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Knowledge regarding neonatal jaundice and its management among staff nurses

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Abstract
Background: Neonatal jaundice (NNJ) is characterized by the yellow discoloration of the skin, sclera, and mucosa due to the accumulation of bilirubin in tissue plasma. It is a prevalent issue affecting a significant portion of newborns, both full term and preterm. Early detection and management of jaundice are crucial for preventing potential complications such as brain, vision, and hearing damage.
Objectives: This study aimed to assess the knowledge regarding neonatal jaundice and its management among staff nurses working at SCPM Super-Specialty Hospital in Gonda, Uttar Pradesh.
Methods: A descriptive study design was employed, and a sample of 40 staff nurses was selected using non-probability convenient sampling from SCPM Super-Specialty Hospital. Data was collected using a structured questionnaire designed to evaluate the level of knowledge. Content validity of the questionnaire was established through consultation with subject experts, and reliability was assessed using the split-half method, yielding a coefficient of 0.86, indicating good reliability.
Results: The majority of the sample (90%) fell within the age group of 21-30 years, with 65% being male. Most staff nurses (87.5%) identified as Hindu. Approximately 82% of participants had between 0-5 years of experience, and 70% reported working in NICU setups. Regarding educational background, 50% had received other courses. The study found that 70% of participants had received in-service education on neonatal jaundice, and 75% reported observing 10 cases of neonatal jaundice. The analysis revealed that the majority (72.5%) of staff nurses had an average knowledge level, while 27.5% had a knowledge level categorized as below average. No significant correlations were found between the variables and the knowledge levels of staff nurses.
Conclusion: The study concluded that staff nurses had less knowledge on Neonatal jaundice and its management. Hence, there is a necessity to provide in-service education on the above topic.

Keywords: Knowledge, neonatal jaundice, management, staff nurses

Introduction

The cry of a sick child is no more painful than dying a thousand times for any parent. Jaundice, derived from the French word "Jaune," meaning yellow, manifests as the yellow discoloration of the skin, sclera, and mucosa due to excessive bilirubin accumulation in tissues and plasma. Neonatal jaundice (NNJ) occurs in up to 60-80% of preterm and term infants, as well as 10% of breastfed neonates, with serum bilirubin levels exceeding 7 mg/dl. The immature hepatic metabolic pathways in neonates lead to bilirubin accumulation, posing life-threatening risks [1, 2].

Globally, approximately 1.1 million babies develop severe hyperbilirubinemia annually, predominantly in sub-Saharan Africa and South Asia. In Nigeria, the incidence is significantly higher than in developed countries [3]. Neonatal jaundice can result from the breakdown of fetal hemoglobin and immature hepatic functions, leading to bilirubin encephalopathy or kernicterus. Severe cases may cause neonatal mortality and long-term neurological damage, including cerebral palsy and sensory neural hearing loss [4].

Determining factors contributing to neonatal jaundice is crucial for prevention and management. While developed countries attribute blood incompatibilities as the main cause, developing nations cite prematurity, low birth weight, and traditional practices as significant contributors. However, comprehensive strategies for prevention, detection, and treatment remain inadequate, especially in resource-limited settings [5].

Need for Study

Neonatal jaundice, first described in the 19th century, remains a common issue in the first two weeks of life, often necessitating hospital readmission. This study seeks to address the prevalence and risk factors of neonatal jaundice in healthy term neonates [6]. The incidence, risk factors leading to clinical jaundice requiring treatment, and the number of neonates requiring phototherapy and exchange transfusion will be explored at SCPM Hospital.

This study updates the 2004 American Academy of Pediatrics (AAP) clinical practice guideline, addressing issues of prevention, risk assessment, monitoring, and treatment. The global burden of neonatal jaundice underscores the highest incidence in the African region, followed by Southeast Asia, America, and Europe [7]. Despite increasing survival rates, there is a rising percentage of children experiencing long-term neurological or developmental issues, emphasizing the need for ongoing follow-up care [8].

Advancements in neonatal jaundice care have increased the survival chances of premature newborns, but they still face a significant economic and local impact in India, with a 40% greater risk of developmental problems. The responsibility of care extends beyond discharge, requiring ongoing medical attention and development assessment [9].

To bridge the gap between specialized care facilities and the number of neonates seeking care, both hospital and home care for neonatal jaundice must be understood by nurses [10]. This study aims to contribute valuable insights into the determination factors of neonatal jaundice morbidity and mortality, ultimately improving prevention, early detection, and management strategies.

Hypothesis

H_1: There is a significant association between the level of knowledge of staff nurses regarding neonatal jaundice and its management with their selected socio-demographic variables.

