Association between the Use of the Self-recording Sections of the Mother and Child Health Handbook and Disaster Preparedness of Mothers in Japan

Shota Ogawa¹², Kunihiko Hayashi² and Hiromitsu Shinozaki²

¹ Mie University Graduate School of Medicine, 2-174 Edobashi, Tsu, Mie 514-8507, Japan
² Gunma University Graduate School of Health Sciences, 3-39-22 Showa-machi, Maebashi, Gunma 371-8514, Japan

Abstract

Aim: This study investigated the use of the Mother and Child Health (MCH) Handbook and the association between the knowledge of disaster preparedness and utilization of the self-recording sections of the MCH Handbook.

Methods: In this cross-sectional study, self-reporting questionnaires were distributed to 1,009 puerperal women, and 662 complete responses were analyzed.

Results: Overall, 42.0% used the self-recording sections in the MCH Handbook during pregnancy, and 29.8% shared the MCH Handbook with family. Additionally, 78.1% participants recorded their weight changes during pregnancy, 54.5% recorded the development of their fetus in the MCH Handbook, and 66.6% had read information for pregnant women. Fisher’s exact test showed a significantly different rate of knowledge of disaster preparedness regarding Disaster Emergency Dengon Dial 171, the cellular phone disaster message board, and a hazard map among pregnant women who used the self-recording sections and those who did not.

Conclusions: This study demonstrated the rate of each function in the MCH Handbook. Pregnant women who used the self-recording sections in the MCH Handbook had disaster preparedness knowledge about the recognition of the Disaster Emergency Dengon Dial 171, the cellular phone disaster message board, and a hazard map.

1. Introduction

The Mother and Child Health (MCH) Handbook is highly utilized in Japan, and almost all parents have read and written in their MCH Handbook.¹ It was introduced in its original form in Japan in 1942.² The MCH Handbook is mainly used in Asia;¹ it fulfills multiple functions such as maintaining the records of maternal and infant health checkups and records of other MCH services as well as vaccination status.² It also contains information on the time period from pregnancy to infancy of the new born child, which is useful for parents. Moreover, the MCH Handbook has a column where expectant mothers and fathers can record their feelings during pregnancy, at birth, on the babies’ birthdays, and so on.² As the revision of MCH Handbook in 2012, blank spaces were added to the recording sections so that the expectant mothers can write freely every four weeks during pregnancy.² Research on the role of the MCH Handbook in providing maternal health knowledge as well as access to and usage of maternal health services has been conducted mainly in developing countries such as Cambodia, Indonesia, Dominica, Kenya, and Thailand.¹,² In Japan, the research on the MCH Handbook and its use have focused more on the evaluation of the content written by the parents regarding their feelings during pregnancy and even after the birth of the child.³,⁴

It is worth noting here that Japan is a disaster-prone
country due to earthquakes (e.g., the Great East Japan Earthquake), storms, and typhoons. Further, the number of natural disasters has increased in recent years.\textsuperscript{12} The World Health Organization (WHO) states that children, pregnant women, elderly people, malnourished people, and people who have illness or immunocompromised conditions are particularly vulnerable when a disaster strikes.\textsuperscript{13} Previous reports suggest that pregnant women are especially vulnerable after a disaster because a disaster leads to risks in approximately 80\% of them requiring either immediate intervention or continuous care by midwives or public health nurses, including regular pregnancy health check-ups.\textsuperscript{14} Moreover, in recent years, preparation for disasters during pregnancy has become increasingly important.\textsuperscript{15}

While the MCH Handbook provides useful information covering all aspects of pregnancy, childbirth and vaccination of infants,\textsuperscript{2} it does not contain any disaster-related information. Some local governments distribute leaflets that provide information on disaster preparedness during pregnancy as additional material. The Fire Department educates citizens on how to use the “Disaster Message Dial 171” and the “Disaster Message Board” on mobile phones as a means of contacting families during a disaster such as an earthquake.\textsuperscript{16}

