

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

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ABSTRACT

Because it increases infant morbidity and mortality, especially in low- and middle-income nations, neonatal hyperbilirubinemia continues to be a major worldwide health concern. Although there are still gaps in professional practice and understanding, nurses are essential in the early detection, monitoring, and treatment of newborn jaundice. The purpose of this study was to assess how well nurses' knowledge, practice, and management of hyperbilirubinemia in newborns were affected by educational interventions, such as structured teaching programs and Continuous Nursing Education (CNE).

Quasi-experimental, pre-experimental, randomized controlled, and descriptive studies with sample sizes ranging from 29 to 202 people were reviewed. Structured instructional modules, phototherapy training, and CNE programs emphasizing risk factors, clinical evaluation, and management procedures were among the interventions. Improvements in clinical procedures, patient outcomes, and knowledge scores were evaluated using outcome measures.

Findings consistently demonstrated significant improvements in nurses' knowledge and clinical performance following educational interventions. Knowledge scores significantly improved after the intervention; several studies reported mastery levels above 90%. Improved early detection, precise jaundice measurement, prompt phototherapy commencement, and suitable referral were among the improved clinical practices. Additionally, comprehensive nursing care interventions were associated with reduced serum bilirubin levels, faster recovery, and higher caregiver satisfaction.

The findings demonstrate the effectiveness of planned educational interventions and continuing professional development programs in closing knowledge-practice gaps among nurses. Better newborn outcomes and the avoidance of problems like kernicterus and neurological damage are closely correlated with increased nursing competency.

In conclusion, to improve newborn care services, healthcare systems must incorporate frequent, evidence-based instructional initiatives. To guarantee long-lasting advancements in the treatment of neonatal hyperbilirubinemia, emphasis should be made on the development of practical skills, ongoing training, and institutional support.

How to cite this article: Vungbiaklun, Yadav S, Kulpooja. Effect of educational interventions on nurses' knowledge, practice, and management of hyperbilirubinemia in neonates. *Int J Drug Deliv Technol.* 2026;16(73s): 382-397. DOI: 10.25258/ijddt.16.73s.43

INTRODUCTION:

One of the main reasons neonates are readmitted to hospitals worldwide is neonatal jaundice, which continues to be a widespread clinical problem (1). About 60% of term babies and up to 80% of preterm babies are affected, and prompt assessment and treatment are frequently necessary to avoid serious consequences like morbidity and death (2). Serum bilirubin levels that above the threshold for apparent jaundice in neonates at far lower concentrations than in adults are the hallmark of

hyperbilirubinemia, which typically presents as yellowish discoloration of the skin and sclera. Approximately 1.1 million babies worldwide are estimated to develop hyperbilirubinemia each year, putting over 20 million at risk for its effects and highlighting the discharge using either transcutaneous or serum measurement. However, issues with resource availability, knowledge sharing, and procedure adherence continue to exist in low- and middle-income nations, resulting in less than ideal results (3). The awareness, expertise,

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

and clinical competence of nursing personnel, who are at the forefront of care in neonatal units, are critical to the prompt and efficient management of newborn jaundice (4). When it comes to the early detection, monitoring, and application of treatments like phototherapy and, in extreme situations, exchange transfusions, nurses are essential. Their duties include training caregivers, getting newborns ready for procedures, and avoiding treatment-related side effects such as retinal damage from phototherapy or exchange transfusion difficulties (5, 6). Despite their crucial role, research shows that nurses continue to have knowledge and practice gaps that can lead to avoidable negative outcomes, especially in situations when sociocultural views or false information may further obstruct prompt response (1, 7).

There was little proof that the treatment for neonates' hyperbilirubinemia was effective. In healthy newborns with jaundice, phototherapy showed an absolute risk reduction rate of 10% to 17% for preventing serum bilirubin levels more than 20 mg/dl. Phototherapy for neonatal hyperbilirubinemia does not appear to have any long-term detrimental consequences on neurodevelopment. (8)

The majority of cases are physiological and go away on their own, but a sizable percentage can develop into pathological jaundice, which, if left untreated, can cause acute bilirubin encephalopathy, kernicterus, and long-term neurodevelopmental problems. Early identification of newborn jaundice has a direct impact on the clinical outcome and is an essential part of neonatal care. Delays in diagnosis greatly increase preventable newborn morbidity and mortality, particularly in environments with few diagnostic resources. Early detection is mostly dependent on the clinical evaluation abilities of frontline healthcare workers, particularly nurses, in many low- and middle-income countries (LMICs) where access to prompt laboratory bilirubin measurement may be restricted. Signs of jaundice because they are the primary caregivers who regularly inspect the newborn. However, a number of studies have revealed significant gaps in nursing staff members' knowledge and proficiency with relation to the identification, evaluation, and treatment of newborn jaundice. For instance, a cross-sectional study conducted in Nigeria by Ogunlesi et al. (2011) [9] revealed that only a tiny percentage of nurses could accurately recognize the warning symptoms necessitating immediate intervention, and less than 50% of them were aware of the threshold bilirubin levels linked to kernicterus.