Assumption

This study assumes that knowledge level may differ among staff nurses. It is acknowledged that the level of knowledge regarding neonatal jaundice and its management may vary among staff nurses due to differences in educational background, training, and clinical experience [11].

Operational Definitions

Knowledge: Refers to the level of information known by the staff nurses on neonatal jaundice and its management. The knowledge levels are categorized as above average, average, and below average based on the assessment conducted in the study [12].

Neonate: Refers to a newborn baby with an age of less than seven days [13].

Jaundice

Refers to the condition in which admitted infants have yellow skin caused by the buildup of bilirubin in the blood [14].

Staff Nurses

Refers to the nursing professionals employed at SCPM Super-Specialty Hospital, Gonda, Uttar Pradesh, who are directly involved in the care and management of neonatal patients.

Conceptual Framework

The conceptual framework serves as a roadmap guiding the researcher's understanding of prior work in the field and how their study will contribute to existing knowledge. It combines concepts and a framework to derive meaningful insights [15].

Conceptualization involves organizing ideas and concepts within a framework to articulate the relationships between variables or characteristics being studied. This framework connects theories, assumptions, beliefs, and concepts in a visual or narrative format, bridging gaps in research [16].

For this study, the conceptual framework draws from Ludwig Von Bertalanffy's General System Theory (1968) [17]. According to this theory, a system comprises interacting components contributing to a common goal, with inputs, throughputs, and outputs.

Input

Assessment of knowledge regarding neonatal jaundice and its management.

Throughput

Implementation of a structured questionnaire on neonatal jaundice and its management, assessing tool validity and reliability, data collection, analysis, and interpretation.

Output

Results, such as gains in knowledge among staff nurses regarding neonatal jaundice.

Feedback

While not explicitly included, feedback refers to the process by which information is received at each stage of the system. It informs subsequent processes based on system output.

This framework offers a structured approach to understanding the relationships between study components, guiding the research process and facilitating result interpretation (Figure: 1).

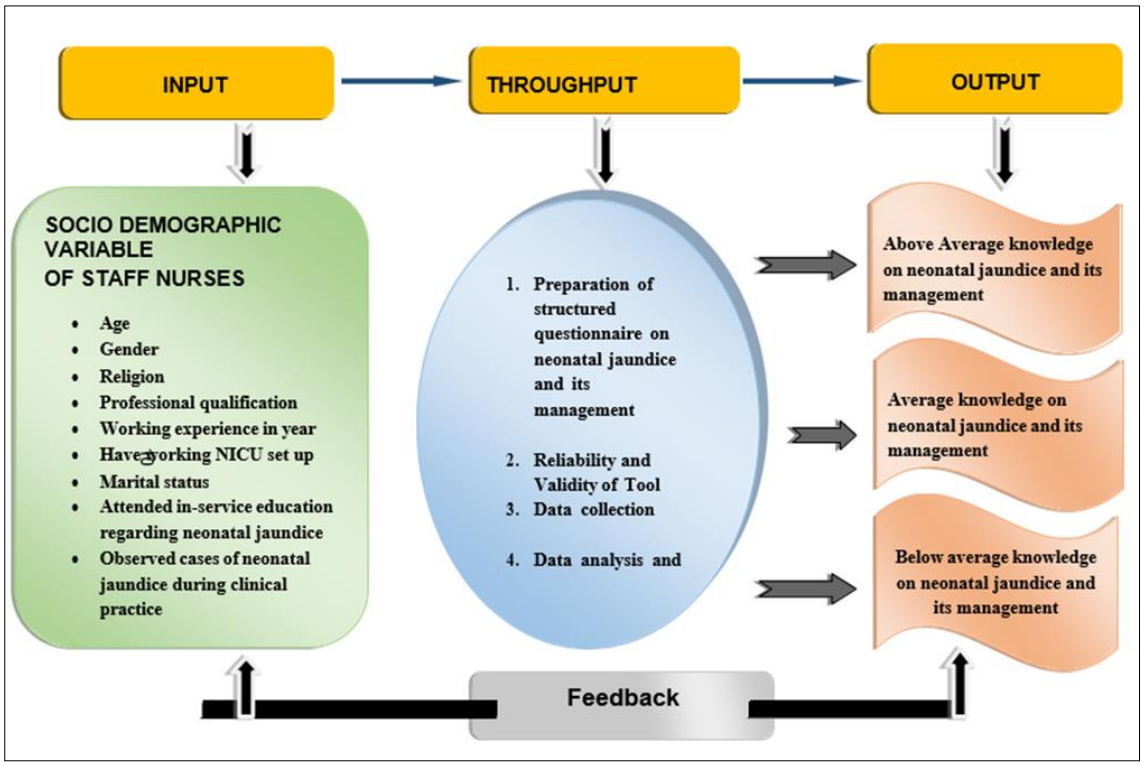

Fig 1: Modified theoretial model based on Ludwing VGN bertalanffy's general system theory (1968)

Methodology

Study Design

This research employs a descriptive study design to assess the knowledge regarding neonatal jaundice and its management among staff nurses at SCPM Super-Specialty Hospital, Gonda, and Uttar Pradesh.

