Scientific Research Publishing

Open Journal of Pediatrics, 2020, 10, 759-768
https://www.scirp.org/journal/ojped
ISSN Online: 2160-8776
ISSN Print: 2160-8741

Etiology of Pediatric Jaundice: Observation in the Pediatric Ward of the Gabriel Toure University Hospital

K. Sacko[1*], A. A. Diakité[1], F. Traoré[1], B. Maiga[1], P. Togo[1], O. Coulibaly[1], G. Guindo[1], D. Konaté[1], A. K. Doumbia[1], H. Konaré[1], S. Sagara[1], A. Dembélé[1], A. Touré[1], F. L. Diakité[1], L. N. Sidibé[1], H. Diall[1], M. Traoré[2], Y. A. Coulibaly[1], M. E. Cissé[1], A. Sangaré[3], A. Ibrahim[1], F. T. Dicko[1], M. Sylla[1], B. Togo[1]

[1]Pediatric Department of Gabriel Toure University Hospital, Bamako, Mali
[2]Pediatric Service of the Reference Health Center of Municipality 5, Bamako, Mali
[3]Pediatric Service of the Mali Hospital, Bamako, Mali
Email: *Karamoko_sacko@yahoo.fr

How to cite this paper: Sacko, K., Diakité, A.A., Traoré, F., Maiga, B., Togo, P., Coulibaly, O., Guindo, G., Konaté, D., Doumbia, A.K., Konaré, H., Sagara, S., Dembélé, A., Touré, A., Diakité, F.L., Sidibé, L.N., Diall, H., Traoré, M., Coulibaly, Y.A., Cissé, M.E., Sangaré, A., Ibrahim, A., Dicko, F.T., Sylla, M. and Togo, B. (2020) Etiology of Pediatric Jaundice: Observation in the Pediatric Ward of the Gabriel Toure University Hospital. *Open Journal of Pediatrics*, **10**, 759-768.
https://doi.org/10.4236/ojped.2020.104077

Received: November 3, 2020
Accepted: December 28, 2020
Published: December 31, 2020

Abstract

Objective: Pediatric jaundice is caused by various conditions. Although some data is available on this issue, data from Mali is insufficient. The present retrospective observational study was an attempt to determine the etiology of pediatric jaundice in the pediatric department of Gabriel Touré teaching hospital in Bamako, Mali. Methods: We reviewed all pediatric patients with jaundice who were hospitalized and treated in this department during January 1 to December 31, 2016 (n = 168). Result: Pediatric jaundice patients accounted for 1.88% of the hospitalized patients, with median age of 6 years and male/female ratio being 1.6. Infectious, cholestatic, and hemolytic jaundice accounted for 75%, 11% and 10%, respectively. Malaria and sickle cell disease accounted for 67% and 9%, respectively. Hepatomegaly and splenomegaly were observed in 49 (29%) and 23 (13.7%) patients, respectively. Of 168, 9 patients died. Conclusion: Infectious jaundice, especially jaundice due to malaria, was the most frequent. However, variety of etiologies was observed, of which the practitioners should be aware. The observation presented here may become fundamental data in health-policy making in this area.

Keywords

Jaundice, Etiology, Paediatrics, Mali

1. Introduction

Jaundice is one of the reasons for frequent consultation in pediatrics. It is often

reported by parents. At times, it is observed by the pediatrician due to the existence of another clinical symptom evoking a liver disease or hemolytic [1]. In practice, the pediatrician often comes across one of these following four situations: jaundice and stool discoloration, jaundice, haemolysis and isolated jaundice [2] [3]. Jaundices etiologies are many; we can divide them into two big categories according to the increase of serum bilirubin which can be non-conjugated bilirubin or conjugated bilirubin and of mixed cause as well [1].

In Mali, we don't have statistics related to child and infant's jaundice, which is the reason why we conducted this study of the infant and child's jaundices etiologies in the paediatric ward at Gabriel Toure university hospital centre.

