




## Article

# Characteristics of Pregnant Women and New Mothers Identified as Being At-Risk for Child Maltreatment in Early Pregnancy

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**Abstract:** Pregnant women and new mothers who have risk factors of child maltreatment are “at high risk for future child maltreatment.” Early detection of them is crucial to prevent it. This community-based, retrospective, cross-sectional, observational study aimed to identify the characteristics of pregnant women, and those in their postpartum period, identified as at-risk cases for child maltreatment. We used data from the municipal pregnancy registration system in City A and analyzed 206 cases identified as “at-risk for child maltreatment” from 1 April 2017 to 31 March 2018. They were categorized into two groups: a pregnancy group (131 cases, 63.6%) and a postpartum group (75 cases, 36.4%). Logistic regression analysis revealed that women who reported having poor relationships with their parents and participated in the interview in their early stages of their pregnancy were less likely to be registered as at-risk cases for child maltreatment after delivery. The results suggest that public health nurses (PHNs) can conduct interviews with pregnant women during the early stages of pregnancy to prevent child maltreatment in community settings. Additionally, to ensure safe delivery and childrearing environments, PHNs need to assess the family support capacity of each registered case and provide assistance to those without parental support.

**Keywords:** child maltreatment; community-based study; early detection; family support; maternal mental health; prevention



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## 1. Introduction

Preventing child maltreatment is a global priority due to its repercussions for the children, including thwarted child development and lifelong impacts, such as physical and mental health in adulthood, cognitive and academic performance, reproductive health, and social functioning [1,2]. Child abuse and neglect are deeply rooted in family relationships and social determinants of health, including socioeconomic status, substance abuse, and environmental factors [3–6]. The literature reviews have shown that depressive disorders and aggressive parental behaviors are factors of child abuse [7,8]. Thus, several studies have focused on screening high-risk mothers for child maltreatment by assessing factors such as the mother's mental health condition [9], anxiety of childrearing [10], young age [11,12], and self-reported history of child maltreatment [13].

Additionally, child characteristics, parenting behaviors, large family size, and living without biological parents are associated with child maltreatment [14]. Family dysfunction that includes domestic violence, parental separation, or divorce is a potential risk factor of child maltreatment [15]. Furthermore, household substance use, criminality, family conflict or discord, separation from family, serious childhood illness or injury, unintended pregnancy, and artificial abortion are also associated [16,17]. Thus, the World Health Organization recommends supporting newborns and their parents in the early postpartum period [18]. The literature review showed the effect of parenting training for high-risk moth-

ers [19]. However, these studies did not adequately assess the risk of child maltreatment for all pregnant women in the community.

To prevent child maltreatment, Japan has developed multi-layered maternal and child healthcare systems. Each local government provides a maternal and child health handbook to all pregnant women, once they submit their pregnancy notification forms, when their pregnancy is confirmed [20]. Additionally, PHNs assess the parental risk factors for child maltreatment using checklists and the Edinburgh Postnatal Depression Scale (EPDS) during home visits to all newborns within four months after birth [21]. Furthermore, each local government conducts health checkups for all children at the age of 4 months, 18 months, and 3 years. Through periodic monitoring of mothers who report difficulty in childrearing at their babies' 4-month health checkups, PHNs prevented child maltreatment [22]. However, these systems have not adequately contributed to decreasing the total number of child maltreatment reports.

Despite the declining birthrate in Japan, the number of child maltreatment reports to Child Guidance Centers has been rapidly increasing. In 2000, when the Child Abuse Prevention Law was enacted, the number of consultations was 17,725; by 2020, it had increased tenfold to 193,780 [23]. Among the 73 child abuse deaths in 2019, 38.4% occurred at 0 months due to unexpected pregnancy, failure to undergo prenatal checkups, and poor parenting skills [24]. Thus, pregnancy support is needed early in pregnancy rather than in the postpartum period, as recommended by the WHO [18]. Hence, a community-based early detection approach, focusing on high-risk pregnant women and new mothers, is needed to decrease the prevalence of child maltreatment and provide more concentrated care for at-risk children.

In Japan, the national government has promoted the early detection of pregnant women and new mothers at high risk for future child maltreatment since 2009 [25]. As part of their routine practices, PHNs identify pregnant women who demonstrate that they are at high risk for future child maltreatment and those who have (or are likely to have) special needs in the prenatal period, postpartum period, or later; these women are registered as "*tokutei ninpu*". *Tokutei* means "requiring help", and *ninpu* means "pregnant women". PHNs develop a care plan for each case and provide continuous care until the child is 18 years of age. Each municipal government has a regional council that monitors all registered cases and their care progress monthly [25].