Setting of the study

SCPM Super-Specialty Hospital is a leading healthcare facility located in Gonda, Uttar Pradesh, India. Established with a mission to provide high-quality healthcare services to the local community and beyond, SCPM Super-Specialty Hospital is equipped with state-of-the-art medical infrastructure and staffed by a dedicated team of healthcare professionals.

The hospital serves as a regional referral center, offering specialized medical care across various disciplines, including pediatrics, neonatology, obstetrics, and internal medicine. With a focus on advanced diagnostics, cutting-edge treatments, and compassionate patient care, SCPM Super-Specialty Hospital has earned a reputation for excellence in healthcare delivery.

Within the hospital, the neonatal unit plays a pivotal role in the care of newborns, including those affected by conditions such as neonatal jaundice. The unit is equipped with neonatal intensive care facilities, including incubators, phototherapy units, and monitoring equipment, to provide comprehensive care to infants in need.

The study conducted within SCPM Super-Specialty Hospital focuses on assessing the knowledge level of staff nurses regarding neonatal jaundice and its management. As such, the setting provides a conducive environment for conducting research and implementing interventions aimed at enhancing the quality of care for neonates with jaundice.

Population and Sampling

The population consists of staff nurses working at SCPM Super-Specialty Hospital. A sample of 40 staff nurses was selected using non-probability convenient sampling.

Scoring key

Above Average (25-36)

Strong understanding and proficiency in recognizing, understanding, and managing neonatal jaundice.

Average (13-24)

Moderate understanding of neonatal jaundice, with some familiarity with its recognition and basic management principles.

Below Average (1-12)

Limited understanding of neonatal jaundice, requiring significant educational interventions to improve knowledge and skills (Table 1).

Table 1: Knowledge score on Neonatal jaundice and its management

Sl. No	Knowledge levels	Knowledge Score
1.	Above average	25-36
2.	Average	13-24
3.	Below average	1-12

Data Collection Tool

A structured questionnaire was developed to assess the level of knowledge among staff nurses regarding neonatal jaundice and its management. The questionnaire included items related to etiology, risk factors, signs and symptoms, and management strategies.

Content Validity

The content validity of the questionnaire was established through consultation with subject experts to ensure that it adequately covered the relevant aspects of neonatal jaundice.

Reliability
The reliability of the questionnaire was assessed using the split-half method, yielding a coefficient of 0.86, indicating good reliability.

Data Collection
Data collection involved administering the structured questionnaire to the selected sample of staff nurses at SCPM Super-Specialty Hospital.

Data Analysis
Descriptive statistics such as frequencies and percentages were used to analyze the data collected from the questionnaire responses. The analysis aimed to summarize the knowledge levels of staff nurses regarding neonatal jaundice and its management.

Ethical Considerations
Ethical approval was obtained from the Institutional Ethics Committee of SCPM Super-Specialty Hospital. Informed consent was obtained from all participants before their involvement in the study, and confidentiality and anonymity were ensured throughout the study process.

Data collection tools
The study developed a structured knowledge questionnaire to assess staff nurses' understanding of neonatal jaundice and its management. This tool was based on the researcher's experience, literature reviews, expert consultations, and study objectives. The questionnaire consisted of two sections: socio-demographic variables and a knowledge questionnaire with 36 multiple-choice questions. Content validity was ensured through expert opinions, and data collection involved obtaining ethical clearance, explaining the study purpose to nurses, ensuring confidentiality, obtaining written consent, and using non-probability sampling. Finally, data was collected, tabulated, and analyzed.

