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ORIGINAL ARTICLE

Assessment of Knowledge, Attitude and Practice of General Practitioners and Pediatricians about Biliary Atresia

Mohammed sanad [1], Hossam Fathy El-Saadany [1], Sally Waheed Elkhadry [2], Enas Alaa El-Din Mohammed El-Ganzoury[3*]

1. Pediatric department , Faculty of Medicine, Zagazig University, Egypt
2. Epidemiology and Preventive Medicine Department at National Liver Institute Menoufia University, Egypt
3. M.C.H.H. Alexandria University , Egypt
4.

Corresponding author:
Enas Alaa El-Din Mohammed El-Ganzoury

Email:
Nosan665@gmail.com

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ABSTRACT

Background: Despite being uncommon, biliary atresia (BA) ranks high among newborn liver diseases that cause mortality. There is a defect of Knowledge, Attitude, and Practice (KAP) about Biliary Atresia among general practitioners and pediatricians. We aimed to assess the knowledge, attitude, and practice of primary care physicians and pediatricians regarding biliary atresia by validating the biliary atresia questionnaire (BAQ).

Methods: We conducted a cross-sectional study from 2022 up to 2024 in primary healthcare units and the department of pediatrics among150 healthcare providers (General practitioners and pediatricians). Data was collected using structured questionnaires filled through Google form questionnaire sheets from primary healthcare providers to assess their KAP about biliary atresia. The Google form questionnaire was directed to general practitioners and pediatricians all over Egypt.

Results: The Google form questionnaire was directed to general practitioners and pediatricians all over Egypt, but the result declared that the majority were from Al Gharbia and Al-Sharqia Governorate. Most participants, 91.4%, had a good attitude towards biliary atresia. The best attitude was towards Lack of knowledge and awareness regarding BA helps in the high percentage of delayed diagnosis as the majority of participants agreed (agree 49.7% - strongly agree 36.4); the leading defective biliary atresia practice was observed among studied regarding using of Stool colored card as a screening tool during evaluation of possible direct hyperbilirubinemia (cholestasis) among newborns only 37.1%. The best practice reported among studied participants was regarding usage of ultrasound (U/S) and referring to a gastroenterologist when suspected a child with biliary atresia (72.2%). Also, good practice was found regarding the following items: suspect Cholangitis in a child after a KPE came to you with unexplained fever, recurrent jaundice with acholic stool (68.9%).

Conclusions: The baseline levels of knowledge regarding biliary atresia among pediatricians were mainly good, except for poor knowledge of the Ruta virus as a cause of biliary atresia. Also, the baseline attitude levels were good.

Keywords: Knowledge ; Attitude ; Practice ; General Practitioners; Biliary Atresia

INTRODUCTION

The extrahepatic biliary system is either completely obstructed or has a break in biliary atresia (BA). Among newborns, BA ranks highest among liver diseases despite the rarity of the disease. It also ranks high as the leading cause of liver transplantation in children. Bacillus avium (BA) patients who do not receive therapy will die within two years due to liver failure [1].

Restoring bile flow is the primary goal of the hepatoportoenterostomy (HPE) technique, which is sometimes called the Kasai procedure, and it is the mainstay of BA care. When deciding whether or not to do the Kasai procedure, it is important to consider the patient's age. The success rate of the Kasai operation is greatly diminished if the surgery is performed before the baby is 90 days old [2].

In addition to its rarity, BA has symptoms similar to those of other causes of newborn cholestasis, including normal neonatal jaundice. It is exceedingly difficult to rule out physiological jaundice or related breast milk jaundice in the early days of life when about half of all newborns have jaundice [3].

Because it is difficult to distinguish between pathologic and physiological jaundice, newborns with pathologic jaundice will frequently be exposed to sunlight for weeks or months, even if there is no change, because ultraviolet (UV) light will improve physiological jaundice. This can be due to parents' ignorance; in such a situation, the holdup in diagnosis is known as a patient delay. On other occasions, parents may have been more skeptical and brought their child to the closest medical facility for an evaluation. Unfortunately, due to the medical staff's ignorance, the baby might not receive the help they need promptly. Thus, early diagnosis relies on a high index of suspicion [4].