Additionally, some mothers are detected as high-risk for child maltreatment during or after the postpartum period. PHNs register these cases as "*yoshien jido and families*" (*yoshien jido*) [26] and continue to support them [21,22]. *Yoshien* means requiring the support of PHNs during the postpartum period, and *jido* means child in Japanese. Although all local governments conduct this registration, the detection systems for *tokutei ninpu* and *yoshien jido* vary. To the best of our knowledge, evidence is lacking to reveal the differences between the early registered pregnant women and mothers registered after the postpartum period. For early detection of mothers at-risk for child maltreatment, and requiring support from PHNs, identifying these differences is necessary and would help provide more effective and focused care. Thus, this study aimed to identify the different characteristics among early registered pregnant women and new mothers, after the postpartum period, who were registered as at-risk cases for child maltreatment. We hypothesized that family relationships will play a crucial role in an increased risk for child maltreatment.

## 2. Materials and Methods

### 2.1. Study Design and Participants

The participants of this retrospective, cross-sectional, observational study were registered in City A as "*tokutei ninpu*" and "*yoshien jido*". The population of City A was approximately 570,000, and the youth population (under 15 years old) was 10.3% in the included residential area within the Tokyo metropolis. The total number of births was approximately 4600. Since 2013, the author has conducted surveys of *tokutei ninpu* and *yoshien jido* and has supported the development of the guidelines for supporting them in

City A. The author has collaborated with PHNs of City A for developing more effective early support systems for *tokutei ninpu* and *yoshien jido*. Since December 2015, PHNs and midwives in City A have interviewed all pregnant women when they received their maternal and child health handbooks upon submitting their pregnancy notification forms. Of the pregnant women, 98.2% were interviewed in 2018. Through the interview, PHNs and midwives identify *tokutei ninpu* and provide consultations, refer women to maternal and childcare services, and develop support plans for all pregnant women.

Additionally, before the 4-month health checkup, they conduct a home visit for all babies and their mothers. With the combination of the interview during submission of pregnancy notification forms, home visits, and daily practice, PHNs and midwives identify *yoshien families* who need continuing support from PHNs. The inclusion criteria for being registered as *tokutei ninpu* or *yoshien jido* are as follows: (1) being at-risk for child maltreatment or having history of it, (2) being unmarried or a single parent without family support, (3) reporting nonawareness of their pregnancy and lacking preparation for childbirth, (4) reporting the pregnancy as unexpected, (5) being a teenager, (6) having mental health problems or intellectual disability, (7) experiencing domestic violence, (8) having economic difficulties, (9) not receiving the Maternal and Child Health Handbook or having the first prenatal checkup after 4 months into their pregnancy, (10) having requested support by PHNs from medical institutions, (11) the baby with difficulty to raise, congenital disease, or disabilities, (12) having an unstable childrearing environment, or (13) not receiving health checkups for children [26]. The total number of registered cases was 206 from 1 April 2017 to 31 March 2018.

## 2.2. Data Collection and Measures

The PHNs in charge of maternal and child healthcare in City A registered the data of each case using a form developed, based on the report of the national government regarding child maltreatment death [22], and the previous research [21,22,26–28]. This study included four categories of variables: (1) maternal demographics: age, economic status, history of moving in and out from City A, having illness and disabilities (physical, mental, intellectual illness/disability), having a history of childhood abuse experiences, postnatal depression, having communication problems, preparation for delivery and childrearing, EPDS scores at neonatal home visit, difficulties with childrearing at 4-month health checkup; (2) family-related factors: cohabiting family, having family support, husband's (partner's) mental illness/disability, unstable family relationships, having health problems of the baby, status of baby's siblings (i.e., the number of siblings, history of abuse in siblings, support for the siblings by PHNs); (3) PHN's assessment: whether or not the interview at the notification of pregnancy contributed to the early detection of the case, having problems at the 32-week pregnancy follow-up by PHNs, having issues as reported in their case, purpose of PHN support; (4) use of maternal and child healthcare services. It was not possible to calculate the number of samples before taking the data.

## 2.3. Statistical Analysis

First, the study participants were categorized into two groups: the "pregnancy group," comprising women who were registered as requiring pregnancy support, and the "postpartum group," comprising women who were registered postpartum as high-risk for child maltreatment, or requiring postpartum support. Ordinal scale data (e.g., EPDS) were compared through the Mann–Whitney U-test. Classification scale data (e.g., presence or absence of physical disability) were compared using the chi-square test for independence. We used Fisher's exact test on a  $2 \times 2$  table.

