



Who Are the Main Recommenders of Herbal Drugs for Treating Neonatal Jaundice?

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Abstract

Background: The use of herbal drugs for treating neonatal jaundice is a common practice in many societies despite the potential complications. However, little is known about the individuals or groups who typically recommend the use of these drugs for affected neonates.

Objectives: This study aims to investigate the main recommendations of herbal drugs for treating neonatal jaundice.

Methods: The format of the present cross-sectional study was designed and implemented based on interviews with parents of infants who have infantile jaundice who used herbal drugs for their neonates during 2019 and 2022 and were admitted to the Children's Medical Center of Tehran, Iran. Along with baseline data, the socioeconomic situation of families was also evaluated.

Results: Regarding the role of people in recommending the use of herbal drugs, in 52.1% of cases, the main recommenders to use this substance to treat infant jaundice were the patient's relatives, while the role of parents in recommending the consumption of this compound was 25.5%. Also, 6.4% of the neighbors of the patients' family were the main recommenders to use herbal drugs for the affected neonates. Interestingly, 4.3% of doctors and 11.7% of pharmacists had the leading role in recommending the use of herbal drugs to treat infant jaundice. Parents who recommended using herbal drugs for their neonates were more likely to be smokers and less affluent.

Conclusions: Relatives, parents, grandparents, and even neighbors play a significant role in recommending the use of herbal drugs in the treatment and control of neonatal jaundice. The role of doctors and pharmacists in recommending the use of this compound in the treatment of jaundice, especially considering the potential side effects, should not be underestimated.

Keywords: Jaundice, Pharmacists, Grandparents, Socioeconomic Factors, Herbal Drug

1. Background

A significant number of babies are jaundiced in the first days after birth due to hyperbilirubinemia. According to published statistics, up to 60% of full-term babies develop jaundice during their first week of life, while 80% of premature babies develop jaundice during their first week of life (1). The leading cause is the breakdown of fetal erythrocytes along with the immaturity of the liver in removing excess bilirubin due to the low activity of glucuronyl transferase enzyme (2). Various maternal and neonatal factors have been identified as the triggers for neonatal physiological jaundice, including ethnicity (higher rate in East Asian and American Indian races), geographical characteristics (living in higher altitudes), genetic variants, and familial susceptibility, nutrition (breastfeeding and inadequate

feeding volume), mothers' comorbidities (diabetes mellitus), congenital infection, and prematurity (3-5). The optimal management of neonatal jaundice can lead to an excellent prognosis; however, in some cases and due to severe hyperbilirubinemia-related side effects such as kernicterus or underlying G6PD deficiency, the risk of neonatal death can be increased (6). In this regard, various treatments have been proposed for neonatal jaundice. As acceptable medical approaches, phototherapy, intravenous immune globulin (IVIG), and exchange transfusion are used to manage this complication (3, 7). However, these protocols have potential complications. In this regard, retinal damage, DNA-strand breakage, skin blood flow disturbances, hypocalcemia (in phototherapy), anemia, neurotoxicity, and hemolytic disorders (in IVIG and exchange transfusion) can be expected (8, 9). For this

reason, many parents and even physicians choose to use other methods, especially herbal medicine. One of these plant compounds that are used abundantly, especially in eastern countries, is Purgative Manna (10). Bilineaster is another compound, a genus of woody plants from the rose family. This plant is a native of the long-northern habitat (temperate regions of Asia, Europe, and North Africa), and its types are concentrated in the southwestern mountains of China and the Himalayas. Experimental and traditional evidence indicate the effectiveness of this drug in treating neonatal jaundice, and the primary mechanism of its effectiveness is its laxative effects (11). However, based on some clinical evidence, the consumption of this substance itself can have significant neonatal risks, such as severe diarrhea and vomiting and even necrotizing enterocolitis, especially in preterm infants (12). The opinion of parents, family, and even the medical staff regarding the effectiveness and effects of this substance on babies with jaundice is equally important. However, the leading advocates of this drug regimen and whether there are specific guidelines for its use remain unclear. Many traditional societies believe that even without the need for the advice and consultation of doctors, this combination is entirely safe. Doctors and pharmacists may allow families to use this substance for babies in some cases. Therefore, it is imperative to identify the main recommenders of this compound and elucidate on what basis they recommend using this substance.

2. Objectives

The present study investigated the role of people in recommending the use of herbal drugs in the treatment of infant jaundice.