A crucial tactic to guarantee nurses' and midwives' continuous professional development and competence improvement is Continuous Nursing

Education (CNE). It keeps them informed on the most recent developments in patient care technology, clinical guidelines, and evidence-based procedures. Health authorities, such as the WHO and the International Council of Nurses (ICN), have strongly supported CNE programs as a way to develop a skilled and adaptable nursing workforce. CNE projects have shown successful in enhancing nursing practices in areas including thermoregulation, infection control, breastfeeding support, and neonatal resuscitation, especially in neonatal care. However, despite the acknowledged significance of CNE, its application is still uneven in healthcare settings, particularly in settings with limited resources. Poor uptake and impact of educational interventions are caused by a number of factors, including staffing shortages, a lack of institutional support, restricted access to standardized learning modules, and the absence of monitoring mechanisms. Additionally, the practical emphasis of CNE courses is sometimes lacking, which makes it challenging for nurses to apply theoretical knowledge in clinical settings. It is imperative that these programs be designed to increase patient contact and on-the-ground decision-making in addition to cognitive knowledge. In the context of neonatal jaundice, the integration of structured CNE programs can empower nurses to make timely clinical judgments based on observed symptoms, risk profiling, and established care protocols. For instance, nurses trained to recognize jaundice progression from cephalocaudal patterns, assess the neonate under appropriate lighting, and apply standard tools like the Kramer scale or transcutaneous bilirubinometry are far more effective in triaging cases and initiating early referrals. Moreover, CNE can sensitize nurses to specific risk factors, such as prematurity, ABO/Rh incompatibility, G6PD deficiency, and exclusive breastfeeding in the first few days, thereby reinforcing anticipatory care strategies. The growing importance of nurse-led care models in newborn units should also be noted, especially in LMICs where doctors might not always be readily available. In these situations, trained nurses are essential in starting phototherapy, teaching mothers about warning symptoms, keeping an eye on bilirubin levels, and preventing the condition from getting worse. As a result, regular and focused nursing education that is adapted to particular clinical circumstances like jaundice is essential. Positive results from educational activities in newborn care have been reported in a number of prior interventional trials. For instance, Olusanya et al. (2018) showed in a randomized control study that a short instructional program on jaundice greatly enhanced the accuracy of visual jaundice diagnosis and raised referral rates among nurses in Lagos, Nigeria. In a similar vein, post-training evaluations in an Indian

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

study by Sharma et al. (2019) [10] demonstrated a 40% increase in nurses' knowledge of phototherapy start thresholds. These results offer compelling evidence in favor of making structured, recurrent CNE a common part of newborn service delivery frameworks.

Ghana has seen increasing trend of cases of NNJ from 2015 to 2019 with 3,031, 4,251, 5,338, 7,175, and 9,273 cases of NNJ, respectively ([Ghana Health Service, 2019](#); [Salia et al., 2021](#)). A cross-sectional study in the Central Region of Ghana reported NNJ prevalence of 66.7% ([Adoba et al., 2018](#)). Another study found that the severe form of NNJ was a common presentation among children receiving care at a neurologic clinic in Ghana ([Adei-Atiemo et al., 2015](#)). In the Tamale Metropolis, another cross-sectional study reported a 9.7% prevalence of severe NNJ ([Abdul-Mumin et al., 2021](#)).

Most previous studies on knowledge, attitudes, and practices (KAP) towards NNJ across the globe have largely been limited to caregivers and mothers ([Al-Zamili & Saadoon, 2020](#); [Onyearugha et al., 2016](#); [Saud et al., 2016](#)). Similarly, in Ghana, studies on KAP towards NNJ have focused on mothers ([Abdul-Mumin et al., 2021](#); [Salia et al., 2021](#); [Seneadza et al., 2022](#)). These studies reported deficits in KAP towards NNJ. The important question is what is the KAP of health workers, particularly nurses and midwives towards NNJ? Studies conducted elsewhere that involved health workers reported varying proportions of KAP towards NNJ ([Alemu et al., 2011](#); [Issa et al., 2018](#); [Mirza & Atrushi, 2019](#); [Shehu et al., 2019](#)). Nurses' role in the quest to attain the Sustainable Development Goal-3 and towards reducing neonatal mortalities and morbidities is significant. In the case of NNJ, this role extends from managing the condition to providing nursing health education to mothers on preventive and remedial measures. It is a common knowledge that one can only give what he/she has and therefore, nurses and midwives can only offer what they have including their KAPs. However, the KAPs of nurses and midwives towards NNJ are not well understood in the only tertiary hospital that serves the northern parts of Ghana. The study therefore assessed the KAPs of nurses and midwives towards the management of NNJ at a tertiary health facility in the Tamale Metropolis, Northern Region, Ghana.

