ORIGINAL ARTICLE

Child Health Nurs Res, Vol.30, No.3, July 2024;30(3):199-209
https://doi.org/10.4094/chnr.2024.021

pISSN 2287-9110
eISSN 2287-9129

CHNR

South Korean first-time mothers' knowledge of digestive health problems in infancy and their utilization of health care facilities for digestive health concerns: a descriptive study

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Received: May 8, 2024
Revised: June 4, 2024
Accepted: June 14, 2024

This article was adapted from a thesis by Yijin Lee in partial fulfillment of the requirements for the master's degree at Seoul National University.

Purpose: This study aimed to assess the knowledge level of first-time mothers regarding digestive health issues in infancy and to examine the utilization of healthcare facilities for such problems. **Methods:** Data from 119 first-time mothers of infants under 6 months of age were analyzed. Descriptive statistics, t-test, and one-way analysis of variance (ANOVA) were conducted using the SPSS software. **Results:** The average correct response rate for first-time mothers' knowledge of digestive health problems in infancy was 61.9%. The highest correct response rate was observed for infantile colic, while diarrhea had the lowest. Less than 50% of mothers received education on infant digestive health problems across all categories. Among digestive health problems in infancy, diarrhea exhibited the highest rate of healthcare utilization, whereas infantile colic had the lowest. First-time mothers' knowledge of digestive health problems in infancy varied based on maternal age (t=-3.66, p<.001), education level (t=-2.26, p=.026), and planned pregnancy (t=3.24, p=.002). Moreover, mothers who received education on infant digestive health problems demonstrated better overall knowledge of digestive health problems. **Conclusion:** The rate of education regarding digestive health problems during infancy among first-time mothers was < 50%. Furthermore, mothers educated on infant digestive health issues exhibited improved knowledge. Therefore, it is necessary to provide appropriate pre-education to primiparous common gastrointestinal health issues in infants.

Keywords: Digestive system; Health services; Infant; Mothers

INTRODUCTION

Infancy is a period of rapid growth and development that presents parents with numerous questions as they nurture their children. Owing to the immaturity of their digestive, nervous, and immune systems, infants commonly experience mild digestive health issues stemming from deficiencies in digestive juices and enzymes [1]. While these issues may seem minor, they can manifest in a variety of forms, ranging from acute to chronic, and occasionally pose serious threats to well-being such as severe dehydration, aspiration, bowel obstruction, acute bilirubin encephalopathy, and nuclear jaundice. Moreover, digestive health problems often lead to emotional distress in parents, resulting in frequent changes in formula and visits to healthcare facilities [2].

Studies conducted in Australia have highlighted that di-

gestive health problems are the third most common cause of hospitalization among infants under one year of age [3]. Similarly, according to a survey on treatment experiences in healthcare facilities during infancy conducted in Korea, jaundice (20.2%) and gastrointestinal infections (17.2%) have been identified as heightened following respiratory infections [4].

In most instances, mothers play a pivotal role in discerning early indicators of illness in infants because of their prolonged and intimate interactions with the baby, enabling them to monitor their well-being consistently. Consequently, mothers must possess adequate knowledge and awareness to recognize the potential risk factors in their infants and undertake appropriate actions [5,6]. Specifically, to address digestive health issues during infancy, a solid foundation in parental education is essential, with family education serving as a cornerstone for preventing ailments from escalating into emergencies [7,8]. Thus, mothers require a comprehensive understanding of digestive health concerns in infants to safeguard their offspring's health and welfare [9,10].

In particular, novice mothers require increased social support and expert guidance in navigating the complexities of childcare alongside access to numerous childcare resources [11]. Furthermore, maternal confidence in infant care flourishes upon receiving professional guidance, feedback on caregiving practices, and precise responses to their inquiries [12]. Specifically, caregivers demonstrated a notable demand for education beyond fundamental infant care, encompassing aspects such as jaundice recognition, identification of abnormal symptoms, and acquisition of skills to manage sudden infant illnesses, including familiarity with emergency procedures [9,13,14].

