CAHIERS MAGELLANES-NS
Volume 06 Issue 2
2024

ISSN:1624-1940
http://magellanes.com/

THE PREVALENCE, PRACTICE AND ATTITUDE TOWARD NEONATAL JAUNDICE AMONG SAUDI MOTHERS

Khaled Hashim Mahmoud[1], Fahad A. Alotaibi*[2], Abdulaziz M. Alsahli[2], Wateen N. Alahmadi[3], Zinab H. Bohulaigah[4], Rahaf K. Alghabban[5], Rewa L. Alsharif[6], Elaf M. Aljabri[7], Abdullah S. Alsaedi[8], Khaled S. Alhammadi[9], Khames T. Alzahrani[10]

[1]Assistant professor of pediatrics, Dawadmi College of Medicine, Shaqra University, Al-Dawadmi, Saudi Arabia.
[2]Medical student, Shaqra University, Al-Dawadmi, Saudi Arabia.
[3]Medical Student, King Faisal University, Alhasa, Saudi Arabia.
[4]Medical Intern, AlMaarefa University, Riyadh, Saudi Arabia.
[5]Medical student, Tabuk University, Tabuk, Saudi Arabia.
[6]Medical Student, King Saud Bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia.
[7]Medical student, Taibah University, Al-Madinah, Saudi Arabia.
[8]General physician, Ministry of health, Jeddah, Saudi Arabia.
[9]General physician, Ministry of health, Dammam, Saudi Arabia
[10]BDS, PGD Endo from Stanford University, Saudi Board of Endodontic SR, King Faisal Specialist Hospital & Research Centre, Riyadh, Saudi Arabia.

***Corresponding author**: Fahad A. Alotaibi; **Email**: drfahad49@gmail.com

Abstract

Background: Neonatal jaundice NNJ is a common problem that threatens a substantial number of newborns, and its occurrence is as high as 55.2% among full-term neonates. Although in most of the time, symptoms are usually mild and resolve on their own, it is considered a highly dangerous neonatal condition, therefore calling for early identification. The specific objectives of this study were: To evaluate the understanding, perception and behavior of mothers in Saudi Arabia on neonatal jaundice, alsoto identify the incidence of NNJ and risk indicators in Saudi Arabia.

Methods: A self-administered survey was carried out from July to November, 2024 by using convenience sampling to recruit 686 Saudi mothers aged 18 years and above with at least one child. Quantitative data were analyzed using Microsoft Excel and statistical analysis was done using SPSS software program.

Results: Participants' average age was 38.1 years, a majority being married at 90.2% and 67.2% having a bachelor's degree. Unfavorably, 85.3% of the mothers had poor understanding about NNJ despite 89.5% of them perceiving it as a yellowish discoloration of the skin and the eyes. A total of 30% of mothers reported that jaundice developing in the first 36 hours is abnormal and only half of the

ISSN:1624-1940
http://magellanes.com/

participants knew its potential triggers; 64% of them stated that breastfeeding can cause jaundice. Despite the fact that 92% of them are willing to seek hospital treatment, only 7.1% has demonstrated a high level of knowledge and thus decision-making deficiency. Sex, number of children, level of education and prior experiences showed signification correlations with the level of knowledge regarding NNJ.

Conclusion: The conclusions drawn from the author's work show poor awareness of neonatal jaundice among potential mothers and high readiness to receive medical aid. This is why educational campaigns designed to increase knowledge about NNJ are needed more than ever in Saudi Arabia. Subsequently, there is increased possibility of improving the status of maternal and neonatal health, underlining the necessity of clearly organized public health campaigns aimed at raising awareness of the female population in the matters of neonatal morbidity.

Keywords: Neonatal jaundice, Practice, Attitude, Mothers.

1. INTRODUCTION

Neonatal jaundice, also referred to as hyperbilirubinemia, is a physiological condition that manifests in approximately 55.2% of full-term neonates [1]. It is caused by the buildup of more than 5mg/dL of serum bilirubin in infants' blood [2]. While most neonatal jaundice is self-limiting, in severe cases, it can cause serious complications [3].

Therefore, early detection of this condition is vital, for it can significantly impact the well-being of neonates [4].The imbalance between the synthesis and conjugation of bilirubin leads to elevated bilirubin levels, which in turn causes neonatal jaundice [5]. This imbalance is mostly caused by the impaired hepatic excretion of bilirubin and the rapid breakdown of red blood cells [6]. NNJ accounts for 75% of hospital readmissions in the first week of life and affects 80% of preterm infants, and 60% of term newborns [7].

A 2022 study in Shenzhen, China, involving 403 mothers, found that while most participants (80.6%) received information about neonatal jaundice from healthcare providers, only 45.4% demonstrated adequate knowledge about the condition and its risk factors [8].A study presenting 15 articles found that most mothers lacked knowledge of specific symptoms. In Saudi Arabia, half of mothers (50%) were unaware that high body temperature is a symptom of NNJ, while 44% did not recognize yellow skin as a clinical feature. Regarding attitude, most mothers reported negative attitudes [9].

Conversely, an opposite study found a low level of knowledge reflecting a poor attitude (7.5% with excellent knowledge, only 5.5% with a good attitude) [10]. A study on 165 pregnant women found that low maternal education level and residence in rural areas were associated with an approximately 2-fold increase in insufficient knowledge about neonatal jaundice compared to mothers with higher education levels and those residing in urban areas [11].

The number of research relevant to our topic is negligible, particularly in Saudi Arabia. The

ISSN:1624-1940
http://magellanes.com/

prevalence of newborn hyperbilirubinemia and its associated factors in Saudi Arabia remain relatively unstudied.