2. Methods and Patients

It was a prospective study led from 1st January to 31st December 2016 (12 months) in the paediatric ward of the university hospital centre of Gabriel Toure. The university hospital center of Gabriel Toure is a third reference hospital in the Bamako city, Mali's capital, sahelo-saharan country. All infants and hospitalized children in the ward with icterus were included at the entry examination witin the study. The parameters studied within the searching were: anamnestic, clinical, paraclinical, treatment and scalable. The data were collected on a survey sheet, entered by Word and Excel software and then analyzed by SPSS version 20 software.

3. Results

During the study we collected 168 files of infants and children with jaundice out of 8924 hospitalization or a frequency of 1.8%.

3.1. Soci-Demographic Data

The average age was 6 years and 3 months with a standard deviation of 4 years and the median age was 6 years. The most represented age group was from 1 to 5 years old with 39.5% (66 patients). The male sex predominated with 62.5%, the sex ratio was 1.66%. Patients from outside Bamako accounted for 42.9%.

3.2. Clinical Data

The vaccination according to Mali's Expanded Program on Immunization (EPI) was up to date in 65% of patients and 15.5% had been hospitalized for at least one year. We found 1st degree consanguinity in 126 patients (75%), the notion of jaundice was found in 20 (11.9%) and 7 (4.1%) were known to have sickle cell disease.

Anemia and fever were the most common reasons for consultation with 26.7% and 23.8% respectively. Icterus was the reason for consultation in 13% of patients. At the entrance clinical examination, 81% of patients presented with fever, 42.8% with digestive disorders and 20.82% with abdominal pain. Feces were discolored in 5.35% of patients and urine was dark in 6.5%. Jaun-

dice was generalized in 112 patients (66.6%), limited to the conjunctiva in 40 (23.8%) and a subicterus in 18 (10.7%). The general condition was poor in 79 patients (47%), pallor was found in 140 (83.3%), hepatomegaly in 49 (29%) and splenomegaly in 23 (13.6%. Infectious jaundice class predominated with 75% followed by cholestatic jaundice (11%) and constitutional hemolytic jaundice (10%) (Table 1).

The hemogram was performed at 97/168. The majority of patients (95%) had an anemia (Hemoglobin ≤ 11 g/dl) that was microcytic (average globular volume < 70 fintolitre) in 62%. Hyperleukocytosis (WBC > 10,000/mm³) was found in 41% of patients and leukopenia in 4%. Increased in 56/72 patients and conjugated bilirubin (VN ≤ 5 µmol/L) was elevated in 21/72 patients. Transaminases were achieved in 33/168 patients with elevated AST in 27/33 and increased ALT in 24/33. GGTs were increased in 14/18 patients and alkaline phosphatases were

Table 1. Clinical characteristics.

Clinicla characteristics	Number	Percentage
Age group		
<1 year	16	9.6
1 to 5 ans	66	39.5
5 to 10 years	52	31.1
>10 years	33	19.8
Sex		
Male	105	62.5
Female	63	37.5
Anamnestic signs		
Dark urine	11	6.54
Discolored stools	9	5.35
Fever	136	81
Digestive disorders	72	42.85
Abdominal pain	35	20.83
pruritus	2	1.19
Physical signs		
Poor general condition	79	47
Skin rashes	4	2.38
Pallor	140	83.33
jaundice	168	100
Hepatomegaly	49	29.16
Splenomegaly	23	13.69
Abdominal mass	4	2.38
Ascites	3	1.78
CVC	2	1.19

elevated in 10/15 patients. Thick Drop was the most requested diagnostic adjunct test and was positive in 67% of patients. Hepatitis A serology was positive in 7% of patients and Hbs Ag was positive in 4%. Abdominal ultrasonography was performed in 45/168 patients and showed hepatomegaly in 15, splenomegaly in 6 and others (Table 2 and Table 3).

The etiologies were dominated by malaria (67%), Sickle cell anemia (9%), hepatitis A (7%) and hepatitis B (4%). Other etiologies such as bile duct atresia, hepatic abscess and pneumonia were found but in very low proportions (Figure 1).

Table 2. Biological charateristics.

