

Effectiveness of Online Community User Response Types in Alleviating Pregnancy-Related Concerns

Shoko Tange

University of the Sacred Heart, Japan
15shokotan6w@u-sacred-heart.ac.jp

Kazuo Nagano

University of the Sacred Heart, Japan
nagano@u-sacred-heart.ac.jp

This study explored the effectiveness of answers provided in online question-and-answer (Q/A) communities for alleviating pregnant women's concerns using medical knowledge, personal experience, and empathic messages. A total of 103 Japanese women who had experienced childbirth completed an online survey, including the presentation of one question related to labor pain and four simulated answers. The simulated answers were based on personal experience, medical knowledge, personal experience + empathic message, and medical knowledge + empathic message. The test indicated that answers based on medical knowledge were more effective in addressing what pregnant women want to know than those based on personal experience. Furthermore, the addition of an empathic message to medical knowledge was more effective in alleviating pregnancy-related concerns than medical knowledge alone. In light of the above, access to reliable information is important; thus, Q/A communities should cater to such needs.

Keywords: Anxiety Reduction, Response Recognition, Online Communication, Pregnant Women, Q/A Community

Introduction

In recent years, the use of the Internet has increased exponentially, and many forms of online media, such as blogs, community sites, and bulletin boards, are now considered primary sources of information. Online groups appear to enable a geographically dispersed and physically disconnected group to connect and create a sense of community (Kirk & Milnes, 2016). Since question-and-answer (Q/A) sites provide a platform for users to post questions on general or specialized topics and receive answers from the community of users (Matthews, 2014), they are particularly effective in providing support. Studies examining the use of online communities suggest that they play an integral role in providing information, as well as emotional and social support (Miyata, 2002).

Researchers have found that women are increasingly using the Internet for information during pregnancy, with many pregnant women using Q/A websites (Lagan et al., 2006; Lagan et al., 2010; Lagan et al., 2011). Lagan et al. (2010) reported that women access the Internet during pregnancy because of "information need" and to "gain more control over decisions affecting their pregnancy;" thus, Q/A communities are valuable resources to support the specific needs of pregnant women. Therefore, it is necessary to identify the types of support pregnant women need from Q/A communities. Kawata and Nagano (2017) analyzed the questions and answers in online communities for pregnant women and found that many of the questions sought to increase their knowledge on labor, cesarean section, and impending preterm labor, as well as ease their anxiety about giving birth.

In general, information provided by experts (Medical Knowledge) is considered to be helpful for answering women's questions on situations related to pregnancy. According to a previous study, 70.1% of pregnant women considered accuracy and reliability to be the most important evaluation criteria when seeking pregnancy/delivery information (Chung et al., 2020). This suggests that medical knowledge from experts is important for pregnant women. However, analysis of the answers on Q/A communities revealed that much of the information was based on the personal experiences of women who had given birth (Personal Experience), and on support, resonance, understanding, empathy, and compassion (Empathic Message; Kawata & Nagano, 2017). Since one of the difficulties with Internet is an inability to judge the quality and accuracy of retrieved information (Sayakhot & Carolan-Olah, 2016), and so it is unclear whether the content of experiential information and empathic messages is really what pregnant women want to know, or if it can provide them with knowledge and reduce their anxiety.

Therefore, the following research question emerges: if pregnant women receive specialized knowledge, will this reduce their anxiety? On Q/A communities, answers can contain empirical information and empathic messages, and it is difficult to know which messages are valid for reducing pregnancy anxiety. Tange and Nagano (2020) used simulated questions and answers to see if personal experience, medical knowledge, and empathic messages could reduce pregnant women's anxiety about uterine contractions. They found that the combination of medical knowledge and empathic messages was effective in reducing anxiety; however, the study did not clarify whether the answers were appropriate for what the pregnant women wanted to know, or how personal experience and medical knowledge worked differently in reducing anxiety.

Thus, the main objective of this study was to identify how personal experience, medical knowledge, and empathic messages, among the types of answers provided by online communities, can help to address the problems faced by pregnant women, as assessed by using simulated questions and answers.

Method

Participants

The participants were 103 Japanese women aged 20 to 49 years, who had experienced childbirth and were registered as monitors at an online research company. Data collection was conducted on December 19, 2017. Owing to preemptive ethical considerations, this research included mothers who had children below 3 years of age and experienced no problems during delivery. The participants' mean age was 30.8 years ($SD = 3.89$); 4 were civil servants, 12 were private employees, 77 were homemakers, 9 worked part-time, and 1 was involved in other types of services.

