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Online Social Support for Pregnant Women's Question Resolution and Anxiety Reduction

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This study aimed to identify the characteristics of communication that resolve questions and reduce anxiety in online self-help groups for pregnant women. To simulate actual online support, questions about labor pain were posed online along with four sample answers that involved medical knowledge, medical knowledge with added empathy, personal experience, and personal experience with added empathy. The experiment was conducted with four groups of 110 respondents who were randomly selected, totaling 440 respondents. Each respondent was assigned to a single condition in the study design. The results show that the degrees of both question resolution and anxiety reduction were higher when empathy was combined with medical knowledge. These results suggest that when medical knowledge incorporates empathy, pregnancy support is more effective in resolving questions and reducing anxiety in online social support.

Keywords: Anxiety reduction, Online social support, Question resolution, Pregnancy support, Online self-help group

Pregnancy and childbirth cause considerable psychological and physical changes in women. Pregnant women, particularly those expecting their first child, experience significant information deficits compared to experienced mothers in healthcare, administration, existing services, preparation for motherhood, the reliability of information, and so on (Slomian et al., 2017; Slomian, Reginster, Emonts, & Bruyère, 2021), leading to increased anxiety. Maternal anxiety during pregnancy can affect the relationship between mother and child post-delivery. Therefore, addressing questions related to pregnancy and childbirth and reducing anxiety are crucial. Social support plays an important role in resolving pregnant women's questions and reducing anxiety. Social support provided by family, friends, and members of social networks contribute to healthy interpersonal relationships, mitigate the adverse effects of daily life, and promote good mental health (Cassel, 1974).

Pregnant women enjoy social support from family members (mothers, grandmothers, sisters, sisters-in-law) and female friends and neighbors (Al-Mutawtah, Campbell, Kubis, & Erjavec, 2023). However, in Japan, social changes such as the weakening of local communities, the shift toward nuclear families, and the declining birthrate impede pregnant women's ability to obtain social support. Online support has compensated for this reduced local community support since the 2000s—it is highly effective for pregnant women and mothers raising children. House (1981) classified social support into informational, emotional, instrumental, and appraisal supports, which are reported to function well in online social support (Nick et al., 2018).

Internet-based social support involves the exchange of support through words and can be categorized into informational support and emotional support (Reinke & Solheim, 2015). Online social support includes self-organized self-help groups that focus on experiential information. Online self-help groups are membership-based online communities where individuals facing similar problems exchange informational and emotional support without relying on external systems or professionals. They share the common goal of solving issues at hand (Miyata, 2002) and engaging in communication through text-based interactions. Meier (2024) reported that most online groups on the Internet are online self-help groups.
Slomian et al. (2017, 2021) ascertained that first-time mothers experience significant informational deficits compared to experienced mothers across various domains, including medical, administrative, and existing services, preparation for motherhood, and reliability of information. These findings highlight the necessity for trustworthy and practical informational support for first-time mothers, and online self-help groups are useful in this regard.

In Japan, parenting services are widely utilized as online self-help groups. Pregnant women can seek advice and the public responds. For pregnant women who may experience anxiety, the presence of peers or mothers with older children is vital. Given weakened connections with local communities, these services play an important role as childcare networks. The author conducted a content analysis using quantitative text analysis methods on the posts and answers in an online self-help group for pregnant women in 2017 (Kawata & Nagano, 2017). The results revealed that posts during the second month of pregnancy focused on pregnancy-related discomfort, while those in the tenth month were more concerned with labor pain. Additionally, it was shown that many of the answers included expressions of empathy, indicating that emotional support was provided.

Most studies on online self-help groups have concentrated on emotional support, but research on informational support remains insufficient. Many pregnant women's questions require specialized medical knowledge.
Therefore, the author conducted a survey in 2020 and 2021 to identify effective emotional and informational support for assisting pregnant women. In 2020, 103 pregnant women participated in an online question-and-answer survey to identify which answers effectively reduced anxiety, particularly regarding "tightening of the abdomen," and to explore whether individual characteristics influenced the anxiety-reducing effects (Tange & Nagano, 2020). The results indicated that simulated answers combining empathetic messages with medical knowledge reduced anxiety. Additionally, respondents with higher decoding skills experienced greater anxiety reduction compared to those with lower decoding skills.