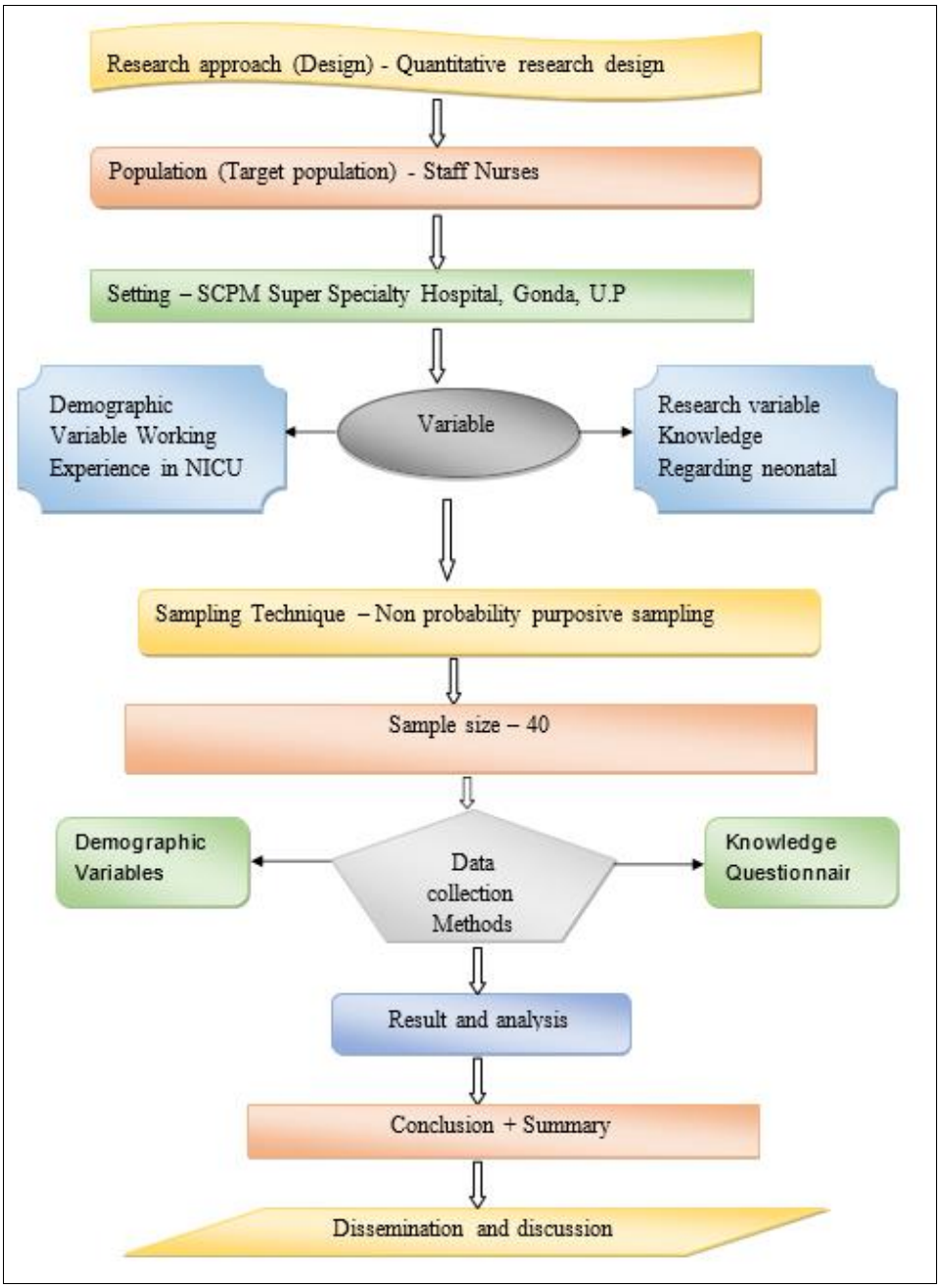

Fig 2: Schematic representation of research design

Data analysis
The data analysis plan involves several key steps:

Organization and Tabulation
Data collected will be organized and tabulated to facilitate analysis.

Knowledge Level Classification
Knowledge levels will be categorized as above average, average, or below average based on scores obtained from the questionnaire.

Descriptive and Inferential Statistics
Both descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (chi-square test) will be used to analyze the data and determine associations.

Presentation of Findings
Findings will be presented using tables and figures to provide a clear representation of the results.

Demographic Data Analysis
Demographic characteristics of the study population will be analyzed using frequency and percentage calculations.

Knowledge Score Classification
A table will be created to illustrate the classification of knowledge scores into different categories.
This data analysis plan will ensure a systematic approach to analyzing and interpreting the findings regarding staff nurses' knowledge of neonatal jaundice and its management. The results and analysis section presents the findings of the study assessing staff nurses' knowledge of neonatal jaundice and its management.

Objective and Hypothesis
The study aimed to assess the knowledge of staff nurses regarding neonatal jaundice and its management and explore any significant associations with demographic variables. The hypothesis suggested a significant association between knowledge levels and demographic factors.

