-existing knowledge of mothers regarding the prevention and management of diphtheria.

Association between the pretest level of attitude regarding prevention and management of diphtheria among mothers of under five children with their selected demographic variables.

The computed Chi-square values between the pre-test attitude scores and the selected demographic variables indicated that there was no significant association between mothers' attitudes and their age, type of family, occupational status, educational status of the mother, educational status of the husband, family income, type of house, number of children, religion, place of residence, economic status, and breastfeeding status of the child. This suggests that these demographic variables did not have a significant influence on the mothers' attitudes regarding the prevention and management of diphtheria.

CONCLUSION

The findings of the study revealed that the self-instructional module was effective in enhancing the knowledge and positively influencing the attitude of mothers of under-five children regarding the prevention and management of diphtheria. A significant improvement was observed in the post-test scores when compared to the pre-test scores, indicating that structured educational interventions can play a crucial role in empowering mothers with essential health information. The study also found no significant association between pre-test knowledge and attitude scores with selected demographic variables, suggesting that the improvement was primarily due to the intervention itself rather than external factors.Thus, the self-instructional module proved to be a simple, practical, and impactful tool for community health education. It can be recommended for wider use in similar settings to promote maternal awareness and engagement in preventing communicable diseases like diphtheria among children under five.

NURSING IMPLICATIONS

The findings of the study have significant implications for the nursing profession. These implications are of vital concern for community nursing practice, nursing education, nursing research, and nursing administration.

Nursing Practice

- Community health nurses can act as resource personnel in community areas and educate people at the grassroots level regarding the prevention and management of diphtheria.
- They should take responsibility for educating the community on diphtheria prevention and its early management.
- Regular training and in-service education programs should be conducted for the community to enhance awareness.
- Posters displaying signs and symptoms of diphtheria can be used in rural areas to increase community knowledge.
- Not only nurses, but all healthcare providers such as auxiliary nurse midwives (ANMs), village health guides, and nurses working in community centers should be involved in providing education on the prevention and management of diphtheria.

Nursing Education

- Nursing personnel must be equipped with adequate knowledge to conduct mass health education programs focused on diphtheria prevention and management.
- The study emphasizes the need for nursing students to be prepared with effective health education materials for use in community health services.
- Nurse educators should be competent in training students in assistive teaching techniques to educate the public.

- Participation in seminars, workshops, and conferences should be encouraged for both students and faculty to stay updated on recent public health advancements and improve communication skills.
- Nursing students should be encouraged to use evidence-based practices in community health education.

Nursing Administration

- Health administrators at national, state, district, institutional, and local levels should focus on spreading awareness in the community about diphtheria prevention and management.
- Nurse administrators should arrange appropriate training sessions and provide teaching materials for use in the community.
- They can organize educational programs in community areas to enhance public knowledge.
- Nurse administrators should motivate nursing students and arrange for periodic health education sessions for the public, especially mothers of under-five children.
- Nurse administrators should recommend to higher authorities the supply of posters and visual aids related to diphtheria prevention, to be displayed in hospitals, primary health centers, schools, temples, and other public places.

Nursing Research

- The findings of this study help professional nurses and students develop a spirit of inquiry by providing a foundation for further research.
- This study serves as a baseline for conducting similar research in different settings.
- The findings should be disseminated through conferences, seminars, and publications in journals and websites.
- Future research should aim to include a larger population to enhance the generalizability of the findings.

Recommendations for Further Study

- The study can be replicated on a larger sample to validate and generalize the findings.
- A comparative study may be conducted to explore the differences or similarities in knowledge and attitude between urban and rural populations.
- Similar studies can be undertaken using different teaching methods or tools to assess their relative effectiveness.

REFERENCES:

Book References

- Allender JA, Rector C. Community and Public Health Nursing. New York: Lippincott Publications; 2014.
- Hiremath S. Essentials of Community Medicine: A Practical Approach. 1st ed. New Delhi: Jaypee Brothers; 2006.
- Witchcock JE, et al. Community Health Nursing: Caring in Action. 1st ed. Toronto: Nelson Education; 2010.
- Fitzpatrick JJ. Conceptual Models of Nursing: Analysis and Application. Maryland: Prentice Hall; 2005.
- Kamalam S. Essentials of Community Health Nursing. New Delhi: Jaypee Brothers; 2005.
- Saucier K. Essentials of Community-Based Nursing. Bangalore: Jones and Bartlett Publications; 2003.
- Kasthun SR. An Introduction to Community Health. 5th ed. New Delhi: BI Publications Pvt. Ltd; 1999.
- Swarnakar K. Community Health Nursing. Bangalore: NR Brothers Publications; 2008.
- Kothari CR. Research Methodology: Methods and Techniques. 1st ed. New Delhi: Vishwa Prakashan; 2000.
- Lalitha D. Essentials of Community Medicine. New Delhi: Jaypee Brothers; 2011.
- Nicoll LH. Perspective of Nursing Theory. Philadelphia: J.P. Lippincott; 1992.
- Mary Jo. Community Health Nursing: Advocacy for Population Health. 5th ed. Upper Saddle River: Pearson Prentice Hall; 2008.
- Burns N. The Practice of Nursing Research. Missouri: Saunders; 2009.
- Ervin NE. Advanced Community Health Nursing Practice: Population Focused Care. 1st ed. Upper Saddle River, NJ: Prentice Hall; 2002
- Polit DF, Beck CT. Nursing Research: Principles and Methods. Philadelphia: Lippincott Company; 2010
- Park K. Textbook of Preventive and Social Medicine. Jabalpur: Banarsidas Bhanot; 2012.
- Raj Bhaskara Elakkuvana. Nursing Research and Biostatistics. Bangalore: Emmis Publishers; 2010
- Rao SS, et al. An Introduction to Biostatistics. Vellore: Prestographic Printers; 2005.
- Visweswara Rao K. Biostatistics: A Manual of Statistical Methods. New Delhi: Jaypee Brothers; 2009
- Satyanarayana. Biostatistics. New Delhi: Prentice Hall of India Pvt. Ltd.; 2006.
- Sundar Rao PS. Introduction to Biostatistics and Research Methods. New Delhi: Prentice Hall of India; 2006
- Singh PK. Climate Change and Human Health. New Delhi: Dorling Kindersley; 2012.
- Treece E. Elements of Research in Nursing. New Delhi: All India Publishers and Distributors; 2005.
- Basavanthappa BT. Nursing Research. Bangalore: Jaypee Brothers; 2007.
- Basavanthappa BT. Nursing Theories. Bangalore: Jaypee Brothers; 2008.