Parametres	Number	Percentage
Total Bilirubin (n = 72)		
High	72	100
Normal	0	0
Conjugated Bilirubin (n = 72)		
High	21	29
Normal	51	71
Free Bilirubin (n = 72)		
High	56	78
Normal	16	22
AST (n = 33)		
Normal	6	18
High	27	82
ALT(n = 33)		
Normal	9	27.3
High	24	72.7
Alkaline Phosphatase (n = 15)		
Low	5	14
High	10	86
Gamma Glutamine Transferase (n = 18)		
Normal	4	8
High	14	92
Prothrombin time (n = 17)		
Normal	17	100
Collapsed	0	0
Thick Drop (n = 99)		
positive	67	68
negative	32	32
Serology hepatitis A (n = 9)		
Positive	7	78
Negative	2	22
Ag Hbs (n = 5)		
Positive	4	80
Negative	1	20

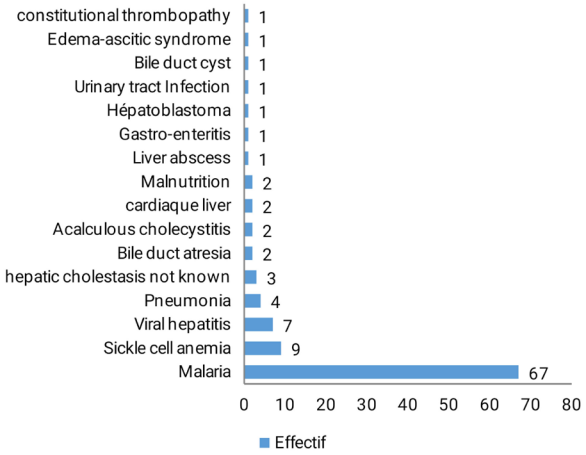

Figure 1. Distribution of patients according to etiologies.

Table 3. Distribution of patients according to jaundice classes.

Class jaundice	Number	Percentage
Infectious jaundice	126	75
Cholestatic jaundice	18	10.7
Constitutional hemolytic jaundice	16	9.5
Isolated jaundice	8	5.4
Total	168	100.0

A cure had been observed in 139 patients, 12 were discharged against medical advice, 9 were deceded and 8 are being followed up.

4. Discussion

Jaundice in infants and children has been a little studied in Africa. As a result, few references have been found in Mali and Africa to discuss our findings.

The frequency of 1.8% was relatively high given the different etiologies likely to cause jaundice in children in our context of malaria-endemic countries.

The average age was 6 years and 3 months and the most common age group was 1 to 5 years with 39.5% (66 patients). Given that infectious etiologies were the most common, the high frequency (39.5%) of the 1 - 5 year age group could be explained by their vulnerability to infection. The average age of 6.3 of our series was close to that of the study carried Morocco in 2010 on the febrile icteres of the child who found an average age of 6.1 ± 3 year, with a median age of 5.5 years (extreme: 1 - 15 years) and children under the age of six were the most affected with 51.7% [4] [5]. The sex ratio was 1.6 in our study, this predominance of the male sex had been reported by several authors [2] [5].

Anemia and fever were the most common reasons for consultation with 26.7% and 23.8% respectively, and jaundice was the reason for consultation for 13% of patients. The association of icterus with fever is much found in infectious diseases such as malaria which the etiology the most common in our searching.

Anemia can be explained by hemolysis, which is due to infectious pathologies, in this case malaria, and to certain constitutional pathologies such as drepanocytosis (sickle cell disease).

At the entrance clinical examination, 81% of the patients had a fever, 42.8% had digestive problems and 20.8% had abdominal pain. All of these signs are found in the infectious syndrome, which remains the most common etiological group in our study.

Feces were discoloured in 5.3% of patients and dark urine in 6.5%. The association of jaundice with coloured feces and dark urine evokes a cholestatic jaundice.

A hepatomegaly is most often a sign of hepatic suffering, its discovery most often leads to an infectious or cholestatic jaundice and requires an etiological assesment. It was found in 29% of our patients.

