ORIGINAL RESEARCH

Impact of altered gestational weight gain guidelines on midwives in Japan: A cross-sectional study

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Received: March 5, 2024 **Accepted:** April 8, 2024 **Online Published:** April 25, 2024
DOI: 10.5430/jnep.v14n8p22 **URL:** https://doi.org/10.5430/jnep.v14n8p22

ABSTRACT

Objective: In March 2021, modifications were made to the dietary guidelines for expectant and nursing mothers in Japan, resulting in an increased recommended gestational weight gain (GWG) based on the pre-pregnancy body mass index. However, the existing landscape of midwives' health-guidance practices remains unexplored. This study aimed to elucidate the situation and perceptions of the revised GWG guidelines among midwives in Japan.

Methods: This cross-sectional study, conducted between January and March 2023, targeted midwives employed across primary, secondary, and tertiary hospitals in Japan. The participants completed a web-based questionnaire via a QR code and provided responses. Descriptive analysis was employed to discern the midwives' perceptions of the revised GWG guidelines.

Results: A total of 160 midwives (24.2%) completed the web-based questionnaire and were included in the analysis. Of them, 117 (73.1%) knew the recommended GWG had been adjusted. A significant difference was observed in the self-evaluation of health guidance before and after the guideline change (p = .015). While 47.9% of the midwives viewed the guideline change positively, 50.4% considered it neither good nor detrimental. The reasons for this positive perspective included the perceived stringency of previous standards and concerns about the potential effects of strict weight guidance on the physical and mental health of both mothers and children. Those with a neutral stance gave the following reasons: 1) uncertainties about the post-change impact and 2) concerns regarding potential health implications for pregnant women gaining excessive weight.

Conclusions: Because not all midwives were aware of the guideline adjustments, the new guidelines must be prioritized.

Key Words: Gestational weight gain, Guideline, Midwife, Perception, Japan

1. INTRODUCTION

Appropriate gestational weight gain (GWG) is important in maternal and fetal health. Increasing the number of underweight pre-pregnancy women and women with inadequate GWG increases the incidence of low birth weight (LBW) neonates in Japan. Approximately 20.7% of 20–29-year-old women in Japan are reportedly underweight;[1] the prevalence of LBW neonates is 8.1%, which is almost the same as that in developing countries, and the average birth weight is approximately 180 g lower than it was 45 years ago.[2] Although Japan has one of the lowest perinatal mortality rates (2.2 deaths per 1,000 live births in 2022),[3] an increase in LBW neonates and a decrease in average birth weight might have long-term negative effects.

In Japan, strict weight control guidance has been given to pregnant women by medical professionals based on the idea of "giving birth small and growing it big," to prevent hypertensive disorders of pregnancy. The Japan Society of Obstetrics and Gynecology recommended that women whose body mass index (BMI) was 18.0 kg/m^2 $\leq$ BMI $\leq$ 24.0 kg/m^2 gain 7–10 kg of weight during pregnancy.[4] Whereas the Ministry

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of Health, Labour and Welfare recommended that women whose BMI was 18.5 kg/m^2 $\leq$ BMI < 25.0 kg/m^2 gain 7–12 kg of weight during pregnancy.[5] However, malnutrition and growth restriction during fetal and early childhood are considered risk factors for non-communicable diseases such as ischemic heart disease, stroke, hypertension, type 2 diabetes mellitus, osteoporosis, malignant tumors, and mental disorders,[6–8] and the idea that the "health and nutritional status of the fetus immediately after birth influences health as an adult" (DOHaD hypothesis) is becoming widespread.[9] With such a social background, the Ministry of Health, Labour and Welfare in Japan changed the "Dietary guidelines for expectant and nursing mothers" to the "Dietary guidelines for expectant and nursing women starting before pregnancy: Creating a healthy body before pregnancy" in March 2021.[10] In this change, the recommended GWG was increased from "9–12 kg" to "12–15 kg" for underweight (BMI < 18.5 kg/m^2) women, from "7–12 kg" to "10–13 kg" for normal weight (18.5 kg/m^2 $\leq$ BMI < 25.0 kg/m^2) women, "individual correspondence" to "7–10 kg" for overweight (25.0 kg/m^2 $\leq$ BMI < 30.0 kg/m^2) women, and "individual correspondence" to "individual correspondence; up to 5 kg" for women with obesity (30.0 kg/m^2 $\leq$ BMI).[11]

As a result of this change, midwives had to change their policy from the previous health guidance in clinical settings, which might have caused confusion because healthcare providers such as midwives believed that GWG should be kept at a minimum.[12] However, no research has been reported on how midwives, who have given strict weight control guidance to pregnant women, feel about the changes in guidelines for GWG guidance and how their health guidance has changed. Understanding these factors will provide necessary suggestions for weight control guidance to pregnant women in the future.