- Basavanthappa BT. Community Health Nursing. Bangalore: Jaypee Publications; 2008.
- Christian PJ, Kenny JW. Nursing Process: Application of Conceptual Models. 3rd ed. Philadelphia: Mosby Company; 1990.
- Fain JA. Reading, Understanding and Applying Nursing Research. New Delhi: Jaypee Publishers; 2009.
- Fawcett J. Analysis and Evaluation of Nursing Theories. Philadelphia: F.A. Davis Company; 2005
- Gulani KK. Principles and Practices of Community Health Nursing. New Delhi: Kumar Publishing House; 2012.
- Hieule JC. Fundamentals of Nursing: Human Health and Function. Philadelphia: Lippincott; 2007.
- Bala S. Fundamentals of Biostatistics. New Delhi: Anne Publications; 2007

Journal References

- Atere AD. Risk assessment and management of diphtheria: Strategies for prevention and control. 2024.
- Musa S, Usaini S, Ahmed I. Dynamics of diphtheria epidemic in Nigeria: Insights from Kano State outbreak data. 2024.
- Akhi AA, Tasnim F, Akter S. A mathematical model of a diphtheria outbreak in Rohingya settlement in Bangladesh. 2023.
- Izzati NN, Andriani A. Optimal control of diphtheria epidemic model with prevention and treatment. 2020
- WHO. Vaccine Preventable Diseases Surveillance Standards: Diphtheria. [Internet]. 2024 [cited 2024 Jan 10]. Available from: https://www.who.int/publications/m/item/vaccine-preventable-diseases-surveillance-standards-diphtheria
- Verbtska YM. Medical and social problems of vaccination of the population in communities under martial law. 2024.
- Alexiev R, Hadjiiski K, Demireva V. Immune status of the population against diphtheria: 2001–2006. 2007.
- Ozhe SI. Respiratory diphtheria fatalities in adolescents in Lafia North, Nigeria. 2023.
- Saini NK, Gaur DR, Saini V, Lal S. Acute respiratory infection in children: Study of knowledge and practices of mothers in rural Haryana. J Commun Dis. 1992;20(1-2):75–7
- Kapoor SK, Reddaiah VP. Knowledge, Attitude and Practices Regarding Acute Respiratory Infections. Indian J Pediatr. 2013;57:533–5.
- Bipin JP, Nitiben JT, Mrudula KL, Sonalia KN. Knowledge, attitude and practices of mothers regarding ARI. Natl J Med. 2012;3(2):101–3.
- Farzana I, et al. Profiling acute respiratory tract infection in children. J Glob.
- WHO. ARI control programme in India. [Internet]. 2000 [cited 2008 July 29]. Available from: http://www.pubmed.com
- Omojuyigbe JO, et al. Re-emergence of diphtheria outbreak in Nigeria. Glob Biosecurity. 2024;6(1).

- WHO. Laboratory manual for diphtheria and related infections. [Internet]. 2021 [cited 2024 Jan 10]. Available from: https://iris.who.int/handle/10665/35227
- Fatiregun AA, Okoro AO. Maternal determinants of complete child immunization in Nigeria. Vaccine. 2012;30(4):730–6.
- Oku A, et al. Childhood vaccination communication strategies.
- Truelove SA, et al. Clinical and epidemiological aspects of diphtheria. Clin Infect Dis. 2020;71(1):89–97.
- Efstratiou A, et al. Diagnosis of diphtheria. J Infect Dis. 2000;181 Suppl 1:S138–S141.
- Kristiansen M, et al. ELISA for antidiphtheria antibodies. APMIS. 1997;105(11):843–53.
- Sangal V, Hoskisson PA. Evolution and epidemiology of Corynebacterium diphtheriae. MEEGID. 2016; 43:364–70.
- De Zoysa A, et al. Molecular typing of C. diphtheriae. J Clin Microbiol. 2008;46(11):3626.
- Bolt F, et al. Sequence typing of C. diphtheriae. J Clin Microbiol. 2010;48(11):4177.
- Czajka U, et al. Changes in C. diphtheriae MLST profiles in Poland. BMC Infect Dis. 2018;18(1):121.
- Du Plessis M, et al. Molecular characterization of C. diphtheriae isolates in South Africa. Emerg Infect Dis. 2017;23(8):1308.

Electronic Version

- PubMed [Internet]. Available from: https://www.pubmed.com
- ResearchGate [Internet]. Available from: https://www.researchgate.net
- Medline [Internet]. Available from: https://www.medline.com
- CDC Oral Health [Internet]. Available from: https://www.cdc.gov/oralhealth/topics/child.htm
- American Dental Hygienists' Association [Internet]. Available from: https://www.adha.org
- Livestrong [Internet]. Available from: https://www.livestrong.com
- Nursing and Midwifery Board of Ireland [Internet]. Available from: https://www.nursingboard.ie
- World Health Organization [Internet]. Available from: https://www.who.int