Japanese researchers have conducted surveys on disaster preparedness and disaster education for pregnant women or midwives.\textsuperscript{17-20} Other studies on disaster education have focused on nursing students in addition to pregnant women.\textsuperscript{21-23}

One study conducted on pregnant women’s disaster preparedness in a disaster-prone area revealed that their preparedness for disasters was not sufficient.\textsuperscript{19}

In this context, the MCH (home-based record) has a positive effect on the health behavior of pregnant women.\textsuperscript{24} A study that analyzed the self-recording sections of the MCH Handbook reported it to be useful for screening pregnant women with high anxiety who show preliminary signs of future postpartum depression.\textsuperscript{25} Additionally, in a study conducted prior to the introduction of the self-recording sections in the MCH Handbook, pregnant women who had maintained diaries during pregnancy were found to be more health-conscious.\textsuperscript{26} However, it remains unclear whether the self-recording sections is also used in term of disaster preparedness.

Thus, this study investigated the rate of usage of each function of the MCH Handbook. It also studied the association between the knowledge of disaster preparedness and utilization of the self-recording sections of the MCH Handbook in a suburban Japanese city located far from the sea and have experienced few disasters.

2. Methods

2.1 Design

This was a cross-sectional study conducted at four maternity facilities with labor and delivery rooms in Maebashi, Gunma.

2.2 Study Site

The study site is located approximately 100 km northwest of Tokyo, and is the capital of Gunma Prefecture. Moreover, Maebashi City is the farthest capital city from the sea in Japan, which is located approximately 100 km from the coast of Japan. This study site was not covered by the Disaster Relief Law during the Great East Japan Earthquake (on March 11, 2011).\textsuperscript{27,28}

2.3 Participants

Study participants were recruited from four obstetric facilities providing labor and delivery services in a local city, after obtaining approval from the facilities’ directors. A total of 1,143 puerperium women were recruited from April 2018 to June 2019. Postpartum women in the hospital were given information about this study by staff at each facility. We excluded participants who were emergency cases. If they agreed to participate, they were provided with the self-administered questionnaire, including an explanation of the study’s aims before discharge. In the end, 1,009 puerperal women responded to the survey. Among them, 347 had incomplete data owing to which their responses were excluded from analysis; the final sample size was 662. (see Figure 1)

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{recruitment_process_profile.png}
\caption{Recruitment process and profile of the analyzed puerperal women}
\end{figure}

2.4 Ethical Considerations

This study was approved by the Epidemiologic Research Ethics Committee of the Gunma University Faculty of Medicine (Approval Number. 2017-221). Approval was also obtained from the director of each facility. The questionnaire included a statement assuring participants of the survey’s anonymity and informing them that submission was equivalent to providing consent. An additional statement explained that the
study had no relationship with medical services or their postnatal care.

2.5 Data Collection

The self-reporting questionnaire was distributed to postpartum participants who were hospitalized. They were then informed of the study’s aim and procedure. Participants submitted their responses in collection boxes provided at the obstetric facilities.

Data on demographic characteristics such as age, parity (primiparous, multiparous), as well as data of the MCH Handbook issue (before 14 weeks, after 15 weeks), and disaster preparedness knowledge were collected. Moreover, notably in Japan, there is a perinatal care custom called “Satogaeri bunben.”29-31 A mother returns to her parents’ house in late pregnancy, and receives support from her family members during the perinatal and postnatal periods.32 Thus, we also asked whether they used “Satogaeri bunben” or not. Additionally, the questions on the utilization of the MCH Handbook included whether participants used the self-recording sections in the MCH Handbook during pregnancy, shared the MCH Handbook with family, recorded their weight changes during pregnancy, recorded the development of the fetus, and read pregnancy related information provided in the handbook. Meanwhile, the questions on disaster preparedness knowledge were as follows: whether they knew the Disaster Emergency Dengon Dial 171, whether participants knew the cellular phone disaster message board, the evacuation site, a hazard map, hospitals or clinics that are available during disaster, back up of the MCH Handbook, and an evacuation bag. SPSS Version 26 (IBM, Armork, NY, USA) was used for the statistical computations, and the two-tailed level of significance was set at P < 0.05.