To decrease the need for expensive liver transplants and increase the rate of early identification and success of the Kasai operation, it is essential to assess the level of BA awareness among parents and healthcare providers [5].

Screening for BA is warranted due to the disease's high morbidity and cost. A useful screening tool is the Stool Color Card (SCC). From abnormally pale to normal-colored infant poop, the SCC displayed it all. This objective tool is designed to assist parents and physicians in accurately identifying stained newborn feces [6].

Most parents found the SCC to be an effective, user-friendly, and straightforward screening tool, according to Borgeat et al. [7]. When it came to obtaining and using the SCC, parents had little concerns. There was no cause for concern regarding the card-related conversation with the pediatrician, and the SCC was not adding needless consultations. An information gap regarding the diagnosis and evaluation of biliary atresia was shown by Menz et al. [8].

There is a defect in the KAP of Biliary Atresia among general practitioners and pediatricians, so there was a need to measure the KAP of BA through a questionnaire, which was not done in Egypt before or in Arab countries. As a consequence, this measurement can help improve the prognosis of the disease. Therefore, this work aimed to assess the knowledge, attitude, and practice of primary care physicians and pediatricians regarding biliary atresia with the validation of the questionnaire.

METHODS

The current study was a cross-sectional study that started in 2022 and continued until 2024 in primary health care units and the department of pediatrics in hospitals among general practitioners and pediatricians. The estimated sample was 150 healthcare providers. After approval from the Institutional Review Board (#9074), the pediatric departments of Zagazig University Hospitals approved the study. The research followed the guidelines in the Declaration of Helsinki, which is part of the World Medical Association's Code of Ethics for Research Involving Humans.

Inclusion and exclusion criteria: All healthcare providers and pediatricians working in primary healthcare centers were involved in the study. Participants were excluded if they were not pediatric primary care providers taking care of infants <28 days old, and hepatologists were excluded.

Data was collected using structured questionnaires filled out using a Google form questionnaire. The Google form questionnaire was directed to general practitioners and pediatricians from Egypt to assess their KAP about biliary atresia. This questionnaire was based on preceding surveys and articles with a similar aim [8-9], which contained Socio-demographic characteristics, e.g., age, gender, residence, governorate, job, workplace, education, 14 true/false questions to assess the knowledge of participants as sings, diagnoses and management of biliary atresia. Each correct answer was one, and each incorrect answer was 0, so the total score was 14. Cut off point was 60%; above 60% good knowledge and below 60% poor knowledge; four questions using a Likert-like scale (strongly agree, agree, unsure, disagree, and strongly disagree) to assess the attitude of participants toward biliary atresia as attitude toward knowledge and awareness regarding BA, attitude toward Applying serum fractionated bilirubin level helps in diagnosis of Biliary Atresia. So the total attitude score was 20, the cut-off point was 60%, above 60% good attitude and below 60% poor attitude, five multiple choice questions about the practice of participants as using

screening tools for diagnosis, the first action to do for a suspected child with BA.

Pretest (pilot study): The following goals informed the pre-test research that preceded the data-gathering phase: the time required to complete the checklist and evaluate each research participant, as well as the test and evaluation of the questionnaire and checklist's suitability, with the goal of identifying possible problems that may arise when carrying out the study.

The questionnaire and the checklist revealed that the items were suitable and easy for the researcher to fill in. The time needed to complete each questionnaire ranged from 10 to 15 minutes. The pre-test responses were not included in the final analysis.

Validity and reliability of the study tool: The American Academy of Pediatrics (AAP) and the cholestatic jaundice guidelines issued by ESPGHAN/NASPGHAN served as the basis for the questionnaire's development. To ensure that the questionnaire was valid and appropriate for measuring the intended constructs, five specialists in pediatric medicine and public health reviewed it for both content and face validity. The experts' opinions were used to calculate the questionnaire's face validity.