1.1 Objective

The study is set out to assess knowledge, attitude, and practice of neonatal jaundice among mothers in KSA and to establish the prevalence of neonatal jaundice and its associated risk factors among mothers in KSA.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

This cross-sectional study conducted between July 2024 and December 2024 adopted the convenience sampling method to collect data from participants across different regions in Saudi Arabia.

2.2 Subject

2.2.1 Participants, recruitment and sampling procedure:

The study population consisted of Saudi mothers from around Saudi Arabia; a sample recruiting approach will depend on social media platforms (such as Twitter, Snapchat, Instagram, WhatsApp, Facebook, etc.)

2.2.2 Sample size

By using the Raosoft online sample size calculator http://www.raosoft.com/samplesize.html, we calculated the sample size. With a predetermined error margin of 5% and a confidence level of 95%, the formula used is n = (1.96)^2 * 0.50 / (0.05)^2. This formula resulted in a calculated sample size of 384.

2.2.3 Inclusion and Exclusion Criteria

This study covered all Saudi Arabian mothers who were at least eighteen years old and had at least one child. Women under the age of 18 and males were excluded from this study.

3. STATISTICAL ANALYSIS

3.1 Method for data collection, instrument, and score system

Research instruments include structured surveys. The questionnaire was developed after a careful

ISSN:1624-1940
http://magellanes.com/

review of two other related studies [12, 13]. Examination of relevant Saudi Arabian research, thirty were completed and categorized into the four main parts of the questionnaire. The first section of questions focused on features of socioeconomic backgrounds. Details on NNJ's treatment site attitude are provided in the second part. A survey of mothers' awareness and perspective of newborn jaundice was conducted in the third portion, and an assessment of their knowledge was conducted in the fourth. A web-based survey was used by medical students to gather data.

3.2 Scoring system

In all, 21 statements served to assess the participants' attitudes and degree of knowledge, 14 for assessment of maternal knowledge about neonatal jaundice, 5 for maternal perception and awareness and 2 for attitude toward treatment site. One point is given for correct answers, and zero points are given for incorrect answers or "I don't know. For scoring, we utilized Likert scales (Dichotomous, Three-Point, and Quality Scales). The maximum score was 37 and divided as follows: The original Bloom's cut-off points, 80.0%-100.0%, 60.0%-79%, and 59.0%, The participants will be divided into three groups based on their scores.

As an illustration, the Assessment of maternal knowledge about neonatal jaundice has 14 questions. A participant with knowledge scores varied from 0 to14 points and was classified into three levels as follows: those with a score of 8 or below (≤ 8) were classified as having a low level of knowledge, those with scores 9-10 as having a moderate level of knowledge, and those with scores 11 or above (≥ 11) as a high level of knowledge.

Attitude toward treatment site has 2 questions scores varied from 0 to 2 points and were classified into three levels as follows: those with a score of 1 or below were classified as having a low level of Attitude toward treatment site, and those with scores 2 having a high level of Attitude toward of treatment site.

Maternal perception and awareness has 5 questions scores varied from 0 to 18 points and were classified into three levels as follows: those with a score of 9 or below (≤ 9) were classified as having a low level of awareness, those with scores between 10 and 13 as having a moderate level of awareness, and those with scores 14 or above (≥ 14) as having a high level of awareness.

3.3 Pilot test

The questionnaire was distributed to 20 individuals and asked to fill it. This was done to assess the study's viability and the ease of use of the questionnaire. The pilot study's results were not included in the study's final analysis

3.4 Analysis and entry method

On a computer, collected data was input using the Windows version of Microsoft Excel (2016). After that, data was moved to version 20 of the Statistical Package for Social Science Software (SPSS) to be

ISSN:1624-1940
http://magellanes.com/

examined statistically.

4. RESULTS

Table (1) displays various demographic parameters of the participants with a total number of (686). Interestingly, the average age of participants is 38.1 years with a standard deviation of 10.3, a relatively diverse age group. A very large proportion of the participants are married (90.2%) and a large majority to have multiple children with 45.8% having 2 to 4 children. With 67.2% having a bachelor's degree, there is an extremely well-educated sample. Status of occupation, it is shown that nearly half of participants (49.1%) are employed, and a large percentage of 33.8% are not employed, thereby posing questions of the economic variables that could influence this populace. The monthly income distribution also provides a broad picture of regional economic diversity, showing that 24.2% of households earned 1,000 to 5,000 Saudi riyals a month. A potential area for further research relates to the health outcomes in relation to socio-demographic factors based on the nearly even split that existed regarding whether participants' children had neonatal jaundice (51.2% no; 48.8% yes).

As shown in figure 1, Findings presented on the data illustrate a vast knowledge gap of relationship between sun exposure and neonatal jaundice for a sample totaling 686 respondents. Of the sample (n=689), 403 (approx. 58.7%) admitted that a lack of sun exposure could indeed constitute a risk factor for neonatal jaundice. However, 111 people, about 16.2%, disagreed with this assertion and 25.1%, or 172 people, did not
know, selecting "I don't know."

Table (1): Socio-demographic characteristics of participants (n=686)

Parameter		No.	Percent (%)
Age (Mean: 38.1, STD:10.3)	26 or less	118	17.2
	27 to 34	126	18.4
	35 to 39	117	17.1
	40 to 44	110	16.0
	45 to 49	118	17.2
	More than 50	97	14.1
Gender	Female	686	100.0
Marital status	Married	619	90.2
	Divorced	38	5.5
	Widow	29	4.2
Number of children	One Child	171	24.9
	2-4	314	45.8