The predominance of infectious jaundice (75%) could be expalained by the poor hygienic conditions and especially by the fact that the study site is a malaria endemic zone.

The anemia found in 95% of patients could be explained by a high prevalence of martial deficiency in the pediatric population where the microcytosis (62%). According to Demographic and health survey-Mali V, 82% of children aged 6 to 59 months suffer from anemia [6].

The low rate of realisation of serum bilirubin (72/168) could be explained by the low income of the parents, free bilirubin was increased in 56/72 and conjugated bilirubin was increased in 21/72. Transaminases were carried out in 33/168 patients with high asparate aminotransferase in 27/33 and increased alamin aminotransferase in 24/33 explaining hepatic suffering due to hepatocyte damage. GGTs were increased in 14/18 patients and PALs were elevated in 10/15. This increase in GGTs points towards a cholestatic ictere.

The thick drop was the complementary examination aimed at the most requested diagnosis and was positive in 67% of patients, in our context every feverish patient is given a thick drop to confirm or rule out malaria. The etiologies were dominated by malaria (67%) followed by drepanocytosis (9%), hepatitis A (7%) and hepatitis B (4%). Other aetiologies such as biliary (tract) atresia, hepatic abscess and pneumonia were found but in very low proportions. In Morocco the etiologies are dominated by G6PD (glucose 6 phosphatase deshydrogenase) deficiency (18%), Wilson's disease (18%) and hepatitis A (15%) [7]. Other studies carried out on the etiologiy of febrile jaundice had found hepatitis A as the first etiology with 91.5% [5] [8] [9] [10]. These results show a difference in the etiology of the jaundice between these two regions in Africa. In Mali, malaria is the first cause of death and death among children under 5 years, which represent 40% of the first cause of consultation in public health facility according to the health facility system data and its national prevalence is estimated to 52% [6].

5. Conclusion

Jaundice is a frequent sign in infants and children, the infectious etiologies are

more frequent and dominated by malaria. Other etiologies such as sickle cell anemia and cholestatic jaundice (Bile duct atresia) should not be forgotten. The treatment is especially etiologic and the progress beneficial if the etiological support is premature and fitted.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Rambaud, P. (2005) Neonatal Jaundice. Medical Corpus. http://www-sante.ujf-grenoble.fr/SANTE/corpus/disciplines/pedia/nouveaune/320/lecon320.htm

[2] Frexinos, J. (1988) Clinical Hepato-Gastroenterology. 4e Edition, Simep, 454 p.

[3] Lacaille, F. and Lachaux, A. (2010) Liver and Biliary Tract Disease in Children. 1st Edition, Wolters Kluvers, France, 410 p.

[4] Benhamou, J.P., Sarles, H. and Gerolami, A. (1890) Liver, Pancreas and Biliary Tract. 2e edition, Flammarion, Paris, 227 p.

[5] Bourrousa, M., Draisa, G., Amineb, M., Adabbousa, A., Admouc, I. and Bouskraouia, M. (2010) Seroprevalence of Viral Hepatitis A in Febrile Jaundice in Children of Marrakech, Maroc. *Diary of Pediatrics Childcare*, **23**, 76-81. https://doi.org/10.1016/j.jpp.2009.09.007

[6] Institut National de la Statistique (INSTAT) (2018) Planning and Statistics Unit for the Health-Social Development and Family Promotion Sector. Sixième Enquête Démographique et de Santé au Mali.

[7] Belarj, B. (2012) Infants and Child's Jaundice (about 33 Cases). Université Sidi Mohammed Ben Abdhella, Fès. Thèse Med.

[8] Bousfiha, A.A., Mikou, N. and Abid, A. (2000) The Diagnostic of Infants and Child's Jaundice. *Esperance med*, **7**, 92-95.

[9] Bourrillon, A., Chouraqui, J.P., Dehan, M., Lechevallier, J., Chantepie, A., Deslandre, J., *et al.* (2003) Pediatrics for Practitionners. 5e edition, Masson, Paris, 832 p.

