

Supplementary File 1

Knowledge, attitudes, and clinical experiences of pediatricians regarding inherited metabolic diseases

Correct answer(s) to knowledge items are shown in bold and marked with an asterisk ().*

Although inherited metabolic diseases are rare, they constitute a substantial public health burden. Advances in metabolic and genetic testing have improved diagnostic rates; however, because these disorders often mimic common pediatric conditions, they continue to pose significant challenges in diagnosis and management. In resource-limited settings, high birth rates and the high prevalence of consanguineous marriages further exacerbate these challenges. While diagnostic and treatment opportunities are more widely available in developed countries, the diagnosis and management of these disorders remain major concerns in settings with limited resources. This study aimed to identify the main challenges in the diagnostic and therapeutic processes by examining pediatricians' knowledge and clinical experience in the management of children with metabolic diseases.

Participant Information

1. Informed consent

Response format: Select all that apply

- ☐ I have been informed in writing about the purpose and scope of the study. I confirm that I am older than 18 years of age and that I voluntarily agree to participate. Anonymous data derived from my responses may be used for scientific publications.
- ☐ I agree to participate in this study.

2. E-mail address

Response format: Open-ended

3. Age

Response format: Open-ended

4. Sex

Response format: Single choice

- ☐ Female
- ☐ Male

5. Institution of employment

Response format: Single choice

- ☐ State hospital
- ☐ Training and research hospital
- ☐ University hospital
- ☐ Private hospital
- ☐ Private practice

6. Professional title

Response format: Single choice

- ☐ Resident physician
- ☐ Specialist physician
- ☐ Academic physician

7. Years of professional experience

Response format: Single choice

- ☐ 0-5 years
- ☐ 5-10 years
- ☐ 10-15 years
- ☐ 15-20 years
- ☐ 20 years or more

8. Have you attended any meeting, conference, congress, or workshop related to metabolic diseases?

Response format: Single choice

- ☐ Yes
- ☐ No

9. Have you ever worked in a pediatric metabolism department?

Response format: Single choice

- ☐ Yes
- ☐ No

Knowledge and Clinical Experience Regarding Inherited Metabolic Diseases

10. What is the estimated frequency of inherited metabolic diseases?

Response format: Single choice

- ☐ **1/5,000 ***
- ☐ 1/10,000
- ☐ 1/50,000
- ☐ 1/100,000

11. What is the most common mode of inheritance in metabolic diseases?

Response format: Single choice

- ☐ Mitochondrial
- ☐ Autosomal dominant
- ☐ **Autosomal recessive ***
- ☐ X-linked
- ☐ I do not know

12. Which of the following findings may suggest an inherited metabolic disease?

Response format: Select all that apply

- ☐ **Recurrent vomiting episodes or formula intolerance ***
- ☐ **Unexplained episodes of dehydration that improve with fluid therapy ***
- ☐ **Episodes of hypoglycemia ***
- ☐ **Family history of thromboembolism ***
- ☐ **Developmental delay accompanied by loss of previously acquired skills ***
- ☐ **Muscle cramps after exercise ***
- ☐ **Unexplained childhood deaths in the family ***

13. In your opinion, what are the benefits of establishing a diagnosis of metabolic disease for the patient?

Response format: Select all that apply

- ☐ **The patient's quality of life may improve with supportive treatment ***
- ☐ **Some conditions are treatable ***
- ☐ **If the causative gene is identified, the family's subsequent child may be unaffected ***
- ☐ Establishing the diagnosis is unnecessary because it is costly
- ☐ Nothing can be done for these patients
- ☐ I do not know

14. How can metabolic diseases be prevented?

Response format: Select all that apply

- ☐ Prenatal screening *
- ☐ Newborn screening *
- ☐ Screening of high-risk individuals *
- ☐ Carrier screening *
- ☐ Special diets

15. When should newborn screening be performed?

Response format: Single choice

- ☐ In all newborns after birth *
- ☐ Only in high-risk newborns
- ☐ Only in newborns who are symptomatic at birth
- ☐ In patients who become symptomatic later in life
- ☐ I do not know