Statistical analysis:

After the data was entered into Excel, it was exported to SPSS (Statistical Package for the Social Sciences) version 21 for further processing, including sorting, tabulation, and analysis. The standard deviation, range, and mean were computed for the quantitative data. We checked for data normality using the one-sample Kolmogorov—Smirnov test; for certain variables, the results were parametric, while for others, they were non-parametric. The Chi-squared test and the Monte Carlo exact test were utilized to examine the correlation between categorical variables in several independent samples. We compared the means of two separate samples using the student t-test for quantitative parametric variables. A 5% significance level was chosen, with a corresponding P value of less than or equal to 0.05.

RESULTS

Table 1 showed that the mean age of studied participants was (44.9± 8.9), and more than half (57.6%) belonged to the age category from 30 – 50 years. Regarding gender, nearly two-thirds of participants were male (60.9%). More than half of the participants were urban (55.6%), and the result declared that the majority were from Al Gharbia and Al-Sharqia Governorate (Tanta University Hospital, El-Renshaw General Hospital, and Zagazig General Hospital) as about half (48.3%) were from the Gharbia governorate.

Table 2 demonstrated that the best knowledge was present among studied participants regarding the following items: “tea-colored urine is a characteristic sign of BA” (87.4%), “Delay in management of BA can cause liver cirrhosis” (84.1%), and “After 2 weeks of prolonged jaundice starting at day 1 would you think about a pathological underlying cause” (81.5%). While the worst knowledge was observed among them regarding “Ruta virus infection is one of the causes of BA” (45.7%). Also, an equal percentage of knowledge (78.8%) was observed regarding the following items: “In case of failure of KP in an infant with BA, the infant should be referred for liver transplantation,” and” BA is the most frequent indication for liver transplantation in children.” Also, the same percentage of knowledge (70.9%) was observed regarding the following items: “Exposing the baby to the morning sunlight will improve neonatal jaundice even if pathological,” and “BA is one of the causes of physiological jaundice.”

Table 3 showed that the mean total knowledge score was 9.88 ± 2.37, ranging from 4- 14. Consequently, nearly three-fourths, 72.2% of participants had good knowledge about biliary atresia; the best attitude was towards Lack of knowledge and awareness regarding BA, which helps in the high percentage of delayed diagnosis as most participants agreed (49.7% - strongly agreed 36.4).

Table 4 showed that the mean total attitude score was 15.38 ± 1.92, ranging from 9-20. Consequently, most participants, 91.4%, had a good attitude towards biliary atresia. It was found that the leading defective biliary atresia practice was observed among studies regarding using Stool colored cards as a screening tool while evaluating the possible direct hyperbilirubinemia (cholestasis) among newborns, only 37.1%.

Table 5 demonstrated a relationship between sociodemographic characteristics and total knowledge score; there was a significant difference between the poor knowledge group and the good knowledge group regarding age (p=0.005), as the higher percentage of poor knowledge was among 30-50 participants, 37.9%. Also, there was a significant difference between the poor knowledge group and the good knowledge group regarding gender (p=0.044), as poor knowledge was higher in males (33.7%). as well as there was a significant difference between the two groups regarding training courses (p=0.001), the knowledge was better among

participants with training courses otherwise biliary atresia and gastroenterology 79.3%.

Table 6 shows the relationship between sociodemographic characteristics and total attitude score. There was a significant difference between the poor attitude group and the good attitude group regarding age (p=0.03), as the higher percentage of poor attitude was among 30-50-year-old participants (13.8%). There was also a significant difference between the two groups regarding governorate (p=0.025).

