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ORIGINAL ARTICLE

# Experiences with epidural anesthesia of Japanese women who had childbirth in the United States

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**Abstract**
*Purpose* Cultural views are purported to be critical barriers to the use of epidural anesthesia during childbirth in Japan, even though it is not routinely available. We sought to understand the importance of the asserted cultural barriers for Japanese women living in Michigan in the United States where access to epidural anesthesia is routine.
*Methods* We used a mixed-methods approach including self-administered, cross-sectional mail surveys and semi-structured qualitative interviews. Participants were Japanese women who received prenatal care at the University of Michigan Japanese Family Health Program.
*Results* Of 78 participants in the mail survey, 63% used epidural anesthesia. Positive influences to have epidural anesthesia came from friends (58%), husbands (42%), and knowledge of the epidural anesthesia experiences of others (50%). Seventeen respondents participated in qualitative interviews. Most had learned little about epidural anesthesia while living in Japan, and some respondents had heard unsettling rumors. Many mentioned obtaining their first detailed knowledge about epidural anesthesia from friends in the United States, and expressed fear or concerns about the side effects of anesthesia. Thirteen out of fourteen interviewed participants who used or wanted epidural anesthesia expressed a desire to use it for the next childbirth.
*Conclusions* While Japanese women in this United States setting considered previously reported cultural barriers to epidural anesthesia for birth pain, many chose to have it during their labor. This finding implicates limited access as a barrier at least as important as cultural barriers to epidural anesthesia use in Japan.

**Keywords** Epidural anesthesia · Labor pain · Japanese · Cultural characteristics

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## Introduction

Epidural anesthesia is an effective pain-control method used during labor, with few serious complications [1]. Epidural or spinal anesthesia is widely used to alleviate the pain of childbirth in the United States [1, 2]. However, in Japan, epidural anesthesia (*mutsu bunben*: literally, "pain-free labor") is not commonly used to control labor pain.

Several factors could explain why epidural anesthesia is not commonly used by women during labor in Japan: (1) social and cultural factors influence women not to use it; (2) lack of access because it is not available in the birthing facility; and (3) lack of knowledge about its benefits and risks. The available literature suggests that a significant source of the resistance to its use may be due to cultural barriers, such as the concept of the virtue of bearing pain for fostering a sense of motherhood [3–5]. However, the extent that the cultural factors inhibit Japanese women from using epidural anesthesia for birth pain remains unclear.

As many United States hospitals routinely offer epidural anesthesia during labor, a high concentration of Japanese

women in the United States allows for a natural experiment to examine cultural factors that influence their decision-making. The University of Michigan Japanese Family Health Program (JFHP) is a unique setting that provides culturally and linguistically competent health care, including obstetrics, to the Southeastern Michigan Japanese community [6, 7]. This region has a high concentration of Japanese residents due to academic opportunities and automotive-related jobs. Most are not American citizens, but rather Japanese nationals re-located for 3–5 years to serve their company.

Because epidural anesthesia for birth pain is routinely available in Michigan, we endeavored to investigate the views about epidural anesthesia of Japanese women who delivered in the United States. The study had four aims: (1) to describe how this population of Japanese women responded to routine access to epidural anesthesia; (2) to describe how Japanese women's preference for and perceptions about epidural anesthesia changed; (3) to describe factors influencing Japanese women's decisions about epidural anesthesia use; and (4) to illustrate the evolution of Japanese women's views about epidural anesthesia.

## Subjects, materials, and methods

### Study design

We used a mixed-methods approach [8]. Mixed-methods researchers intentionally combine both qualitative and quantitative data collection in their studies in order to provide a more robust understanding of a phenomenon of interest. Specifically, data collection involved a quantitative cross-sectional mail survey and semi-structured qualitative interviews with a sub-sample of survey participants. The data were analyzed concurrently with both the quantitative survey data and qualitative interview data being used to examine the study questions and provide integrated results. This use of two forms of data collection allows triangulation, the process of corroborating findings from different methods of data collection to provide a stronger, overall understanding [9, 10]. The present study provides additional analysis of a larger study that has been published previously [11]. Approval for this mixed-methods study was obtained from the University of Michigan Health System Institutional Review Board, and all participants provided written informed consent in Japanese.

### Setting

At the University of Michigan JFHP, bilingual care providers provide a booklet with information about epidural anesthesia during the first prenatal visit. The booklet describes key pregnancy stages from prenatal through postnatal care and discusses epidural anesthesia. In addition, pregnant patients learned about epidural anesthesia during prenatal classes, including one that focused on pain control during labor. Finally, pregnant women received further explanation in Japanese during an advance consent discussion for epidural anesthesia several weeks before their due date, because Japanese interpreters cannot always be accessed at the hospital [11].