Understanding digestive health issues in infants is paramount, given the nuanced presentation of symptoms compared to other ailments, underscoring the indispensable role of maternal knowledge in discerning the baby's condition. Moreover, maternal awareness regarding infantile digestive health problems is anticipated to impact the infant's well-being and shape patterns of healthcare utilization. A recent study in India focused on maternal knowledge of digestive health problems in infants [15]. Studies conducted in Korea on mothers' knowledge of infant care have mostly focused on general infant care skills, such as bathing, umbilical cord management, diaper changing, temperature measurement, feeding, and observation of abnormal signs. However, research specifically examining mothers' knowledge of digestive health issues in infants is scarce [13,14,16]. Consequently, this study endeavored to explore the knowledge of first-time mothers concerning infantile digestive health problems and their utilization of healthcare services in response to such issues.

This study aimed to investigate the knowledge levels of first-time mothers concerning digestive health problems in infants and to determine healthcare utilization patterns related to these concerns. The specific aims of this research were as follows: 1) evaluate participants' knowledge levels regarding digestive health problems during infancy; 2) ascertain healthcare utilization trends concerning digestive health problems in infants among the participants' babies; 3) identify differences in knowledge regarding infantile digestive health problems according to participants' demographic characteristics; 4) determine differences in knowledge regarding infantile digestive health problems according to whether participants have received education specifically addressing these issues.

METHODS

Ethical statements: This study was approved by the Institutional Review Board (IRB) of Seoul National University (IRB No. 2302/001-011). This study received a consent waiver.

1. Study Design

This descriptive study aimed to investigate the knowledge level of first-time mothers regarding digestive health problems in infancy and elucidate their utilization of healthcare facilities in response to infantile digestive issues. The reporting of this study was based on the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines.

2. Setting and Samples

The target population of this study comprised first-time mothers who had given birth within the last six months. The inclusion criteria stipulated that participants must (a) have delivered their first baby with a gestational period of 37 weeks or more or a birth weight of 2,500 g or more and (b) be legal adults. The exclusion criteria were as follows: (a) mothers raising babies with congenital disorders and (b) mothers raising babies with genetic disorders.

Using G*power 3.1, accounting for one-way ANOVA, α=.05, power of 80%, effect size 0.3 [17], and three groups, a priori sample size was calculated to be 111. Considering an expected incomplete response rate, 131 participants were recruited for this study. Among 131 sets of questionnaires collected, 119 were deemed suitable for analysis, and 12 sets of responses were excluded because they did not meet the research criteria.

3. Measurements and Instruments

1) Demographic variables

The questionnaire included sociodemographic factors such as age, marital status, education level, employment status, and income level. It also inquired about the place of delivery, planned pregnancy status, and high-risk pregnancy status. Moreover, the survey assessed whether the participants had received education regarding digestive health problems in infancy, specifying the source of education, and inquired about any digestive system health issues experienced while caring for their babies. Furthermore, the survey collected data on infant age, singleton/multiple birth status, and birth weight.

2) Knowledge of digestive health problems in infancy

The authors conducted an extensive literature review to develop a questionnaire to assess mothers' knowledge of digestive health problems in infancy [7,18-20]. Each item in the questionnaire was designed to measure general knowledge about common digestive health problems in infancy, such as diarrhea, constipation, infantile colic, neonatal jaundice, vomiting, gastroesophageal reflux, and coping skills. Scores were assigned as follows: one point for a correct answer and zero points for responses marked as "I do not know" or incorrect answers. The possible score range was 0–53 points, with higher scores indicating a higher level of maternal knowledge of infant digestive system health problems.