Table 1: Socio-demographic characteristics among study participants**.**

Socio-demographic characteristics	NO	%
Age (years)**:** (Mean ± SD) Range	44.9± 8.9 27-69	
Age categories		
Less than 30 years	60	39.7
30 – 50Years	87	57.6
More than 50 years	4	2.6
Gender		
Female	59	39.1
Male	92	60.9
Residence		
Rural	67	44.4
Urban	84	55.6
Governorate		
Al-Qalyubia	7	4.6
Al-Sharqia	25	16.6
Alexandria	7	4.6
Bahira	13K	8.6
Cairo	12	7.9
Damietta	6	4.0
Faiyum	4	2.6
Gharbia	73	48.3
Menoufia	4	2.6
what is your job		
General practitioners	82	54.3
Pediatricians	58	38.4
otherwise.	11	7.3
Workplace		
1ry (health unit)	44	29.1
2 yr. (general hospital)	90	59.6
3 yr. (private institute)	13	8.6
Other	4	2.6
Level of education		
Bachelor	111	73.5
diploma	5	3.3
Master	32	21.2
Ph.D.	3	2.0
Training courses		
Biliary Atresia	10	6.6
gastroenterology	20	13.2

Socio-demographic characteristics	NO	%
Otherwise	121	80.1

Table 2: Knowledge of participants about biliary atresia.

	NO	%
1: clay colored stool, tea-colored urine is a characteristic sign of BA		
True (Correct answer)	132	87.4%
False	19	12.6%
2: In the case of BA, jaundice will always gradually disappear		
True	45	29.8%
False (Correct answer)	106	70.2%
3: The longest duration after which the neonate should be examined for pathological condition is 2 weeks		
True (Correct answer)	118	78.1%
False	33	21.9%
4: Exposing the baby to the morning sunlight will improve neonatal jaundice even if pathological		
True	44	29.1%
False (Correct answer)	107	70.9%
5: BA is one of the causes of physiological jaundice		
True	44	29.1%
False (Correct answer)	107	70.9%
6: Ruta virus infection is one of the causes of BA		
True (Correct answer)	69	45.7%
False	82	54.3%
7: BA can't be differentiated clinically from physiological jaundice at the early stage of the disease		
True (Correct answer)	104	68.9%
False	47	31.1%
8: The best time for surgical intervention (Kasai procedure) to an infant with BA is before 60 days of life		
True (Correct answer)	105	69.5%
False	46	30.5%
9: In case of failure of KP in an infant with BA the infant should be referred for liver transplantation		
True (Correct answer)	119	78.8%
False	32	21.2%
10: Delay in management of BA can cause liver cirrhosis		
True (Correct answer)	127	84.1%
False	24	15.9%
11:BA is the most frequent indication for liver transplantation in children		
True (Correct answer)	119	78.8%
False	32	21.2%
12: The best definition of direct hyperbilirubinemia (cholestasis) is Direct bilirubin >1.0 mg/dl		
True (Correct answer)	98	64.9%
False	53	35.1%
13: In a newborn (<28 days old) with jaundice > 2 weeks duration the condition does you feel needs to be ruled out first is breast feeding jaundice		
True	93	61.6%
False (Correct answer)	58	38.4%

	NO	%
14: After 2 weeks of prolonged jaundice starting at day 1 would you think about a pathological underlying cause?		
True (Correct answer)	123	81.5%
False	28	18.5%

Table 3: Total knowledge score, and Distribution of participants attitude toward biliary atresia among participants.

	NO	%
Total knowledge score		
Mean ± SD)	9.88 ± **2.37**	
Range	4 - 14	
Knowledge score interpretation		
Poor knowledge	42	27.8
Good knowledge	109	72.2
	NO	**%**
1: Lack of knowledge and awareness regarding BA helps in the high percentage of delayed diagnosis		
strongly disagree	1	0.7%
disagree	3	2.0%
insure	17	11.3%
agree	75	49.7%
strongly agree	55	36.4%
2 Do you think that the outcomes of BA will improve if surgery is performed before 60 days of life		
strongly disagree	1	0.7%
disagree	6	4.0%
insure	36	23.8%
agree	77	51.0%
strongly agree	31	20.5%
3: Applying serum fractionated bilirubin level helps in the diagnosis of BA		
strongly disagree	2	1.3%
disagree	13	8.6%
insure	36	23.8%
agree	88	58.3%
strongly agree	12	7.9%
4: A good neonatal screening especially SCC reduces the need for hazardous liver transplantation at a young age		
strongly disagree	2	1.3%
disagree	13	8.6%
insure	36	23.8%
agree	88	58.3%
strongly agree	12	7.9%

Table 4: Total attitude score and Distribution of participants practice to word biliary atresia among participants.