Data Presentation
Data was organized into sections based on socio-demographic variables, knowledge levels, mean knowledge scores, and standard deviations.

Section A - Socio-demographic Variables
Data on age, gender, religion, professional qualification, working experience, NICU experience, marital status, attendance of in-service education, and observed cases of neonatal jaundice were presented. Most staff nurses were aged 21-30, male, Hindu, had other professional qualifications, had 0-5 years of experience, worked in NICU setups, were unmarried, attended in-service education, and observed fewer than 10 cases of neonatal jaundice(Table-2, Figure:1-10).

Table 2: Frequency and percentage distribution based on the socio demographic variable of staff nurses

S. No	Demographic variable	F	%
1.	**Age in year**		
	a) 21-30	36	90
	b) 31-40	3	7.5
	c) Above 40	1	2.5
2.	**Gender**		
	a) Male	26	65
	b) Female	14	35
3.	**Religion**		
	a) Hindu	35	87.5
	b) Muslim	5	12.5
	c) Christian	-	-
	d) Other	-	-
4.	**Professional qualification**		
	a) ANM	5	12.5
	b) GNM	5	12.5
	c) B.Sc. nursing	10	25
	d) Any other	20	50
5.	**Working experience in year**		
	a) 0-5	33	82.5
	b) 6-10	6	15
	c) 11-15	1	2.5
	d) >15	-	-
6.	**Do you have working experience in NICU set up**		
	a) Yes	28	70
	b) No	12	30