3. Results

The participants’ demographic characteristics are shown in Table 1. Their mean age was 31.18 years (SD = 4.749), with 44.7% (296/662) of the participants being primiparous and 55.3% (366/662) of them being multiparous. Moreover, 29.6% (196/662) of participants had no disaster experience and 70.4% (466/662) of them had one or more disaster experiences. The participants’ utilization of the MCH Handbook is shown in Table 2. Moreover, 78.1% (517/662) of participants recorded weight changes during pregnancy, 42.0% (278/662) used the self-recording sections in the MCH Handbook.
Handbook during pregnancy, 29.8% (197/662) shared their MCH Handbook with the family, 54.5% (361/662) recorded the development of their fetus in the MCH Handbook, and 66.6% (441/662) had read the information that pregnant women should know during pregnancy.

Table 3 shows the characteristics of the pregnant women who did and did not use the self-recording sections in the MCH Handbook. Fisher’s exact test showed that age (≤ 29 years/ ≥ 30 years) was significant in this context.

Table 4 shows participants’ knowledge of disaster preparedness based on whether they used the self-recording sections in the MCH Handbook or not. Moreover, 39.6% (262/662) of the participants knew the Disaster Emergency Dengon Dial 171, 64.0% (424/662) knew the disaster message board on their mobile phones, 58.9% (390/662) knew the evacuation site, 45.9% (304/662) knew the hazard map, and 19.9% (132/662) prepared an evacuation bag. Fisher’s exact test showed a significant difference in knowledge of disaster preparedness for Disaster Emergency Dengon Dial 171, 64.0% (424/662) knew the disaster message board on their mobile phones, 58.9% (390/662) knew the evacuation site, 45.9% (304/662) knew the hazard map, and 19.9% (132/662) prepared an evacuation bag.

Fisher’s exact test showed a significant difference in knowledge of disaster preparedness for Disaster Emergency Dengon Dial 171.
the cellular phone disaster message board, and the hazard map between the participants who used the self-recording sections and those who did not.

### Table 4  
Preparation before disaster among study participants who used or did not use the self-recording section in the MCH Handbook during pregnancy (N=662)

| Variables                                      | Total n=662 (%) | Utilization of self-recording section in the MCH Handbook during pregnancy | P-value* |
|------------------------------------------------|-----------------|--------------------------------------------------------------------------------|----------|
| Recognition of Disaster Emergency Dengon Dial 171 |                 | Yes n=278 (%) No n=384 (%)                                                   |          |
| Aware                                          | 262 (39.6)      | 127 (45.7) 135 (35.2)                                                        | 0.008**  |
| Unaware                                        | 400 (60.4)      | 151 (54.3) 249 (64.8)                                                         |          |
| Recognition of the cellular phone disaster message board |             | Yes n=278 (%) No n=384 (%)                                                   |          |
| Aware                                          | 424 (64.0)      | 197 (70.9) 227 (59.1)                                                         | 0.002**  |
| Unaware                                        | 238 (36.0)      | 81 (29.1) 157 (40.9)                                                          |          |
| Recognition of the evacuation site             |                 | Yes n=278 (%) No n=384 (%)                                                   |          |
| Aware                                          | 390 (58.9)      | 176 (63.3) 214 (55.7)                                                         | 0.055    |
| Unaware                                        | 272 (41.1)      | 102 (36.7) 170 (44.3)                                                         |          |
| A hazard map                                   |                 | Yes n=278 (%) No n=384 (%)                                                   |          |
| Aware                                          | 304 (45.9)      | 149 (53.6) 155 (40.4)                                                         | <0.001***|
| Unaware                                        | 358 (54.1)      | 129 (46.4) 229 (59.6)                                                         |          |
| Hospitals or clinics available during disaster  |                 | Yes n=278 (%) No n=384 (%)                                                   |          |
| Aware                                          | 39 (5.9)        | 15 (5.4) 24 (6.3)                                                             | 0.739    |
| Unaware                                        | 623 (94.1)      | 263 (94.6) 360 (93.8)                                                         |          |
| Electronic backup of the MCH Handbook          |                 | Yes n=278 (%) No n=384 (%)                                                   |          |
| They made a backup                             | 4 (0.6)         | 1 (0.4) 3 (0.8)                                                               | 0.643    |
| They did not make a backup                     | 658 (99.4)      | 277 (99.6) 381 (99.2)                                                         |          |
| Preparation of an evacuation bag               |                 | Yes n=278 (%) No n=384 (%)                                                   |          |
| They prepared one                              | 132 (19.9)      | 64 (23.0) 68 (17.7)                                                           | 0.095    |
| They did not prepare one                       | 530 (80.1)      | 214 (77.0) 316 (82.3)                                                         |          |