To ensure content validity, the tool was scrutinized by five experts, including two pediatricians, two pediatric nursing professors, and a nurse with more than 10 years of experience in the neonatal intensive care unit. They evaluated the appropriateness of each item using a 4-point Likert scale. Items that received a rating of 3 points (appropriate) or 4 points (very appropriate) from 80% or more of the experts were retained. Consequently, 6 of the initial 60 items were excluded, resulting in 53 final items. Some sentences have been revised based on expert feedback to enhance clarity and coherence. The final content validity index for the tool's content validity verification was 0.96. Furthermore, a pilot study involving ten first-time mothers was conducted to assess face validity. The feedback indicated difficulties and unfamiliarity with certain terms, prompting the inclusion of additional explanations. The final version of the tool had a KR20 reliability coefficient of 0.89. The reliability coefficients (KR20) for each item were as follows: neonatal jaundice 0.57, infantile colic 0.68, vomiting 0.59, gastroesophageal reflux 0.56, diarrhea 0.42, and constipation, 0.66.

3) Utilization of health care facilities due to infants' digestive system health problem

A survey on the utilization of healthcare facilities due to infants' digestive system health problems assessed whether parents sought medical assistance from local clinics, general hospitals, public health centers, or emergency rooms or required hospitalization for their infants with digestive health problems.

4. Data Collection and Research Procedures

The data collection period for this study spanned two days: February 23 and 24, 2023. For offline surveys, access was limited to certain regions, and due to the ongoing COVID-19 pandemic, face-to-face interactions were challenging. Therefore, a non-face-to-face online survey was conducted using a Google Survey Form (https://docs.google.com/forms/d/1tj6cvm6msh1Zl4F21KZb3-ccBh3rFXODxyh3W6b0vK0/edit).

The researcher facilitated recruitment for the study by posting announcements and recruitment documents on the Naver Cafe "Mom's Holick." Participation was voluntary, and interested individuals agreed to participate by completing the self-report survey. A total of 131 first-time mothers were surveyed, and subsequent analyses excluded 12 participants who did not meet the research criteria.

5. Data Analysis

The data were analyzed using SPSS WIN version 23.0(IBM Corp.). Characteristics of the subjects and infants, knowledge about digestive system health problems in infancy, utilization of health care facilities due to digestive system health problems in infancy among the participants' infants were analyzed using descriptive statistics, including mean, standard

deviation, maximum and minimum values, and percentage. Differences in knowledge about digestive system health problems in infancy among first-time mothers based on the characteristics were analyzed using independent t-tests and one-way ANOVA. Post-hoc analysis was conducted using Scheffe's test when the assumption of homogeneity of variance was met, and Dunnett's T3 test when the assumption was violated.

RESULTS

1. Characteristics of the Participants

The average age of the sample was 32.87 years (standard deviation [SD] = 3.63), and 69.8% of the samples were university graduates. Regarding employment status, 59.7% were on childcare leave, and the monthly household income ranged most frequently range between 3 and 4 million won, representing 32.0%. Moreover, 71.4% gave birth in private hospitals, women's hospitals, or midwives. Among the 119 first-time mothers, 66.4% reported planned pregnancies, and the incidence of high-risk pregnancies was 39.5%. The average age was 3.79 months, and the average birth weight was 3,189.25 g (SD = 283).

Participants' education on infant digestive system health problems varied, with less than 50% reporting Participants' education on infant digestive system health problems varied, with less than 50% reporting having received education on each specific issue. Among the topics, diarrhea had the lowest educational experience, with only 30.3% of the participants reporting having received education on it. Conversely, infantile colic patients had the highest educational experience, with 45.4% of participants reporting education on this topic. Regarding the educational places, hospitals where infants were delivered and postpartum care centers emerged as the primary locations where participants received education on infant digestive system health problems (Table 1).

2. Participants' Experiences and Knowledge of Infants' Digestive Health Problems

The participants' average overall knowledge score regarding digestive system health problems in infancy was 33.08 ± 9.35, with a range of 11–48. The correct answer rates for each health issue were as follows: infantile colic (69.6%); vomiting (68.6%); constipation (66.6%); gastroesophageal reflux (59.3%); neonatal jaundice (53.8%); diarrhea (53.7%). The overall correct answer rate for all items was 61.9% (Table 2).