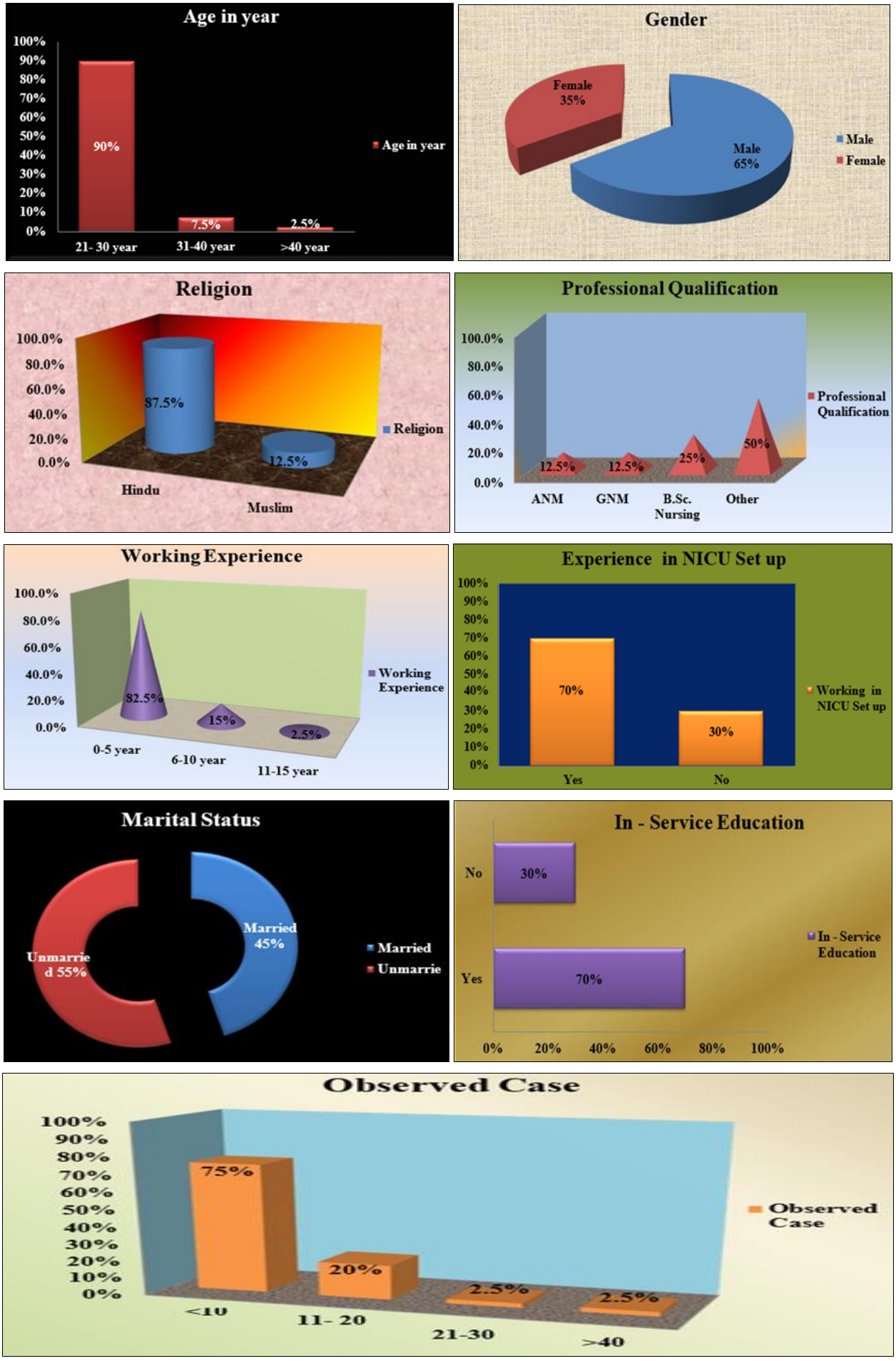

Fig 3: Demographic variables of staff nurses

Section B - Knowledge Levels

The majority of staff nurses had average knowledge (60%), followed by below-average knowledge (27.5%), and above-average knowledge (12.5%) (Table:3, Figure:11).

Table 3: Frequency and percentage distribution of knowledge level on neonatal jaundice and its management among staff nurses (n=40)

Knowledge levels of staff nurses on Neonatal jaundice and its management	Frequency	Percentage
Above average	5	12.5
Average	24	60
Below average	11	27.5

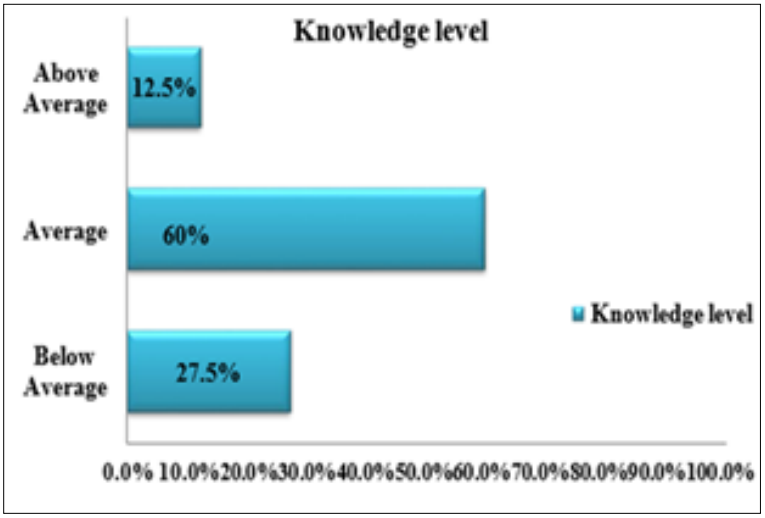

Fig 4: Knowledge levels of staff nurses

Section C - Overall Mean and Standard Deviation

The overall mean knowledge score among staff nurses was 16.8, with a standard deviation of 5.54(Table-4).

Table 4: Overall mean and standard deviation of knowledge score among staff nurses

Knowledge level of staff nurses	Mean	SD
	16.8	5.54

Section-D- Knowledge associations with demographic factors

This section illustrates the lack of significant associations between knowledge levels about neonatal jaundice and its management among staff nurses in Gonda, U.P., and various socio-demographic factors. Despite examining variables such as age, gender, religion, professional qualification, work experience, NICU exposure, and marital status, no statistically significant relationships were found. Consequently, the hypothesis H1 proposing significant associations between knowledge levels and socio-demographic variables was refuted. This suggests that factors beyond those studied may influence differences in knowledge levels among staff nurses (Table: 5).

Table 5: Association between knowledge level regarding neonatal jaundice and its management concerned staff nurse's, Gonda, U.P. (n=40)

Demographic Variable	Categories	Scores				Total		df S/NS P=0.05
		Average		Below Average				
		F	%	F	%	F	%	
Age in year	21-30	27	67.5	9	22.5	36	90	df= 2 TV = 5.99 CV =1.13 NS
	31-40	1	2.5	1	2.5	3	7.5	
	>40	1	2.5	1	2.5	1	2.5	
Gender	Male	17	42.5	9	22.5	26	65	df = 1 TV = 3.84 CV = 1.93 NS
	Female	12	30	2	5	14	35	
Religion	Hindu	27	67.5	8	20	35	87.5	df= 1 TV= 3.84 CV= 3.02 NS
	Muslim	2	5	3	7.5	5	12.5	
Professional Qualification	ANM	3	7.5	2	5	5	12.5	df = 3 TV = 7.82 CV= 1.88 NS
	GNM	4	10	1	2.5	5	12.5	
	B.Sc Nursing	6	15	4	10	10	25	
	Other	16	40	4	10	20	50	
Working Experience in Year	0-5	25	62.5	8	20	33	82.5	df = 3 TV= 7.82 CV=1.07 NS
	6-10	3	7.5	2	5	6	15	
	11-15	1	2.5	1	2.5	2	5	
working Experience in NICU set up	Yes	18	45	10	25	28	70	df= 1 TV= 3.84 CV=3.16 NS
	No	11	27.5	1	2.5	12	30	