ISSN:1624-1940
http://magellanes.com/

	>4	201	29.3
Residential region	Northern region	81	11.8
	Southern region	55	8.0
	Central region	189	27.6
	Eastern region	136	19.8
	Western region	225	32.8
Educational level	Primary	14	2.0
	Intermediate	14	2.0
	High school	111	16.2
	Bachelor	461	67.2
	Master	82	12.0
	I do not have an academic qualification	4	.6
Occupational status	Student	50	7.3
	Employee	337	49.1
	Retired	31	4.5
	Not Employed	232	33.8
	Freelance Work	36	5.2
Monthly Income	Less than 1000 Saudi riyal	100	14.6
	1000 – 5000	166	24.2
	5001 – 10000	150	21.9
	10001 – 15000	140	20.4
	More than 15000 Saudi riyal	130	19.0
Did any of your Children have Neonatal Jaundice?	No	351	51.2
	Yes	335	48.8

ISSN:1624-1940
http://magellanes.com/

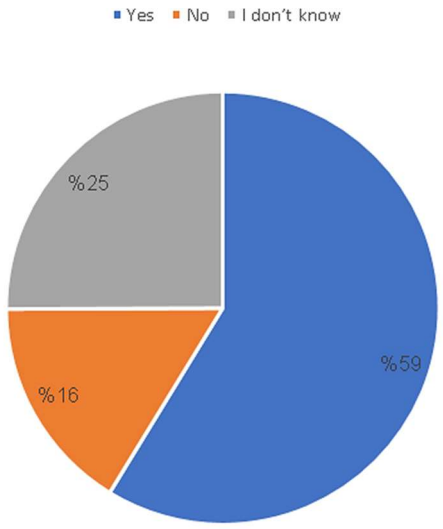

Figure (1): Illustrates effect of sun exposure on neonatal jaundice among participants.

Table 2 presents the comprehensive data of maternal knowledge to neonatal jaundice with detailed awareness and misconceptions shown among surveyed group of 686 mothers. Clearly, a major foundational understanding is possessed by respondents, as 89.5 percent accurately identify neonatal jaundice as a yellowish discoloration of the skin and eyes. However, the responses show that there are large knowledge gaps regarding the abnormality of jaundice in the first 36 hours, only 30% being able to correctly mention this is a potential problem. More importantly, while the overwhelming majority (68.4%) acknowledges that jaundice which persists beyond two weeks is abnormal; many the mothers cannot fathom what it implies. What are notable however, are the misconceptions that breastfeeding is a risk factor, and which have 64% not acknowledging that breastfeeding causes jaundice.

Table (2): Parameters related to maternal knowledge about neonatal jaundice, its risk factors and its management (n=686).

Parameter		No.	Percent (%)
It is a yellowish discoloration of the skin (skin, eyes) of newborn?	Yes	614	89.5
	No	15	2.2
	I don't know	57	8.3
It is a common problem in neonates?	Yes	582	84.8
	No	33	4.8
	I don't	71	10.3

ISSN:1624-1940
http://magellanes.com/

	know		
It is an abnormal condition if appears within the first 36h?	Yes	206	30.0
	No	259	37.8
	I don't know	221	32.2
It is abnormal if persists for>2 wk?	Yes	469	68.4
	No	65	9.5
	I don't know	152	22.2
Is breastfeeding a risk factor for jaundice?	Yes	96	14.0
	No	439	64.0
	I don't know	151	22.0
Is early labour a risk factor for neonatal jaundice?	Yes	181	26.4
	No	136	19.8
	I don't know	369	53.8
Is the difference in the blood type of mother and child considered a risk factor for neonatal jaundice?	Yes	197	28.7
	No	142	20.7
	I don't know	347	50.6
Lack of sun exposure can be a risk factor for neonatal jaundice?	Yes	403	58.7
	No	111	16.2
	I don't know	172	25.1
Some maternal food intake increases jaundice in breast-breasted babies	Yes	163	23.8
	No	170	24.8
	I don't know	353	51.5
Can infections be risk factors for neonatal jaundice?	Yes	195	28.4
	No	143	20.8
	I don't know	348	50.7
Does NNJ require medical intervention?	Yes	13	1.9
	Always	137	20.0
	Sometimes	505	73.6
	Never (no)	31	4.5
Severe jaundice may lead to brain damage?	Yes	182	26.5
	No	108	15.7

ISSN:1624-1940
http://magellanes.com/

	I don't know	396	57.7
Severe jaundice may lead to death?	Yes	158	23.0
	No	116	16.9
	I don't know	412	60.1
Severe jaundice can lead to deafness?	Yes	103	15.0
	No	106	15.5
	I don't know	477	69.5

As shown in figure (2), insights into trends in data derived from a sample of 686 individuals regarding awareness of possible consequences of severe jaundice is presented. About 26.5 per cent, or 182 respondents, admit that severe jaundice does cause brain damage. On the contrary, 108 participants (about 15.7%) unequivocally deny this assertion. Notably, 396 (approximately 57.7%) picked 'I don't know,' a major proportion.

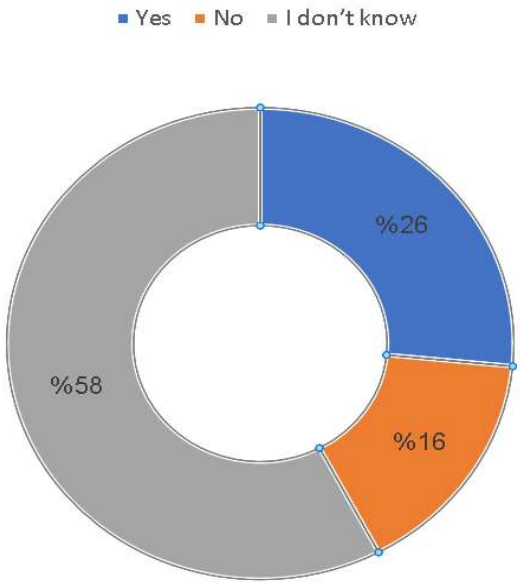

Figure (2): Illustrates effect of severe jaundice on brain damage according to participants.