	NO	%
Total attitude score		
Mean ± SD)	15.38 ± **1.92**	
Range	9 - 20	
Attitude score interpretation		
Poor attitude	13	8.6%
Good attitude	138	91.4%
	NO	**%**
1: which screening tool you rely on most when evaluating for possible direct hyperbilirubinemia (cholestasis) in a newborn <28 days old?		
Abdominal U/S	38	25.2%
serum alpha 1 antitrypsin level	21	13.9%
serum fractionated bilirubin level	36	23.8%
Stool colored card (Correct answer)	56	37.1%
2: If you suspect a child with BA what is the first action to do?		
serum fractionated bilirubin level	42	27.8%
U/S and refer to a gastroenterologist. (Correct answer)	109	72.2%
3: A child after a KPE came to you with unexplained fever, recurrent jaundice with acholic stool what will you suspect of?		
anastomotic fistula	12	7.9%
Cholangitis (Correct answer)	104	68.9%
Intestinal obstruction	35	23.2%
4: A mom came to you with her jaundiced child at age of 2 weeks what is your advice to her?		
advise her to apply a stool-colored test and refer (Correct answer)	97	64.2%
give her supplementary medication.	22	14.6%
state that this is a normal condition to her baby	32	21.2%
5: A child came to you after a KPE what your advice to his mom about his diet is?		
encourage breastfeeding (Correct answer)	91	60.3%
hasten weening	22	14.6%
state that there is no correlation between diet and her child condition	38	25.2%

Table 5: Relationship between sociodemographic characteristics of participants and total knowledge score.

	Knowledge score				Test of significance	P value
	poor		good			
	No	%	No	%		
Age categories						
Less than 30 years	8	13.3%	52	86.7%	χ^2 =10.717	0.005*
30 – 50Years	33	37.9%	54	62.1%		
More than 50 years	1	25.0%	3	75.0%		
Gender					χ^2	
Female	11	18.6	48	81.4	4.056	0.044*
Male	31	33.7	61	66.3		
Residence						
Rural	18	26.9	49	73.1	0.054	0.816
Urban	24	28.6	60	71.4		
Governorate						
Al-Qalyubia	1	14.3	6	85.7		
Al-Sharqia	4	16.0	21	84.0		
Alexandria	5	71.4	2	28.6		

	Knowledge score				Test of significance	P value
	poor		good			
	No	%	No	%		
Beheira	3	23.1	10	76.9	MC	0.172
Cairo	3	25.0	9	75.0		
Damietta	1	16.7	5	83.3		
Faiyum	2	50.0	2	50.0		
Gharbia	21	28.8	52	71.2		
Monufia	2	50.0	2	50.0		
What is your job						
General practitioners	27	32.9	55	67.1	3.730	0.155
Pediatricians	11	19.0	47	81.0		
otherwise.	4	36.4	7	63.6		
Workplace						
1ry (health unit)	12	27.3	32	72.7	3.035	0.386
2 ry(general hospital)	28	31.1	62	68.9		
3 ry (private institute)	2	15.4	11	84.6		
other	0	0.0	4	100.0		
Level of education						
Bachelor	27	24.3	84	75.7	2.584	0.460
diploma	2	40.0	3	60.0		
Master	12	37.5	20	62.5		
Ph.D	1	33.3	2	66.7		
Training courses						
Biliary Atresia	5	50.0%	5	50.0%	15.854	0.001*
gastroenterology	12	60.0%	8	40.0%		
otherwise	25	20.7%	96	79.3%		