This study aimed to elucidate the situation and perceptions regarding the revised GWG guidelines among midwives in Japan. It is important to understand whether there have been any changes in midwives' guidance on weight control and whether health guidance is being provided based on the new guidelines after the GWG guidelines were changed. This study is the first to investigate midwives' perceptions regarding the revised GWG guidelines in Japan. This will help resolve emaciation in women, reduce the rate of LBW neonates, and lower the incidence of lifestyle-related diseases.

2. METHODS

2.1 Study design and population

This cross-sectional study was conducted in Japan between December 2022 and March 2023. Eligible participants were midwives working in hospitals dealing with childbirth in Japan. First, the list of primary, secondary, or tertiary hospitals dealing with childbirth was made by referring to the website of *Shusanki Iryo no Hiroba* (`https://shusanki.org/area.html`), and 100 facilities were randomly selected from the list. The letters and explanatory documents for this study were sent to the directors of nursing by post. The directors of nursing who agreed to participate in this study sent written informed consent forms and documents with information about the number of midwives who worked at their hospital. Next, the researchers sent explanatory documents of the study with QR codes to access the web-based questionnaire to the midwives.

Because the acceptance rate of research participation was low, an additional 50 secondary and tertiary hospitals were randomly selected from the list of hospitals, and letters and explanatory documents of the study were sent to the directors of nursing by post.

2.2 Data collection

Data were collected using a web-based questionnaire. Participant characteristics such as age, educational attainment (vocational school, non-degree course or special course of junior college, university, non-degree course or special university course, or graduate school), duration of working experience as a midwife, duration of clinical experience (including as a nurse), medical facility of work (tertiary, secondary, primary, or clinic), and experience teaching midwifery students were asked. The questions about the knowledge of GWG, situation of weight control guidance, self-evaluation of health guidance, and awareness of changes in recommended GWG guidelines were asked as follows: "Did you know the recommended amount of GWG has been changed?" (yes or no), "Who provides health guidance to pregnant women regarding weight control?" (multiple choice: midwife, dietician, medical doctor, nobody, and others), "How do you provide health guidance to pregnant women regarding weight control?" (multiple choice: individual guidance at antenatal clinic, group guidance at mother's class or parents' class, nutrition guidance class, watching video, and others), self-evaluation of health guidance before and after changing the recommended amount of GWG (teaching a little strictly, not either, teaching not very strictly, teaching not strictly at all, and no guidance about weight control), and "What do you think about the change in guidelines?" ("It was good to be changed," "I wish it had not been changed," not either).

2.3 Statistical analysis

Descriptive statistics were used; categorical data are shown as n (%), and continuous variables are shown as means and

standard deviations. The chi-squared test for categorical data and Student's t-test for continuous variables were used to compare the values between the groups, knowing that the recommended amount of GWG had been changed and without the knowledge, as well as before and after changing the recommended amount of GWG regarding self-evaluation of health guidance. All data were analyzed using IBM SPSS Statistics 25.0 for Windows (IBM Corp., Armonk, NY, USA), and all two-tailed p values < .05 (two tails) were considered statistically significant.

2.4 Ethical consideration

This study was approved by the Research Ethics Committee of the School of Nursing at Dokkyo Medical University, Tochigi, Japan (No. Nursing 14). Participation was voluntary, and before answering the web-based questionnaire, participants who agreed to participate in this study ticked a blank box of agreement and provided consent electronically. The questionnaire was anonymous, and participants' identifying information, such as their home address or date of birth, was not required. After completing the questionnaire, participants who wanted the voucher accessed the page for the application, and for several days, they received a small gift certificate by e-mail as compensation for their participation.

3. Results

Of the 100 medical facilities where letters were sent first, 19 (19.0%), including 261 midwives, agreed to participate in this study. Of the additional 50 hospitals, 17 facilities (34.0%), including 401 midwives, agreed to participate. A total of 662 midwives were provided with explanatory documents for the study with QR codes to access the web-based questionnaire. Of these, 160 (24.2%) midwives completed a web-based questionnaire and were included in the analysis.

Table 1 shows the characteristics of the participants. The mean participant age was 37.5 ± 9.7 years; 55 (34.4%) graduated from vocational school, and 62 (38.8%) worked at tertiary care hospitals. The mean duration of working experience as a midwife was 156.2 ± 109.0 months. Only 117 (73.1%) knew that the recommended amount of GWG had changed, and 43 (26.9%) did not.