In 2021, another survey targeting labor pain—the most significant source of anxiety among pregnant women—was conducted with 103 respondents (Tange & Nagano, 2021). This group was entirely different from the 2020 cohort. The study aimed to identify effective answers for anxiety reduction and response recognition. The findings showed that answers based on medical knowledge were more effective than those grounded in personal experience. Although certain conclusions were drawn, as noted in the limitations of the 2021 study, the experimental design required each respondent to experience all four conditions, making it difficult to eliminate the effects of repetition and presentation order. Differences in the length of the simulated answers may have also influenced the results. Therefore, addressing and adjusting for these issues for further validation was important.

The present study incorporated question resolution, which was not examined in 2021. Addressing the limitations of the 2021 study and future research needs, the experiment was redesigned with four groups of 110 respondents, ensuring that each respondent experienced only one condition. A total of 440 respondents participated, and the content of the simulated answers was carefully analyzed. Therefore, this study clarified the characteristics of communication that resolve questions and reduce anxiety in pregnant women within online self-help groups by considering medical knowledge, personal experiences, and empathy as functions of pregnancy support. We conducted a survey in which respondents were questioned about labor pains to explore the childcare support function that helps question resolution and anxiety reduction among pregnant women. Respondents' answers were categorized according to whether they reflected medical knowledge or personal experience with or without empathy.

Methods

Respondents

Respondents were 440 Japanese women aged 20–40 years who had experienced childbirth and were registered as monitors at an online research company. The pre-survey screening questions included respondents' age at birth of the first child, age of the child, and pregnancy and childbirth experiences (a. gestational hypertension, b. gestational diabetes, c. impending preterm birth, d. placenta previa, e. early abruption of the abomasum, f. water breakage, g. low birth weight, h. NICU admission, i. none in particular). Screening criteria were that the child was ≤ 3 years and that respondents were 20–40 years old and answered "none in particular" regarding their pregnancy and childbirth experiences. Respondents' mean age was 30.8 years (SD = 4.11). They were public officials (16), managers/executives (3), private employees (143), free-lance workers (1), homemakers (203), part-time workers (65), others (7), and unemployed (2). There were 252 women with a first child in their 20s and 188 in their 30s. The current age of the first child was 0 years (135 respondents), 1 year (109 respondents), 3 years (101 respondents), and 4 years (95 respondents). Four groups of 110 individuals each were created by random selection, with each group participating in only one condition.

Procedure

A simulated question and corresponding simulated answers were presented to respondents through the online

document platform. The simulated question concerned "labor pains," frequently discussed by pregnant women in online self-help groups.

All four groups were presented with the same simulated question. However, simulated answers were presented to each group according to whether they included personal experience only (Group A), personal experience and empathy (Group B), medical knowledge only (Group C), or medical knowledge and empathy (Group D). Noteworthy is that many answers were based on personal experience and empathy, with few on medical knowledge, even though pregnant women often seek highly reliable medical knowledge.

The survey comprised a (1) screening investigation, (2) presentation of the simulated question, (3) survey of anxiety levels regarding the simulated question, (4) presentation of the simulated answer, and (5) questionnaire on the degree of question resolution, anxiety level, impressions of the answers, and statements that influenced changes in feelings (Table 1). This study was conducted using an online questionnaire method. The purpose of the study and the proposed manner of handling personal experience were explained clearly to the respondents before the commencement of the study. Informed consent was obtained from all the respondents. Moreover, respondents could withdraw, decline to cooperate, or discontinue at any time during the survey. In such cases, their responses were discarded. This study was approved by the Research Ethics Committee of the University of the Sacred Heart, Japan.

Table 1

Study Procedure

1. Screening investigation
2. Presentation of simulated question
3. Survey of anxiety level about simulated question
4. Presentation of simulated answer Group A: Personal experience Group B: Personal experience + empathy Group C: Medical knowledge Group D: Medical knowledge + empathy
5. Questionnaire on the degree of question resolution, anxiety level, impressions of answers, and statements that influenced changes in feelings

Presentation of the Simulated Question

The simulated question about "labor pains" was extracted from real online questions but edited for anonymity. A preliminary survey was conducted with 13 mothers whose childbearing experiences differed from those in the main survey to ensure that there were no issues in the posted descriptions. The questions addressed labor pains for pregnant women at 38 weeks of gestation (Table 2). After presenting the simulated question, respondents were asked to "Imagine that you are in the position of the person who asked this question. Choose one that you think applies to the questioner's current feelings about labor." The respondents were asked to provide their level of anxiety using a 5-point scale (1 = not anxious, 5 = extremely anxious).

