

THE RELATIONSHIP BETWEEN MATERNAL KNOWLEDGE AND CONGENITAL HYPOTHYROIDISM SCREENING IN NEWBORNS

Syarini Novita¹⁾, Dewi Fajar Wati²⁾

Email: syarininovita85@gmail.com¹⁾, dewifajar1824@gmail.com²⁾

^{1,2)}Bachelor of Midwifery Study Program, Faculty of Health Sciences and Science, Universitas Bhakti Pertiwi Indonesia

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Abstract

Infants with Congenital Hypothyroidism who are not diagnosed and treated early are at risk of intellectual disability and growth impairment. Congenital Hypothyroidism Screening coverage for newborns at the Bukoposo Community Health Center in Mesuji, Lampung, during December 2025 to January 2026, reached only 25.9%. This study aimed to determine the extent to which maternal knowledge influences the uptake of Congenital Hypothyroidism Screening for newborns in this working area. A quantitative analytical survey with a cross-sectional design was employed. The study sample consisted of 99 mothers with infants aged 15 days to one month, selected using purposive sampling. Data were collected via questionnaires and analyzed using the Chi-square test. The results showed that among mothers with low knowledge, the majority (90%) did not have their infants screened, while only 10% did (p -value = 0.000; OR = 11.65). The study concludes that there is a very strong and significant relationship between the level of maternal knowledge and Congenital Hypothyroidism Screening uptake. Mothers with poor knowledge were far less likely to have their infants screened. These findings indicate a need for more extensive efforts to improve knowledge and provide education regarding newborn Congenital Hypothyroidism Screening to mothers in this area.

Keywords: Knowledge, Newborn, SHK screening,

Correspondence:

Dewi Fajar Wati, Bachelor of Midwifery Study Program, Faculty of Health and Science, Universitas Bhakti Pertiwi Indonesia.
dewifajar1824@gmail.com

1. Introduction

According to 2024 World Health Organization (WHO) data, the global incidence of congenital hypothyroidism is approximately 1 in every 2,000 to 3,000 live births; notably, 95% of cases show no signs or symptoms during the early intervention period. Iodine deficiency and/or thyroid dysfunction during pregnancy can have significant consequences for fetal growth and infant neurodevelopment, particularly in high-risk pregnancies [1].

Data on congenital hypothyroidism in Indonesia for 2023

indicates that 1.2 million infants underwent screening for the condition. The incidence rate was 62.3% in 2022 and 77.1% in 2023, showing an upward trend. Additionally, a review of medical records from endocrine clinics in 2022 revealed that 70% of infants diagnosed with congenital hypothyroidism were aged one year or older, while 2.3% were diagnosed before the age of three months. Among this latter group (the 2.3%), 2.3% experienced minimal growth and developmental delays, whereas 70% suffered from permanent intellectual disability [2]. Neonatal

screening in Indonesia has not yet been implemented nationwide. Data on congenital hypothyroidism (CH) in Indonesia shows 85 positive cases out of 213,669 screened infants (an incidence of 1:2,513). This figure is higher than the reported global incidence of 1:3,000 [3].

Congenital Hypothyroidism screening aims to ensure that affected individuals receive optimal treatment from an early stage. Successful treatment requires the support and cooperation of parents and families. The government is also progressively expanding the screening program's coverage by preparing human resources and management support, as well as fostering collaboration among various stakeholders at both central and regional levels. Program implementation at the provincial level is coordinated by the provincial health office, with funding sourced from the state budget (APBN), regional budgets (APBD), and other non-binding funding sources [4].

This detection process goes beyond mere laboratory testing; it is a system that integrates various processes and stakeholders—including community health center (Puskesmas) or hospital management, program coordinators, healthcare workers, and local government. The system encompasses components such as Communication, Information, and Education (CIE); specimen collection and testing; follow-up on screening results; diagnosis; clinical management; case monitoring; program organization; and monitoring and evaluation [5].

Lampung Province implements a Congenital Hypothyroidism Screening program for newborns; this program is reported to be active across regencies and cities and is supported by the Regional Health Laboratory. In 2024, out of a total of 35,330 samples received, 1,031 samples (2.92%) were returned, and 34,299 samples were tested. Screening results indicated 14 cases of high Congenital Hypothyroidism Screening levels (screening-positive); 8 cases were reported as having undergone

follow-up, while 6 were pending follow-up. In January–February 2025, out of 10,666 total samples received, 575 samples (5.39%) were returned, and 10,091 samples were tested. Screening results indicated 6 cases of high SHK levels (screening-positive); 3 cases were reported as having undergone follow-up, while 3 were pending follow-up [6].

Data from the Bukoposo Community Health Center in Mesuji, Lampung, covering the period from January to October 2025, shows that out of 535 infants born, only 139 (25.9%) underwent Newborn Screening. Of the 139 total samples, 36 (25.9%) were returned, while 103 were analyzed. The screening results indicated that no cases of high Congenital Hypothyroidism Screening levels (positive screening results) were detected [6].