Table 1. Characteristics of participants (n = 160)

	All		Did you know the recommended amount of gestational weight gain has been changed?				p
			Yes (n = 117, 73.1%)		No (n = 43, 26.9%)		
	Mean ± SD or n (%)		Mean ± SD or n (%)		Mean ± SD or n (%)		
Age (years)	37.5 ± 9.7		37.3 ± 9.7		38.1 ± 9.7		.665
< 29	47	(29.4)	33	(70.2)	14	(29.8)	.299*
30-39	44	(27.5)	36	(81.8)	8	(18.2)	
40-49	38	(23.8)	24	(63.2)	14	(36.8)	
⩾ 50	22	(13.8)	16	(72.7)	6	(27.3)	
Missing	9	(5.6)					
Educational attainment							.946*
Vocational school	55	(34.4)	40	(72.7)	15	(27.3)	
Non-degree course or special course of junior college	25	(15.6)	17	(68.0)	8	(32.0)	
University	44	(27.5)	34	(77.3)	10	(22.7)	
Non-degree course or special university course	22	(13.8)	16	(72.7)	6	(27.3)	
Graduate school	14	(8.7)	10	(71.4)	4	(28.6)	
Medical facility of work							.367*
Tertiary care hospital	62	(38.8)	44	(71.0)	18	(29.0)	
Secondary care hospital	53	(33.1)	36	(67.9)	17	(32.1)	
Primary care hospital	35	(21.9)	28	(80.0)	7	(20.0)	
Clinic	10	(6.2)	9	(90.0)	1	(10.0)	
Duration of working experience as midwife (months)	156.2 ± 109.0		156.9 ± 109.9		154.4 ± 107.7		.898
Duration of clinical experience (months)	172.5 ± 111.7		170.0 ± 111.4		179.2 ± 113.8		.647
Experience in providing health guidance at antenatal clinic							.435
Yes	146	(91.3)	108	(74.0)	38	(26.0)	
No	14	(8.8)	9	(64.3)	5	(35.7)	
Experience teaching midwifery students							.677*
Yes	119	(74.4)	86	(72.3)	33	(27.7)	
No	41	(25.6)	31	(75.6)	10	(24.4)	

*: Chi-square test

Table 2 presents the weight control guidance at medical facilities. Midwives provided health education to pregnant women in almost all facilities (93.1%), followed by medical doctors (55.6%) and dietitians (48.1%). Health guidance regarding weight control was provided as individual instructions at the antenatal clinic (98.1%), followed by group guidance in the mothers or parents classes (45.0%).

Table 3 presents the self-evaluation of health guidance before and after changing the recommended GWG guidelines. Before changing the guidelines of the recommended GWG, 29 (24.8%) midwives thought their health guidance about weight control was a little strict, 46 (39.3%) thought their guidance was neither strict nor not strict, 37 (31.6%) thought their guidance was not so strict, and 4 (3.4%) thought their guidance was not strict at all. After changing the recommended GWG guidelines, 10 (8.5%) midwives thought their health guidance on weight control was slightly strict, 58 (49.6%) thought their guidance was neither strict nor not strict, 44 (37.6%) thought their guidance was not strict, and 5 (4.3%) thought their guidance was not strict at all. A significant difference was observed before and after the guidelines were changed (p = .015).

Table 2. Weight control guidance at medical facilities (n = 160)

	n	(%)
Who provides health guidance to pregnant women regarding weight control? (Multiple choice)		
Midwife	149	(93.1)
Dietician	77	(48.1)
Medical doctor	89	(55.6)
Nobody	1	(0.6)
Others	4	(2.5)
How do you provide health guidance to pregnant women regarding weight control? (Multiple choice)		
Individual guidance at antenatal clinic	157	(98.1)
Group guidance at mother's class or parents' class	72	(45.0)
Nutrition guidance class	44	(27.5)
Watching video	20	(12.5)
Others	2	(1.3)

Table 3. Self-evaluation of health guidance before and after changing the recommended gestational weight gain guidelines (n = 117)

		Self-evaluation of health guidance										p
		A little strict		Neither strict nor not strict		Not so strict		Not strict at all		No guidance about weight control		
	n	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
Before change	117	29	(24.8)	46	(39.3)	37	(31.6)	4	(3.4)	1	(0.9)	.015
After change	117	10	(8.5)	58	(49.6)	44	(37.6)	5	(4.3)	0	(0.0)	

Note. Chi-square test

Table 4 shows the relationship between the perception of change in the recommended GWG and self-evaluation of health guidance. Almost half of midwives thought (n = 56, 47.9%) the change in guidelines was good, whereas 59 (50.4%) thought the change in guidelines was neither good nor bad. Only two (1.7%) thought the guideline should have not been changed. Between these three groups, there was no significant difference in self-evaluation of health guidance.