Table 2

Survey Instructions and Simulated Question

Section	Content
Survey Instructions	Please answer the following question, imagining that you are in the position of the person who asked it.
Simulated Question	I am pregnant with my first child and am 38 weeks along. How long will labor take? Will I be able to tolerate the pain? What should I do if something happens? I am very worried because I do not know everything. I would really appreciate your advice.

Presentation of the Simulated Answer

After asking respondents to provide their level of anxiety about the simulated question, we presented four simulated answers pertaining to "personal experience," "personal experience + empathy," "medical knowledge," and "medical

knowledge + empathy." As with the question content, the simulated answers for personal experience were extracted from actual online answers and edited to ensure anonymity. The answers to the questions on medical knowledge were based on content from medical books and prepared with the cooperation of three midwives. The empathetic answers were created on the basis of the survey results of actual online answers and included "support" and "understanding," which are two of the six classifications of empathy described by Tange and Nagano (2017). Empathetic answers were common to both personal experience and medical knowledge and were added before and after the simulated answers (Table 3).

Table 3

Content of the Simulated Answers

Personal experience	A multiparous woman responded as follows: With my first, I called the hospital and went there when I started having some pain, but it was prodromal labor, so I went home. The labor pains started at night, and I went to hospital, where I gave birth after 9 hours. With my second child, my water broke first, and I was admitted to hospital where I gave birth. There are many different patterns of labor pains. Before I had my first child, I wanted to know about the pain of labor, so I listened to stories beforehand to get an idea of what to expect. When the pain peaked, I just exhaled without trying. Then, when the midwife put something on my buttocks and rubbed it, the pain eased.
Personal experience + empathy	A multiparous woman responded as follows: *I am sure you are spending very anxious days as birth approaches.* With my first child, I called the hospital and went there when I started having some pain, but it was prodromal labor, so I went back home. The labor pains started at night, and I went to the hospital, where I gave birth after 9 hours. With my second child, my water broke first, and I was admitted to the hospital where I gave birth. There are many different patterns of labor pains. Before I had my first child, I wanted to know about the pain of labor, so I listened to stories beforehand to get an idea of what to expect. When the pain peaked, I just exhaled without trying. Then, when the midwife put something on my buttocks and rubbed it, the pain eased. *Even if you have experienced labor pains before, I understand how scary it can be, especially if it is your first time giving birth. All the mothers in the world have overcome it! You will be fine!*
Medical knowledge	A midwife gave the following answer: From the actual onset of labor, it takes an average of about 10 hours for a first-time mother to give birth. If you think you may be in labor or your water may have broken, you should first call the facility where you will give birth. Labor pains are not sudden and unimaginable. They are often described as menstrual-like pain or back pain. They do not hurt all the time; in the beginning, contractions occur about once every 10 minutes, with about 10 minutes of pain-free time in between. It is a good idea to try as many comfortable positions and ways to release the pain as possible (e.g., breathing exercises, lying or standing posture, having your back rubbed, warming your lower back).
Medical knowledge + empathy	A midwife gave the following answer: *I am sure you are spending very anxious days as birth approaches.* From the actual onset of labor, it takes an average of about 10 hours for a first-time mother to give birth. If you think you may be in labor or your water may have broken, you should first call the facility where you will give birth. Labor pains are not sudden and unimaginable. They are often described as menstrual-like pain or back pain. They do not hurt all the time; in the beginning, contractions occur about once every 10 minutes, with about 10 minutes of pain-free time in between. It is a good idea to try as many comfortable positions and ways to release the pain as possible (e.g., breathing exercises, lying or standing posture, having your back rubbed, warming your lower back). *Even if you have experienced labor pains before, I understand how scary it can be, especially if it is your first time giving birth. All the mothers in the world have overcome it! You will be fine!*

Note: The empathy part is italicized.