[10] Smahi, M.C., Rahmoun, L., Ghomari, S.M., Benmansour, S., Sendani, H., Bendaddouche, A.S. and Gendrel, D. (2009) Seroprevalence and Risk Factors for Viral Hepatitis A, Tlemcen. *Algérie Archi de Pediatrie*, **16**, 844-846. https://doi.org/10.1016/S0929-693X(09)74175-2

Enquiry Form

1) Identity:
File number:
Date of entry: /___/___/_____/
Release Date: /___/____/_____/
Last name and First name:
Age:
Sex: □M □F
Tribe:
Address:
2) Medical background
a) Personal:
Gestational age: Childbirth: □Medicalized □Non-medicalized
Birth weight: psychomotor development:
Feeding mode: □artificial breastfeeding □breastfeeding □mixed breastfeeding
Expanded Program on Immunization (EPI): □correct □Incorrect □Not done
Educated: □Yes □No
Known pathology:
Transfusion: □Yes □No
Hospitalization antecedent: _____
Jaundice Antecedent: □Yes □No
b) Familial:
Sibling: Consanguinity: □1st degree □2nd degree
Family history of jaundice: □Yes □No
3) Reason for consultation: _____
4) History of the disease:
Start date: /___/___/_____/
Installation mode: □Brutal □Progressive
Associated signs: _____
Urine appearance: □Dark □clear
Feces appearance: □discoloured □normal
Fever: □yes □no
Asthenia: □yes □no
Weight loss: □yes □no
Abdominal pain: □yes □no
Digestive disorders: □yes □no
pruritus: □yes □no
5) Admission examination:
a) General examination:
Weight (kg): _____
Size (cm): _____
Cranial perimeter (cm):_____
Temperature (˚C): _____

Heart beat frequency:
Breathing frequency:
General condition: □good □fair □bad
Skin rash: □yes □no
Mucocutaneous pallor: □yes □no
Conjunctive: □jaundice □subicterus
Generalized jaundice (mucous membrane and teguments): □yes □no
Discolored stools: □yes □no
Dark urine: □yes □no
Pruritus: □yes □no

b) Examen abdominal:

Hepatomegaly: □yes □no
Splenomegaly: □yes □no
Abdominal mass: □yes □no
Ascites: □yes □no
Collateral venous circulation: □Yes □No

c) Other:

Psychomotor delay: □yes □no
Failure to thrive: □yes □no
Associated malformation: _____
Neurological signs: _____
Other associated signs: _____

6) Complementaryexamination:

a) Biological:

Blood count:
Red Blood Cells (RBC) HbHemoglobin
White Blood Cells (WBC) Polynuclear neutrophils platelets
Lymphocyte
Monocytes
Reticulocyte
Mean corpuscular volume
Average Corpuscular Hemoglobin Concentration
Gamma glutamyl transpeptidase (GGT)
Alkaline phosphatase (ALP)
LDH PRTotal BIL
Conjugate BIL
Free BIL
Aminotranferase: ALT AST
Serology

Ac anti HAV	Ac anti HCV	Ac anti HBc
AgHBs	TPHA-VDRL	CMV
Leishmaniasis	Toxoplasmosis	Rubella
Cytobacteriological study of urine	Blood culture	
Blood smear		

Electrophoresis of Hemoglobin	EPP
Rate of G6PD	
Myelogram	
THS	
Liver function	Liver biopsy puncture
Ascite puncture	Other:

b) Radiologiques:

Chest X-ray	Abdominal ultrasound
Echocardiography	Abdominal CT
Digestiveendoscopy	Cholangiography
CT cholangiography	Cholecystography
Other:	

7) Diagnostic selected:

_____

8) Complications:

_____

9) Care:

Symptomatic:

Etiologic:

Medical: _____

Surgical: _____

10) Duration of hospitalization:

_____

11) Evolution:

Full recovery: □yes □No

Chronic evolution and secondary complication:

Cholestasis: □decreased □aggravated □stabilized

Edema-ascitic Syndrome: □HTP Portal hypertension □IHC Hepatocellular insufficiency □Infection □Cirrhosis

Sequelae:

Death: