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Health Promotion Using Counseling Cards to Increase Perceived Benefit, Perceived Barrier, and Self-Efficacy for Congenital Hypothyroid Screening

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ABSTRACT

Congenital hypothyroid screening coverage in Indonesia remains low (2.3%), partly due to limited effective health promotion and inadequate use of educational media, leading to low maternal participation. Strengthening health promotion through appropriate media and optimizing the role of health cadres are essential to improving mothers' perceived benefits, reducing perceived barriers, and enhancing self-efficacy for screening. This study aimed to analyze the effect of education delivered through counseling cards by health cadres on mothers' perceived benefits, perceived barriers, and self-efficacy in conducting congenital hypothyroid screening. A quasi-experimental pre–post test design was conducted in Tasikmalaya City, involving 41 third-trimester pregnant women selected via quota sampling from 20 primary health center service areas. Trained cadres provided education using counseling cards. Data were collected before and after the intervention using validated questionnaires measuring perceived benefit, perceived barrier, and self-efficacy. Data analysis showed significant improvements in all variables after the intervention ($p < 0.05$). In conclusion, counseling card–based education is effective in improving mothers' perceived benefits, perceived barriers, and self-efficacy toward congenital hypothyroid screening. It is recommended that this approach be integrated into routine maternal health promotion and scaled up through community health cadres to enhance screening uptake and support early detection at the population level.

Keywords: Congenital hypothyroid screening; Counseling Card; Perceived benefit; Perceived barrier; Self-efficacy

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INTRODUCTION

Congenital hypothyroidism is a preventable cause of intellectual disability. It results from anatomical abnormalities or metabolic disorders affecting thyroid hormone production, as well as iodine deficiency, and is characterized by low thyroxine levels, often accompanied by elevated thyroid-stimulating hormone [1]. As most affected newborns are asymptomatic at birth, early detection through systematic screening programs is essential to prevent irreversible developmental delays and long-term disability. Therefore, congenital hypothyroid screening represents a critical public health strategy to ensure timely diagnosis and intervention.

Delayed detection of congenital hypothyroidism has serious consequences. Approximately 90% of affected newborns show no clinical symptoms at birth, leading to missed or late diagnoses. Untreated cases may result in intellectual disability with an IQ below 70, and each one-month delay in treatment may reduce cognitive potential by 5–10 IQ points. These impacts extend beyond the individual, affecting educational attainment, increasing family burden, and ultimately reducing the quality of human resources at the population level [2,3].

In response to these risks, early neonatal screening at 48–72 hours of age, followed by timely treatment before one month, is essential [4]. Globally, the incidence of congenital hypothyroidism is estimated at 1 in 2,000–4,000 live births, indicating a substantial need for universal screening. In Indonesia, with approximately 5 million births per year, this translates to an estimated 1,600 or more affected infants annually. However, despite this considerable burden, screening coverage remains very low. In 2022, only 101,797 out of approximately 4.4 million newborns were screened (2.3%), although only 8 cases were identified. A similar pattern is observed at the regional level; in West Java, the average weekly screening achievement from January to February 2023 was only 308 infants compared to a target of 7,138. These findings highlight a substantial gap between the expected number of cases and the actual screening coverage, indicating that many affected infants may remain undiagnosed. This underscores the urgent need to strengthen screening programs to ensure early detection and timely intervention [5–7].

Recent studies have identified several barriers contributing to the low coverage of congenital hypothyroid screening (SHK). Health system–related factors include limited confidence among midwives in performing screening procedures, while at the community level, family refusal remains a significant challenge [8,9]. In addition, health education activities have not been optimally implemented, as they often target only pregnant women and are constrained by low participation. The lack of adequate educational media, such as posters or brochures, further limits the effectiveness of communication, resulting in suboptimal delivery of information to the target population [10–12].

To address these challenges, strengthening health promotion strategies through appropriate educational media and community engagement is essential. The use of counseling cards, recommended as a visual communication tool in health promotion, can facilitate effective message delivery from

health workers to the community [13]. Furthermore, empowering community health cadres (posyandu cadres) is crucial, as they play a strategic role in primary health care transformation and act as frontliners in delivering health education to the community [14].