Before the online survey, participants were asked to read and understand the aim of the study and other relevant information, and were informed that they could withdraw their participation at any point during the study. Approval for this study was obtained from the institutional review board of the University of the Sacred Heart.

Procedure

One simulated question and four simulated answers were created and presented to the participants, and their anxiety levels were measured after each answer was presented. We also investigated whether the pregnant women recognized the simulated answers as the information they were seeking.

The survey was conducted in the following order: (1) Questionnaire on Personal Characteristics of Participants, (2) Presentation of the Simulated Question, (3) Presentation of the Simulated Answer, (4) Investigation of Anxiety Reduction, (5) Investigation of Response Recognition, and (6) Questionnaire on Reasons for Emotional Changes. Table 1 illustrates the study procedure. This research was conducted on the same day as the study by Tange and Nagano (2020); however, the purpose and participants of the research were different.

Thus, this is considered a different study.

Table 1

Study Procedure

1. Questionnaire on Personal Characteristics of Participants
2. Presentation of the Simulated Question
3. Presentation of the Simulated Answer Personal Experience, Medical Knowledge, Personal Experience + Empathic Message, Medical Knowledge + Empathic Message
4. Investigation of Anxiety Reduction
5. Investigation of Response Recognition
6. Questionnaire on Reasons for Emotional Changes.

Questionnaire on Personal Characteristics of Participants

The first step was to provide a questionnaire on participants' personal characteristics. We collected data based on the participants' self-reported individual characteristics such as participants' age, occupation, and how to gather information about childbirth. We used a 5-point Likert scale ranging from 1 (never) to 5 (always) to assess the frequency at which respondents had used resources and consultations to obtain information about pregnancy and childbirth. Next, to assess the helpfulness of the information resources used during pregnancy, we used questions rated on a 5-point Likert scale ranging from 1 (not at all helpful) to 5 (very helpful)

Presentation of the Simulated Question

As labor pain are a typical source of anxiety for pregnant women (Kawata & Nagano, 2017), we created Q/A simulations to test the effectiveness of medical knowledge, personal experience, and empathic messages regarding this topic. The simulated question referred to the content of an actual online question, which we edited so that the individual who posted it could not be identified. The question asked whether women at 38 weeks of pregnancy worried about how to prepare for labor pain (Table 2). Following the simulated question, the instruction "Please answer assuming that you are pregnant" was presented to the participants.

Table 2

Content of the Simulated Question

I am pregnant with my first child, and I have entered my 38th week today. The images of childbirth I've seen before are imprinted on my mind, so it's frightening to imagine a birth. Will I be able to notice labor pains? Will I know if my water has broken? There are too many anxieties, and I can't let go of my baby care book every day. The pain is unimaginable. Unimaginable pain is really frightening. I know I have to endure, but I'm really worried about whether I can endure it or not. Please give me some advice on how I should prepare myself.

Presentation of the Simulated Answer

After the simulated question, we presented four answer types: "Personal Experience," "Medical Knowledge," "Personal Experience + Empathic Message," and "Medical Knowledge + Empathic Message." The Personal Experience answer was written from the perspective of a pregnant woman and designed as it would be answered by women who have experienced childbirth. The Personal Experience answer was taken from previous research (Kawata & Nagano, 2017) and edited so that the individual who posted it could not be identified. The Medical Knowledge answer included medical content and was designed as it would be answered by medical staff. The Medical Knowledge answer was derived from medical books, and we asked three midwives

to verify and confirm its content. According to a text mining analysis of empathic messages (Kawata & Nagano, 2017), their types included “supporting,” “resonance,” “empathy,” “understanding,” “sympathy,” and “compassion.” In the Empathic Message we incorporated the “supporting and “understanding” types, which are prevalent online. The Empathic Message was added before and after both the Personal Experience and Medical Knowledge answers.

Moreover, the simulated answers concerning medical knowledge identified the occupation of the person at the end of the answer. In contrast, the Medical Knowledge + Empathic Message answer revealed the occupation at the beginning of the answer. In summary, we composed four simulated answers (Table 3), which were presented in the following order: Personal Experience, Medical Knowledge, Personal Experience + Empathic Message, and Medical Knowledge + Empathic Message. After each simulated answer was presented on the screen, the screen was set not to return to the previous page.

Table 3
Content of the Simulated Answers

Personal Experience	Women gave birth even in times when medical care was less developed. Mothers, grandmothers, or ancestors have been giving birth since the origin of humans. During my first delivery, I was afraid that the birth date was approaching. But, when the labor pain started, I had no choice but to give birth! When the pain peaked, I just exhaled and did my best. It does hurt, but just try to listen to the advice of your midwife and others. Please give birth soon! I was desperate, but when I met my baby, I was so moved that the pain up to that point was blown away.
Medical Knowledge	In general, during the birth of your first baby, it is unlikely to give birth in a matter of minutes after first becoming aware of labor pains. It is said that it takes an average of about 10 hours to give birth for the first time after the actual labor begins. If you are worried about labor pains or your water breaking, you should first call the facility where you are going to give birth. It's a good idea to reconfirm the phone number, so that you can call anytime. When it comes to labor pains, it's natural to become scared. However, it is not sudden unimaginable pain. Rather, labor pains are often described as similar to menstrual pain or lower back pain. Also, it does not always hurt, and since the labor pain comes once every 10 minutes, in the beginning, there is a painless period of about 10 minutes in between. It's a good idea to try some comfortable positions and ways to get rid of pain (for example, breathing, sideways or standing positions, rubbing your back, warming your back, etc.). Some hospitals use a method to relieve pain with anesthesia, so please consult your partner, doctor, or midwife. (Midwife)
Personal Experience + Empathic Message	Don't worry! Calm down! “Personal Experience” Even those who have experienced labor pains will feel uneasy. Therefore, I do understand your fear related to giving birth for the first time. Mothers all around the world have overcome such fears! I'm sure you will be just fine. I wish you a safe delivery.

Medical Knowledge + Empathic Message	I am a Midwife. Don't worry! Calm down! “Medical Knowledge” Even those who have experienced labor pains will feel uneasy. Therefore, I do understand your fear related to giving birth for the first time. Mothers all around the world have overcome such fears! I'm sure you will be just fine. I wish you a safe delivery.
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Investigation of Anxiety Reduction

After each simulated answer was presented, a question was presented on anxiety reduction. The item was as follows: “My anxiety decreased after reading the answer,” rated from 1 (not applicable at all) to 7 (applies very well).

Investigation of Response Recognition

After each simulated answer was presented, we investigated whether the women recognized the information provided as what they had been seeking. The item was as follows: “I better understood what I wanted to know” rated from 1 (not applicable at all) to 7 (applies very well).

Questionnaire on Reasons for Emotional Changes

Finally, we included a questionnaire on the reasons why the participants experienced changes in their emotions during the simulated Q/A. The item used was as follows: “Please choose all reasons for experiencing emotional changes after you read the previous simulated answer to the simulated question: ‘I felt that the answer of the medical specialist is reliable,’ ‘I felt that the answer exemplifies how to act,’ ‘The answer depicts my situation,’ ‘I was relieved that I am in a problem-free situation,’ ‘I was encouraged by words of support,’ and ‘I felt others understood my anxiety.’”

Results

Personal Characteristics

In this study, all statistical analyses were conducted using IBM SPSS version 26.0. First, we analyzed the participants’ information use, information evaluation. Table 4 shows the frequency at which participants used information resources and consultations regarding pregnancy and childbirth. The mean scores were as follows: Medical Expert, 3.16 ($SD = 1.10$); Family, 3.73 ($SD = 1.05$); Birth experienced friends, 3.36 ($SD = 1.27$); Parenting Technical Care Book, 2.75 ($SD = 1.22$); Parenting Magazine, 2.87($SD = 1.24$); Website that contains reviews of experienced people, 3.12 ($SD = 1.10$), Website supervised by experts, 3.25 ($SD = 1.16$). As illustrated in Table 4, 28.2% of the participants consulted family members and 21.4% consulted friends who had previously given birth. Meanwhile, the number of those who always consulted a medical expert was low at 14.6 % participants. This indicates that they consulted and received information from closest to them.

Table 4
Participants’ Answers for Information Use and Consultation about Pregnancy and Childbirth

Use and consultation	n	Never	Hardly	Sometimes	Often	Always	Mean	SD
Medical Expert (Doctor, Nurse, Midwife, Public health nurse)	103	5 (4.9)	25 (24.3)	37 (35.9)	21 (20.4)	15 (14.6)	3.16	1.10

Use and consultation	n	Never	Hardly	Sometimes	Often	Always	Mean	SD
Family (Husband, Parents, Relatives)	103	2 (1.9)	11 (10.7)	29 (28.2)	32 (31.1)	29 (28.2)	3.73	1.05
Birth experienced friends	103	14 (13.6)	7 (6.8)	32 (31.1)	28 (27.2)	22 (21.4)	3.36	1.27
Parenting Technical Care Book	103	20 (19.4)	25 (24.3)	27 (26.2)	23 (22.3)	8 (7.8)	2.75	1.22
Parenting Magazine	103	17 (16.5)	24 (23.3)	28 (27.2)	23 (22.3)	11 (10.7)	2.87	1.24
Website that contains reviews of experienced people	103	10 (9.7)	14 (13.6)	45 (43.7)	22 (21.4)	12 (11.7)	3.12	1.10
Website supervised by experts	103	10 (9.7)	14 (13.6)	34 (33.0)	30 (29.1)	15 (14.6)	3.25	1.16

n(%)

Table 5 illustrates the evaluation of helpful pregnancy information sources. The mean scores were as follows: Medical Expert, 4.23 ($SD = 0.69$); Family, 4.00 ($SD = 0.73$); Birth experienced friends, 4.28 ($SD = 0.56$); Parenting Technical Care Book, 3.76 ($SD = 0.73$); Parenting Magazine, 3.78 ($SD = 0.87$); Website that contains reviews of experienced people, 3.89 ($SD = 0.70$), Website supervised by experts, 3.95 ($SD = 0.58$). Regarding the evaluation of helpful sources, 34% participants thought information from medical expert was very helpful, while 29.1% participants also thought information from friends who had experienced childbirth was very helpful. Hence, many participants felt that both medical knowledge and personal experience were helpful.

Table 5
Participants' Answers Indicating Helpfulness of Sources for Information on Pregnancy and Childbirth

Helpfulness of sources	n	Not at all helpful	Not very helpful	Neither	Somewhat helpful	Very helpful	Mean	SD
Medical Expert (Doctor, Nurse, Midwife, Public health nurse)	98	0 (0.0)	2 (1.9)	8 (7.8)	53 (51.5)	35 (34.0)	4.23	0.69
Family (Husband, Parents, Relatives)	101	0 (0.0)	3 (2.9)	17 (16.5)	57 (55.3)	24 (23.3)	4.00	0.73
Birth experienced friends	89	0 (0.0)	0 (0.0)	5 (4.9)	54 (52.4)	30 (29.1)	4.28	0.56
Parenting Technical Care Book	83	0 (0.0)	6 (5.8)	16 (15.5)	53 (51.5)	8 (7.8)	3.76	0.73
Parenting Magazine	86	2 (1.9)	6 (5.8)	14 (13.6)	51 (49.5)	13 (12.6)	3.78	0.87
Website that contains reviews of experienced people	93	0 (0.0)	5 (4.9)	13 (12.6)	62 (60.2)	13 (12.6)	3.89	0.70
Website supervised by experts	93	0 (0.0)	2 (1.9)	12 (11.7)	68 (66.0)	11 (10.7)	3.95	0.58

n(%)

Analysis of Anxiety Reduction for Each Simulated Answer

The Friedman test was conducted to compare differences in anxiety reduction scores depending on the four simulated answers. Responses of “not applicable at all,” “hardly applicable,” and “not so applicable” were coded as 0 (did not reduce anxiety or does not affect anxiety). We coded the remaining answers as follows: 1 (limited application), 2 (applies well), and 3 (applies very well). The results of the Friedman test (Table 6) showed significant differences in anxiety reduction between Personal Experience, Medical Knowledge, Personal Experience + Empathic Message, and Medical Knowledge + Empathic Message answers ($\chi^2(3) = 52.44, p < .001$). According to the multiple comparisons using the Bonferroni test, Medical Knowledge + Empathic Message had a higher median score than Personal Experience and Personal Experience + Empathic Message ($p < .001$). Furthermore, Medical Knowledge + Empathic Message showed a higher median score than Medical Knowledge alone ($p < .01$). The mean anxiety reduction scores were as follows: Personal Experience, 0.87 ($SD = 0.98$); Medical Knowledge, 1.23 ($SD = 0.92$); Personal Experience + Empathic Message, 1.00 ($SD = 0.92$); and Medical Knowledge + Empathic Message, 1.58 ($SD = 0.93$).

These findings indicated that the Medical Knowledge + Empathic Message answer significantly reduced anxiety for participants, compared with the other answer types.