Additionally, the adjusted standardized residuals were calculated after the chi-square test for independence. Since adjusted standardized residuals have a standard normal distribution, when this value reaches the positive rejection range, it is judged that the frequency of the group is high and vice versa. Furthermore, we conducted logistic regression analysis using independent variables that were significantly associated with the intergroup

differences in the bivariate analysis. Because the 32-week pregnancy follow-up by PHNs and economic status data could be co-dependent, we excluded the former variable. The other variables that were significantly associated with the intergroup differences in the bivariate analysis were included in the logistic regression analysis.

A *p*-value of less than 0.05 was considered to indicate a statistically significant intergroup difference. Statistical analysis was conducted using SPSS for Windows (version 25; IBM Corp, Armonk, NY, USA).

### 2.4. Ethical Approval

The Institutional Review Board of the primary researcher’s institute approved the study protocol (approval no. NIPH-IBRA#12319) in 2021. Thereafter, the Child and Family Department of City A provided the anonymous data of 206 cases. The study complied with the principles of the Declaration of Helsinki.

## 3. Results

### 3.1. Sample Characteristics

The 206 cases included 131 cases in the pregnancy group (63.6%) and 75 in the postpartum group (36.4%). Table 1 shows the characteristics of the two groups. Women in the pregnancy group were significantly younger (*p* = 0.003), had more economic difficulties (*p* < 0.001), history of childhood abuse experiences (*p* = 0.012), communication problems (*p* = 0.035), lack of awareness or knowledge of pregnancy (*p* = 0.001), and lack of preparation for delivery (*p* < 0.001) compared to the postpartum group. The postpartum group had significantly less instances of moving in and out (*p* = 0.016), fewer intellectual disabilities (*p* = 0.025), fewer cases of postnatal depression (*p* = 0.008), higher EPDS scores at the neonatal home visit (*p* = 0.023), and more difficulties with childrearing as of the 4-month health checkup (*p* = 0.008) than the pregnancy group.

**Table 1.** Maternal demographics and Family-related factors of the pregnancy group and the postpartum group (*N* = 206).

| Categories   | Variables                                | Items                                     | Pregnancy Group<br><i>n</i> = 131 |           | Postpartum Group<br><i>n</i> = 75 |        | <i>p</i> -Value |
|--|--|---|-----------------------------------|-----------|-----------------------------------|--------|-----------------|
|  |  |   | <i>n</i> (%)                      | ASR       | <i>n</i> (%)                      | ASR    |                 |
| Maternal demographics                                      | Economic status                          | No problem of economic status             | 57 (43.5)                         | −4.3      | 56 (74.7)                         | 4.3    | <0.001          |
|  |  | Having problem of economic status         | 74 (56.5)                         | 4.3       | 19 (25.3)                         | −4.3   |                 |
|  |  | Unstable employment/unemployed            | 20 (15.3)                         | 2.1       | 4 (5.3)                           | −2.1   | 0.041           |
|  |  | Stable employment                         | 111 (84.7)                        | −2.1      | 71 (94.7)                         | 2.1    |                 |
|  | History of moving in and out from City A | None                                      | 52 (39.7)                         | −2.9      | 44 (58.7)                         | 2.9    | 0.016           |
|  |  | Moving in City A                          | 26 (19.8)                         | 0.4       | 13 (17.3)                         | −0.4   |                 |
|  |  | Moving out from City A                    | 36 (27.5)                         | 2.1       | 11 (14.7)                         | −2.1   |                 |
|  |  | Moving in City A and then out from City A | 9 (6.9)                           | 1.8       | 1 (1.3)                           | −1.8   |                 |
|  | Having physical illness and disabilities | Yes                                       | 9 (6.9)                           | 0.0       | 5 (6.7)                           | 0.0    | 1.000           |
|  |  | No  | 120 (91.6)                        | 0.0       | 67 (89.3)                         | 0.0    |                 |
|  | History of childhood abuse experiences   | Yes                                       | 21 (16.0)                         | 2.6       | 3 (4.0)                           | −2.6   | 0.012           |
|  |  | No  | 110 (84.0)                        | −2.6      | 72 (96.0)                         | 2.6    |                 |
| Postnatal depression                                       | Yes                                      | 10 (7.6)                                  | −2.8                              | 16 (21.3) | 2.8                               | 0.008  |                 |
|  | No                                       | 121 (92.4)                                | 2.8                               | 59 (78.7) | −2.8                              |        |                 |
| Having communication problems                              | Yes                                      | 35 (26.7)                                 | 2.2                               | 10 (13.3) | −2.2                              | 0.035  |                 |
|  | No                                       | 96 (73.3)                                 | −2.2                              | 65 (86.7) | 2.2                               |        |                 |
| Preparation for delivery and childrearing                  | Lack of knowledge of pregnancy: Yes      | 19 (14.5)                                 | 3.1                               | 1 (1.3)   | −3.1                              | 0.001  |                 |
|  | Lack of knowledge of pregnancy: No       | 112 (85.5)                                | −3.1                              | 74 (98.7) | 3.1                               |        |                 |
|  | Lack of preparation for delivery: Yes    | 19 (14.5)                                 | 3.5                               | 0 (0)     | −3.5                              | <0.001 |                 |
|  | Lack of preparation for delivery: No     | 112 (85.5)                                | −3.5                              | 75 (100)  | 3.5                               |        |                 |
| Difficulties with childrearing at a 4-month health checkup | Yes                                      | 29 (22.1)                                 | −2.8                              | 36 (48.0) | 2.8                               | 0.008  |                 |
|  | No                                       | 57 (43.5)                                 | 1.6                               | 32 (42.7) | −1.6                              |        |                 |
|  | Unknown                                  | 13 (9.9)                                  | 2.0                               | 3 (4.0)   | −2.0                              |        |                 |