Table 3 presented data from 686 participants to showcase maternal perception, awareness and attitude towards neonatal jaundice (NNJ). Among mothers uncertain about possible causes of NNJ, 49.4% answered 'may be due to ABO incompatibility,' with 31.9% and 30.9% citing prematurity, respectively. Such a gap in knowledge clearly presents a major obstacle to an efficient response in time. The results indicate that a majority (82.5%) correctly identified the eyes as the first location for jaundice

ISSN:1624-1940
http://magellanes.com/

detection, yet an alarming 6.7% could not distinguish this as the preferred site. In terms of treatment, 79.0% mentioned phototherapy as a hospital based, 65.6% suggested spontaneous recovery by sunlight exposure as home treatment, suggesting an underestimation of intensive medical an approach. Overall, 92.0% of the at-risk mortality population would seek hospital treatment and this together with the overwhelmingly positive attitude speaks to a sincere desire to make health a priority in potentially life or death situations.

Table (3): participants 'maternal perception and awareness and attitude towards treatment site (n=686).

Parameter		No.	Percent (%)
What are the possible causes of NNJ? *	ABO incompatibility between mother and baby	219	31.9
	Prematurity	212	30.9
	Dehydration	93	13.6
	Hemolysis	189	27.6
	Breastfeeding	65	9.5
	Infection	95	13.8
	Multiple US during pregnancy	26	3.8
	Others	74	10.8
	I don't know	339	49.4
What is the first site for jaundice detection? *	Eyes	566	82.5
	Skin	175	25.5
	Face	166	24.2
	I don't know	46	6.7
What are the other signs and symptoms of neonatal jaundice? *	Refusal of feed	151	22.0
	High pitched cry	148	21.6
	High-grade fever	130	18.9
	Yellowish discoloration (Jaundice)	10	1.5
	Others	15	2.2
	I don't know	408	59.5
What are the Methods of treatment in hospital? *	Phototherapy	542	79.0
	Blood exchange transfusion	88	12.8
	Drugs	112	16.3
	Neon lamp	175	25.5
	Others	5	0.7
	I do not know	110	16.0
What are the Methods of treatment at home? *	Nothing to do, spontaneous recovery by exposing to the	450	65.6

ISSN:1624-1940
http://magellanes.com/

	sunlight in the early morning		
	Give water with sugar	148	21.6
	Herbal medication	26	3.8
	Avoid oil massage	16	2.3
	I do not know	174	25.4
	Others	10	1.5
If one of your children got neonatal jaundice, God forbid, would you go to the hospital to treat them?	No	55	8.0
	Yes	631	92.0
If one of your children gets neonatal jaundice, God forbid, would you treat them at home?	No	578	84.3
	Yes	108	15.7

***Results may overlap**

Table 4 shows that the disparity between the attitudes towards the treatment site of participants and the astonishing 83.2% positive attitude to the facility. This overwhelmingly favorable response suggests a very good rapport between an area of treatment and its clientele, an area that communicates well, provides care and creates a caring environment with patients. On the contrary, the 16.8 percent of respondents that reported low attitudes

Table (4): shows attitude toward treatment site score results.

	Frequency	Percent
High attitude	571	83.2
Low attitude	115	16.8
Total	686	100.0

Table 5 shows that most women surveyed had low knowledge about neonatal jaundice which is concerning given the prevalence of the data presented. In essence, just 7.1 percent of mothers had high maternal knowledge, 7.6 percent had moderate knowledge, while an unacceptable 85.3 percent showed low or no knowledge of this key health issue.

Table (5): Shows Assessment of maternal knowledge about neonatal jaundice score results.

	Frequency	Percent
High maternal knowledge	49	7.1
Moderate maternal knowledge	52	7.6
Low maternal knowledge	585	85.3
Total	686	100.0

ISSN:1624-1940
http://magellanes.com/

As seen in Table 6, the presentation of data reveals and paints a worrying trend regarding perception and awareness of mothers whereby, in excess of 87.6% of mothers had low perception. This is an overwhelming figure that suggests also a critical gap about knowledge or awareness that could negatively affect maternal and child health outcomes. However, whereas only 1.7% of mothers had high maternal perception, 10.6% demonstrated moderate perception.

Table (6): Shows maternal perception and awareness score results.

	Frequency	**Percent**
High maternal perception	12	1.7
Moderate perception	73	10.6
Low perception	601	87.6
Total	686	100.0

Table (7) shows that attitude toward treatment site has statistically significant relation to number of children (P value=0.019), residential region (P value=0.0001), educational level (P value=0.012), and whether any children of participants had neonatal jaundice (P value=0.0001). It also shows statistically insignificant relation to age, marital status, occupational status, and monthly income.

Table (7): relation between attitude toward treatment site and socio-demographic characteristics.

Parameters		Attitude toward treatment site		Total (N=686)	P value*
		High attitude	**Low attitude**		
Age	26 or less	99	19	118	0.509
		17.3%	16.5%	17.2%	
	27 to 34	106	20	126	
		18.6%	17.4%	18.4%	
	35 to 39	99	18	117	
		17.3%	15.7%	17.1%	
	40 to 44	96	14	110	
		16.8%	12.2%	16.0%	
	45 to 49	96	22	118	
		16.8%	19.1%	17.2%	
	More than 50	75	22	97	
		13.1%	19.1%	14.1%	
Marital status	Married	512	107	619	0.322
		89.7%	93.0%	90.2%	