3. Healthcare Facility Utilization Due to Infants' Digestive Health Problems

When infants encounter digestive system health problems, they predominantly seek medical care at local clinics. Furthermore, among the six identified digestive system health problems, diarrhea had the highest healthcare facility utilization rate (14.3%), whereas infantile colic had the lowest utilization rate (2.5%) (Table 3).

4. Differences in Mothers' Knowledge of Digestive Health Problems in Infancy by Characteristics

Participants aged 35 years and above demonstrated significantly higher knowledge scores regarding digestive system health problems in infancy than those below 35 years (t = -3.66, $p < .001$). Mothers with a final education level of university graduation or above exhibited statistically significantly higher knowledge scores than those with education levels below university graduation (t = -2.26, $p = .026$). Knowledge scores regarding digestive system health problems in infancy were

Table 1. Education on Digestive Health Problems in Infancy of the Participants (*N*=119)

Health problems	Education	Education place[a,b]			
		Hospital[d]	Postpartum care center[d]	Public health center[d]	Others[c,d]
	n (%)	n (%)	n (%)	n (%)	n (%)
Infantile colic	54 (45.4)	20 (33.3)	37 (61.7)	-	3 (5.0)
Vomiting	53 (44.5)	30 (47.6)	30 (47.6)	3 (4.8)	-
Gastro-esophageal reflux	51 (42.9)	22 (38.6)	34 (59.6)	-	1 (1.8)
Neonatal jaundice	51 (42.9)	33 (56.9)	23 (39.7)	1 (1.7)	1 (1.7)
Constipation	38 (31.9)	22 (53.7)	17 (41.5)	1 (2.4)	1 (2.4)
Diarrhea	36 (30.3)	19 (48.7)	19 (48.7)	1 (2.6)	-

[a]Including multiple responses; [b]Missing values were excluded; [c]Including internet, local clinic; [d]Percentage based on answers.

Table 2. Participants' Knowledge of Digestive Health Problems in Infancy (*N*=119)

Health problems	Question	Number of correct answer	Correct answer rate (%)
Infantile colic	19. Infantile colic begins around 3 to 6 weeks and lasts until 3 to 4 months	93	78.2
	22. If the mother is breastfeeding, it is good to avoid eating irritating foods to prevent infantile colic	93	78.2
	21. There is no clear treatment for infantile colic	89	74.8
	26. If your baby cries continuously for more than two hours, he (she) should see a doctor	89	74.8
	24. For infants suffering from colic, it is recommended to increase the amount of milk at one time[a)]	85	71.4
	23. Infants with colic should be rocked vigorously to sleep[a)]	81	68.1
	20. Infantile colic is an abnormal symptom[a)]	79	66.4
	25. Babies with colic cry weakly[a)]	65	54.6
Sub-total score of infantile colic 5.66±2.01 (min: 0, max: 8)			69.6
Vomiting	30. If your baby vomits repeatedly and spasmodically, he (she) should see a doctor	104	87.4
	27. If your infant vomits greenly, it is a danger sign	95	79.8
	32. You can prevent the baby from vomiting by lying him (her) up about 30 degrees after feeding	86	72.3
	29. If a vomiting baby does not urinate for more than 8 hours, he (she) should see a doctor	86	72.3
	34. It is important to treat the cause of vomiting in babies	84	70.6
	33. If your baby vomits, it is good to lay them on their side	72	60.5
	28. If your baby vomits, it is good to give him (her) an antiemetic right away[a)]	69	58.0
	31. If your baby vomits, it is better not to feed at least 1 to 2 hours	68	57.1
Sub-total score of vomiting 5.58±1.84 (min: 1, max: 8)			68.6
Constipation	56. If there is blood on your baby's diaper, he (she) should see a doctor	102	85.7
	55. If your baby is losing weight due to constipation, he (she) should see a doctor	91	76.5
	54. After 6 weeks of age, the number of stools per day decreases and the volume of stools increases	89	74.8
	61. If the baby is underfed, he (she) may become constipated	86	72.3
	59. Constipation may occur if your baby is breastfed and switched to formula feeding	85	71.4
	58. A baby not excreting meconium 24 hours after birth is a danger sign	83	69.7
	57. Babies should have at least one bowel movement per day in the first week of life	74	62.2
	60. Stool softeners can be given to babies under 6 months of age[a)]	35	29.4
Sub-total score of constipation 5.42±1.92 (min: 0, max: 8)			66.6
Gastro-esophageal reflux	42. If your baby regurgitates milk containing blood, he (she) should see a doctor	101	84.9
	35. Gastro-esophageal reflux (regurgitation) is a common phenomenon in the infant period	95	79.8
	43. Gastro-esophageal reflux (regurgitation) can be prevented by burping the baby more frequently during feeding	88	73.9
	36. If your baby has frequent gastro-esophageal reflux (regurgitation), it is better to reduce the amount of milk per feeding	79	66.4
	41. If your baby's gastro-esophageal reflux (regurgitation) symptoms progress to vomiting, you should see a doctor	78	65.5
	38. If your baby has frequent severe coughs after feeding, your baby should see a doctor	77	64.7
	44. Normal gastro-esophageal reflux (regurgitation) does not affect the baby's weight gain	73	61.3