Table 1. Cont.

| Categories                         | Variables                                       | Items                                 | Pregnancy Group<br>n = 131 |           | Postpartum Group<br>n = 75 |       | p-Value |
|------------------------------------|---|---------------------------------------|----------------------------|-----------|----------------------------|-------|---------|
|                                    |   |                                       | n (%)                      | ASR       | n (%)                      | ASR   |         |
| Family-related factors             | Cohabiting Family                               | Husband: Yes                          | 82 (62.6)                  | −3.2      | 63 (84.0)                  | 3.2   | 0.001   |
|                                    |   | Husband: No                           | 49 (37.4)                  | 3.2       | 12 (16.0)                  | −3.2  |         |
|                                    |   | Partner: Yes                          | 13 (9.9)                   | 1.9       | 2 (2.7)                    | −1.9  | 0.091   |
|                                    |   | Partner: No                           | 118 (90.1)                 | −1.9      | 73 (97.3)                  | 1.9   |         |
|                                    |   | Older brother/sister of the baby: Yes | 49 (37.4)                  | 1.6       | 20 (26.7)                  | −1.6  | 0.127   |
|                                    | Older brother/sister of the baby: No            | 82 (62.6)                             | −1.6                       | 55 (73.3) | 1.6                        |       |         |
|                                    | Having family support                           | Yes                                   | 87 (66.4)                  | −1.4      | 57 (76.0)                  | 1.4   | 0.159   |
|                                    |   | No                                    | 44 (33.6)                  | 1.4       | 18 (24.0)                  | 1.4   |         |
|                                    |   | Poor relationship with parents: Yes   | 32 (24.4)                  | 2.7       | 7 (9.3)                    | −2.7  | 0.009   |
|                                    |   | Poor relationship with parents: No    | 99 (75.6)                  | −2.7      | 68 (90.7)                  | 2.7   |         |
|                                    | Unstable family relationships                   | Unstable marital status: Yes          | 12 (9.2)                   | 2.7       | 0 (0)                      | −2.7  | 0.004   |
|                                    |   | Unstable marital status: No           | 119 (90.8)                 | −2.7      | 75 (100)                   | 2.7   |         |
|                                    |   | No problem: Yes                       | 28 (21.4)                  | −3.4      | 33 (44.0)                  | 3.4   | 0.001   |
|                                    |   | No problem: No                        | 103 (78.6)                 | 3.4       | 42 (56.0)                  | −3.4  |         |
| Having health problems of the baby | Yes   | 6 (4.6)                               | 0.4                        | 3 (4.0)   | −0.4                       | 0.742 |         |
|                                    | No  | 100 (76.3)                            | −0.4                       | 68 (90.7) | 0.4                        |       |         |
| Status of the baby's siblings      | History of abuse in siblings: Yes               | 33 (25.2)                             | 2.2                        | 8 (10.7)  | −2.2                       | 0.037 |         |
|                                    | History of abuse in siblings: No                | 27 (20.6)                             | −2.2                       | 19 (25.3) | 2.2                        |       |         |
|                                    | Support for the siblings by PHNs: Yes           | 33 (25.2)                             | 1.6                        | 10 (13.3) | −1.6                       | 0.165 |         |
|                                    | Support for the siblings by PHNs: No            | 27 (20.6)                             | −1.6                       | 17 (22.7) | 1.6                        |       |         |
| Maternal demographics              | Age   | Mean (SD)                             | 29.3 (7.2)                 |           | 32.4 (6.0)                 |       | 0.003   |
|                                    | Mental illness/disability                       | Have                                  | 47 (35.9)                  |           | 20 (26.7)                  |       | 0.394   |
|                                    |   | Suspect                               | 8 (6.1)                    |           | 7 (9.3)                    |       |         |
|                                    |   | None                                  | 76 (58.0)                  |           | 45 (60.0)                  |       |         |
| Intellectual disability            | Have  | 5 (3.8)                               |                            | 0 (0)     |                            | 0.025 |         |
|                                    | Suspect   | 13 (9.9)                              |                            | 3 (4.0)   |                            |       |         |
|                                    | None  | 109 (83.2)                            |                            | 69 (92.0) |                            |       |         |
| EPDS score at neonatal home visit  | Mean (SD)                                       | 5.8 (5.3)                             |                            | 7.9 (6.3) |                            | 0.023 |         |
| Family-related factors             | Husband's (Partner's) mental illness/disability | Have                                  | 11 (8.4)                   |           | 2 (2.7)                    |       | 0.015   |
|                                    |   | Suspect                               | 5 (3.0)                    |           | 0 (0)                      |       |         |
|                                    |   | None                                  | 84 (64.1)                  |           | 59 (78.7)                  |       |         |
|                                    | Number of the siblings                          | None                                  | 73 (55.7)                  |           | 50 (66.7)                  |       | 0.137   |
| 1                                  |   | 32 (24.4)                             |                            | 16 (21.3) |                            |       |         |
| 2                                  |   | 15 (11.5)                             |                            | 4 (5.3)   |                            |       |         |
| More than 3                        |   | 5 (3.8)                               |                            | 3 (4.0)   |                            |       |         |