ISSN:1624-1940
http://magellanes.com/

	Divorced	35	3	38	
		6.1%	2.6%	5.5%	
	Widowed	24	5	29	
		4.2%	4.3%	4.2%	
Number of children	One child	153	18	171	0.019
		26.8%	15.7%	24.9%	
	2 to 4	260	54	314	
		45.5%	47.0%	45.8%	
	More than 4	158	43	201	
		27.7%	37.4%	29.3%	
Residential region	Northern region	79	2	81	0.0001
		13.8%	1.7%	11.8%	
	Southern region	43	12	55	
		7.5%	10.4%	8.0%	
	Central region	144	45	189	
		25.2%	39.1%	27.6%	
	Eastern region	108	28	136	
		18.9%	24.3%	19.8%	
	Western region	197	28	225	
		34.5%	24.3%	32.8%	
Educational level	Primary	12	2	14	0.012
		2.1%	1.7%	2.0%	
	Intermediate	7	7	14	
		1.2%	6.1%	2.0%	
	High school	87	24	111	
		15.2%	20.9%	16.2%	
	Bachelor	393	68	461	
		68.8%	59.1%	67.2%	
	Master	69	13	82	
		12.1%	11.3%	12.0%	
	I do not have an academic qualification	3	1	4	
		0.5%	0.9%	0.6%	
Occupational status	Student	43	7	50	0.191
		7.5%	6.1%	7.3%	
	Employee	288	49	337	
		50.4%	42.6%	49.1%	
	Retired	26	5	31	

ISSN:1624-1940
http://magellanes.com/

		4.6%	4.3%	4.5%	
	Not Employed	182	50	232	
		31.9%	43.5%	33.8%	
	Freelance Work	32	4	36	
		5.6%	3.5%	5.2%	
Monthly income	Less than 1000 Saudi riyal	88	12	100	0.438
		15.4%	10.4%	14.6%	
	1000 – 5000	137	29	166	
		24.0%	25.2%	24.2%	
	5001 – 10000	128	22	150	
		22.4%	19.1%	21.9%	
	10001 – 15000	115	25	140	
		20.1%	21.7%	20.4%	
	More than 15000 Saudi riyal	103	27	130	
		18.0%	23.5%	19.0%	
Did any of your Children have Neonatal Jaundice?	No	325	26	351	0.0001
		56.9%	22.6%	51.2%	
	Yes	246	89	335	
		43.1%	77.4%	48.8%	

***P value was considered significant if ≤ 0.05.**

Table (8) shows that attitude toward treatment site has statistically significant relation to age (P value=0.004), number of children (P value=0.003), residential region (P value=0.001), occupational status (P value=0.0001), and monthly income (P value=0.0001). It also shows statistically insignificant relation to marital status, educational level, and whether any children of participants had neonatal jaundice.

Table (8): maternal knowledge in association with socio-demographic characteristics

Parameters		Maternal Knowledge		Total (N=686)	P value*
		High or moderate knowledge	**Low maternal knowledge**		
Age	26 or less	26	92	118	0.004
		25.7%	15.7%	17.2%	
	27 to 34	28	98	126	
		27.7%	16.8%	18.4%	
	35 to 39	14	103	117	

ISSN:1624-1940
http://magellanes.com/

		13.9%	17.6%	17.1%	
	40 to 44	13	97	110	
		12.9%	16.6%	16.0%	
	45 to 49	11	107	118	
		10.9%	18.3%	17.2%	
	More than 50	9	88	97	
		8.9%	15.0%	14.1%	
Marital status	Married	92	527	619	0.949
		91.1%	90.1%	90.2%	
	Divorced	5	33	38	
		5.0%	5.6%	5.5%	
	Widowed	4	25	29	
		4.0%	4.3%	4.2%	
Number of children	One child	39	132	171	0.003
		38.6%	22.6%	24.9%	
	2 to 4	38	276	314	
		37.6%	47.2%	45.8%	
	More than 4	24	177	201	
		23.8%	30.3%	29.3%	
Residential region	Northern region	8	73	81	0.001
		7.9%	12.5%	11.8%	
	Southern region	11	44	55	
		10.9%	7.5%	8.0%	
	Central region	17	172	189	
		16.8%	29.4%	27.6%	
	Eastern region	34	102	136	
		33.7%	17.4%	19.8%	
	Western region	31	194	225	
		30.7%	33.2%	32.8%	
Educational level	Primary	3	11	14	0.079
		3.0%	1.9%	2.0%	
	Intermediate	2	12	14	
		2.0%	2.1%	2.0%	
	High school	19	92	111	
		18.8%	15.7%	16.2%	
	Bachelor	56	405	461	
		55.4%	69.2%	67.2%	
	Master	20	62	82	

ISSN:1624-1940
http://magellanes.com/

		19.8%	10.6%	12.0%	
	I do not have an academic qualification	1	3	4	
		1.0%	0.5%	0.6%	
Occupational status	Student	17	33	50	0.0001
		16.8%	5.6%	7.3%	
	Employee	56	281	337	
		55.4%	48.0%	49.1%	
	Retired	1	30	31	
		1.0%	5.1%	4.5%	
	Not Employed	22	210	232	
		21.8%	35.9%	33.8%	
	Freelance Work	5	31	36	
		5.0%	5.3%	5.2%	
Monthly income	Less than 1000 Saudi riyal	11	89	100	0.0001
		10.9%	15.2%	14.6%	
	1000 – 5000	8	158	166	
		7.9%	27.0%	24.2%	
	5001 – 10000	29	121	150	
		28.7%	20.7%	21.9%	
	10001 – 15000	23	117	140	
		22.8%	20.0%	20.4%	
	More than 15000 Saudi riyal	30	100	130	
		29.7%	17.1%	19.0%	
Did any of your Children have Neonatal Jaundice?	No	46	305	351	0.221
		45.5%	52.1%	51.2%	
	Yes	55	280	335	
		54.5%	47.9%	48.8%	

***P value was considered significant if ≤ 0.05.**

Table (9) shows that maternal perception and awareness has statistically significant relation to number of children (P value=0.007), residential region (P value=0.0001), educational level (P value=0.027), monthly income (P value=0.001), and whether any children of participants had neonatal jaundice (P value=0.028). It also shows statistically insignificant relation to age, marital status, and occupational status.