Table 6
Degree of Anxiety Reduction Based on Type of Simulated Answer ($N = 103$)

Dimensions	n	Median	Quartile Deviation	Mean	SD	χ^2	p	Multiple Comparisons
Personal Experience	103	1	0.5	0.87	0.98	52.44	<.001	Personal Experience $\approx$ Personal Experience + Empathic Message < Medical Knowledge < Medical Knowledge + Empathic Message
Medical Knowledge	103	1	0.5	1.23	0.92			
Personal Experience + Empathic Message	103	1	1	1.00	0.92			
Medical Knowledge + Empathic Message	103	2	0.5	1.58	0.93			

Analysis of Response Recognition for Each Simulated Answer

The Friedman test was conducted to determine whether participants' response recognition differed depending on the four simulated answers. Responses of “not applicable at all,” “hardly applicable,” “not so applicable,” and “neither applicable nor not applicable” were coded as 0 (i.e., I can't find what I want to know or it does not affect my response recognition). We coded the remaining answers as follows: 1 (limited application), 2 (applies well), and 3 (applies very well).

The results of the Friedman test, as shown in Table 7, denote significant differences in response recognition between Personal Experience, Medical Knowledge, Personal Experience + Empathic Message, and Medical Knowledge + Empathic Message answers ($\chi^2(3) = 66.97, p < .001$). We conducted multiple comparisons using the Bonferroni correction to clarify the source of the significant differences between the scores. The results indicated that Medical Knowledge received a higher score than Personal Experience and Personal Experience + Empathic Message ($p < .001$). The mean response recognition scores were as follows: Personal Experience, 0.95 ($SD = 0.97$); Medical Knowledge, 1.44 ($SD = 0.79$); Personal Experience + Empathic Message, 0.79 ($SD = 0.91$); and Medical Knowledge + Empathic Message, 1.57 ($SD = 0.91$). These results indicated that the Medical Knowledge + Empathic Message answer generated significantly higher response recognition among participants, compared with the other answer types.

Table 7
Degree of Response Recognition Based on Type of Simulated Answer (N = 103)

Dimensions	n	Median	Quartile Deviation	Mean	SD	χ^2	p	Multiple Comparisons
Personal Experience	103	1	1	0.95	0.97	66.97	<.001	Personal Experience $\approx$ Personal Experience + Empathic Message < Medical Knowledge $\approx$ Medical Knowledge + Empathic Message
Medical Knowledge	103	1	0.5	1.44	0.79			
Personal Experience+ Empathic Message	103	1	0.5	0.79	0.91			
Medical Knowledge + Empathic Message	103	2	0.5	1.57	0.91			

Analysis of Reasons for Emotional Changes

We analyzed why the participants thought that their feelings changed after reading the simulated answers. Table 8 confirms that there were significant differences between the four answers for all reasons except for “The answer depicts my situation” and “I felt others understood my anxiety.”

In comparing Personal Experience and Medical Knowledge answers, for Personal Experience alone, many participants selected “I was encouraged by words of support” (35%) and “I felt others understood my anxiety” (34%). However, for Medical Knowledge, many participants selected “I felt that the answer of the medical specialist is reliable” (30.1%) and “I felt that the answer exemplifies how to act” (62.1%). Next, in a comparison of Medical Knowledge + Empathic Message and Medical Knowledge alone, Medical Knowledge + Empathic Message received a score that was twice as high as Medical Knowledge, with participants identifying three main reasons: “I felt that the answer of the medical specialist is reliable” (63.1%), “I was encouraged by words of support” (50.5%), and “I was relieved that I am in a problem-free situation” (28.2%).

Table 8
Response Numbers and Percentages for Reasons for Emotional Changes for Each Simulated Answer (N = 103)

	Personal Experience	Medical Knowledge	Personal Experience + Empathic Message	Medical Knowledge + Empathic Message	p*
I felt that the answer of the medical specialist is reliable.	5 (4.9)	31(30.1)	6 (5.8)	65 (63.1)	<.001
I felt that the answer exemplifies how to act.	30 (29.1)	64 (62.1)	20 (19.4)	65 (63.1)	<.001
The answer depicts my situation.	16 (15.5)	10 (9.7)	11 (10.7)	10 (9.7)	n.s.
I was relieved that I am in a problem-free situation.	19 (18.4)	14 (13.6)	19 (18.4)	29 (28.2)	<.10
I was encouraged by words of support.	36 (35.0)	15 (14.6)	62 (60.2)	52 (50.5)	<.001

I felt others understood my anxiety.	35 (34.0)	30 (29.1)	38 (36.9)	39 (37.9)	n.s.
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n(%); *Fisher's exact test.