Notes: ASR: adjusted standardized residual, DV: domestic violence, SD: standard deviation. Mann–Whitney U-test. EPDS: Edinburgh Postnatal Depression Scale, SD: standard deviation.

Additionally, women in the postpartum group were significantly more likely to be cohabiting with their husbands ( $p = 0.001$ ), and there were fewer cases of unstable marital status ( $p = 0.004$ ) and history of abuse of the baby's siblings ( $p = 0.037$ ) than in the pregnancy group. Moreover, women in the pregnancy group were more likely to have poor relationships with their parents ( $p = 0.009$ ) and have a husband (partner) with mental illness/disability ( $p = 0.015$ ) than those in the postpartum group.

### 3.2. PHNs' Assessment of the Cases and Their Maternal and Child Healthcare Services Use

Table 2 shows the PHNs' assessment of the cases and their maternal and child healthcare service use. Among the pregnancy group, the interview at the notification of pregnancy contributed more significantly to the early detection of the pregnant cases than in the postpartum group ( $p < 0.001$ ). The postpartum group reported significantly fewer problems at the 32-week pregnancy follow-up by PHNs ( $p < 0.001$ ) and more anxiety of childrearing ( $p = 0.005$ ) than the pregnancy group. Additionally, regarding the purpose of support

by PHNs, assessment during pregnancy was significantly more necessary for ensuring a safe delivery environment ( $p < 0.001$ ), assessing the mother’s life and parenting skills ( $p < 0.001$ ), and establishing a support system for mothers to raise their children ( $p < 0.030$ ) than assessment during the postpartum period. However, the burden of childcare was significantly higher in the postpartum group than in the pregnancy group ( $p = 0.013$ ). Building credibility, improving parenting skills, and reducing childcare anxiety were not associated with the inter-group differences.