Table 5 shows the participants' perceptions of the change in guidelines. Three categories could be identified as the reasons why it was good to change the guidelines: 1) perceived stringency of previous standards, 2) concerns about the potential effects of strict weight guidance on the physical and mental health of both mothers and children, and 3) the perception that it became easier to teach about weight control.

Four categories could be identified as the reasons why they thought it was good or bad to change the guidelines: 1) uncertainties about the post-change impact, 2) the content of the health guidance remains the same, 3) both midwives and pregnant women do not comply with the guidelines, and 4) concerns regarding potential health implications for pregnant women gaining excessive weight.

Table 4. Relationship between perception of change in recommended gestational weight gain (GWG) and self-evaluation of health guidance (n = 117)

		Self-evaluation of health guidance after changing in recommended GWG								*p*
		A little strict		Neither strict nor not strict		Not very strict		Not strict at all		
		n	%	n	%	n	%	n	%	
Perception of change in recommended GWG.										.857
The change in guidelines was good.	(n = 56, 47.9%)	4	7.1	28	50.0	22	39.3	2	3.6	
The guideline should have not been changed.	(n = 2, 1.7%)	0	0.0	2	100.0	0	0.0	0	0.0	
The change in guidelines was neither good nor bad.	(n = 59, 50.4%)	6	10.2	28	47.4	22	37.3	3	5.1	

Note. Chi-square test. GWG: gestational weight gain.

Table 5. Participants' perception towards the change in guidelines

The change in guidelines was good	
Category of reason	Responses (Free answer)
Perceived stringency of previous standards	I have always felt that the previous standards were a bit strict for women with a normal or thin physique. I had been wondering if it really needed to be managed gestational weight gain (GWG) so strictly in the first place. I did not think it was necessary to limit the weight so extremely.
	There were some cases that pregnant women were not getting enough nutrition because they were worried about weight gain. I have felt that many pregnant women received strict guidance and restricted diet excessively.
Concerns about the potential effects of strict weight guidance on the physical and mental health of both mother and child	For some pregnant women, receiving weight control guidance was stressful and they worked hard excessively to lose their weight. I thought the strict weight control guidance would cause stress and affect childbirth badly. The increased recommended GWG for pregnant women has alleviated some of the mental pressure. Because there are many pregnant women with obesity, if weight control guidance is too strict, the motivation of pregnant women would decrease.
	It may help prevent fetal growth retardation. Being thin and having little weight gain can lead to the childbirth of a low-birth-weight baby. It is possible to provide weight control guidance that suits the times when the number of low-birth-weight babies is increasing.
Perception that it became easier to teach about weight control	The guideline became easier to understand and explanation about weight control was getting easier. Weight control guidance for thin pregnant women has become easier.
The guideline should have not been changed.	
Weight gain at each health checkup is more important	The final weight goal is important, but I think it's more important to see how much weight you gain in a short period of time at each health checkup.
The amount of increase is too large and standards became too lax	I feel the guidelines of recommended GWG have become a little looser.
The change in guidelines was neither good nor bad.	
Uncertainties about the post-change impact	I don't see any benefit from the change so far. I don't know how pregnant women and babies affected before and after being changed the guideline.
The content of the health guidance remains the same	There is no big difference in the contents of the weight control guidance. The direction of health guidance has not been changed much.
Both midwives and pregnant women do not comply with the guidelines	Though there are standards, weight control guidance is adjusted individually. It doesn't make sense because pregnant women often can't comply even if we give them weight control guidance.
Concerns regarding potential health implications for pregnant women gaining excessive weight	The current standard is fine for thin pregnant women, but it is a little loose standard for pregnant women whose weight are increasing. I think it is too much for overweight pregnant women to increase 10 kg during pregnancy. I think it would be good for women with normal body mass index to be able to keep their weight gain at around 10 kg.
	I'm worried about the change in the recommended GWG may lead to an increase in the number of pregnant women with hypertensive disorder of pregnancy. I have a perception that pregnant women with significant weight gain are more likely to have a caesarean section. Gaining too much weight can affect pregnant women and their fetuses.

4. DISCUSSION

Although the recommended GWG was changed in March 2021, and it has been over a year, only 73.1% of the midwives knew that the recommended GWG had been adjusted. The self-evaluation of health guidance differed significantly before and after changing the recommended GWG.