(Continued to the next page)

Table 2. Continued

Health problems	Question	Number of correct answer	Correct answer rate (%)
	37. Gastro-esophageal reflux (regurgitation) in infancy requires immediate treatment because most of it progresses to disease[a)]	68	57.1
	40. If a formula-fed infant has frequent gastro-esophageal reflux (regurgitation, it is recommended to thicken the formula)	46	38.7
	39. If your baby is regurgitating frequently, it is better to put him (her) in a sitting position[a)]	12	10.1
Sub-total score of gastro-esophageal reflux 6.03±2.0 (min: 1, max: 9)			59.3
Neonatal jaundice	17. If your baby has jaundice that lasts longer than 2 weeks, he (she) should see a doctor	92	77.3
	13. Neonatal jaundice is a common symptom in the neonatal period	81	68.1
	14. Neonatal jaundice usually goes away harmlessly	77	64.7
	18. Physiological jaundice peaks on the 4th or 5th day after birth	74	62.2
	15. Jaundice starts on the face and moves downward	71	59.7
	10. Severe jaundice can cause brain damage	71	59.7
	11. Neonatal jaundice can occur when breastfeeding is not sufficient	66	55.5
	16. Breastfeeding is possible when the baby is receiving phototherapy	47	39.5
	9. Most physiologic neonatal jaundice appears within the first 24 hours of life[a)]	36	30.3
	12. If breast milk jaundice occurs, breastfeeding should be stopped immediately[a)]	36	30.3
Sub-total score of neonatal jaundice 5.47±2.15 (min :1, max: 9)			53.8
Diarrhea	51. Washing your hands before feeding can help prevent diarrhea in babies	98	82.4
	49. If a baby with persistent diarrhea has a depressed fontanelle, the baby should see a doctor immediately	89	74.8
	52. Breastfed infants usually have looser stools than formula-fed infants	88	73.9
	53. Rotavirus remains contagious for up to two weeks after symptoms disappear	73	61.3
	47. If your baby has mild diarrhea, you may need to feed them more often to prevent dehydration	62	52.1
	45. The most common cause of diarrhea is parasites[a)]	51	42.9
	50. If a breastfed infant has diarrhea, breastfeeding should be discontinued immediately[a)]	45	37.8
	46. If a baby under 6 months of age has diarrhea and their body temperature exceeds 39 degrees, you can give them ibuprofen[a)]	44	37.0
	48. It is normal for babies with diarrhea to have dark yellow urine, so you can just observe them without treatment[a)]	35	29.4
Sub-total score of diarrhea 4.92±1.76 (min: 0, max: 8)			53.7
A total score of digestive problems in infancy 33.08±9.35 (min: 11, max: 48)			61.9

[a)]Reverse questions.

significantly higher for mothers with planned pregnancies than for those with unplanned pregnancies (t=3.24, p=.002) (Table 4).