**Table 2.** PHNs’ assessment of the cases and their maternal and child healthcare services use ( $N = 206$ ).

| Categories   | Variables  | Items   | Pregnancy Group<br><i>n</i> = 131 |           | Postpartum Group<br><i>n</i> = 75 |       | <i>p</i> -Value |
|--|--|---|-----------------------------------|-----------|-----------------------------------|-------|-----------------|
|  |  |   | <i>n</i> (%)                      | ASR       | <i>n</i> (%)                      | ASR   |                 |
| PHNs’<br>assessment of<br>the cases                                    | Whether or not the interview at the notification of pregnancy contributed to early detection of the case | Yes   | 107 (81.7)                        | 5.4       | 33 (44.0)                         | −5.4  | <0.001          |
|  |  | No  | 22 (16.8)                         | −5.4      | 38 (50.7)                         | 5.4   |                 |
|  | Having problems at the 32-week pregnancy follow-up by PHNs   | Yes   | 70 (53.4)                         | 5.4       | 12 (16.0)                         | −5.4  | <0.001          |
|  |  | No  | 33 (25.2)                         | −4.2      | 41 (54.7)                         | 4.2   |                 |
|  |  | Unable to contact                                   | 9 (6.9)                           | −1.5      | 10 (13.3)                         | 1.5   |                 |
|  |  | Identification after 32 weeks of pregnancy          | 14 (10.7)                         | −0.5      | 10 (13.3)                         | 0.5   |                 |
|  | Issues related to the case   | Anxiety of childrearing: Yes                        | 32 (24.4)                         | −2.9      | 33 (44.0)                         | 2.9   | 0.005           |
|  |  | Anxiety of childrearing: No                         | 99 (75.6)                         | 2.9       | 42 (56.0)                         | −2.9  |                 |
|  |  | Lack of parenting skills: Yes                       | 40 (30.5)                         | 1.6       | 15 (20.0)                         | −1.6  | 0.105           |
|  |  | Lack of parenting skills: No                        | 91 (69.5)                         | −1.6      | 60 (80.0)                         | 1.6   |                 |
|  |  | Tendency of child maltreatment: Yes                 | 18 (13.7)                         | 1.2       | 6 (8.0)                           | −1.2  | 0.264           |
|  |  | Tendency of child maltreatment: No                  | 113 (86.3)                        | −1.2      | 69 (92.0)                         | 1.2   |                 |
|  | Purpose of PHN support   | Building credibility: Yes                           | 105 (80.2)                        | 0.9       | 56 (74.7)                         | −0.9  | 0.384           |
|  |  | Building credibility: No                            | 26 (19.8)                         | −0.9      | 19 (25.3)                         | 0.9   |                 |
|  |  | Ensuring a safe delivery environment: Yes           | 69 (52.7)                         | 6.8       | 4 (5.3)                           | −6.8  | <0.001          |
|  |  | Ensuring a safe delivery environment: No            | 62 (47.3)                         | −6.8      | 71 (94.7)                         | 6.8   |                 |
|  |  | Assessing the case’s life and parenting skills: Yes | 89 (67.9)                         | 4.1       | 29 (38.7)                         | −4.1  | <0.001          |
|  |  | Assessing the case’s life and parenting skills: No  | 42 (32.1)                         | −4.1      | 46 (61.3)                         | 4.1   |                 |
|  |  | Improving parenting skills: Yes                     | 51 (38.9)                         | 0.8       | 25 (33.3)                         | −0.8  | 0.456           |
|  |  | Improving parenting skills: No                      | 80 (61.1)                         | −0.8      | 50 (66.7)                         | 0.8   |                 |
| Reducing childcare anxiety: Yes  |  | 66 (50.4)   | −1.5                              | 46 (61.3) | 1.5                               | 0.147 |                 |
| Reducing childcare anxiety: No   |  | 65 (49.6)   | 1.5                               | 29 (38.7) | −1.5                              |       |                 |
| Reducing the burden of childcare: Yes                                  |  | 67 (51.1)   | −2.5                              | 52 (69.3) | 2.5                               | 0.013 |                 |
| Reducing the burden of childcare: No                                   |  | 64 (48.9)   | 2.5                               | 23 (30.7) | −2.5                              |       |                 |
| Establishing a support system for mothers to raise their children: Yes | 66 (50.4)  | 2.2   | 26 (34.7)                         | −2.2      | 0.030                             |       |                 |
| Establishing a support system for mothers to raise their children: No  | 65 (49.6)  | −2.2  | 49 (65.3)                         | 2.2       |                                   |       |                 |

Table 2. Cont.