χ^2 for chi squared test. *t for student t test.* *MC for mont Carlo test.*
**Statistically significant at p0.05*

Table 6: Relationship between sociodemographic characteristics participants and total attitude score

	Attitude score				Test of significance	P value
	poor		good			
	No	%	No	%		
Age categories					χ^2	
Less than 30 years	1	1.7%	59	98.3%	7.024	0.03*
30 – 50Years	12	13.8%	75	86.2%		
More than 50 years	0	0.0%	4	100.0%		
Gender					χ^2	
Female	6	10.2	53	89.8	0.300	0.584
Male	7	7.6	85	92.4		
Residence						
Rural	3	4.5	64	95.5	2.613	0.106
Urban	10	11.9	74	88.1		
Governorate						
Al-Qalyubia	0	0.0	7	100.0	MC	0.025*
Al-Sharqia	0	0.0	25	100.0		
Alexandria	1	14.3	6	85.7		
Bahira	0	0.0	13	100.0		
Cairo	0	0.0	12	100.0		
Damietta	0	0.0	6	100.0		

	Attitude score				Test of significance	P value
	poor		good			
	No	%	No	%		
Faiyum	1	25.0	3	75.0		
Gharbia	9	12.3	64	87.7		
Menoufia	2	50.0	2	50.0		
What is your job						
General practitioners	10	12.2	72	87.8	3.307	0.191
Pediatricians	2	3.4	56	96.6		
otherwise.	1	9.1	10	90.9		
Workplace						
1ry (health unit)	3	6.8	41	93.2	MC	0.476
2 yr. (general hospital)	10	11.1	80	88.9		
3 yr. (private institute)	0	0.0	13	100.0		
other	0	0.0	4	100.0		
Level of education						
Bachelor	10	9.0	101	91.0	MC	0.849
diploma	0	0.0	5	100.0		
Master	3	9.4	29	90.6		
Ph.D	0	0.0	3	100.0		
Training courses						
Biliary Atresia	0	0.0	10	100.0	MC	0.598
gastroenterology	2	10.0	18	90.0		
otherwise	11	9.1	110	90.9		

χ^2 for chi squared test. *t for student t test.* *MC for mont Carlo test.*
**Statistically significant at* $P \leq 0.05$

DISCUSSION

Initially, a child with BA will have a generally healthy state. Eventually, as liver failure progresses, the patient will start to lose weight, have an enlarged abdomen from ascites and splenomegaly, and experience bleeding diathesis from a lack of vitamin K absorption. The disease can progress to cirrhosis and ultimately cause death if not managed [9]. Early identification, better Kasai operation results, and less costly liver transplantation can be achieved by assessing parents' and healthcare providers' BA knowledge [10].

The current study showed that the mean age of studied participants was (44.9± 8.9), and more than half (57.6%) of the participants belonged to the age category from 30 – 50 years. Regarding gender, nearly two-thirds of participants were male (60.9%). More than half of the participants were urban (55.6), and about half (48.3) were from the Gharbia governorate.

Regarding their job, more than half (54.3%) of study participants were general practitioners, and 59.6% worked in 20 general hospitals. While regarding the level of education, nearly three-quarters of respondents (73.5%) had bachelor's degrees. At the same time, most respondents (80.1%) didn't take biliary atresia or gastroenterology training courses.

The current study was conducted in the western region of Saudi Arabia, similar to the Hasosah study [11], which showed that 55% of those who responded were Males aged 31–40 (49% of the total). In terms of occupation, 46% were residents in pediatrics, 16% were consultants in pediatrics, and 14% were family doctors. 69% were drawn from public hospitals, while 27% were from private ones.

On the other side, Lianti et al. [9] study conducted in Indonesia showed that Women comprised the vast majority of the study's participants. The healthcare provider group consisted primarily of male medical doctors (n=9) and a small number of female nurses; when broken down by age category, the most significant proportion of participants were between the ages of 30 and 50. Healthcare providers, on the other hand, tended to have a younger age distribution. The gender difference may be due to cultural differences, but the age was almost similar in the different studies.