5. Differences in Mothers' Knowledge of Digestive Health Problems in Infancy According to Education on Infants' Digestive Health Problems

Participants who received education on each infant digestive system health problem demonstrated significantly higher knowledge scores in the respective categories of diarrhea (t=4.29, p<.001), constipation (t=3.30, p=.001), gastro-esophageal reflux (t=3.16, p<.002), infantile colic (t=5.51, p<.001), and neonatal jaundice (t=5.03, p<.001) compared to those who did not. Moreover, the overall knowledge about infants' digestive system health problems was significantly higher for participants who received education on diarrhea (t=5.24, p<.001), constipation (t=3.58, p<.001), vomiting (t=2.37, p=.019), gastroesophageal reflux (t=5.26, p<.001), infantile colic (t=6.71, p<.001), and neonatal jaundice (t=7.58, p<.001)

Table 3. Health Care Facility Utilization Due to Infants' Digestive Health Problems (*N*=119)

Categories	Health care facility utilization	Health care facility[a,b]				
		Local clinic[c]	General hospital[c]	Community health center[c]	Emergency room[c]	Hospital admission[c]
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Diarrhea	17 (14.3)	17 (71.0)	2 (8.3)	2 (8.3)	2 (8.3)	1 (4.1)
Vomiting	14 (11.8)	13 (72.2)	1 (5.6)	1 (5.6)	2 (11.0)	1 (5.6)
Gastro-esophageal reflux	7 (5.9)	6 (54.5)	3 (27.3)	-	2 (18.2)	-
Neonatal jaundice	6 (5.0)	4 (40.0)	2 (20.0)	-	1 (10.0)	3 (30.0)
Constipation	5 (4.2)	5 (71.4)	1 (14.3)	-	1 (14.3)	-
Infantile colic	3 (2.5)	2 (66.7)	1 (33.3)	-	-	-

[a]Missing values were excluded; [b]Including multiple responses; [c]Percentage based on answers.

Table 4. Differences in Mothers' Knowledge of Digestive Health Problems in Infancy by Characteristics (*N*=119)

Variables	Category	n	Overall knowledge of digestive health problems in infancy	
			M±SD	t/F (*p*)
Mother				
Age (year)	<35	81	31.19±9.56	-3.66 (<.001)*
	≥35	38	37.11±7.53	
Education level	High school	31	29.87±7.26	-2.26 (.026)*
	University & graduated school	88	34.20±9.77	
Current working status	Working	10	32.60±9.08	
	Maternity leave	71	34.68±9.78	2.93 (.057)
	Not working	38	30.21±8.02	
Monthly income (10,000 KRW)	<300	18	30.89±8.61	
	≥300–<400	38	33.92±11.79	1.52 (.213)
	≥400–<500	33	31.18±8.17	
	≥500	30	35.40±6.87	
Planned pregnancy	Yes	79	35.22±7.44	3.24 (.002)*
	No	40	28.85±11.23	
Diagnosis of high-risk pregnancy[a]	Yes	47	32.82±10.20	0.25 (.802)
	No	72	33.25±8.82	
Infant				
Babies current age (month)	<3	51	31.92±8.85	-1.17 (.245)
	≥3	68	33.94±9.68	

[a]Diagnosed one of preterm labor, severe preeclampsia, premature rupture of membranes, bleeding related to delivery, placental abruption, placenta previa, polyhydramnios, oligohydramnios, bleeding before delivery, cervical incompetence, gestational hypertension, gestational diabetes, multiple pregnancies, excessive vomiting of pregnancy with metabolic disorders, kidney disease, heart failure, intrauterine growth restriction, diseases of the uterus and its appendages; *p<0.05; M, mean; SD, standard deviation; KRW, South Korean Won.

compared to those who did not (Table 5).

DISCUSSION

This study aimed to evaluate the knowledge levels of first-time mothers concerning digestive health problems in infancy and explore healthcare utilization patterns related to these issues.