Questionnaire on Question Resolution, Anxiety, Impressions of Answers, and Statements that Influenced a Change in Feelings

A questionnaire was administered after each simulated answer was presented to the respondents. Anxiety levels were calculated using a 5-point scale. We asked, "After reading the answer, choose one that you think applies to the questioner's current feelings about labor." The answers were analyzed based on the indicated level of anxiety (1 = not anxious, 5 = extremely anxious.

Next, regarding question resolution, we asked, "Did the answer resolve any questions you had about labor pains?" Answers were ranked on a 5-point scale (1 = not resolved, 5 = completely resolved) and analyzed.

Subsequently, "What is your overall impression of the answer provided?" was asked to measure impressions of answers by allowing respondents to select multiple options. The choices were as follows:

a. I felt the answer was reliable.
b. The answer was specific about what action to take.
c. I felt the respondents' experiences were similar to my own.
d. I was relieved to know that my situation was not a problem in the end.
e. I was encouraged by the words of support.
f. I felt that others understood my situation.

Each simulated answer was separated into sentences, and respondents were asked about the statements that influenced changes in their feelings: "Which part of your answer changed your mind? Please select up to three sentences that apply to you."

Statistical Analysis

A Kruskal–Wallis test using a nonparametric method was used to confirm whether there was a difference in the degree of anxiety and question resolution between the four groups after presentation of the simulated question. This was followed by a multiple comparison test with Bonferroni's correction. The same procedure was used to analyze anxiety levels and question resolution after the presentation of the simulated answers. The difference in anxiety levels after the presentation of the simulated question and answer was calculated and named "anxiety reduction." The differences between the four groups of answers to each question were examined using the χ^2 test, and residuals were analyzed for significant differences. The frequencies of answers were aggregated to determine which answers influenced the impression of answers and which influenced the change in feeling. Statistical software, SPSS® Statistics 28.0 (Armonk, NY: IBM®), was used for all analyses.

Results

Anxiety Level after Presenting the Simulated Question

There was no significant difference between the four answer groups ($H(3) = 6.166$, $p = .104$) (Table 4); there was no difference in the way the four groups received the simulated question, confirming the validity of the random grouping.

Table 4

Anxiety Levels after Presenting Simulated Question

Dimensions	*n*	Median	Quartile deviation	Mean	*SD*	H	*p*
Personal experience	110	4	0.5	3.51	0.98		
Personal experience＋empathy	110	4	0.5	3.47	1.00		
Medical knowledge	110	3	1	3.22	1.13	6.166	.104
Medical knowledge＋empathy	110	4	0.5	3.53	0.97		

Degree of Question Resolution

The Kruskal–Wallis test was conducted to see if there was a difference in the degree of question resolution between the four answer groups; there was a significant difference at the 5% level ($H(3) = 8.626$, $p < .05$) (Table 5). A multiple comparison test using Bonferroni's correction confirmed that the degree of question resolution was significantly higher at the 5% significance level for "medical knowledge + empathy" than for "personal experience."

Table 5

Degree of Question Resolution for Simulated Answers

Dimensions	*n*	Median	Quartile deviation	Mean	*SD*	H	*p*	Multiple comparisons
Personal experience	110	2	0	2.19	0.68			
Personal experience ＋empathy	110	2	0.5	2.26	0.70			Personal experience <Medical knowledge＋ empathy
Medical knowledge	110	2	0.5	2.35	0.76	8.626	.035*	
Medical knowledge＋ empathy	110	2	0.5	2.42	0.71			

†$p < .1$ *$p < .05$ **$p < .01$

Anxiety Level after Presenting the Simulated Answer

The Kruskal–Wallis test was conducted to determine whether there was a difference in the level of anxiety between the four answer groups after presenting the simulated answers ($H(3) = 1.918$, $p = .590$) (Table 6).

Table 6

Anxiety Level after Presenting Simulated Answers

Dimensions	*n*	Median	Quartile deviation	Mean	*SD*	H	*p*
Personal experience	110	2	0.5	2.56	0.784		
Personal experience ＋empathy	110	2	0.5	2.45	0.749		
Medical knowledge	110	2	0.5	2.43	0.795	1.918	.590
Medical knowledge ＋empathy	110	2	0.5	2.46	0.725		

Amount of Anxiety Reduction

The Kruskal–Wallis test was conducted to clarify whether there was a difference in the amount of anxiety reduction between the four groups. The mean degree of anxiety reduction is reported in Table 7. There was a trend toward a difference at the 10% level between the four answer groups ($H(3) = 6.594$, $p < .1$). Bonferroni's multiple comparison tests revealed that anxiety reduction tended to be higher for "medical knowledge + empathy" at the 10% level than for "medical knowledge" alone. The results indicate that the amount of anxiety reduction was related to the inclusion of empathy and that the combination of "medical knowledge＋empathy" was particularly effective.

Table 7

Amount of Anxiety Reduction

Dimensions	*n*	Median	Quartile deviation	Mean	*SD*	H	*p*	Multiple comparisons
Personal experience	110	1	1	0.95	1.06			
Personal experience ＋empathy	110	1	1	1.03	0.92			Medical knowledge
Medical knowledge	110	1	0.5	0.79	1.05	6.594	.086†	<Medical knowledge ＋empathy
Medical knowledge ＋empathy	110	1	1	1.06	1.13			

†$p < .1$ *$p < .05$ **$p < .01$

Analysis of Impressions of the Answers

Table 8 presents the impressions of the simulated answers. The χ^2 test showed that there was a significant difference between the four answer groups for "The answer was specific about what action to take" ($\chi^2(3) = 23.17$, $p < .01$). In the subsequent residual analysis, it was confirmed that the group that responded "The answer was specific about what action to take" was significantly less likely to respond to "personal experience + empathy" at the 5% level (adjusted residual was -4.00) and significantly more likely to respond to "medical knowledge + empathy" at the 5% level (adjusted residual was 3.31). The χ^2 test also found a significant difference between the four answer groups for "Encouraged by the words of support" ($\chi^2(3) = 24.18$, $p < .01$). A subsequent residual analysis confirmed that the group corresponding to "I was encouraged by the words of support" was significantly more likely to respond at the 5% level (adjusted residual of 4.03) for "personal experience + empathy" and significantly less likely to respond at the 5% level (adjusted residual of -3.90) for "medical knowledge."

Table 8

Analysis of Impressions of Answers

		Personal experience *N* = 110 Degree (%)	Personal experience ＋empathy *N* = 110 Degree (%)		Medical knowledge *N* = 110 Degree (%)	Medical knowledge ＋empathy *N* = 110 Degree (%)		*p*
a. I felt the answer was reliable	Applicable	43 (39.1)	36 (32.7)		37 (33.6)	38 (34.5)		n.s.
	Not applicable	67 (60.9)	74 (67.3)		73 (66.4)	72 (65.5)		
b. The answers were specific about what action to take	Applicable	36 (32.7)	23 (20.9)	▽	48 (43.6)	55 (50.0)	△	$p < .01$
	Not applicable	74 (67.3)	87 (79.1)	△	62 (56.4)	55 (50.0)	▽	
c. I felt the respondents' experiences were similar to my own	Applicable	12 (10.9)	12 (10.9)		16 (14.5)	18 (16.4)		n.s.
	Not applicable	98 (89.1)	98 (89.1)		94 (85.5)	92 (83.6)		
d. I was relieved to know that my situation was not a problem in the end	Applicable	18 (16.4)	12 (10.9)		16 (14.5)	18 (16.4)		n.s.
	Not applicable	92 (83.6)	98 (89.1)		94 (85.5)	92 (83.6)		

e. I was encouraged by the words of support	Applicable	32 (29.1)	46 (41.8)	△	14 (12.7)	▽	27 (24.5)	$p < .01$
	Not applicable	78 (70.9)	64 (58.2)	▽	96 (87.3)	△	83 (75.5)	
f. I felt that others understood my situation	Applicable	42 (38.2)	43 (39.1)		27 (24.5)		29 (26.4)	n.s.
	Not applicable	68 (61.8)	67 (60.9)		83 (75.5)		81 (73.6)	

Note: △: Significantly more at the 5% level in the analysis by adjusted residuals ▽: Significantly less at the 5% level in the analysis by adjusted residuals.

Statements that Influenced Changes in Feelings

Tables 9, 10, 11, and 12 portray the frequency and response rates of the selected answers (up to three) that influenced changes in feelings. For answers containing "personal experience" and "personal experience + empathy," the statement "When the pain peaked, I just exhaled without trying." had higher response rates compared to other answers, with "personal experience" at 38.2% and "personal experience + empathy" at 27.3%.

For answers containing "medical knowledge" and "medical knowledge + empathy," the statement "Labor pains are not sudden and unimaginable" had "medical knowledge" at 38.2% and "medical knowledge + empathy" at 29.1%. Another statement, "They do not hurt all the time; in the beginning, contractions are about once every 10 minutes, with about 10 minutes of pain-free time in between," had "medical knowledge" at 30% and "medical knowledge + empathy" at 30.9%, both showing higher response rates compared to other answers.

These results indicate that answers containing specific coping methods and knowledge significantly impact changes in feelings, supporting the results presented in the Kruskal-Wallis test.

Table 9

Statements that Influenced Changes in Feelings (Personal experience)

Personal experience （N = 110）	Frequency	Response rate
With my first, I called the hospital and went there when I started having some pain, but it was prodromal labor, so I went back home.	13	11.8%
The labor pains started at night, and I went to the hospital, where I gave birth after 9 hours.	9	8.2%
With my second child, my water broke first, and I was admitted to the hospital where I gave birth.	7	6.4%
There are many different patterns of labor pains.	50	45.5%
Before I had my first child, I wanted to know about the pain of labor, so I listened to stories beforehand to get an idea of what to expect.	38	34.5%
When the pain peaked, I just exhaled without trying.	42	38.2%
Then, when the midwife put something on my buttocks and rubbed it, the pain eased.	37	33.6%

Table 10

Statements that Influenced Changes in Feelings (Personal experience + empathy)

Personal experience + empathy （*N* = 110）	Frequency	Response rate
I am sure you are spending very anxious days as the birth approaches.	17	15.5%
With my first, I called the hospital and went there when I started having some pain, but it was prodromal labor, so I went back home.	7	6.4%
The labor pains started at night, and I went to the hospital, where I gave birth after 9 hours.	6	5.5%
With my second child, my water broke first, and I was admitted to the hospital where I gave birth.	3	2.7%
There are many different patterns of labor pains.	23	20.9%
Before I had my first child, I wanted to know about the pain of labor, so I listened to stories beforehand to get an idea of what to expect.	16	14.5%
When the pain peaked, I just exhaled without trying.	30	27.3%
Then, when the midwife put something on my buttocks and rubbed it, the pain eased.	8	7.3%
Even if you have experienced labor pains before, I understand how scary it can be, especially if it is your first time giving birth.	38	34.5%
All the mothers in the world have overcome it!	29	26.4%
You will be fine!	21	19.1%

Table 11

Statements that Influenced Changes in Feelings (Medical knowledge)

Medical knowledge （*N* = 110）	Frequency	Response rate
From the actual onset of labor, it takes an average of about 10 hours for a first-time mother to give birth.	12	10.9%
If you think you may be in labor or your water may have broken, you should first call the facility where you will give birth.	33	30.0%
Labor pains are not sudden and unimaginable.	42	38.2%
They are often described as menstrual-like pain or back pain.	25	22.7%
They do not hurt all the time; in the beginning, contractions are about once every 10 minutes, with about 10 minutes of pain-free time in between.	33	30.0%
It is a good idea to try as many comfortable positions and ways to release the pain as possible (e.g., breathing exercises, lying or standing posture, having your back rubbed, warming your lower back).	28	25.5%

Table 12

Statements that Influenced Changes in Feelings (Medical knowledge + empathy)

Medical knowledge＋empathy （*N* = 110）	Frequency	Response Rate
I am sure you are spending very anxious days as the birth approaches.	8	7.3%
From the actual onset of labor, it takes an average of about 10 hours for a first-time mother to give birth.	15	13.6%
If you think you may be in labor or your water may have broken, you should first call the facility where you will give birth.	39	35.5%
Labor pains are not sudden and unimaginable.	32	29.1%
They are often described as menstrual-like pain or back pain.	19	17.3%
They do not hurt all the time; in the beginning, contractions are about once every 10 minutes, with about 10 minutes of pain-free time in between.	34	30.9%
It is a good idea to try as many comfortable positions and ways to release the pain as possible (e.g., breathing exercises, lying or standing posture, having your back rubbed, warming your lower back).	27	24.5%
Even if you have experienced labor pains before, I understand how scary it can be, especially if it is your first time giving birth.	29	26.4%
All the mothers in the world have overcome it!	12	10.9%
You will be fine!	8	7.3%