The normal level of bilirubin in the blood is 5 -7 mg/dl. Five percent of neonates have blood bilirubin levels of 17 mg/dL, and only 1.2% of this reaches 20 mg/dl. It is considered high; >25 mg/dL, very high; >30 mg/dl. Elevated bilirubin levels are recognized as a neurological risk factor for both premature and full-term infants. Other contributing factors include premature delivery, low birth

weight, intrauterine growth restriction, perinatal asphyxia, sepsis, bronchopulmonary dysplasia, neonatal hypoglycemia, periventricular leukomalacia, and intraventricular hemorrhage. (Merino, 2024)

Hyperbilirubinemia can be caused by various conditions in babies. Hemolysis is the main cause which is brought on by a G6PD enzyme deficiency or ABO blood group incompatibility. RH blood incompatibility or closed bleeding (hematoma and hemorrhage) may be the causes in this hemolysis because of the infant's sepsis and gastroenteritis. It results due to enterohepatic reabsorption and enzyme deficiency. Jaundice might also result from an inadequate milk supply because there is a low milk supply on the first day. Therefore, due to inadequate food intake, food does not bind to direct bilirubin once it reaches the intestine and does not eliminate through the anus. (Fadliyah , 2022)

phototherapy can improve the jaundice symptoms of the trunk, face, and neck of children with neonatal jaundice, and can reduce serum bilirubin levels. In order to further shorten the duration of jaundice symptoms in children with neonatal jaundice, it is particularly important to strengthen nursing intervention. Studies have found that taking scientific and reasonable nursing measures can accelerate the disappearance of jaundice symptoms in children, improve and stabilize the condition of children, and help improve the nursing effect. Although conventional nursing also plays a certain role in the process of jaundice in children with neonatal jaundice, it cannot fundamentally meet the nursing needs of children with neonatal jaundice. Comprehensive nursing has a relatively high application value in modern clinical practice, is suitable for neonatal nursing, and can have a positive impact on the control of the condition of children with neonatal jaundice. Therefore, 60 cases were randomly selected from 58 neonatal jaundice patients admitted to our hospital from March 2023 to March 2024 as research subjects to study the clinical intervention effect of comprehensive nursing [11].

METHODOLOGY

Author	Year	Study design	Sample size	Intervention	Outcome measures	Result
Misbah Tariq et.al	2025	quasi-experimental	35	structured educational intervention	nurses' knowledge, practice, and	structured educational interventions

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

		pre-and post-test design		venti on	manag ement of neonat al hyperb ilirubi nemia,	signifi cantly impro ve nurses ' knowl edge, practic e, and manag ement capabi lities concer ning hyperb ilirubi nemia in neonat es, with post-interve ntion master y in key domai ns surpass ing 90%
Yadav U. et.al	2022	pre-experim ental one group pre test and post test desi gn.	50	educ ation al inter venti on	knowl edge of the Nurses regard ing care of neonat es under photot herapy	educat ional interve ntion on knowl edge regard ing care of neonat es under photot herapy is effecti ve in impro ving the knowl edge level of the nurses

Tanvir Alam	2024	quasi-experim ental pre-test and post-test study	60	struc tured CNE progr am	nurses ' knowl edge, confid ence, and clinica l vigilan ce in the early detecti on of neonat al jaundi ce.	The signifi cant impro vemen ts in both theoret ical knowl edge and practic al applic ation observ ed among the interve ntion group reflect the effecti veness of structu red educat ional progra ms in neonat al care setting s. Nurses who receiv ed targete d CNE were more vigilan t, accura te in clinica l assess ment, and timely in referri

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

					ng neonates for further management, contributing to the prevention of complications associated with untreated hyperbilirubinemia.
Doreen Rember Donkor et.al	2023	descriptive cross-sectional study	202	substantial knowledge, attitudes, and practices of nurses and midwives towards the management of neonatal jaundice.	The participants demonstrated substantial KAPs towards NNJ.
Adhikari et.al	2025	A scoping review method	13 articles	nursing interventions	knowledge and understanding of nursing interventions are essential in early detection and treatment of neonatal jaundice

					ce to enhance neonatal care.	s of newborn's jaundice such as kernicterus and neurological abnormalities
Yang Liu	2025	RC T	29	Comprehensive nursing services	clinical intervention effect of comprehensive nursing	comprehensive nursing care is effective, can reduce the serum bilirubin level of children with neonatal jaundice, can promote the disappearance of jaundice, and help improve the prognosis of children with neonatal jaundice.