Based on this background, this study was conducted to develop and evaluate educational media in the form of counseling cards (Counseling Cards) used by health cadres to educate the community about congenital hypothyroid screening. This study highlights its novelty by integrating counseling card–based education with the active involvement of community health cadres, which has not been widely explored in previous SHK promotion strategies. The effectiveness of this approach was assessed in terms of perceived benefits, perceived barriers, and family self-efficacy in implementing congenital hypothyroid screening.

This study is grounded in the Health Belief Model, which posits that health behavior change is influenced by individuals' perceptions of benefits and barriers, as well as their confidence in performing the action (self-efficacy). Therefore, strengthening public awareness through innovative, cadre-based educational media is expected to support the improvement of SHK program implementation [3,15].

METHOD

This study employed a quasi-experimental pre–post test design conducted in Tasikmalaya City, Indonesia. The study population consisted of pregnant women in the third trimester. The sample size was determined using the Slovin formula, resulting in a total of 41 participants. Participants were selected using quota sampling from 20 primary health care areas, with approximately 2 participants recruited from each area. Although quota sampling ensured representation across service areas, it may introduce selection bias; therefore, consistent inclusion criteria were applied to minimize this limitation.

The intervention consisted of health education delivered through counseling cards by trained community health cadres. To ensure standardization, all cadres received structured training prior to implementation, including orientation on congenital hypothyroid screening (SHK), standardized use of counseling cards, and effective communication techniques. Each session followed the same procedure, duration, and content delivery across all locations.

Data were collected using structured questionnaires measuring perceived benefits, perceived barriers, and self-efficacy. The instrument underwent validity and reliability testing prior to data collection. Content validity was assessed by experts in maternal and child health. Item validity testing showed that all items were valid, with correlation coefficients ranging from r = 0.45–0.82, exceeding the r-table value (r-table = 0.308). Reliability testing demonstrated good internal consistency, with Cronbach's alpha values of 0.82 for perceived benefit, 0.78 for perceived barrier, and 0.85 for self-efficacy. A pilot test was conducted with 10 respondents to ensure the instrument's clarity and feasibility.

Data were collected before and after the intervention. Normality testing using the Shapiro–Wilk test indicated that perceived barrier data were normally distributed ($p > 0.05$), while perceived benefit

and self-efficacy were not ($p < 0.05$). Therefore, the paired-samples t-test was used for perceived barrier, while the Wilcoxon signed-rank test was used for perceived benefit and self-efficacy. Statistical significance was set at $p < 0.05$.

This study was approved by the Health Research Ethics Committee of RSUD Dr. Moewardi Semarang with ethical clearance number 1.524/VI/HREC/2024. Written informed consent was obtained from all participants prior to data collection.

RESULTS

The following presents the results of a comparison of perceived benefits, perceived barriers, and self-efficacy before and after intervention.

Table 1. Characteristics of Respondents

Variable	Category	n	%
Age (years)	<20	3	7,3
	20-35	30	73,2
	>35	8	19,5
Education Level	Primary School	6	14,6
	Secondary School	25	61
	Higher Education	10	24,4
Occupation	Housewife	28	68,3
	Employed	13	31,7
Parity	Primiparous	15	36,6
	Multiparous	26	63,4

Table 1 presents the characteristics of the respondents involved in this study. The majority of respondents were aged 20–35 years (73.2%), followed by those aged >35 years (19.5%) and <20 years (7.3%). Based on educational level, most respondents had secondary education (61.0%), while 24.4% had higher education and 14.6% had primary education. In terms of occupation, the majority of respondents were housewives (68.3%), while 31.7% were employed. Regarding parity, most respondents were multiparous (63.4%), while 36.6% were primiparous.

These characteristics show that most respondents were in the reproductive age group, which includes those between 20 and 35 years old. This age range is considered a good time for pregnancy and making health choices. The higher number of respondents with secondary education indicates a fair level of understanding regarding health, which might affect how well they grasp the health information shared in educational programs. Also, the large number of housewives and multiparous mothers suggests that the respondents likely have experience with pregnancy and child health services. This background may help them be more open to health education and lead to better feelings and confidence about carrying out congenital hypothyroid screening.