3. Methods

The format of the present cross-sectional study was designed and implemented based on interviews with parents of infants suffering from infantile jaundice using herbal drugs admitted to the Children's Medical Center of Tehran, Iran, in 2019 and 2022. Initially, the parents of 94 babies with neonatal jaundice who were referred to the hospital and used herbal drugs were interviewed at the beginning of hospitalization. In addition to collecting basic and background information related to the patient, data regarding who recommended the drug for the baby were collected. The background information that was assessed included the demographic information (gender, birth weight, age, and weight at the time of using herbal drugs), type of nutrition (formula or breastfeeding),

type of delivery, and information related to social status (level of education), economic condition (income level) of the family, and complications. Herbal drugs are natural ingredients from plant parts, such as leaves, roots, or flowers, for treating infantile jaundice. The main recommenders of the use of herbal drugs for the treatment of neonatal jaundice were classified into five groups, which included parents, neighbors, grandparents, doctors, and pharmacists. The purpose of this study was to determine the role of the mentioned people as recommenders of using herbal drugs and investigate the relationship between this treatment recommendation and families' socioeconomic status.

For statistical analysis, results were presented as mean \pm standard deviation (SD) for quantitative variables and were summarized by frequency (percentage) for categorical variables. The categorical variables were compared using the chi-Square or Fisher's exact tests. The statistical software SPSS version 23.0 for Windows (IBM, Armonk, New York) was used for the statistical analysis.

3.1. Ethics Code

This study was approved by the Ethics Committee of Tehran University of Medical Science, and the Ethics Code is [IR.TUMS.CHMC.REC.1400.175](https://doi.org/10.1007/978-3-031-14001-75).

4. Results

The baseline characteristics of study subjects are summarized in [Table 1](#). In total, the parents of 94 neonates who had jaundice and used herbal drugs (43 males and 51 females) were interviewed. Regarding the fathers' education, 35.1% had diplomas, and 64.9% had academic degrees. Regarding monthly income, 46.8% had low monthly incomes (less than 50 million Rials), 33.0% had moderate incomes (50 - 100 million Rials), and 20.2% had proper incomes (higher than 100 million Rials). Also, 33.0% of parents had a history of smoking.

Regarding the role of people in recommending the use of herbal drugs, in 52.1% of cases, the main recommenders were the relatives. In comparison, the parents' role in recommending this compound's consumption was 25.5%. Also, 6.4% of the neighbors of the patient's family were the main recommenders to use herbal drugs for the neonates. Interestingly, 4.3% of doctors and 11.7% of pharmacists were involved in recommending herbal drugs to treat infant jaundice.

In comparing the background characteristics between two groups of parents who had recommended the use of herbal drugs for the neonates and parents who did not recommend the use of this compound ([Table 2](#)), we

Table 1. Baseline Characteristics of the Study Population ^a

Variables	Values
Gender of neonate	
Male	43 (45.7)
Female	51 (54.3)
Type of feeding	
Formula	35 (37.2)
Breast milk	59 (62.8)
Term condition on delivery	
Preterm	59 (62.8)
Term	33 (35.1)
Type of delivery	
Vaginal	64 (68.1)
Cesarean	30 (31.9)
Mean gestational age (week)	36.91 ± 1.36
Mean birth weight (g)	3506.06 ± 290.64
Mean weight at the time of herbal drug use	3256.06 ± 475.43
Neonate age at the time of herbal drug use	6.91 ± 6.28
Fathers' education level	
Diploma	33 (35.1)
Higher degree	61 (64.9)
Economic status of the family	
Low	44 (46.8)
Moderate	31 (33.0)
High	19 (20.2)
History of smoking	31 (33.0)

^a Values are presented as mean ± SD or No. (%).

observed no difference in educational levels. However, parents who recommend using herbal drugs for their neonates had significantly lower economic levels ($P = 0.046$). Also, smoker parents were more likely to recommend this compound to treat infantile jaundice ($P = 0.002$). Poor feeding and dehydration were the most common complications in these neonates (22.3% and 24.4%, respectively), and necrotizing enterocolitis (NEC), hypernatremia, and vomiting were other less common complications (Table 3).

5. Discussion

Physiological jaundice, in most cases, is a benign phenomenon but may concern parents. Due to insufficient knowledge of parents, especially in underdeveloped countries, dealing with neonatal physiological jaundice

is always difficult, and sometimes, it is associated with resorting to unapproved and unsafe treatment methods. Reliance of parents of babies with jaundice on traditional and experimental treatment approaches, which sometimes cause morbidity and even mortality in the baby, originates from several factors, the most important one being high trust and confidence in the experiences of others, especially parents, relatives, and even the neighbors. The people around the parents of the affected baby sometimes do not refrain from giving non-scientific treatment recommendations and suggestions. Trusting the opinions of non-specialists makes parents unwilling to refer to specialists to manage their patients. Another reason for turning to the advice of others in the treatment of neonatal jaundice is the cost-effectiveness of these methods compared to conventional ones and scientific treatment methods.