Marital Status	Married	13	32.5	5	12.5	18	45	df = 1 TV = 3.84 CV = 0.00 NS
	Unmarried	16	40	6	15	22	55	
		29	72.5	11	27.5	40	100	
Attended in - service education regarding neonatal jaundice	Yes	19	47.5	9	22.5	28	70	df = 1 TV = 3.84 CV = 1.00 NS
	No	10	25	2	5	12	30	
Observed cases of neonatal jaundice during clinical practice	<10	22	55	8	20	30	75	df = 3 TV = 7.82 CV = 0.55 NS
	11-20	6	15	2	5	8	20	
	21-30	1	2.5	1	2.5	2	5	

Discussion

The discussion section delves into the implications and significance of the study's findings regarding the knowledge of staff nurses regarding neonatal jaundice and its management at SCPM super-specialty Hospital, Gonda, and U.P. The objectives aimed to assess this knowledge and explore potential associations with demographic variables, as hypothesized in H_1.

Firstly, the demographic profile of the staff nurses revealed important insights. The majority were young, predominantly male, Hindu, and held professional qualifications other than BSc nursing. Most had relatively limited work experience, although a significant proportion had exposure to NICU settings. Additionally, a majority had attended in-service education on neonatal jaundice but had observed few cases during clinical practice.

When examining knowledge levels, the study found that a substantial portion of staff nurses exhibited an average level of knowledge, with a smaller percentage falling into the below-average category. The mean knowledge score was moderately high, indicating a reasonable level of understanding overall.

However, when exploring potential associations between knowledge levels and socio-demographic variables, no significant relationships were identified. This suggests that factors such as age, gender, religion, professional qualification, work experience, NICU exposure, marital status, and in-service education attendance do not significantly influence the level of knowledge among staff nurses regarding neonatal jaundice.

These findings have several implications for nursing practice and education. Despite the absence of significant associations, they underscore the importance of ongoing education and training initiatives to ensure that staff nurses remain up-to-date on neonatal jaundice management practices. Additionally, efforts should be made to tailor educational programs to address specific areas where knowledge gaps may exist, particularly among those with limited clinical exposure.

Furthermore, the study highlights the need for further research to explore other potential factors that may influence knowledge levels among staff nurses. Factors such as individual learning styles, motivation, and access to resources could be considered in future investigations to provide a more comprehensive understanding of knowledge acquisition and retention in this context.

Overall, while this study contributes valuable insights into the knowledge of staff nurses regarding neonatal jaundice management, further research is needed to fully elucidate the complex interplay of factors that shape nursing knowledge and practice in this critical area.

Summary

Neonatal jaundice, characterized by yellowish discoloration of the eyes and skin in newborns due to elevated bilirubin levels, presents a significant concern for infants' health. Complications of neonatal jaundice can range from seizures to cerebral palsy and even death, making prompt and effective management essential. In the context of SCPM Super Specialty Hospital in Gonda, U.P., the present study aimed to assess the knowledge of staff nurses regarding neonatal jaundice and its management.

The findings revealed concerning gaps in staff nurses' knowledge regarding neonatal jaundice management. Despite being crucial frontline caregivers, many nurses demonstrated inadequate knowledge, as evidenced by low knowledge scores. This highlights a critical need for enhanced awareness and education among staff nurses in this hospital setting.

The implications of these findings extend across various domains of nursing practice, education, administration, and research:

1. **Nursing Practice:** Pediatric nurses bear a significant responsibility for newborn health and must ensure adequate knowledge and interventions for neonatal jaundice management. Health education campaigns and early treatment initiatives are vital components of nursing practice to address this issue effectively.
2. **Nursing Education:** Nurse Educators play a pivotal role in equipping staff nurses with essential knowledge and skills related to neonatal jaundice. Emphasis on teaching strategies and in-service education programs can help bridge knowledge gaps and enhance patient care.
3. **Nursing Administration:** Nurse Administrators are instrumental in guiding, monitoring, and planning educational initiatives to improve staff nurses' knowledge and competency in neonatal jaundice management. Policy-making and health education measures within the hospital setting are critical for fostering a culture of awareness and proactive intervention.