RESULTS:

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Misbah et al : Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

items	Pre inter venti on	Post inter venti on	Pre interve ntion percent age/me an	Post inter venti on perce ntage	Effect iveness perce ntage
Know ledge, Practi ce, and Mana geme nt Score s:	66.6 (4.8)	81.2 (4.5)	14.6 (4.83)	0.3	12.96 to 16.23
Yello wish staini ng of skin/e yes jaundi ce	---	---	100.0	100.0	0
Blood group dispar ity can cause jaundi ce	---	---	88.6	100.0	+11.4
Prema ture birth may result in jaundi ce	---	---	60.0	74.3	+14.3
Breast feedin g might result in jaundi ce	---	---	31.4	65.7	+34.3
Cold water causes jaundi	---	---	0.0	0.0	0

ce (myth)					
Delay ed mecha nisms may cause jaundi ce	---	---	77.2	74.3	-2.9
Jaundi ce can cause brain dama ge	---	---	77.2	100.0	+22.8
Jaundi ce can render a child physic ally handi cappe d	---	---	68.6	100.0	+31.4
Jaundi ce leads to convu lsions	---	---	42.9	100.0	+57.1
Jaundi ced baby may die	---	---	40.0	80.0	+40.0
Jaundi ce baby feeds very poorly	---	---	57.1	85.7	+28.6

Yadav U et al: Effectiveness of Educational Intervention on Knowledge Regarding Nursing Care of Neonates under Phototherapy for Neonatal Jaundice Among Staff Nurses of Selected Wards of BPKIHS

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Table No.1: Pre test & post test knowledge score of Nurses (N = 50)

S I N O	VARIA BLES	PRE TEST		POST TEST	
		Knowle dge score	Frequ ency(N)	Frequ ency(N)	Perce ntage(%)
1	Adequat e(>65%)	6	12.0	21	42
2	Moderat e (30- 65%)	44	88.0	29	58
3	Inadequ ate(<30 %)	0	0.0	0	0.0

Table 2 Association between Pre-test and Post-Test Mean Knowledge Score of Nurses N=50

SN	Variables	Mean SD	±	P-Value
1	Pre-Test Knowledge Score	18.0	± 2.03	<0.0001*
2	Post-Test Knowledge Score	20.16	± 1.79	

Table 3: Association of Independent Variables with Knowledge of the Nurses Regarding care of baby under Phototherapy (Pre Test) N=50

S N	Variabl es	Knowledge level (Pre test)		P- Val ue	Remar ks
		modera te	inadequ ate		
1	Age Catego ry			0.54	NS
	≤23 years	19(38 %)	3(6%)		
	>23 years	25(50 %)	3(6%)		
2	Workin g Area			0.67	NS
	Wards	15(30%)	2(4%)		

	Clinica l Areas	29(58%)	4(8%)		
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Tanvir Alam: Impact of continuous nursing education on early detection of neonatal jaundice

Knowledge Score Improvement

Knowledge Domain	Pre-Test Mean (%)	Post-Test Mean (%)	Mean difference (%)	P-Value
Risk Factors	48.7	85.3	+36.6	<0.001
Visual Signs	51.2	88.4	+37.2	<0.001
Bilirubin Levels	56.0	89.0	+33	<0.001
Total Score	52.3	87.6	+35.3	<0.001

There was a statistically significant increase in the knowledge score of the intervention group after the CNE program. No significant change was observed in the control group. **Clinical Observation Outcomes**

Clinical Behavior	Pre-CNE (%)	Post-CNE (%)	Change (%)
Documenting jaundice signs within 48 hrs	58	90	+32
Use of TcB meter within first 72 hrs	56	88	+42
Timely referral to pediatrician	49	81	+42

[Doreen Remember Donkor](#) et.al ,Neonatal Jaundice Management: Knowledge, Attitude, and Practice Among Nurses and Midwives in the Northern Region, Ghana

Variables	Categories	Frequ ncy (n)	Percent age (%)
Definition of neonatal	Yellow discoloration of	133	65.80

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Variables	Categories	Frequency (n)	Percent age (%)
jaundice (select all that apply)	sclera of the eye		
	Yellow discoloration of skin	69	34.20
Causes/risk factors of jaundice (select all that apply)	Massive RBCs destruction	115	56.90
	Short lifespan of RBCs	97	48.00
	Immature liver & increased enterohepatic circulation	36	17.80
	Low albumin level	108	53.50
	Immature intestine	7	3.50
Normal neonate will appear jaundiced when serum bilirubin level reaches	1–2 mg/dl	4	2.00
	2–4 mg/dl	3	1.50
	5–7 mg/dl or greater	195	96.50
Blood group combinations will put a baby at risk (select all that apply)	Mother and father both BRH (+)	2	1.00
	Mother ARH (-), father ORH (-)	16	7.90