Table 2. Baseline Information in Parents with and Without Recommendation to use Herbal Drugs

Characteristics	Parents as Recommender, No. (%)	Parents as Non-recommender, No. (%)	P-Value
Fathers' education level			0.202
Diploma	11 (45.8)	22 (31.4)	
Higher degree	13 (54.2)	48 (68.6)	
Economic status of the family			0.046
Low	15 (62.5)	29 (41.4)	
Moderate	3 (12.5)	28 (40.0)	
High	6 (25.0)	13 (18.6)	
History of smoking			0.002
Smoker	14 (58.3)	17 (24.3)	
Non-smoker	10 (41.7)	53 (75.7)	

Table 3. Frequency of Complications of the Study Population

Complications	No. (%)
Dehydration	23 (24.4)
Poor feeding	21 (22.3)
NEC	15 (16)
Diarrhea	12 (12.8)
Hypernatremia	8 (8.5)
Vomiting	6 (6.4)

Abbreviation: NEC, necrotizing enterocolitis.

Traditional medicine interventions are less costly than other methods in the treatment of diseases (13). The use of Purgative Manna in the treatment of infantile jaundice is quite common in Iranian society (10). Meanwhile, the majority of users and recommenders of this herbal medicine believe that these substances are completely safe and do not have any side effects. On the contrary, this combination may have life-threatening side effects (14). A series of studies have explored the effects of treatment with herbal medicines in reducing bilirubin levels (15). It is crucial to investigate the potential side effects of these medicines in patients while also closely monitoring the weight gain of babies, considering that dehydration and poor feeding were common complications associated with the use of herbal drugs in our study (12). However, the case can become more complicated when a significant part of the treatment staff, including doctors and pharmacists, become the main recommenders of herbal drugs in the treatment of neonatal jaundice. As in our study, doctors and pharmacists constituted 16% of those recommending the use of this substance to treat infantile jaundice. This shows the incomplete and defective knowledge of the benefits and harms of herbal drugs in the management of

neonatal jaundice. Therefore, the treatment staff should be strongly advised to obtain comprehensive scientific information about this therapeutic combination for managing infants with neonatal jaundice.

Another finding of our study was regarding the role of economic and livelihood status in recommending the use of herbal drugs to treat neonatal jaundice. Firstly, the recommended consumption of herbal drugs was significantly higher in families from a lower economic status. Secondly, this recommendation was significantly higher among smoker parents than non-smokers (currently, in our society, smoking is a profile for a lower social level). Obviously, in the opinion of non-experts, dealing with jaundice in babies can have a close relationship with the socioeconomic level of families (16). Of course, we did not find a relationship between the recommendation to use herbal drugs and the education level of parents, which is because all participants in the study had at least a diploma, and under-graduated people were not included in the study. Therefore, radio and other media platforms are essential tools for providing information to parents about the potential side effects of herbal drugs in neonates.

5.1. Conclusions

In conclusion, relatives, parents, grandparents, and even neighbors play a significant role in recommending the use of herbal drugs in the treatment and control of neonatal jaundice. Interestingly, the role of doctors and pharmacists in recommending the use of this compound in the treatment of jaundice cannot be underestimated, as 16% of those recommending the use of this substance in the treatment of jaundice were healthcare professionals. Considering the numerous reports of the potential side effects of this herbal drug in the treatment of neonatal

jaundice, it is necessary to improve the level of knowledge and understanding of all people in society at different levels regarding the benefits and harms of this substance.

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Footnotes

Authors' Contribution: Study concept and design: Kayvan Mirnia; analysis and interpretation of data: Maryam Saeedi; collection of data: Ashkan Talebi; drafting of the manuscript: Razieh Sangsari; critical revision of the manuscript for important intellectual content: Maryam Saeedi; development of the original idea: Razieh Sangsari.

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Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication.