Discussion

The current study presented four types of simulated answers to a simulated question, similar to what could be found in an online Q/A community related to pregnancy. The results indicated that answers based on medical knowledge were more effective than answers based on personal experience, for response recognition and anxiety reduction. As shown in Table 8, the participants considered answers based on personal experience to be supportive, while they regarded medical knowledge to be trustworthy and concrete. A comparison of personal experience and medical knowledge answers indicated that content with precise instructions was preferred to those with emotional elements alone. Thus, direct information from medical specialists is thought to be effective in alleviating pregnancy-related concerns in online communication.

Comparing the Personal Experience + Empathic Message and Personal Experience answers, both response recognition and anxiety reduction showed no differences in the median score. Personal Experience + Empathic Message was more often linked with "I was encouraged by words of support" as a reason for emotional change than was Personal Experience. Therefore, the results suggest that participants did not perceive a difference between the contents of answers except for the empathy message.

Moreover, comparing the Medical Knowledge + Empathic Message and Medical Knowledge answers, there was no significant difference in the response recognition score, but the anxiety reduction score for Medical Knowledge + Empathic Message was higher than for Medical Knowledge alone. The lack of a difference in response recognition between these two types of answers indicated that the presence or absence of an empathic message did not affect how they viewed the source of the knowledge they are seeking. However, as shown in Table, participants felt that the Medical Knowledge + Empathic Message answer conveyed a reliable message because it was provided by a medical specialist. A previous study highlighted that an empathic message attached to medical knowledge might change how it is perceived, from supportive or understanding to trustworthy (Tange & Nagano, 2020), and messages with added empathy from medical professionals can be effective in reducing pregnancy anxiety.

In contrast, today's online pregnancy communities are generally dominated by the sharing of personal experiences and empathic messages. As shown in Tables 4 and 5, participants perceived information from medical experts to be useful; however, they did not consult them much compared to their friends and family with birth experience. Studies have reported that women may not receive helpful advice or adequate information about physical activity and nutrition during medical visits since physicians are constrained by time and may lack knowledge about proper recommendations (Cannella et al., 2010; Cheyney & Moreno-Black, 2010; Jones et al., 2010; Kivits et al., 2006). Therefore, it is suggested that a gap exists between the information that pregnant women are seeking, the information that is actually available, and the environment that supports them.

Considering the results of this research, answers based on personal experience or personal experience combined with an empathic message are not as effective in alleviating pregnancy-related issues, including response recognition and anxiety reduction. Furthermore, medical knowledge is more effective for response recognition; however, empathic messages are also necessary for reducing anxiety. Therefore, online services need to present accurate information based on medical knowledge and empathic messages for the Q/A community to become a suitable tool for supporting pregnant women. An approach to providing support for pregnant women could be an automatic response system, which, in today's world of artificial intelligence, would be vital in the Q/A community system. There are several types of automatic dialogue systems including task-based systems that provide accurate information, such as train arrival and departure guidance systems (Kauts 1986); and Siri. It is possible to use such AI technology to provide medical knowledge. However, if they want to alleviate the anxiety of the questioner as well, it would be more effective to generate a response that includes an empathy message. Going forward, it is necessary to construct a support network related to pregnancy and

childbirth, which can be accessed in online communities.

In conclusion, this study revealed that answers based on medical knowledge were more effective in addressing what pregnant women want to know than those based on personal experience. Additionally, answers based on medical knowledge combined with an empathic message were the most helpful in alleviating pregnancy-related concerns.

Limitations

This research had several limitations that should be addressed. First, the varying amount of text between the simulated answers may have affected the response recognition and anxiety reduction scores. Thus, it would have been preferable that all simulated answers had comprised the same amount of text. Second, the answer presentation order may have affected the results of response recognition, anxiety reduction, and reasons for experiencing emotional changes. However, the mean scores for response recognition and anxiety reduction did not increase in the order of presentation; therefore, it is not clear whether the order of presentation had an effect. Finally, Likert scales were used in this study. When responses provided using Likert scales are reduced to two categorical variables, deviations in the data may be lost and the original meaning may be distorted. These limitations are also challenges that need to be addressed in future research.

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