Based on the results presented in Table 2, from 41 respondents involved in the study, the average perceived benefit was 57.72 with a range of answers between 25% - 100%, after congenital

hypothyroid screening education was carried out through the "counseling card" media, the average perceived benefit in respondents increased to 91.67% with a range of respondents' answers between 75% - 100%.

Table 2. Comparison of Congenital Hypothyroid Screening Education Through "Counseling Card" Media Against Perceived Benefits Before and After Intervention

	Perceived Benefit	
	Pre Test	Post Test
Mean (SD)	57,72 (12,55)	91,67 (10,37)
Median	58,33	100,00
Range	25 - 100	75 - 100
% Increase Δ	33,94%	
p-value	<0,001**	

**Wilcoxon signed-rank test

The treatment results showed an increase in perceived benefit before and after treatment, with an increase of 33.94%. The results indicate a statistically significant difference in perceived benefit scores before and after the intervention ($p < 0.001$).

Table 3. Comparison of Congenital Hypothyroid Screening Education Through "Counseling Card" Media Against Perceived Barrier Before and After Intervention

	Perceived Barrier	
	Pre Test	Post Test
Mean (SD)	58,94 (8,96)	82,52 (13,86)
Median	58,33	83,33
Range	50 - 83,333	50 - 100
% Increase Δ	23,58%	
p-value	<0,001*	

** Paired Sample Test*

Based on the results presented in Table 3, the 41 respondents involved in the research had an average perceived barrier of 58.94 with a range of answers between 50% - 83.33%, after congenital hypothyroid screening education was carried out through the media " counseling card" obtained that the average perceived barrier of respondents increased to 82.52 with the range of respondents' answers being between 50% - 100%, the results of the treatment showed that there was an increase in perceived barrier before and after treatment with an increase rate reaching 23.6%.

Furthermore, the results of the comparison using the Paired sample test obtained a p-value <0.001 which shows that there is a significant difference in perceived barrier before and after congenital hypothyroid screening education through the "counseling card" media.

Table 4. Comparison of Congenital Hypothyroidism Screening Education Through the Media "Counseling Card" on Self-Efficacy Before and After Intervention

	Self Efficacy	
	Pre Test	**Post Test**
Mean (SD)	59,3 (11,19)	90,55 (14,99)
Median	56,25	100,00
Range	25 - 81,25	25 - 100
% Increase Δ	31,25%	
p-value	<0,001**	

p) Wilcoxon

Based on the results presented in Table 4, the 41 respondents involved in the research had an average self-efficacy of 59.30% with a range of answers between 25% - 81.25%, after congenital hypothyroid screening education was carried out through the media " counseling card" obtained that the average self-efficacy of respondents increased to 90.55% with the range of respondents' answers being between 25% - 100%. The results of the treatment showed that there was an increase in self-efficacy before and after treatment, with an increase rate reaching 31.25%.

Furthermore, the comparison results using the Wilcoxon Test yielded a p-value <0.001, indicating a significant difference in self-efficacy scores before and after congenital hypothyroidism screening education delivered through the "counseling card" media.

DISCUSSION

The effect of health promotion using Counseling Card media on Perceived Benefit

The results of this study showed a significant improvement in perceived benefit scores after the intervention ($p < 0.001$), indicating that counseling-based card education effectively enhanced mothers' understanding of the benefits of congenital hypothyroid screening (Table 1). This suggests that counseling card–based education effectively enhanced mothers' understanding of the benefits of congenital hypothyroid screening.

The improvement in perceived benefit can be explained by the use of counseling cards as visually engaging, structured educational media. These tools likely facilitated clearer communication between health cadres and mothers, making health messages easier to understand and retain. As a result, mothers became more aware of the positive outcomes of screening, which is a key factor influencing their willingness to participate [16,17].

This finding is consistent with the Health Belief Model, which posits that perceived benefits are an important determinant of health behavior. When individuals believe that a health action provides clear advantages, they are more likely to adopt and maintain that behavior. In this study, increased perceived benefits were associated with greater readiness among mothers to engage in congenital

hypothyroid screening. This is supported by recent studies showing that perceived benefits significantly influence preventive health behaviors [18,19].