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References

- Woodgate P, Jardine LA. Neonatal jaundice: phototherapy. *BMJ Clin Evid.* 2015;2015. [PubMed ID: 25998618]. [PubMed Central ID: PMC4440981].
- Huang MJ, Kua KE, Teng HC, Tang KS, Weng HW, Huang CS. Risk factors for severe hyperbilirubinemia in neonates. *Pediatr Res.* 2004;56(5):682-9. [PubMed ID: 15319464]. <https://doi.org/10.1203/01.PDR.0000141846.37253.AF>.
- Mitra S, Rennie J. Neonatal jaundice: Aetiology, diagnosis and treatment. *Br J Hosp Med (Lond).* 2017;78(12):699-704. [PubMed ID: 29240507]. <https://doi.org/10.12968/hmed.2017.78.12.699>.
- Ip S, Chung M, Kulig J, O'Brien R, Sege R, Glick S, et al. An evidence-based review of important issues concerning neonatal hyperbilirubinemia. *Pediatrics.* 2004;114(1):e130-53. [PubMed ID: 15231986]. <https://doi.org/10.1542/peds.114.1.e130>.
- Gomez-Manzo S, Marcial-Quino J, Vanoye-Carlo A, Serrano-Posada H, Ortega-Cuellar D, Gonzalez-Valdez A, et al. Glucose-6-phosphate dehydrogenase: Update and analysis of new mutations around the world. *Int J Mol Sci.* 2016;17(12). [PubMed ID: 27941691]. [PubMed Central ID: PMC5187869]. <https://doi.org/10.3390/ijms17122069>.
- Shapiro S, Le Pichon JB, Riordan SM, Watchkoe J. The neurological sequelae of neonatal hyperbilirubinemia: Definitions, diagnosis and treatment of the kernicterus spectrum disorders (KSDs). *Curr Pediatr Rev.* 2017;13. <https://doi.org/10.2174/1573396313666170815100214>.
- Barrington KJ, Sankaran K, Canadian Paediatric Society Fetus and Newborn Committee. Guidelines for detection, management and prevention of hyperbilirubinemia in term and late preterm newborn infants. *The Canadian Pediatrics Society.* 2018.
- Xiong T, Tang J, Mu DZ. [Side effects of phototherapy for neonatal hyperbilirubinemia]. *Zhongguo Dang Dai Er Ke Za Zhi.* 2012;14(5):396-400. chi. [PubMed ID: 22613117].
- Al-Lawama M, Badran E, Elrimawi A, Bani Mustafa A, Alkhatib H. Intravenous Immunoglobulins as Adjunct Treatment to Phototherapy in Isoimmune Hemolytic Disease of the Newborn: A Retrospective Case-Control Study. *J Clin Med Res.* 2019;11(11):760-3. [PubMed ID: 31803318]. [PubMed Central ID: PMC6879023]. <https://doi.org/10.14740/jocmr4003>.
- Monsef A, Eghbalian F, Rahimi N. Comparison of purgative manna drop and phototherapy with phototherapy treatment of neonatal jaundice: A randomized double-blind clinical trial. *Osong Public Health Res Perspect.* 2019;10(3):152-7. [PubMed ID: 31263664]. [PubMed Central ID: PMC6590883]. <https://doi.org/10.24171/j.phrp.2019.10.3.06>.
- Ameli Z, Assarroudi A, Akrami R. Effect of bilineaster drop on neonatal hyperbilirubinemia. *Evidence Based Care.* 2017;6(4):66-73. <https://doi.org/10.22038/ebcj.2016.7982>.
- Boskabadi H, Maamouri G, Mafinejad S. The effect of traditional remedies (camel's thorn, flixweed and sugar water) on idiopathic neonatal jaundice. *Iran J Pediatr.* 2011;21(3):325-30. [PubMed ID: 23056809]. [PubMed Central ID: PMC3446180].
- Khedmat L, Mojtahedi SY, Moienafshar A. Recent clinical evidence in the herbal therapy of neonatal jaundice in Iran: A review. *J Herb Med.* 2021;29. <https://doi.org/10.1016/j.hermed.2021.100457>.
- Meincke R, Pokladnikova J, Straznicka J, Meyboom RHB, Niedrig D, Russmann S, et al. Allergy-like immediate reactions with herbal medicines in children: A retrospective study using data from VigiBase®. *Pediatr Allergy Immunol.* 2017;28(7):668-74. [PubMed ID: 28846157]. <https://doi.org/10.1111/pai.12778>.
- Rezapour M, Mozaffarpur SA, Nikpour M, Alijanpour Aghamaleki M. The effect of herbal medicine on neonatal jaundice: a systematic review. *Int J Pediatr.* 2022;10(2):15377-88. <https://doi.org/10.22038/ijp.2020.54279.4293>.
- Ogunlesi TA, Ogunlesi FB. Family socio-demographic factors and maternal obstetric factors influencing appropriate health-care seeking behaviours for newborn jaundice in Sagamu, Nigeria. *Matern Child Health J.* 2012;16(3):677-84. [PubMed ID: 21365297]. <https://doi.org/10.1007/s10995-011-0765-1>.