In essence, the appendix to Minister of Health Regulation No. 78 of 2014 outlines the consequences of congenital hypothyroidism: affected children may suffer from disabilities and impaired overall physical growth; families face psychological and economic burdens in caring for children with intellectual disabilities; and the state incurs additional costs for the education of children with special needs, ultimately compromising the quality of the nation's future generations. A lack of early detection efforts has the potential to cumulatively lower the quality of Indonesia's human resources and create future health challenges [2].

Research result [7], Health education has a positive impact on pregnant women's attitudes toward congenital hypothyroid screening. However, acceptance of this information and implementation of screening are still influenced by maternal characteristics, such as age, education, occupation, and parity (number of births). For this educational program to be more effective, the counseling method provided must be personalized or tailored to the individual background of each pregnant woman. Other research conducted by [8] There is a relationship

between knowledge and attitudes and mothers' preparation for Congenital Hypothyroidism Screening, with a p-value of 0.001 [9] In the study, maternal age was indirectly associated with Congenital Hypothyroidism Screening management ($p=0.002$). The same applies to the study results[10] The results indicate that age and education are associated with the implementation of Newborn Screening. An individual's age and level of education are linked to their knowledge regarding this specific issue; consequently, a higher level of knowledge correlates with a greater willingness on the part of mothers to have the screening performed.

Based on the results of a preliminary study conducted by the researcher at the Bukoposo Community Health Center in Mesuji Regency in September 2025 involving 18 mothers who had recently given birth, 10 mothers (55.6%) had their infants undergo Newborn Screening, while 8 mothers (44.4%) did not. The latter group cited fears that the procedure—which involves drawing blood from the infant's heel—might cause abnormalities; they were unaware of the procedure's benefits and deemed it unnecessary, noting that their previous children had not undergone such a test yet remained healthy and free of abnormalities.

Congenital hypothyroidism remains a health issue among infants, as it can lead to impaired growth and intellectual development if not detected and treated early. Consequently, the Congenital Hypothyroidism Screening program requires continuous evaluation to ensure that affected infants are identified promptly and receive immediate treatment. Although the SHK program is already in place, its implementation is not yet uniform across all regions. One such area is the working territory of the Bukoposo Community

Health Center (Puskesmas), where there is still a lack of public awareness regarding the importance of screening for newborns. Based on issues identified during a preliminary study, the author is interested in conducting research on “The Relationship Between Maternal Knowledge and Congenital Hypothyroidism Screening for Newborns in the Working Area of Bukoposo Community Health Center, Mesuji, Lampung (Period: December 2025 – January 2026).”

2. Methods

This study employs a quantitative analytical design with a cross-sectional approach to determine the extent of the influence of maternal knowledge on Congenital Hypothyroidism Screening for newborns in the working area of the Bukoposo Community Health Center (*Puskesmas*) in Mesuji, Lampung. Data collection involved the use of secondary data—specifically, registry records for Congenital Hypothyroidism Screening—while primary data regarding maternal knowledge were obtained through questionnaires. A checklist designed to guide the data collection process served as the research instrument.

The study population consisted of 115 mothers with infants aged 15 days to one month who gave birth within the Bukoposo Community Health Center (*Puskesmas*) service area between December 2025 and January 2026. Due to time and budget constraints, the sample size was determined using Slovin's formula, resulting in 99 respondents. Purposive sampling was employed to select participants based on the researcher's inclusion criteria. Data collection took place from December 2025 to January 2026, and data analysis was performed using the chi-square test.

3. Results and Discussion

Table 1. Frequency Distribution of Maternal Knowledge and Congenital Hypothyroidism Screening in Newborns in the Working Area of Bukoposo Community Health Center, Mesuji, Lampung (December 2025–January 2026 Period)

No	Variable	Frequency (n)	Percentage (%)
SHK inspection			
1	Not Implementing	71	71,7
2	Implement	28	28,3
	Total	99	100
Mother's Knowledge			
1	Not Good	60	60,6
2	Good	39	39,4
	Total	99	100

Based on the table above, the majority of mothers (71 respondents or 71.7%) did not implement Congenital Hypothyroidism Screening, and the

most common level of knowledge regarding Congenital Hypothyroidism Screening was poor, observed in 60 respondents (60.6%).