Discussion

This study identified the characteristics of communication in online self-help groups for pregnant women, focusing on resolving questions and reducing anxiety. The multiple-comparison test indicated that questions were effectively resolved when empathy was added to medical Knowledge; the degree of question resolution was also significantly higher when empathy was added to medical knowledge than when only personal experience was considered. The test also showed that when empathy was added to medical knowledge, anxiety tended to be reduced more than when only medical knowledge was included.

The implication is that pregnant women's question resolution and anxiety reduction is most effectively met when empathy is combined with medical knowledge. This is because respondents perceived the answers that included empathy with medical knowledge as more concrete. Analysis of the impressions of answers confirmed that more respondents perceived the content of the answer as more concrete with "medical knowledge + empathy" than with the other three conditions. In the analysis of answers that influenced changes in feelings, answers containing specific medical knowledge such as "Labor pains are not sudden and unimaginable" and "They do not hurt all the time; in the beginning, contractions are about once every 10 minutes, with about 10 minutes of pain-free time in between" had high response rates.

The specificity of medical knowledge that encourages pregnant women to solve their problems may be related to the quality of information. Vogel-Broeke et al. (2022) pointed out that, although digital sources are perceived as less trustworthy than professional, conventional sources, they are the most commonly used source of information for pregnant women. This suggests that receiving concrete information and support from experts online is important for pregnant women.

The second reason for the efficacy was the granting of empathy. In the analysis of impressions regarding responses, 13 respondents (12%) answered that "I was encouraged by the words of support " under "medical knowledge + empathy" compared to "medical knowledge" alone. Although medical knowledge is essential for pregnant women, medical information provided unilaterally without considering specificities is not necessarily beneficial. Aikawa (2004) investigated the relationship between pregnant women and experts and found this to be relevant. We believe that empathy, which is the most visible form of online social support (Walter, 2019), can alleviate the impression of one-sided information from experts; without empathy, medical knowledge may be considered only as informational support.

Based on this study, two approaches can effectively reduce pregnant women's anxiety and resolve questions in online self-help groups. The first is the participation of medical experts. Currently, online self-help groups primarily comprise people with childcare experience and the exchange of personal experiences related to pregnancy and childbirth. It is challenging to obtain medical knowledge through such groups. Providing reliable and high-quality informational support is crucial for resolving pregnant women's issues. One method of supplementing medical knowledge with empathy, and one method is to include medical professionals in online self-help groups. However, when involving medical experts, it is important to strengthen traditional helper–helpee dynamics and ensure group members' active participation.

The second approach is to incorporate empathy into the provision of medical knowledge. When medical knowledge was supplemented with empathy, a more significant reduction in anxiety was observed compared to conditions where only medical knowledge was provided. Under the condition where only medical knowledge was offered, fewer respondents reported "I was encouraged by the words of support" compared to the other three conditions. These findings suggest that adding emotional support, such as empathy, to informational support reduces the impression of the information being one-sided. Professionals participating in online self-help groups should provide both medical knowledge and emotional support.
This study has some limitations. First, honest medical practitioners do not provide overly hopeful diagnoses; it is important to discuss how to include professionals in this kind of forum and eliminate poor quality information (such as folk medicine without scientific evidence). Establishing online self-help groups requires care in ensuring the quality of experts' communications.

Second, the sample may have been biased. The respondents were mothers with children, so the sense of urgency experienced by pregnant women with no prior childbirth experience may have been diminished. Future research should reconsider the selection of respondents to include a broader population.

Third, this study did not examine the influence of pregnant women's individual characteristics. Tange and Nagano (2020) found that, among pregnant women, those who accurately perceive others' feelings with high communication skills were less anxious than were those with lower skill levels. Pregnant women's individual factors should thus be examined in the future.

Finally, pregnant women do not always discuss their problems in online self-help groups, even anonymously. Although these groups address some of pregnant women's problems, they do not cover all of them; a comprehensive approach to solving pregnant women's problems must be addressed in the future.

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