| Categories                                    | Variables                              | Items                               | Pregnancy Group<br>n = 131 |      | Postpartum Group<br>n = 75 |      | p-Value |
|---|--|-------------------------------------|----------------------------|------|----------------------------|------|---------|
|   |  |                                     | n (%)                      | ASR  | n (%)                      | ASR  |         |
| Use of maternal and child healthcare services | Maternal and child healthcare services | Used                                | 70 (53.4)                  | -2.6 | 54 (72.0)                  | 2.6  | 0.012   |
|   |  | Not used                            | 61 (46.6)                  | 2.6  | 21 (28.0)                  | -2.6 |         |
|   |  | Prenatal and postnatal helpers: Yes | 12 (9.2)                   | 0.3  | 6 (8.0)                    | -0.3 | 1.000   |
|   |  | Prenatal and postnatal helpers: No  | 119 (90.8)                 | -0.3 | 69 (92.0)                  | 0.3  |         |
|   |  | Postpartum short stay services: Yes | 6 (4.6)                    | 0.7  | 2 (2.7)                    | -0.7 | 0.713   |
|   |  | Postpartum short stay services: No  | 125 (95.4)                 | -0.7 | 73 (97.3)                  | 0.7  |         |
|   |  | Postpartum daycare services: Yes    | 5 (3.8)                    | -2.8 | 11 (14.7)                  | 2.8  | 0.012   |
|   |  | Postpartum daycare services: No     | 126 (96.2)                 | 2.8  | 64 (85.3)                  | -2.8 |         |
|   |  | Mental health consultations: Yes    | 4 (3.1)                    | -3.1 | 11 (14.7)                  | 3.1  | 0.004   |
|   |  | Mental health consultations: No     | 127 (96.9)                 | 3.1  | 64 (85.3)                  | -3.1 |         |
|   |  | Parent-child meetings: Yes          | 7 (5.3)                    | -2.3 | 11 (14.7)                  | 2.3  | 0.037   |
|   |  | Parent-child meetings: No           | 124 (94.7)                 | 2.3  | 64 (85.3)                  | -2.3 |         |
|   |  | Child short stay services: Yes      | 6 (4.6)                    | 0.2  | 3 (4.0)                    | -0.2 | 1.000   |
|   |  | Child short stay services: No       | 125 (95.4)                 | -0.2 | 72 (96.0)                  | 0.2  |         |

Notes: Chi-square test. ASR: adjusted standardized residual. PHNs: public health nurses.

Regarding maternal and child healthcare services, the pregnancy group used significantly fewer services than the postpartum group ( $p = 0.012$ ). The postpartum group was associated with significantly more postpartum daycare services ( $p = 0.012$ ), mental health consultations ( $p = 0.004$ ), and parent-child meetings ( $p = 0.037$ ) than the pregnancy group. In contrast, prenatal and postnatal helpers, postpartum short stay services, and child short stay services were not the inter-group differences.

### 3.3. Variables Associated with Differences in High-Risk Cases of Child Maltreatment

Table 3 shows the variables associated with early registration as high-risk cases of child maltreatment.

Table 3. Variables associated with early registration as high-risk cases of child maltreatment (N = 206).

| Categories                    | Variables  | Items             | OR    | 95% CI      | p-Value |
|-------------------------------|--|-------------------|-------|-------------|---------|
| Maternal demographics         | Economic status: no problems   | Yes<br>(ref = No) | 3.269 | 1.274–8.384 | 0.014   |
| Family-related factors        | Poor relationship with the parents   | Yes<br>(Ref = No) | 0.143 | 0.033–0.614 | 0.009   |
| PHNs' assessment of the cases | Whether or not the interview at the notification of pregnancy contributed to early detection of the case | Yes<br>(Ref = No) | 0.231 | 0.087–0.616 | 0.003   |
|                               | Ensuring a safe delivery environment   | Yes<br>(Ref = No) | 0.056 | 0.012–0.263 | <0.001  |

Notes: Logistic regression analysis. Nagelkerke  $R^2 = 0.552$ , Hosmer–Lemeshow Test = 0.985 (chi-square = 1.422, df = 7). PHNs: public health nurses, Ref: reference. Dependent variable used in this model was as follows: the women who were registered as requiring pregnancy support = 0, and the women who were registered postpartum and as high-risk for child maltreatment = 1.

Cases with no economic problems were more likely to be registered during the postpartum period ( $p = 0.014$ ). In contrast, women who had poor relationships with their parents ( $p = 0.009$ ), those who participated in the interview at the notification of pregnancy

( $p = 0.003$ ), and those needing an assured safe delivery environment ( $p < 0.001$ ) were less likely to be registered after delivery.

#### 4. Discussion

This cross-sectional study revealed that participating in the interview at the notification of pregnancy, leading to the early detection of the case, was associated with being registered as an at-risk case for child maltreatment during the early pregnancy period. The national government has promoted the early detection of *tokutei ninpu* since 2009 [25]. PHNs who used the national guideline for child maltreatment prevention improved their competencies for identifying, and supporting, at-risk cases [29]. The characteristic social problems of pregnant women at risk were being unmarried, having anxiety, an unplanned pregnancy, and economic difficulties [17,30]. Additionally, a previous cohort study, using pregnancy notification forms, showed that being unmarried, having a history of artificial abortion, and smoking during pregnancy were risk factors of child maltreatment. The local government provided a home visiting program for these high-risk pregnant women to improve their birth outcomes [31]. However, previous studies have not examined the effect of conducting interviews with all pregnant women at the time of registering their pregnancy and receiving maternal and child health handbooks. To prevent child maltreatment, and for early detection of pregnant women who need exceptional support from PHNs, we would recommend that PHNs need to conduct interviews with all pregnant women during early pregnancy as a community-based approach, even though it is beyond the WHO recommendation [18].