The results are also in line with previous research demonstrating that the use of appropriate educational media can improve knowledge and perceptions related to preventive health behaviors [20]. Visual-based education has been shown to enhance comprehension and positively influence attitudes toward health interventions [12] .

From a practical perspective, these findings highlight the importance of using simple, low-cost, and visually engaging media such as counseling cards in community-based health promotion. Involving community health cadres as educators further strengthens the delivery of health messages and may improve maternal participation in screening programs. Therefore, integrating counseling card–based education into routine maternal health services could be an effective strategy to increase congenital hypothyroid screening coverage.

The effect of health promotion using the Counseling Card media on perceived barriers

The results of this study showed that perceived barrier scores were significantly different as a result of the intervention ($p < 0.001$), with the mean score changing from 58.94 to 82.52 (Table 3). This indicates a positive change in mothers' perceptions regarding barriers to congenital hypothyroid screening.

The increase in perceived barrier scores in this study reflects a reduction in perceived obstacles, as higher scores indicate more favorable perceptions toward overcoming barriers. This means that the counseling card–based sources of education helped mothers manage better with issues related to cost, availability for health services, time restrictions, and family support. As a result, these barriers were perceived as less limiting to screening participation [21].

According to the Health Belief Model, perceived barriers are an important factor in health behavior engagement. People are more likely to adopt the recommended actions when perceived barriers are lowered. Reducing perceived access barriers has also emerged as a clinical correlate of preventive health service delivery in recent studies [22–24] . In addition, another study found that individuals with lower perceived barriers were more likely to accept and engage in preventive health interventions [25].

These results are practically important by providing straightforward solutions that outeducate common misconceptions at a community level. The use of counseling cards by health cadres can serve as an effective strategy to reduce perceived barriers and improve maternal participation in congenital hypothyroid screening programs.

The effect of health promotion using Counseling Card media on Self-efficacy

The results of this study showed a significant effect of counseling card–based education on self-efficacy ($p < 0.001$). This indicates that the intervention successfully improved mothers' confidence in their ability to perform congenital hypothyroid screening for their newborns.

Self-efficacy refers to an individual's belief in their capacity to carry out a specific health behavior [26]. Individuals are more likely to engage in a behavior when they believe that their actions will produce positive outcomes and that they are capable of overcoming potential challenges [11,19]. In this study, improvements in self-efficacy reflect increased confidence among mothers in accessing and using screening services.

Table 3 shows an average self-efficacy of 59.30% with a range of answers between 25% - 81.25%, after congenital hypothyroid screening education through the "counseling card" media, the average self-efficacy of respondents increased to 90.55% with a range of respondents' answers between 25% - 100%, the results of the treatment showed an increase in self-efficacy before and after treatment with an increase of 31.25%. A person's attitude is closely related to sources of information such as mass media, health workers, posters, leaflets, counseling cards, and other health promotion media. Education using counseling cards by cadres can help mothers have a better attitude. A person's attitude will affect health attitudes, and health attitudes are influenced by the information received. A person's positive attitude will produce positive health attitudes and behaviors. A positive attitude here is a mother who is correct in her view of congenital hypothyroid screening (the tendency to have it performed). Mothers who have good information will understand the importance of hypothyroid screening in infants and will show a supportive attitude towards infant hypothyroid screening [9,10,12].

CONCLUSIONS AND RECOMMENDATIONS

Health promotion using counseling card media has been shown to improve perceived benefits, reduce perceived barriers, and enhance mothers' self-efficacy in performing congenital hypothyroid screening. These findings indicate that counseling cards are an effective educational tool to support behavior change at the community level. This method can be used in regular maternal and child health services, especially in primary health care and posyandu settings, for practical purposes. To ensure that health education is delivered consistently and effectively, health cadres should be trained and provided with standardized counseling card materials. Also, the program should reach out to more people by getting family members, especially husbands, involved to help make decisions about screening practices. Adding counseling card-based education to national or regional health promotion plans may help get more people to get screened. Future programs should concentrate on expanding this intervention, overseeing its execution, and incorporating it with current maternal and newborn health initiatives to facilitate the early identification of congenital hypothyroidism.

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