Table (9): maternal perception and awareness in association with socio-demographic characteristics

ISSN:1624-1940
http://magellanes.com/

Parameters		Maternal perception and awareness		Total (N=686)	P value*
		High or moderate perception	**Low perception**		
Age	26 or less	22	96	118	0.110
		25.9%	16.0%	17.2%	
	27 to 34	20	106	126	
		23.5%	17.6%	18.4%	
	35 to 39	11	106	117	
		12.9%	17.6%	17.1%	
	40 to 44	11	99	110	
		12.9%	16.5%	16.0%	
	45 to 49	10	108	118	
		11.8%	18.0%	17.2%	
	More than 50	11	86	97	
		12.9%	14.3%	14.1%	
Marital status	Married	77	542	619	0.916
		90.6%	90.2%	90.2%	
	Divorced	4	34	38	
		4.7%	5.7%	5.5%	
	Widowed	4	25	29	
		4.7%	4.2%	4.2%	
Number of children	One child	33	138	171	0.007
		38.8%	23.0%	24.9%	
	2 to 4	31	283	314	
		36.5%	47.1%	45.8%	
	More than 4	21	180	201	
		24.7%	30.0%	29.3%	
Residential region	Northern region	4	77	81	0.0001
		4.7%	12.8%	11.8%	
	Southern region	3	52	55	
		3.5%	8.7%	8.0%	
	Central region	14	175	189	
		16.5%	29.1%	27.6%	
	Eastern region	32	104	136	
		37.6%	17.3%	19.8%	
	Western region	32	193	225	

ISSN:1624-1940
http://magellanes.com/

		37.6%	32.1%	32.8%	
Educational level	Primary	0	14	14	0.027
		0.0%	2.3%	2.0%	
	Intermediate	0	14	14	
		0.0%	2.3%	2.0%	
	High school	10	101	111	
		11.8%	16.8%	16.2%	
	Bachelor	57	404	461	
		67.1%	67.2%	67.2%	
	Master	18	64	82	
		21.2%	10.6%	12.0%	
	I do not have an academic qualification	0	4	4	
		0.0%	0.7%	0.6%	
Occupational status	Student	12	38	50	0.056
		14.1%	6.3%	7.3%	
	Employee	44	293	337	
		51.8%	48.8%	49.1%	
	Retired	2	29	31	
		2.4%	4.8%	4.5%	
	Not Employed	22	210	232	
		25.9%	34.9%	33.8%	
	Freelance Work	5	31	36	
		5.9%	5.2%	5.2%	
Monthly income	Less than 1000 Saudi riyal	9	91	100	0.001
		10.6%	15.1%	14.6%	
	1000 – 5000	13	153	166	
		15.3%	25.5%	24.2%	
	5001 – 10000	18	132	150	
		21.2%	22.0%	21.9%	
	10001 – 15000	15	125	140	
		17.6%	20.8%	20.4%	
	More than 15000 Saudi riyal	30	100	130	
		35.3%	16.6%	19.0%	
Did any of your Children have Neonatal Jaundice?	No	34	317	351	0.028
		40.0%	52.7%	51.2%	
	Yes	51	284	335	

ISSN:1624-1940
http://magellanes.com/

		60.0%	47.3%	48.8%	

***P value was considered significant if ≤ 0.05.**

5. DISCUSSION

One of the most common clinical problems encountered by neonates is neonatal jaundice. The cause of this is the buildup of bilirubin in the tissues like the mucous membranes and skin causing it to take on a yellowish tint – the infant's skin and the sclera turn yellow. On the average, bilirubin concentrations of 90 mmol/L [14] are seen in newborns with lighter than normal skin color tending to show signs of jaundice and above. Reading hospital readmissions in the first week after being born, neonatal jaundice is the culprit for 75% of readmissions in certain areas. It occurs in about half (50% to 60%) of full-term newborns and almost all (80%) of preterm infants [15].

In Saudi Arabia, 15.9% of newborns had indirect hyperbilirubinemia, and ABO incompatibility was the most common cause at 31.6%, G6PD deficiency at 10.5% and Rh incompatibility at 2.6% [16]. All babies are jaundiced for the first week but usually only a little and without harm. Yet around 8 to 10 percent of cases can become serious enough that the newborns can be harmed by severe neonatal jaundice [17]. Physiological jaundice is most common in breastfed infants in the first week of life. Distinguishing rare cases of severe jaundice from bilirubin encephalopathy and kernicterus, and from the more common mild and harmless forms of jaundice, is the primary challenge [18]. Thus, we aimed in this study to assess knowledge, attitude, and practice of neonatal jaundice among mothers in KSA.

Our study findings on the mothers' knowledge and awareness of neonatal jaundice matched previous studies. In particular, we noticed that not only are the majority, 89.5%, accurate in describing jaundice as a yellowish discoloration in the skin and eyes, which is higher than what was documented by Demis et al. (2021), 39.2, who were only able to accurately define NNJ [19]. Perhaps this discrepancy speaks to a higher general awareness in our study population or perhaps other aspects of maternal health education programs in our region are more effective. Critical timing recognition in jaundice presentation remains a concern. Despite the less than 30% acknowledgement of jaundice within the first 36 hours by mothers in our study, we observed that this is markedly lower than that reported by Salia et al. (2021) in which a large percentage sought medical help immediately—a variance that may reflect the discrepancy in the cultural perceptions of health and health seeking by individuals based on past experiences with health systems. Secondly, our observation that although 68.4% of users understood jaundice lasting more than two weeks as abnormal, this was very similar to same general awareness as displayed in the literature, but also a large gap in the understanding of jaundice progression similarities. Our study found a lot of misconception, 64% were unaware that infection has nothing to do with breastfeeding and cause jaundice.