**P<0.01, ***P<0.001  
a : Mother and Child Health  
b : Fisher’s exact test

4. Discussion

This study primarily aimed to evaluate the function of the MCH Handbook during pregnancy. It found that recording weight changes during pregnancy was the most used function of the MCH Handbook. Excessive gestational weight gain is associated with complications in mothers and children. A study from Japan demonstrated that Japanese women tend to perceive themselves as overweight or obese even though their body mass index is underweight or within the normal range, and a previous systematic review suggested that pregnant Japanese women tried to achieve minimal gestational weight gain rather than appropriate weight gain. A previous qualitative study found that pregnant women sought information about weight gain, diet, and health during pregnancy from many sources. Taken together, pregnant women (especially Japanese pregnant women) might be concerned about weight gain during pregnancy.

Reading educational information for parents, including information that pregnant women should know, was the second most used feature of the MCH Handbook. Studies show that the MCH Handbook is an effective tool to improve pregnant women’s knowledge regarding maternal, newborn and child health. However, the information provided by the MCH Handbook does not cover any information related to disaster preparedness. For this reason, some local governments distribute leaflets regarding disaster information.

This study also aimed to assess the association between disaster preparedness knowledge and utilization of the self-recording sections of the MCH Handbook. Our findings demonstrated that the recognition of the Disaster Emergency Dengon Dial 171, the cellular phone disaster message board, and a hazard map among the participants was associated with use of the self-recording sections in the MCH Handbook during pregnancy. Further, a report from Japan demonstrated that pregnant women who used the self-reporting sections were more likely to display dental health behavior during pregnancy than those who did not use it. Taken together, these findings might be indicated that pregnant women who used the self-reporting sections of the MCH Handbook...
showed higher health behavior and consciousness, including disaster preparedness, than those who did not use these sections.\textsuperscript{41} Further research, including longitudinal and cohort studies, is needed to clarify the association between the usage of the self-reporting sections of the MCH Handbook and health behavior and consciousness, including disaster preparedness.

The limitations of this study are as follows. First, in this study, participants were recruited from just one local city in Japan. Therefore, the results of this study might not be generalizable to all pregnant women in Japan. However, this study is meaningful due to its evaluation of the situation of simple disaster preparedness awareness in the farthest capital city from the sea, in Japan. Further research is needed for the generalization of those results. Second, in this study, the participants were asked whether they used the self-recording sections or not but were not asked the frequency at which they did so and the amount of description. Thus, further research is required in this direction.

In conclusion, this study demonstrated the rate of usage of each function of the MCH Handbook. Pregnant women who used the self-recording sections in the MCH Handbook had disaster preparedness knowledge about the recognition of the Disaster Emergency Degen Dial 171, the cellular phone disaster message board, and a hazard map.

**Acknowledgments**

We thank all the participants and the participating facilities in Maebashi City, Gunma Prefecture.

**Declarations of interest:** The authors have no conflicts of interest to report.

**Funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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