Variables	Categories	Frequency (n)	Percent age (%)
	Mother ARH (+), father ORH (+)	99	49.00
	Mother ORH (+), father BRH (+)	85	42.10
Signs and symptoms of NNJ (select all that apply)	Discoloration of the skin and eyes	202	100.00
	Poor feeding	113	55.90
	Arching of the back	76	37.60
	Seizures	87	43.10
	Diarrhea	7	3.50
Source of information about NNJ (select all that apply)	School	115	56.90
	In-service training	61	30.20
	On the job	117	57.90
	Media (radio/television/internet)	36	17.80
	Colleagues	27	13.40
Ever trained on neonatal jaundice	Yes	53	26.20
	No	149	73.80
Focus of training	Causes and management of neonatal jaundice	47	23.30
	None	155	76.70
Last training on neonatal	A year or above	23	11.40

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Variables	Categories	Frequency (n)	Percentage (%)
jaundice			
	Less than a year	179	88.60
NNJ can be treated by (select all that apply)	Medication	95	47.00
	Phototherapy	202	100.00
	Blood exchange	56	27.70
	Sun exposure	22	10.90
	Ventilation	3	1.50
NNJ can cause death of a baby	Yes	140	69.30
	No	62	30.70
Complications of NNJ (select all that apply)	Cerebral palsy	24	11.90
	Deafness	89	44.10
	Kernicterus	197	97.50
Overall knowledge of neonatal jaundice	Good knowledge	140	69.30
	Poor knowledge	62	30.70

Table 3: Nurses and Midwives' Attitudes Towards Neonatal Jaundice in the Tamale Metropolis

Variables	Categories	Frequency (n)	Percentage (%)
Are nurses and midwives responsible	Yes	164	81.20

Variables	Categories	Frequency (n)	Percentage (%)
for the care of neonates with NNJ?			
	No	38	18.80
Nurses' responsibility in the care of neonates with NNJ (select all that apply)	Encourage mothers to breastfeed immediately after birth	121	59.90
	Assess the neonate's skin for early detection of the condition	153	75.70
	Ensure neonate maintains fluid balance in the body	101	50.00
	Cover neonate's eyes during phototherapy	187	92.60
	Change position frequently, especially during the first several hours of treatment	121	59.90
NNJ can be prevented?	Yes	178	88.10
	No	24	11.90
Oral water with sugar can treat jaundice?	Yes	1	0.50
	No	201	99.50

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Variables	Categories	Frequency (n)	Percentage (%)
Physiological jaundice can be treated at home with early morning sun	Yes	55	27.20
	No	147	72.80
Overall attitude toward NNJ	Good attitude	131	64.90
	Poor attitude	71	35.10

Table 4: Nurses and Midwives' Practices Towards Neonatal Jaundice in the Tamale Metropolis

Variables	Categories	Frequency (n)	Percentage (%)
Number of years in current unit	Less than 5 years	196	97.00
	5 years and above	6	3.00
Are you involved in the care of neonates with NNJ?	Yes	116	57.40
	No	86	42.60
How would you check a baby for the presence of jaundice? (Select all that apply)	By the yellow color of the skin, nail and sclera of the eye	202	100.00
	By looking at the palms or soles of the foot	95	47.00
	By the color of the	21	10.40

Variables	Categories	Frequency (n)	Percentage (%)
	urine		
	By the color of the stool	61	30.20
Nursing care during phototherapy (Select all that apply)	Cover eyes with eye patches to prevent eye injury	192	95.00
	Close eyes before applying eye patches	147	72.80
	Eye patches should be loose enough to avoid pressure	150	74.30
	Eye patches should be changed every 8 h and eye care given	129	63.90
Complications observed during phototherapy practice (Select all that apply)	Overheating	158	78.20
	Water loss and dehydration	111	55.00
	Diarrhea	16	7.90
	Rash	64	31.70
	Retinal damage	186	92.10
Overall practice	Good practice	127	62.90

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Variables	Categories	Frequency (n)	Percentage (%)
	Poor practice	75	37.10

Table 5: Association Between Knowledge, Attitudes and Sociodemographic Characteristics