This is consistent with earlier reports of Ogunfowora, and Daniel (2006), who observed that parents generally have little knowledge of the etiology and treatment of NNJ [21]. While we found that 82.5% identified the eyes as the primary detection site and 79% mention phototherapy as an option for treating NNJ, a substantial amount (65.6%) suggested sunlight exposure as a home remedy, indicative of a widespread misconception discussed in Wang et al. (2021), where nearly half of the respondents

ISSN:1624-1940
http://magellanes.com/

wrongly view sunlight as a remedy for NNJ [22]. Remarkably high willingness to seek hospital treatment was expressed by our cohort, but only 7.1 percent showed very high NNJ knowledge. Therefore, this implies that some people are ready to seek medical help but still lack in informed decision making; similar to findings reported by Amegan-Aho et al. (2019) that there is lack of understanding regarding the significance of postnatal check up to detect early case of jaundice [23].

A second critical area of concern is the awareness of complications associated with NNJ: half (54.5%) were aware that complications may arise, but 40.2% were unaware of specific outcomes. This mirrors what Magai et al. (2020) observed as a knowledge deficit regarding the long-term implications of NNJ [24]. In addition, we investigated how sociodemographic factors influence attitudes towards treatment and knowledge, with significant correlations with number of children, educational level, and previous experience with neonatal jaundice. This is consistent with the results of previous studies indicating that processes of becoming familiar with the condition through personal experience significantly promote knowledge and awareness [25].

Interestingly, our data shows that only 21.5% of parents told us they learned anything about NNJ after diagnosis, indicating an urgent need for proactive education. Several studies echoed this phenomenon stating that parents sought information reactively, rather than proactively [26]. Our study shows a relatively high initial awareness of NNJ compared to other studies; however, significant knowledge gaps remain about critical timelines, complications and misconceptions of treatment. Structured awareness campaigns and educational interventions are important, as they could increase maternal knowledge substantially and thereby improve maternal as well as baby health outcomes [27,28]. This emphasizes the need to develop targeted public health initiatives to improve comprehension and management of NNJ in community settings.

6. CONCLUSION

Finally, this study reveals a great gap in the knowledge and awareness regarding neonatal jaundice (NNJ) among Saudi mothers although they recognize jaundice as the yellowish coloring of the skin and the eyes at the onset of the jaundice. Although 89.5% of participants got jaundice right, only 30% knew to be worried if jaundice shows up in the first 36 hours and misconceptions about breastfeeding and jaundice linger. This is alarming as only 7.1% of the mothers had high maternal knowledge while 85% had low awareness of this serious health problem. This study emphasizes the necessity of increased maternal education and education about NNJ, focusing on two important things, including critical timelines and potential complications and possible treatments. Education campaigns, which are proactive and improve the outcomes for the mothers and their newborns, given the great willingness of the mothers to seek medical help. However, this knowledge assess are important in reducing the risks of NNJ and promoting mother and child health in Saudi Arabia.

ISSN:1624-1940
http://magellanes.com/

7. ACKNOWLEDGEMENT

We thank the participants who all contributed samples to the study.

8. ETHICAL APPROVAL

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

9. FUNDING

There was no external funding for this study.

10. CONFLICT OF INTERESTS

The authors declare no conflict of interest.

11. INFORMED CONSENT

Written informed consent was acquired from each individual study participant.

12. Data and materials availability

All data associated with this study are present in the paper.

References

1. Brits H, Adendorff J, Huisamen D, Beukes D, Botha K, Herbst H, et al. The prevalence of neonatal jaundice and risk factors in healthy term neonates at National District Hospital in Bloemfontein. African J Prim Heal Care Fam Med. 2018;10(1):1–6.
2. Melinda F, Suryawan IWB, Sucipta AAM. Factors associated with the incidence of neonatal hyperbilirubinemia in Perinatology Ward of Wangaya General Hospital, Denpasar. Bali Med J. 2021;10(3):1105–10.
3. fadilMohsin M, Sahib Obaid S, Ghazi HasoonAlmhanna M. Knowledge and Attitudes of Mothers towards Neonatal Jaundice…. Mohsin, et al. Karbala J Med. 2021;14(2):2534–41.
4. Tessema M, Mekonnen H, Alemu T, Godie Y, Teklehaimanot WZ, Mengstie LA. Magnitude and

ISSN:1624-1940
http://magellanes.com/

its associated factors of neonatal jaundice among neonates admitted to the neonatal intensive care unit of Dessie Town public hospitals, Amhara region, Ethiopia, 2020: a multicenter cross-sectional study. Front Pediatr. 2024;12(January):1–8.