The current study showed that nearly three-fourths, 72.2% of participants, had good knowledge about biliary atresia. The distribution of the studied

participants regarding knowledge about biliary atresia was found that the best knowledge was present among studied participants regarding the following items: "tea-colored urine is a characteristic sign of BA" (87.4%), "delay in BA management could lead to liver cirrhosis" (84.1%) and "After 2 weeks of prolonged jaundice starting at day 1 would you think about a pathological underlying cause" (81.5%). The worst knowledge was observed among them regarding "Ruta virus infection as one of the causes of BA" (45.7%).

These results agreed with Christakis et al. [12] study conducted in the United States, which reported that out of the respondents (300 pediatricians), 66% were aware of the hyperbilirubinemia guideline**.** Also, the study **by** Lianti et al. [9] documented that according to the BA knowledge questionnaire findings, which range from 0 to 12, the healthcare professional group had a median score of 9 (range 2-12, 75%). Most healthcare providers (65%) knew that abnormal jaundice lasting longer than two weeks necessitated further investigation and a more comprehensive evaluation. Furthermore, it was mentioned that 87.6% of babies with pathological jaundice found relief after being exposed to sunlight.

Furthermore, Averbukh et al. [3] demonstrated that by utilizing the low cut-off for optical density values, four investigations found that rotavirus C had a prevalence rate of 40% in BA. In contrast, rotavirus A had a rate ranging from 0% to 15% in BA. Furthermore, the study conducted by Queiroz et al. [13] in Brazil confirmed that health professionals are becoming more aware of the need for early referral during observation. The median time from the initiation of propaedeutics after admission and the performance of the Kasai procedure was 10.5 days. Patients who finished their preoperative workup had to wait an additional 4 days before their portoenterostomy procedure could be performed, and the median time for starting tests and surgical indication was 6 days. [3,14].

On the opposite side, Hasosah. [11] the study noted that Only 28% of people who took the survey knew what Neonatal Cholestasis (NC) means. Among them, 53% were pediatric residents, 18% were consultants, and 16% were specialists. Similarly, just 25.4% of participants knew that a cholestasis workup requires jaundice lasting more than two weeks. Regarding knowing the NASPGHAN/ESPGHAN standards for evaluating NC, 37% had a minimal understanding, and 11% had no information. In addition, the Hasosah study reported that almost two-thirds of the participants did not know that pale stool color is a crucial screening for the history of the condition. Biliary atresia treatment problems may increase due to a lack of awareness, which diminishes the feeling of urgency.

The current study showed that 91.4% of participants had a good attitude toward biliary atresia. The best attitude was towards "Lack of knowledge and awareness regarding BA helps in the high percentage of delayed diagnosis," as most participants agreed (49.7%—strongly agree 36.4).

Similar findings were reported in the Lianti et al. [9] study, as the vast majority of healthcare workers (136 doctors and nurses) could diagnose the condition early on by analyzing the color of stool using the SCC (96.4%). Along with this, 91.2% believe that patients suffering from biliary atresia have a pale, putty-like stool and that the SCC is an effective tool for the early detection of BA.

Supporting this finding, Menz et al. [8], in a study conducted in Rhode Island, used a Likert-type scale from 1 (strongly disagree) to 5 (strongly agree) to ask 116 pediatricians if they were confident or comfortable with cholestasis evaluation, diagnosis, and management. Although 87.1% of clinicians were confident in their ability to read serum-fractionated bilirubin levels, 28.5% reported feeling uneasy when asked to determine whether stool was acholic, and 17.8% said they did not know whether to refer a child to pediatric gastroenterology. The serum-fractionated bilirubin level was also easily interpretable by 87.1% of clinicians. Although the NASPGHAN/ESPGHAN guidelines state that the first screening test for a newborn with prolonged jaundice is a serum-fractionated bilirubin level, only 70.7% of providers felt confident ordering this test. Additionally, 63.8% of providers believed that surgery for BA improved outcomes if done before 60 days of life, but 30.2% were unsure of the age at which surgery should be done once BA is diagnosed. On the other hand, Hasosah. [11] regarding the diagnosis, just 18.9% of pediatric consultants and other PPs stated that biliary atresia should be eliminated as a first possibility, with a significant difference ($P < 0.001$). Additionally, the gold standard investigation for NC (neonatal cholestasis) is a liver biopsy, yet only 92 responders (18.9%) were positive. There may be a delay in diagnosing BA due to this lack of understanding, which reduces the feeling of urgency.