Variables	Categories	Knowledge Good n (%)	Knowledge Poor n (%)	p-value (χ^2)	Attitude Good n (%)	Attitude Poor n (%)	p-value (χ^2)
Sex	Female	99 (68.8)	45 (31.3)	0.79 (0.07)	94 (65.3)	50 (34.7)	0.84 (0.04)
	Male	41 (70.7)	17 (29.3)		37 (63.8)	21 (36.2)	
Age (years)	21–30	88 (82.2)	19 (17.8)	<0.001 (19.6)	86 (80.4)	21 (19.6)	<0.001 (24.1)
	31–40	51 (56.0)	40 (44.0)		43 (47.3)	48 (52.7)	
	41–50	1 (25.0)	3 (75.0)		2 (50.0)	2 (50.0)	
Highest educational qualification	Postgraduate	2 (100.0)	0 (0.0)	0.024 (9.4)	2 (100.0)	0 (0.0)	0.013 (10.8)
	Degree	29 (54.7)	24 (45.3)		28 (52.8)	25 (47.2)	
	Diploma	87 (71.9)	34 (28.1)		78 (64.5)	43 (35.5)	
	Certificate	22 (84.6)	4 (15.4)		23 (88.0)	3 (12.0)	

Variables	Categories	Knowledge Good n (%)	Knowledge Poor n (%)	p-value (χ^2)	Attitude Good n (%)	Attitude Poor n (%)	p-value (χ^2)
Rank	Enrolled nurse	23 (85.7)	4 (14.8)	<0.001 (25.0)	23 (85.2)	4 (14.8)	<0.001 (32.3)
	Staff nurse/midwife	63 (55.3)	51 (44.7)		55 (48.2)	59 (51.8)	
	Senior staff nurse/midwife	28 (84.8)	5 (15.2)		28 (84.8)	5 (15.2)	
	Nursing/midwifery officer	19 (90.5)	2 (9.5)		18 (85.7)	3 (14.3)	
	Senior nursing/midwifery officer	7 (100.0)	0 (0.0)		7 (100.0)	0 (0.0)	
Years of experience	≤3 years	126 (70.0)	54 (30.0)	0.54 (0.37)	116 (64.4)	64 (35.6)	0.73 (0.12)
	>3 years	14 (63.6)	8 (36.4)		15 (68.2)	7 (31.8)	
Current unit	CWC	34 (69.4)	15 (30.6)	0.02 (11.7)	28 (57.1)	21 (42.9)	0.018 (12.0)
	Labor ward	18 (50.0)	18 (50.0)		17 (47.8)	19 (52.2)	
	NICU	42 (82.4)	9 (17.6)		41 (80.4)	10 (19.6)	
	Postnatal ward	34 (73.9)	12 (26.1)		31 (67.4)	15 (32.6)	

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Variables	Categories	Knowledge Good n (%)	Knowledge Poor n (%)	p-value (χ^2)	Attitude Good n (%)	Attitude Poor n (%)	p-value (χ^2)
	Theater staff	12 (60.0)	8 (40.0)		14 (70.0)	6 (30.0)	

Table 6: Predictors of Good Practices Towards Neonatal Jaundice Management

Variables	Categories	Good n (%)	Poor n (%)	p-value (χ^2)	CO R (95% CI)	p-value	A O R (95% CI)	p-value
Sex	Male	37 (63.8)	21 (36.2)	0.86 (0.03)	Ref*			
	Female	90 (62.5)	54 (37.5)		1.06 (0.56–1.99)	0.86	—	—
Age	21–30 years	81 (75.7)	26 (24.3)	<0.001 (16.0)	Ref*		Ref*	
	31–40 years	44 (48.4)	47 (51.6)		0.30 (0.16–0.55)	<0.001	0.81 (0.32–2.02)	0.65
	41–50 years	2 (5.0)	2 (5.0)		0.32 (0.04–2.39)	0.27	2.12 (0.12–34.05)	0.60
Highest education	Non-degree	90 (62.1)	55 (37.9)	0.91 (0.0)	0.22 (0.0)	0.018	—	—

Variables	Categories	Good n (%)	Poor n (%)	p-value (χ^2)	CO R (95% CI)	p-value	A O R (95% CI)	p-value
Professional qualification				13)	6–0.78)			
	Degree	34 (63.0)	20 (37.0)		0.13 (0.03–0.49)	0.002	—	—
Rank	Enrolled nurse	19 (70.4)	8 (29.6)	0.012 (8.81)	Ref*		Ref*	
	Staff nurses	82 (56.6)	63 (43.4)		0.15 (0.05–0.45)	<0.001	0.25 (0.05–1.40)	0.12
	Nursing/midwifery officers	23 (85.2)	4 (14.8)		1.26 (0.28–5.59)	0.76	0.32 (0.04–2.42)	0.27
Years of experience	≤5 years	114 (63.3)	66 (36.7)	0.70 (0.15)	Ref*		—	—
	>5 years	13 (59.1)	9 (40.9)		0.83 (0.34–2.06)	0.70	—	—
Current unit	CWC	26 (53.1)	23 (46.9)	0.044 (9.8)	Ref*		Ref*	
	Labor	19	17		0.9	0.9	0.3	0.1