5. Shitran RF, Abed MY. Risk factors and outcomes of neonatal jaundice at Al-Ramadi teaching hospital for maternity and childhood. Ann Trop Med Public Heal. 2020;23(12).
6. Deep Kaur R, Lamba S, Rawal M. Evaluation of Risk Factors and Management of Neonatal Jaundice in Newborns Admitted in a Tertiary Care Hospital of Rural Haryana. Am J Pediatr. 2021;7(3):150.
7. Magfouri H, Aqeel A, Maashi A, Maghfuri N, Jarad R, Kathiah A, et al. Mothers' perception of neonatal jaundice in Jazan Region, KSA. J ClinNeonatol. 2019;8(2):116.
8. Huang Y, Chen L, Wang X, Zhao C, Guo Z, Li J, et al. Maternal knowledge, attitudes and practices related to neonatal jaundice and associated factors in Shenzhen, China: a facility-based cross-sectional study. BMJ Open. 2022;12(8):1–11.
9. Alhassan A, Brago AM, Abena KA, Kekeli CJ, Nuamah AJ. Knowledge , Attitude and Practices Regarding Neonatal Jaun- dice among Mothers. J Nurs Care. 2022;11:1–9.
10. Hassan ZI, Abdul-Ra'aoof HH, Tiryag AM. Mothers' Knowledge and Attitudes towards her Children with Neonatal Jaundice: A Cross-Sectional Study. Heal Educ Heal Promot. 2022;10(3):565–70.
11. AL-EZZİ Jİ, SHAREEF AJ, ALİ MH. NeonatalJaundice:Knowledge, Practice, And Attitude AmongPrimigravidaWomen. GenelTıpDerg. 2022;32(5):530–3.
12. Moawad EMI, Abdallah EAA, Ali YZA. Perceptions, practices, and traditional beliefs related to neonatal jaundice among Egyptian mothers A cross-sectional descriptive study. Med (United States). 2016;95(36).
13. Aldandan J, AlSobie S, Albahrani M, Albattat S, Al-Ghadeer F, Alamer F, et al. Prevalent Practice and Attitude toward Neonatal Jaundice among Saudi Mothers. Int J Med Dev Ctries. 2024;8(November 2023):104–10.
14. Neonataljaundice:aetiology, diagnosis and treatment. Mitra S, Rennie J. Br J Hosp Med (Lond) 2017;78:699–704. doi: 10.12968/hmed.2017.78.12.699. [DOI] [PubMed] [Google Scholar]
15. Mothers' perception of neonataljaundice in JazanRegion, KSA. Magfouri H, Aqeel A, Maashi A, et al. J Clin Neonatol. 2019;8:116–119. [Google Scholar]
16. The assessment of awarenesslevelamong the parents regarding the neonataljaundice in the Arar city, KSA. Hanif I, Hussain S, Alanazi WKJ, Alanazi FAF, Alanazi AAQ, Alanazi ZDR. Med Sci. 2022;26:1–8. [Google Scholar]
17. Evaluation of neonataljaundice in the Makkahregion. Alkhotani A, Eldin EE, Zaghloul A, Mujahid S. SciRep. 2014;4:4802. doi: 10.1038/srep04802. [DOI] [PMC free article] [PubMed] [Google Scholar]
18. Assessment of knowledge, attitude and practice of Saudi parents towardsneonataljaundice (NNJ): a cross-sectionalstudy. Alfouwais NM, Seada LS, Alahmadi RY, Alassiri AA, Alenazi AA, Aljuaeed MS. Egypt J Hosp Med. 2018;70:1686–1694. [Google Scholar]
19. Knowledge on neonataljaundice and itsassociatedfactorsamongmothers in

ISSN:1624-1940
http://magellanes.com/

northernEthiopia:afacility-based cross-sectionalstudy. Demis A, Getie A, Wondmieneh A, Alemnew B, Gedefaw G. BMJ Open. 2021;11:0. doi: 10.1136/bmjopen-2020-044390. [DOI] [PMC free article] [PubMed] [Google Scholar]

20. Knowledge, attitudes and practices regardingneonataljaundiceamongcaregivers in a tertiaryhealthfacility in Ghana. Salia SM, Afaya A, Wuni A, et al. PLoS One. 2021;16:0. doi: 10.1371/journal.pone.0251846. [DOI] [PMC free article] [PubMed] [Google Scholar]
21. Neonatal jaundice and its management: knowledge, attitude and practice of community health workers in Nigeria. Ogunfowora OB, Daniel OJ. BMC Public Health. 2006;6:19. doi: 10.1186/1471-2458-6-19. [DOI] [PMC free article] [PubMed] [Google Scholar]
22. Challenges of phototherapy for neonatalhyperbilirubinemia (Review) Wang J, Guo G, Li A, Cai WQ, Wang X. ExpTher Med. 2021;21:231. doi: 10.3892/etm.2021.9662. [DOI] [PMC free article] [PubMed] [Google Scholar]
23. .NeonatalJaundice: awareness, perception and preventive practices in expectant mothers. Amegan-Aho KH, Segbefia CI, Glover ND, Ansa GA, Afaa TJ. Ghana Med J. 2019;53:267–272. doi: 10.4314/gmj.v53i4.3. [DOI] [PMC free article] [PubMed] [Google Scholar]
24. Neonataljaundice and developmentalimpairmentamong infants in Kilifi, Kenya. Magai DN, Mwaniki M, Abubakar A, et al. Child Care Health Dev. 2020;46:336–344. doi: 10.1111/cch.12750. [DOI] [PMC free article] [PubMed] [Google Scholar]
25. Recurrencerisk of neonatalhyperbilirubinemia in siblings. Khoury MJ, Calle EE, Joesoef RM. Am J Dis Child. 1988;142:1065–1069. doi: 10.1001/archpedi.1988.02150100059026. [DOI] [PubMed] [Google Scholar]
26. Feasibility and acceptability of home-basedneonatalhyperbilirubinemia screening by communityhealthworkersusingtranscutaneousbilimeters in Bangladesh. Rahman M, Jahan F, Billah SM, et al. BMC Pediatr. 2023;23:155. doi: 10.1186/s12887-023-03969-4. [DOI] [PMC free article] [PubMed] [Google Scholar]
27. Maternalknowledge, attitudes and practices related to neonataljaundice and associatedfactors in Shenzhen, China: a facility-based cross-sectionalstudy. Huang Y, Chen L, Wang X, et al. BMJ Open. 2022;12:0. doi: 10.1136/bmjopen-2021-057981. [DOI] [PMC free article] [PubMed] [Google Scholar]
28. Neonataljaundice:knowledge, attitude and practices of mothers in Mosan-Okunolacommunity, Lagos, Nigeria. Goodman OO, Kehinde OA, Odugbemi BA, Femi-Adebayo TT, Odusanya OO. Niger Postgrad Med J. 2015;22:158–163. doi: 10.4103/1117-1936.170741. [DOI] [PubMed] [Google Scholar]