We found that having a poor relationship with the parents, and requiring assurance of a safe delivery environment, were both less likely to be registered as high-risk for child maltreatment after delivery. In Japan, traditionally, the child's grandparents provide perinatal and postnatal support for women, who commonly return to their parents' house in the last months of pregnancy. This family support promotes the acquiring of parenting skills and reduces the mother's anxiety of childrearing [28,32]. In particular, support from their biological mothers reduces the expectant mothers' psychosocial problems and the need for multidisciplinary perinatal support [33]. Thus, in Japan, family support is crucial to safe delivery and childrearing for new mothers. However, the age of marriage and childbirth is rising in Japan [34], and the parents' generation is also getting older. Grandmothers who are less than 60 years old are likely to feel the burden of providing perinatal and postnatal support for their daughters [28]. Thus, the findings suggest that PHNs can identify pregnant women who lack family support through the interview of their early pregnancy as a potential strategy of preventing child maltreatment. Additionally, only 26.2% of local governments provided postpartum care services in 2018 due to difficulties in securing sufficient budget and staff [35]. Therefore, it is possible that PHNs need to develop postpartum care services by cooperating with neighboring local governments to ensure safe delivery and a childrearing environment.

We found that the postpartum group had significantly fewer economic problems than the pregnancy group. Poverty and unemployment are strongly associated with child maltreatment [3] and negatively impacted the person's life course [36]. Thus, pregnant women and mothers with low socioeconomic status were at higher priority for receiving support to prevent child maltreatment. However, pregnant women and mothers without economic difficulties were not adequately supported by the PHNs. Thus, the findings suggest that PHNs need to pay more attention to new mothers, without financial problems, who are also eligible for their support in preventing child maltreatment.

##### 4.1. Limitations and Future Research

This study has some limitations. First, the study sample was small and only included one city in Tokyo. Therefore, we could not conduct a power analysis. Additionally, this study was a retrospective, cross-sectional, observational study. Furthermore, the assessment items in the pregnancy notification forms were specifically designed for City



A and were not standardized for all municipalities in Japan. Thus, we cannot generalize our findings to other communities. Second, having a poor relationship with the parents was associated with being registered as high-risk for child maltreatment during pregnancy. However, this variable would be related to the inclusion criteria, registered as *tokutei ninpu* or *yoshien jido*, such as unmarried or a single parent without family support. Thus, we need to conduct a cohort study and confirm the causal relationships between child maltreatment and pregnant women with poor relationships with their parents. Third, due to insufficient data regarding the trimester of pregnancy, time since birth, and the kind of mental illness and mental health condition of the participants, measured by professional psychological methods (e.g., General Health Questionnaire), we could not identify related factors of at-risk cases for child maltreatment.

In the future, pregnancy notification forms, with evidence-based assessment items, should be developed, and a nationwide survey should be conducted to identify the characteristics of early registered pregnant women and mothers registered during or after the postpartum period as high-risk cases for child maltreatment.

#### 4.2. Recommendation for the Practice

Under the COVID-19 pandemic situation, reducing direct maternal and child health-care services would increase the risk of child abuse and neglect [37,38]. PHNs felt difficulties in the early detection of child maltreatment in the community [39]. However, our finding suggested that PHNs can assess all pregnant women during the early stages of pregnancy to screen high-risk pregnant women in the community setting. PHNs would use web conferencing systems and mobile apps to meet all pregnant women while reducing the infection risk of COVID-19.

### 5. Conclusions

This cross-sectional study found that women who have poor relationships with their parents, those who participated in the interview at the notification of pregnancy, leading to early detection of the case, and those requiring the assurance of a safe delivery care system were less likely to be registered as at-risk cases for child maltreatment after delivery. The results suggested that an effective community-based approach to prevent child maltreatment requires that PHNs conduct interviews with all pregnant women during the early stages of pregnancy. Additionally, the findings suggest that PHNs need to assess each pregnant woman's family support capacity and provide additional support, to pregnant women without prenatal support, to ensure safe delivery and childrearing environment.

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**Informed Consent Statement:** Not applicable, since the data belongs to City A and permission has been obtained from the directors of the child and home care division and the legal department of City A. The Act on the Protection of Personal Information in Japan states that it is unnecessary to obtain informed consent in each case for studies using public health data for promoting public health or when it is difficult to obtain each individual's consent. These conditions for waiving informed consent requirements apply to this study and article. Thus, it was not necessary to obtain informed consent for each individual case.

**Data Availability Statement:** To protect the privacy of research participants, the data of this study are not available to share with other researchers.

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