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Variables	Categories	Good n (%)	Poor n (%)	p-value (χ^2)	CO R (95 % CI)	p-value	A O R (95 % CI)	p-value
	ward	(52.8)	(47.2)		9 (0.42–2.34)	8	3 (0.08–1.37)	0
	NICU	40 (78.4)	11 (21.6)		3.14 (1.31–7.51)	0.01	3.21 (0.92–11.24)	0.07
	Postnatal ward	31 (67.4)	15 (32.6)		1.89 (0.82–4.33)	0.13	2.79 (0.80–9.70)	0.11
	Theater staff	11 (55.0)	9 (45.0)		1.08 (0.38–3.07)	0.88	1.35 (0.30–5.99)	0.70
Overall knowledge	Poor knowledge	11 (17.7)	51 (82.3)	<0.001 (78.05)	Ref *		Ref *	
	Good knowledge	116 (82.9)	24 (17.1)		22.41 (10.21–49.18)	<0.001	7.66 (2.76–21.21)	<0.001
Overall attitude	Poor attitude	14 (19.7)	57 (80.3)	<0.001 (87.34)	Ref *		Ref *	
	Good attitude	113	18 (1)		25.00	<0.001	8.73	<0.001

Variables	Categories	Good n (%)	Poor n (%)	p-value (χ^2)	CO R (95 % CI)	p-value	A O R (95 % CI)	p-value
		(86.3)	3.7		(11.86–55.07)		(3.39–22.47)	

Adhikari et.al: Nursing Intervention of Neonatal Jaundice in a Pediatric Ward

Authors have presented the result part with two themes which include Detection and Intervention Outcomes. In the table, along with themes, each theme has its subthemes as well. Themes and subthemes are illustrated in the table below.

Table 2 Themes and Subthemes

THEME	SUBTHEME
Detection	Screening and monitoring
	Knowledge and Training
Interventions outcomes	Clinical results
	Nursing performance
	Feeding support

Yang Liu :Study on the Application Effect of Comprehensive Nursing in Neonatal Jaundice Nursing

1.Nursing effect

After the intervention, the nursing effect of the children in the observation group was more significant and superior to that of the control group (P < 0.05) (see Table 1).

Table 1: Comparison of Nursing Effects Between the Two Groups of Children (n/%)

Group	n	Significant Effect n (%)	Effective n (%)	Invalid n (%)	Total Effectiveness n (%)
Observation Group	29	21 (72.41)	6 (20.69)	2 (6.90)	27 (93.10)
Control	2	17	5	7 (24.1)	22 (75.86)

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

Group	n	Significant Effect n (%)	Effective n (%)	Invalid n (%)	Total Effectiveness n (%)
Group	9	(58.62)	(17.24)	4)	
χ^2 value					8.765
P-value					<0.05

2 Clinically relevant indicators

After the intervention, the children in the observation group quickly recovered from jaundice and their bilirubin levels dropped significantly. Compared with the control group, the difference was significant ($P < 0.05$) see table 2

Table 2: Comparison of Clinical Indicators Between the Two Groups of Children (Mean $\pm$ SD)

Group	n	Recovery Time (days)	Time of First Bowel Movement (hours)	Serum Bilirubin Level ($\mu\text{mol/L}$)
Observation Group	29	8.54 $\pm$ 1.07	42.43 $\pm$ 10.55	105.65 $\pm$ 8.77
Control Group	29	12.22 $\pm$ 1.11	72.54 $\pm$ 10.76	176.54 $\pm$ 7.43
t-value		10.654	8.776	9.123
P-value		<0.05	<0.05	<0.05

3 Satisfaction

After the intervention, the family members of the children in the observation group were more satisfied, and the difference was statistically significant compared with that in the control group ($P < 0.05$) (see Table 3)

Table 3: Comparison of Patient Satisfaction Between the Two Groups (n/%)

Group	n	Very Satisfied n (%)	Generally Satisfied n (%)	Dissatisfied n (%)	Overall Satisfaction n (%)
Observation Group	29	21 (72.41)	7 (24.14)	1 (3.45)	28 (96.55)
Control Group	29	16 (55.17)	6 (20.69)	7 (24.14)	22 (75.86)
χ^2 value					5.654
P-value					<0.05

Group	n	Very Satisfied n (%)	Generally Satisfied n (%)	Dissatisfied n (%)	Overall Satisfaction n (%)
Observation Group	29	21 (72.41)	7 (24.14)	1 (3.45)	28 (96.55)
Control Group	29	16 (55.17)	6 (20.69)	7 (24.14)	22 (75.86)
χ^2 value					5.654
P-value					<0.05

DISCUSSION:

The study, according to Misbah Tariq and colleagues, reaffirmed the clinical necessity of funding organized, evidence-based nursing education to improve neonatal outcomes, especially in areas with low resources. These interventions have the potential to close persistent knowledge practice gaps, improve patient safety, and support the professional development of neonatal nursing staff when they are used as part of an all-encompassing, system-level approach that includes standardized protocols, multidisciplinary collaboration, and ongoing feedback. (7,22).