Although the response rate in this study was very low (24.2%), a previous study that compared the response rates of web surveys with other survey modes reported that the average response rate of web surveys was approximately 11%, which was lower than that of other survey modes.[13] Compared with that report, the response rate in our study was higher for web surveys. This may be because we provided incentives (gift certificates) to the responders. Incentives are usually used to increase the response rate of a survey and are one of the factors affecting the response rate.[14]

Midwives provide weight control guidance at almost all medical facilities, and even though it has been over a year since the guidelines were changed, more than a quarter of the midwives did not know that the recommended GWG has been adjusted. This indicates that the midwives' continued education after graduation may not be sufficient. In Japan, medical workers have to submit a medical worker notification to the Ministry of Health, Labour and Welfare once every 2 years,[15] and medical licenses, including midwifery licenses, do not need to be renewed; thus, once a person passes the national exam, they can keep their license for life. Therefore, continuing medical education is dependent on midwives' passion for self-improvement; for example, they attend seminars or have credit for the Clinical Ladder of Competencies for Midwifery Practice (CLoCMiP).[16] Although midwives who attend seminars or who are motivated to learn have the chance to know that the recommended GWG has changed, those who do not attend seminars or who are not motivated to learn will be unaware of the changes. We must consider the efforts needed to ensure that all midwives are informed of the changes in the guidelines promptly.

In this study, the participants' self-evaluation of weight control guidance before and after the guidelines were adjusted was significantly different; the percentage of midwives who answered "teaching a little strictly" decreased, and that of midwives who answered "neither strictly nor not strictly" increased. This result indicates that the strictness of weight control guidance has been somewhat eased by the recent changes in the guidelines. This might be because the recommended GWG was increased, and midwives no longer needed to be strict when they gave weight control guidance to pregnant women. In fact, the participants who believed that the change in recommended GWG was good answered "the previous standards were strict" or "concerns about the potential effects of strict weight guidance on the physical and mental health of both mother and child." In Japan, in order to prevent hypertensive disorders during pregnancy, strict weight control guidance has been provided to pregnant women.[4] Furthermore, incorrect body shape recognition and an excessive desire for thinness have caused insufficient GWG in Japan,[17] subsequently resulting in LBW neonates.[18]

Meanwhile, 50.4% of participants thought the recommended amount of GWG was neither good nor bad and chose "impact after changing the guideline is not clear" or "worried about the impact on pregnant women's health due to gaining too much weight." Despite 2 years passing since the change in guidelines for GWG[10] and an increase in the number of people giving birth after the change, no studies have investigated the amount of GWG or the physical and mental effects on mothers or babies before and after the change in guidelines. Therefore, it seems that midwives could not realize the benefit of changing the guidelines or know whether it was beneficial to change them. It is necessary to investigate the effects on mothers and babies before and after changing the GWG guidelines as early as possible. This will help midwives to confidently provide health guidance.

Limitations

This study has a few limitations. First, the participation rate was very low, and the sample size was small; thus, generalizability was limited. Second, although we asked participants if they had experience providing health guidance at antenatal clinics, we did not ask them if they currently took charge of health guidance at antenatal clinics. Therefore, if providing health guidance to pregnant women was not a part of their current job, they may not know that the recommended GWG had changed.

Despite these limitations, this study has several strengths. This is the first study to investigate the situation and perception of the changing guidelines for the recommended GWG during pregnancy among midwives in Japan. Moreover, we targeted midwives from primary, secondary, and tertiary hospitals across Japan; thus, the responses reflected Japanese midwives' perceptions.

5. CONCLUSION

This study revealed that only 73.1% of midwives were aware of the adjusted recommendations for GWG. Given the lack of awareness among all midwives regarding the guideline adjustments, it is imperative to prioritize the dissemination and adoption of the new guidelines within the midwifery community. Furthermore, the self-evaluation of health guidance before and after the guideline change differed significantly.

Almost half of the midwives believed that the guidelines were neither good nor bad.

ACKNOWLEDGEMENTS

We would like to thank all the midwives who participated in this study.

AUTHORS CONTRIBUTIONS

N.H. was responsible for study design and drafted the manuscript and revised it. R.I., K.M., H.A., and A.I. collected data. All authors read and approved the final manuscript.

FUNDING

This study has been funded by the School of Nursing, Dokkyo Medical University, Tochigi, Japan.

CONFLICTS OF INTEREST DISCLOSURE

No conflicts of interest has been declared by the authors.

INFORMED CONSENT

Obtained.

ETHICS APPROVAL

The Publication Ethics Committee of the Sciedu Press. The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

PROVENANCE AND PEER REVIEW

Not commissioned; externally double-blind peer reviewed.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

DATA SHARING STATEMENT

No additional data are available.

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