16. Which of the following diseases are included in the newborn screening program?

Response format: Select all that apply

- ☐ Phenylketonuria *
- ☐ Congenital hypothyroidism *
- ☐ Biotinidase deficiency *
- ☐ Cystic fibrosis *
- ☐ Congenital adrenal hyperplasia *
- ☐ Spinal muscular atrophy *
- ☐ I do not know

17. Which of the following may trigger metabolic decompensation in metabolic diseases?

Response format: Select all that apply

- ☐ Consumption of certain carbohydrates
- ☐ Increased protein intake
- ☐ Conditions that increase catabolism, such as infection, fasting, or fever
- ☐ Anesthesia and surgical procedures
- ☐ Use of certain medications
- ☐ I do not know

18. How often do you encounter metabolic diseases in clinical practice?

Response format: Single choice

- ☐ At least once a week
- ☐ At least once a month
- ☐ Once every 6 months
- ☐ Every day
- ☐ I have never encountered a case

19. What do you do when you suspect a metabolic disease?

Response format: Single choice

- ☐ I immediately refer the patient to a pediatric metabolism specialist
- ☐ I order baseline investigations and then refer the patient to a pediatric metabolism specialist
- ☐ I evaluate baseline investigations and, if necessary, request further tests
- ☐ I initiate baseline treatment and refer the patient to a pediatric metabolism specialist for further evaluation and management

20. Do you feel competent in making a preliminary diagnosis of metabolic diseases?

Response format: Single choice

- ☐ Yes
- ☐ No

21. Do you think the education you received during medical school or residency regarding metabolic diseases was sufficient?

Response format: Single choice

- ☐ Yes
- ☐ No

22. Do you find follow-up of patients with diagnosed metabolic diseases challenging?

Response format: Single choice

- ☐ Yes
- ☐ No

23. In your opinion, what is the greatest barrier to establishing the diagnosis?

Response format: Single choice

- ☐ Insufficient training
- ☐ Insufficient clinical experience
- ☐ Lack of adequate laboratory facilities in my workplace
- ☐ Limited access to specialists because this is a subspecialty field
- ☐ Delayed diagnosis because these conditions clinically resemble other diseases
- ☐ Diagnostic tests are expensive

24. Which investigations do you request first when you suspect a metabolic disease?

Response format: Select all that apply

- ☐ **Blood glucose ***
- ☐ **Blood gas analysis ***
- ☐ **Ammonia ***
- ☐ **Lactate ***
- ☐ **Tandem mass spectrometry and urinary organic acid analysis ***
- ☐ Cranial MRI
- ☐ Genetic testing
- ☐ **Blood and/or urine ketones ***
- ☐ **Routine biochemistry tests ***

25. Do you think your institution has adequate laboratory facilities for the evaluation of metabolic diseases?

Response format: Single choice

- ☐ Yes
- ☐ No

26. What are your views on treatment outcomes in metabolic diseases?

Response format: Single choice

- ☐ Some are treatable
- ☐ Many are treatable
- ☐ Dietary treatment is recommended
- ☐ None are treatable
- ☐ All have a poor prognosis
- ☐ I do not know

27. Which of the following are included in the routine treatment of metabolic diseases?

Response format: Select all that apply

- ☐ **Dietary therapy ***
- ☐ **Enzyme replacement therapy ***
- ☐ **Cofactor replacement ***
- ☐ Gene therapy
- ☐ Regular dialysis
- ☐ I do not know

28. Which of the following are common clinical findings in metabolic diseases?

Response format: Select all that apply

- ☐ **Encephalopathy ***
- ☐ Sudden death
- ☐ **Metabolic acidosis ***
- ☐ **Hypoglycemia ***
- ☐ **Psychomotor retardation ***
- ☐ **Musculoskeletal findings and abnormalities of muscle tone ***
- ☐ Cataract
- ☐ Hepatosplenomegaly
- ☐ Dysmorphism
- ☐ Rhabdomyolysis

29. Which of the following statements about metabolic diseases are correct?

Response format: Select all that apply

- ☐ **The embryo/fetus may not be affected ***
- ☐ **There may be asymptomatic periods ***
- ☐ **Symptoms may begin at any age ***
- ☐ None are treatable
- ☐ Life expectancy is always short

Abbreviation: MS, mass spectrometry.