The average correct answer rate for knowledge of digestive health problems during infancy among first-time mothers was 61.9%. This result showed a higher overall correct answer rate compared to a previous study conducted with Indian mothers, where the average correct answer rate was 48.3% [15]. Another study conducted in India reported correct answer rates of 45.0% for vomiting, 45.6% for diarrhea, 51.0% for constipation, and 32.0% for neonatal jaundice [21]. While a direct comparison is limited because of differences in the items used to measure knowledge, this study indicates a higher level of maternal knowledge. This difference could be attributed to the higher education level of mothers in this study, with 74.8% having a university degree or higher, contrary to the majority being elementary or high school gradu-

Table 5. Differences in Mothers' Knowledge of Digestive Health Problems in Infancy According to Education on Infants' Digestive Health Problems (*N*=119)

Education		n	Specific knowledge of individual digestive health problems in infancy		Overall knowledge of digestive health problems in infancy	
			M±SD	t/F (*p*)	M±SD	t/F (*p*)
Diarrhea	Yes	36	5.78±1.25	4.29 (<.001)*	38.56±6.53	5.24 (<.001)*
	No	83	4.54±1.82		30.70±9.41	
Constipation	Yes	38	6.24±1.76	3.30 (.001)*	37.34±8.50	3.58 (<.001)*
	No	81	5.02±1.89		31.07±9.07	
Vomiting	Yes	53	5.91±1.82	1.75 (.083)	35.30±9.35	2.37 (.019)*
	No	66	5.32±1.82		31.29±9.02	
Gastro-esophageal reflux	Yes	51	6.65±1.60	3.16 (<.002)*	37.51±5.89	5.26 (<.001)*
	No	68	5.56±2.15		29.75±10.01	
Infantile colic	Yes	54	6.63±1.35	5.51 (<.001)*	38.26±5.32	6.71 (<.001)*
	No	65	4.86±2.12		28.77±9.80	
Neonatal Jaundice	Yes	51	6.55±2.24	5.03 (<.001)*	38.94±5.34	7.58 (<.001)*
	No	68	4.66±1.70		28.68±9.31	

*p<0.05; M, mean; SD, standard deviation.

ates in previous Indian studies [15].

When examining the differences in knowledge about digestive health problems in infants based on the general characteristics of the participants, we found that mothers aged 35 years and older had a higher level of knowledge than those under 35 years. This finding is consistent with the results of a study assessing maternal knowledge of neonatal jaundice, in which older maternal age was associated with higher knowledge [17]. Similar results were observed in a previous study that investigated mothers' knowledge of digestive health problems in infants [15].

Furthermore, participants with a higher level of education, specifically university graduates or higher, had a higher level of knowledge about digestive health problems in infants. This finding is consistent with the results of previous studies assessing mothers' knowledge of neonatal jaundice and diarrhea [15,17,22-24]. Based on the results of this study, more detailed information on digestive health problems in infancy should be provided to mothers with lower educational levels.

Regarding socioeconomic characteristics, mothers with planned pregnancies showed a higher level of knowledge about digestive health problems in their infants than those with unplanned pregnancies. This finding aligns with previous research suggesting that mothers with planned pregnancies tend to be better prepared for infant care [25]. Therefore, it is important to provide more detailed education on infant digestive health problems to mothers with unplanned pregnancies.

When examining the differences in mothers' knowledge of infant digestive health problems according to education on infants' digestive health problems, statistically significant disparities were found for diarrhea, constipation, gastro-esophageal reflux, jaundice, and infantile colic, excluding vomiting. Mothers who received education on each digestive health problem demonstrated significantly higher knowledge levels on each item compared to those who did not. Additionally, regarding overall knowledge of digestive health problems in infants, mothers who received education on each digestive health problem were significantly more knowledgeable than those who did not. This aligns with findings from previous studies in which mothers and pregnant women who received education about jaundice demonstrated higher knowledge than those who did not [17,26,27]. These results suggest that education on digestive health problems in infants can enhance mothers' knowledge of these health concerns.