The present study showed the distribution of studied particles regarding biliary atresia practice measures. It was found that the main defective biliary atresia practice was observed among the studies regarding

using a stool-colored card as a screening tool when evaluating for possible direct hyperbilirubinemia (cholestasis) in a newborn, only 37.1%.

On the other hand, the best practice reported among studied participants was regarding using U/S and referring to a gastroenterologist when suspected of a child with biliary atresia (72.2%). Also, good practice was found regarding the following items: suspect Cholangitis in a child after a KPE came to you with unexplained fever, recurrent jaundice with acholic stool (68.9%). Advise the mom to apply for a stool-colored test and refer if she came with her jaundiced child at the age of 2 weeks (64.2%). Encourage breastfeeding for children 0after a KPE (60.3%).

The current study was supported by Lianti et al. [9] study, which found that 136 healthcare providers (doctors and nurses) agreed that patients suspected of having BA should be referred to tertiary care centers as soon as possible (86.1%). Additionally, 96.4% of participants agreed that the optimal time to treat a baby with the Kasai procedure was before two months of age to prevent permanent liver failure and the need for a liver transplant (96.4% of participants).

The current study reported a Low percentage of Stool colored cards as a screening tool; this could be explained by the Borgeat et al. [7] study, which was conducted in Switzerland, as the vast majority of parents (98%) were unaware of biliary atresia before to obtaining the SCC. 64% of parents said it was "extremely" easy to use, while 36% said it was "quite" easy to use. A whopping 97% of people said the screening explanations on the SCC were crystal clear. Most parents' pediatricians provided all the information they required. Nearly all respondents (98%) thought the card's colors suitably. Almost all parents (90%) correctly identified the corresponding color.

In contrast to the current study, Hasosah. [11] stated that Pediatric consultants made the majority of referrals, while interns recommended the fewest cases to pediatric gastroenterologists in instances of persistent cholestasis (28.3%, $P < 0.001$). More frequently than other PPs, ursodeoxycholic acid was recommended as a supportive treatment by pediatric consultants and residents (41.8%). [12].

All general practitioners and pediatricians should be subjected to awareness campaigns about biliary atresia causes, diagnosis, and management. Great attention should be paid to implementing stool-colored cards as a screening tool in health care centers and teaching parents how to use them. Emphasis should be placed on saving the requirements needed for early detection, evaluation, and management of biliary atresia patients. Programs of biliary atresia screening should be implemented regularly, evaluated for cost-effectiveness, and popularized.

Strength points of the current study:

Using Google Forms for data collection allows researchers to reach geographically diverse healthcare providers, which is a significant advantage. This enables researchers to gather data from participants across different locations. Also, the ability to access and complete the form from any device at their convenience ensures higher participation rates.

***Limitations*:**

One limitation of this study is that it is missing a question about years of experience, which critical items could have provided deeper insights into the study and given an explanation for some results. Also, as the study is cross-sectional and conducted at a single point in time, it cannot establish causality.

Conclusions

Based on these findings, it could be concluded that pediatricians' baseline levels of knowledge regarding biliary atresia were mainly good, except for poor knowledge of the Ruta virus as a cause of biliary atresia. Also, the baseline attitude levels were good. However, the baseline practice levels were fair except for the deplorable practice of not using stool-colored cards as a screening tool when evaluating for possible direct hyperbilirubinemia (cholestasis) in a newborn.

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