A study by Yadav and colleagues found that staff nurses responded very well to an educational intervention on nursing care of neonates under phototherapy. It demonstrates that at the 5% level of significance, independent variables with the nurses' knowledge of how to care for a baby under phototherapy (Pre-Test) were not found to be significant. The study finds that the participants' knowledge was improved by the intended teaching program. The results of this study contradict those of Garg AK et al.'s study, which found a significant correlation between nurses' pre-test knowledge scores and demographic variables including age and area of placement.

The Tanvir Alam study shows that after a comprehensive Continuous Nursing Education (CNE) program focused on neonatal jaundice was implemented, nurses' clinical practices and understanding clearly and statistically significantly improved. Additionally, this study supports the global focus on task-sharing and capacity building in the field of maternity and child health.

Doreen Recalls Donkor and associates: The results demonstrated that most study participants had

Effect of Educational Interventions on Nurses' Knowledge, Practice, and Management of Hyperbilirubinemia in Neonates

positive opinions on NNJ. This is crucial to guarantee proper treatment of the illness, particularly in the research region. The study found that nurses and midwives play a crucial role in the early detection of NNJ through physical examination, covering the neonate's eye during phototherapy, and indicating that nurses and midwives are responsible for the care of NNJ. Positive treatment outcomes will result from nurses' roles and duties in the care of newborns with jaundice being acknowledged and accepted. The results demonstrated that positive attitudes and knowledge were positively correlated with NNJ practices.

Yasmin Adhikari and colleagues have recognized that improving the infant outcome requires both clinical intervention and compassionate care. Early detection is a result of timely screening, and timely treatment is a result of early detection. In any healthcare context, the combination of these elements improves newborn care and results in favorable clinical outcomes. As aspiring nurses, we have also discovered that, while working in both pediatric and maternity wards, offering mothers support and encouragement during the postpartum period might improve breastfeeding because moms are more likely to feed their infants regularly.

After nursing, Yang Liu discovered that the children in the observation group had earlier jaundice removal times and first defecation times than the children in the control group. They also had lower serum bilirubin levels than the children in the control group. The data from the two groups differed, and the findings demonstrated that the application effect of comprehensive nursing in neonatal jaundice nursing is definite. It was discovered that there were very few families who were unhappy with the extensive nursing provided to the children in the observation group. Comprehensive nursing was acknowledged by the families of children with neonatal jaundice and played a significant role in controlling the condition of the children and improving their symptoms, even though there were also very satisfied families in the control group. The overall satisfaction needed to be improved. The aforementioned study findings support the usefulness of comprehensive nursing in the treatment of newborn jaundice.

CONCLUSION:

With post-intervention competence in important domains above 90%, Misbah Tariq and colleagues showed that structured educational interventions greatly enhance nurses' knowledge, practice, and management capabilities regarding hyperbilirubinemia in newborns.

Yadav and associates came to the conclusion that educating nurses on the treatment of newborns receiving phototherapy is a successful way to raise their level of expertise.

The Tanvir Alam study highlighted the critical impact that Continuous Nursing Education (CNE) plays in improving frontline nursing staff's ability to identify infant jaundice early. The intervention group's notable gains in theoretical understanding and practical application demonstrate the value of organized educational initiatives in neonatal care environments. In order to reduce problems related to untreated hyperbilirubinemia, nurses who received targeted CNE were more watchful, accurate in clinical assessment, and prompt in sending neonates for additional therapy.

Doreen Remember Donkor and associates Significant KAPs toward NNJ were shown by the individuals.

Adhikari and associates showed that they need to improve the skills of nurses, employ evidence-based care practices, keep up with new interventions and procedures, and conduct additional research. That would improve neonatal clinical outcomes by ensuring every newborn with jaundice received appropriate and prompt treatment from nursing interventions.

Yang Liu study signified that comprehensive nursing care proved beneficial for children with neonatal jaundice because it could lower their serum bilirubin levels, encourage the jaundice to go away, and enhance their prognosis.

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15. **Neonatal Jaundice Management: Knowledge, Attitude, and Practice Among Nurses and Midwives in the Northern Region, Ghana**

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<https://doi.org/10.1177/23779608231187236>

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