In this study, mothers' educational experience with digestive health problems in infancy averaged 40%. Among the health problems, infantile colic (45.4%) and vomiting (44.5%) had the highest educational experience, while diarrhea (30.3%) had the lowest. Although diarrhea is one of the most common digestive health problems in infancy, with a relatively high experience rate (62.2%) and the highest healthcare utilization rate (14.3%), the education level for this problem was the lowest. Based on these findings, notably, education on common and frequently occurring health problems is being overlooked. Therefore, providing basic education on everyday health problems is crucial for helping mothers understand their infants' conditions accurately.

Furthermore, hospitals where mothers delivered their babies and postpartum care centers were identified as the primary sources where mothers received the highest proportion of education on infant digestive health problems. Therefore, it is crucial to provide basic education on infant digestive health problems through specialized medical professionals in maternity hospitals and postpartum care centers, especially during the prenatal and postnatal periods. Conversely, participants who received education on digestive health problems in infancy from public health centers showed a lower proportion than those from maternity hospitals and postpartum care centers because the maternal education provided by public health centers tends to focus more on breastfeeding and postpartum depression than on the management of infant health problems. Based on these findings, public health centers should provide specific education on digestive health problems in infancy during maternal education sessions.

Outpatient visits to private hospitals accounted for the highest proportion of healthcare utilization for digestive health problems in infants. When investigating the reasons for the low healthcare utilization compared to the digestive health problems experienced in infants, most mothers stated that this was because the baby's symptoms were not severe (84.9%), with financial burden being the second most common reason. This aligns with the findings of a previous study in which mothers often did not seek medical attention for infant diarrhea because they perceived the symptoms as not requiring nursing care [28].

Recognizing and taking appropriate medical-seeking actions for serious illnesses in infants are crucial for maintaining their health. While most digestive health problems in infancy do not have a significant impact on the infants' health and are part of the normal growth process, neglecting serious health problems may worsen the baby's health outcomes if they do not receive timely treatment. Therefore, it is essential to educate caregivers on potential risk symptoms that require medical attention through education on digestive health problems during infancy.

This study, focusing on infant digestive health problems for the first time in Korea, aimed to assess mothers' knowledge and healthcare utilization. As a foundational study, this study contributes to future research on digestive health problems in infants. Furthermore, this study identifies differences in mothers' knowledge levels based on whether they received education on digestive health problems during infancy. This highlights the importance of providing education on infant digestive health issues, specifically to first-time mothers.

Although this study has significant value, it has several limitations. First, the data were collected from specific users of the internet community, necessitating caution when generalizing the research results. Second, the researchers developed the tool used to measure mothers' knowledge of digestive health problems in infants, indicating the need for potential enhancement of this tool. Third, this study was the first attempt in South Korea to assess mothers' knowledge levels regarding digestive health problems in infants, making it challenging to compare it with other studies. Consequently, there are limitations to generalizing the findings, and future repeated studies are necessary.

CONCLUSION

This study assessed the knowledge levels of first-time mothers regarding digestive health problems during infancy. The researchers also investigated the factors influencing this knowledge and confirmed healthcare facility utilization due to digestive health problems in infants. This study revealed that first-time mothers had an average knowledge level of 61.9% regarding digestive health problems during infancy. Factors such as maternal age, educational level, planned pregnancy, and previous education about digestive health problems in infants significantly influenced knowledge of digestive health problems in infancy. Infants with colic had the highest educational level among infants with digestive health problems, whereas those with diarrhea had the lowest. Most mothers received education on these health problems in hospitals where they delivered their babies and postpartum care centers. However, among digestive health problems in infants, diarrhea showed the highest healthcare facility utilization, whereas infantile colic had the lowest. Ultimately, based on the results of this study, it is necessary to develop and implement a comprehensive and systematic educational program on digestive health problems in infants, targeting first-time mothers.

ARTICLE INFORMATION

Authors' contribution

Conceptualization: all authors; Data collection, Formal analy-

sis: all authors; Writing-original draft: all authors; Writing-review and editing: all authors; Final approval of published version: all authors.

Conflict of interest

No existing or potential conflict of interest relevant to this article was reported.

Funding

None.

Data availability

Please contact the corresponding author for data availability.

Acknowledgements

None.

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