Nursing Research: The study's findings provide a foundation for further research endeavors aimed at addressing knowledge deficits and improving neonatal jaundice management practices. Replication of the study and the pursuit of evidence-based nursing practices are essential for advancing patient care in this area.

Recommendations

Recommendations for future studies related to neonatal jaundice and its management

1. **Longitudinal Studies:** Conduct longitudinal studies to assess the long-term outcomes of neonates with jaundice, including neurodevelopmental outcomes, hearing impairment, and quality of life measures. Follow cohorts of neonates over an extended period to

evaluate the impact of early management strategies on these outcomes.

2. **Risk Factor Analysis:** Explore the prevalence and significance of additional risk factors for neonatal jaundice, such as genetic predispositions, maternal factors, and environmental exposures. Investigate potential interactions between these factors and their impact on the severity and course of jaundice.
3. **Effectiveness of Interventions:** Evaluate the effectiveness of various interventions for the management of neonatal jaundice, including phototherapy protocols, exchange transfusion strategies, and novel pharmacological agents. Compare different treatment modalities in terms of efficacy, safety, and long-term outcomes.
4. **Health Economics Studies:** Conduct health economics studies to assess the economic burden of neonatal jaundice on healthcare systems and society. Evaluate the cost-effectiveness of different screening, diagnostic, and treatment approaches to inform resource allocation and policy decisions.
5. **Quality Improvement Initiatives:** Implement and evaluate quality improvement initiatives aimed at optimizing the management of neonatal jaundice in healthcare settings. Assess the impact of standardized protocols, interdisciplinary collaboration, and continuous education programs on patient outcomes and healthcare delivery efficiency.
6. **Telemedicine and Remote Monitoring:** Explore the feasibility and effectiveness of telemedicine and remote monitoring technologies for the management of neonatal jaundice in underserved or remote areas. Investigate the role of teleconsultation, tele diagnosis, and tele monitoring in improving access to care and reducing disparities in jaundice management.
7. **Parental Education Interventions:** Design and evaluate educational interventions targeting parents and caregivers to improve their understanding of neonatal jaundice, its signs, and the importance of timely medical evaluation. Assess the impact of parental education on early detection, treatment compliance, and healthcare utilization patterns.
8. **Impact of Cultural and Socioeconomic Factors:** Investigate the influence of cultural beliefs, socioeconomic status, and healthcare access barriers on the management of neonatal jaundice in diverse populations. Identify culturally sensitive approaches to promoting awareness, screening, and treatment adherence among at-risk communities.
9. **Translational Research:** Translate findings from basic science research on the pathophysiology of neonatal jaundice into clinical practice. Investigate potential biomarkers, genetic markers, and targeted therapeutic approaches for personalized management of jaundice in high-risk neonates.
10. **Global Collaborative Studies:** Foster international collaborations and multi-center studies to gather data on neonatal jaundice epidemiology, management practices, and outcomes across different geographic regions and healthcare settings. Pooling resources and expertise can facilitate the development of evidence-based guidelines and strategies for improving neonatal jaundice care on a global scale.

Conclusion

In conclusion, the study conducted at SCPM Super Specialty Hospital in Gonda, U.P., sheds light on the knowledge gaps among staff nurses regarding neonatal jaundice and its management. The findings revealed a concerning lack of knowledge among many nurses, highlighting the need for targeted interventions to improve awareness and competency in this critical area of newborn care.

Despite being frontline caregivers, many staff nurses demonstrated inadequate knowledge levels, as evidenced by low scores on the knowledge assessment tool. This indicates a potential risk for suboptimal care and underscores the importance of addressing these gaps promptly.

The study's implications extend beyond the hospital setting, emphasizing the critical role of nursing education, practice, administration, and research in ensuring optimal neonatal care. Nurse educators, administrators, and researchers play pivotal roles in addressing knowledge deficits, implementing evidence-based practices, and fostering a culture of continuous learning and improvement.

Moving forward, it is essential for healthcare institutions to prioritize staff education and training initiatives focused on neonatal jaundice management. By equipping nurses with the necessary knowledge and skills, we can enhance patient outcomes, minimize complications, and ensure the delivery of high-quality care to newborns in need.

In summary, this study underscores the urgency of addressing knowledge gaps among staff nurses regarding neonatal jaundice. Through targeted interventions, ongoing education, and a commitment to evidence-based practice, we can improve patient safety and quality of care for newborns in healthcare settings.

Declarations

Author's contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis, and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Conflict of interest

There is no expressed conflict of interest among the authors

Ethical clearance

SCPM College of nursing paramedical sciences, Haripur, Gonda, Uttar Pradesh, India-271003.

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Data availability

Data available within the manuscript

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