Table 2. The Relationship Between Maternal Knowledge and Congenital Hypothyroidism Screening in Newborns in the Working Area of Bukoposo Community Health Center, Mesuji, Lampung (December 2025–January 2026)

Knowledge	Congenital Hypothyroidism Screening (SHK) in Newborns				Total		<i>P Value</i>	OR
	Failure to Implement		carry out					
	n	%	n	%	N	%		
Not good	54	90,0	6	10,0	60	100	0,000	11,647 (4,057- 33,433)
Good	17	43,6	22	56,4	39	100		
Amount	71	71,7	28	28,3	99	100		

Based on table 2, it can be seen that among mothers with poor knowledge, 54 respondents (90.0%) did not have their newborns screened for Congenital Hypothyroidism while 6 respondents (10.0%) did; conversely, among mothers with good knowledge, 17 respondents (43.6%) did not have their newborns screened for Congenital Hypothyroidism while 22 respondents (56.4%) did.

Bivariate analysis using the chi-square test yielded a p-value of 0.000 ($p < 0.05$), indicating a significant association between knowledge and Congenital Hypothyroidism Screening for newborns in the working area of the Bukoposo Community Health Center (Puskesmas), Mesuji, Lampung, during the period of December 2025 – January

2026. Furthermore, the Odds Ratio (OR) of 11.647 (95% CI: 4.057–33.433) indicates that mothers with poor knowledge are 11.647 times more likely to fail to have their newborns undergo Congenital Hypothyroidism Screening compared to mothers with good knowledge.

Congenital Hypothyroidism screening is a screening test used to distinguish infants with Congenital Hypothyroidism from those without the condition. The rationale behind the screening is that diagnosing and treating the condition before signs and symptoms appear leads to a better prognosis compared to initiating treatment after symptoms have already manifested[11]. Thyroid hormone (HT) is necessary for normal metabolism throughout life, for

physical growth during childhood, and for brain development in the womb and during the first 2-3 years of life. According to [2] If TSH levels are ≤ 20 mU/L, the result is considered normal; however, TSH levels > 50 mU/L indicate a very high probability of permanent congenital hypothyroidism [12].

In line with the research findings [13] The majority of mothers of newborns (72.3%) did not undergo Congenital Hypothyroidism Screening (SHK). The study results also reflect this [8] A majority of mothers of newborns—62.4%—did not undergo Congenital Hypothyroidism Screening [14] The study results indicate that the majority of mothers of newborns—59.8%—did not undergo Congenital Hypothyroidism Screening.

A total of 71.7% of mothers did not have their infants screened for congenital hypothyroidism. This was due to a lack of awareness regarding the benefits of the screening and the consequences of omitting it; furthermore, the procedure was viewed as taboo—as it had not been performed on previous infants—and there was a prevailing belief that the baby was healthy and thus did not require the test. Several factors influenced this outcome, including the mothers' low level of education, a lack of information leading to insufficient knowledge about the screening, and a lack of support from husbands and the surrounding community, which caused the procedure to be perceived as unusual.

According to [15] Lack of knowledge among breastfeeding mothers has a significant impact on the management of Congenital Hypothyroidism Screening. According to [16] Mothers' knowledge of congenital hypothyroidism screening, making them aware of the benefits of CHD, motivates them to receive CHD for their babies. One way to increase knowledge is by providing health education [15] Health education can enhance the community's knowledge, awareness, willingness, and ability to

lead healthy lives and actively participate in health-related efforts.

In accordance with the research findings [13] Knowledge is associated with the implementation of Congenital Hypothyroidism Screening, with a p-value of 0.000 for knowledge. The same applies to the research findings [8] There is a relationship between knowledge and maternal preparation for Congenital Hypothyroidism Screening, with a p-value of 0.001 [14] The study results showed a value of 0.006 for knowledge, leading to the conclusion that knowledge is associated with the management of Congenital Hypothyroidism screening in infants. Further research was subsequently conducted [17] There is a significant relationship between knowledge and the coverage of congenital hypothyroidism screening implementation ($p\text{-value} = 0.000 < 0.05$).

The researchers hypothesized a link between knowledge and the uptake of congenital hypothyroidism screening; this is evidenced by findings showing that the majority of mothers with good knowledge proceeded with the screening, whereas most of those with poor knowledge did not. This is because knowledge regarding the screening influences a mother's mindset regarding the urgency of the procedure. Mothers with good knowledge understand the benefits of the screening and the consequences of failing to have it performed on their infants. The study results indicate that knowledge is a key factor in the uptake of congenital hypothyroidism screening. Health education is a necessary measure to improve maternal knowledge, as it fosters the awareness and willingness of mothers to undergo the procedure voluntarily. Through such health education, the community is encouraged to adopt healthy lifestyles and play an active role in maintaining their health.

4. Conclusion

This study demonstrates a very strong and significant relationship between a mother's level of knowledge

and the uptake of congenital hypothyroidism (CH) screening. Mothers with poor knowledge are far more likely to forgo CH screening for their infants. Therefore, efforts are needed to improve maternal knowledge regarding CH screening through health education—starting during pregnancy—by providing information sessions or counseling during prenatal visits and distributing educational posters; such measures aim to enhance knowledge, awareness, and the willingness of mothers to ensure optimal treatment for their newborns.

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