### Participants

Targeted participants were all Japanese women who received prenatal care in the JFHP and delivered during the study period. Participants met these inclusion criteria: (1) fluency in speaking Japanese; (2) age 18 or older; (3) received prenatal care at the JFHP; (4) delivered a baby at the University of Michigan Women's Hospital between January 1, 2001 and February 28, 2003. Exclusion criteria included physical injury, incapacitating mental illness, or Japanese speaker of non-Japanese descent.

### Data collection

#### *Quantitative data collection*

We developed and distributed a self-administered, cross-sectional survey instrument that addressed patients' methods for managing labor pain, preference for epidural anesthesia for labor, and factors influencing the decision to accept or reject epidural anesthesia. We sent the survey to eligible participants at least 6 weeks after their delivery. We performed up to four mailings, using a modified Dillman technique; the instrument package was mailed first, followed by a reminder 2 weeks later [12]. The third mailing again included the instrument and was followed by a final reminder 2 weeks later.

#### *Qualitative data collection*

We recruited subjects from August 19 through September 16, 2003 from the women who had participated in the mail survey and indicated on it their willingness to engage in further research. The demographic characteristics identified through the survey provided a basis for our intentional sampling approach. Specifically, we examined candidate demographics and used maximum variation sampling (a strategy designed to achieve the greatest heterogeneity in a sample) to identify candidates for recruitment into the study [13]. This method yielded the diversity we sought, such that participants included both primiparous and

multiparous women, as well as women with various levels of English ability.

We performed a semi-structured qualitative interview of Japanese women who were sampled with the method described above. A study investigator contacted participants by phone and used the semi-structured interview guide that was developed by investigators to contain open-ended questions and probe questions to encourage participants to fully describe their views. Questioning focused on women's experiences in prenatal care, childbirth, and the consent discussion of epidural anesthesia for labor. Other topics included the women's knowledge about epidural anesthesia, when and how they gained this knowledge, their views toward epidural anesthesia, and whether their views changed during pregnancy and after labor. All interviews were audiotaped and transcribed verbatim in Japanese, using a standardized approach to transcription [14, 15]. We reviewed the transcripts for content and applied saturation criteria as the endpoint of data collection [15, 16]. Participants received a $20 gift certificate to compensate them for the time of participating.

### Data entry and analysis

We used the Statistical Package for the Social Sciences (SPSS) program to analyze the quantitative data generated from the mailed surveys. We used descriptive statistics to analyze outcome measures. We then employed Pearson's $\chi^2$ test to detect any differences in trends in the choice of epidural anesthesia between groups of primigravida and multigravida women.

To qualitatively analyze all text data, we combined immersion/crystallization and editing analytic approaches [17]. Iteratively, two analysts read the text multiple times in Japanese as transcripts became available. As thematic connections emerged, we identified units of relevant text and sub-thematic categories. A third analyst reviewed the text and categories and worked iteratively with the analytic team to further revise text units. Analysis yielded the participants' knowledge of epidural anesthesia while in Japan; their ways of obtaining knowledge about epidural anesthesia; their response to detailed information about epidural anesthesia; factors influencing their choices whether to receive or forgo epidural anesthesia; and their views about epidural anesthesia usage during future births.

The mixed-methods integration of the quantitative and qualitative data of our design was achieved by using the qualitative data to corroborate and clarify the quantitative study. We organized these integrated findings by each major area of inquiry. The qualitative data clarified how women's views evolved over time.

## Results

### Demographics

Table 1 provides demographic information. Seventy-three percent (82/112) of potential participants responded to the mail survey. Two respondents who had scheduled a Cesarean section and two respondents whose ethnicities were other than Japanese were excluded from the data analysis. Of the 19 women contacted for an interview, 18 women met the eligibility criteria and 17 participated in the qualitative interviews. Sixteen of them were interviewed by telephone, and one interview was conducted face-to-face per her request.

### How Japanese women responded to routine access to epidural anesthesia

Among the mail survey participants, 49 of 78 (63%) used epidural anesthesia (Table 2). Among 76 women who had

**Table 1** Demographics of the total sample from the quantitative survey and sub-sample that participated in qualitative interviews

| Characteristics | Mail survey ($N = 78$) | | Interview ($N = 17$) | |
|---|---|---|---|---|
| | Median | Range | Median | Range |
| Age (years) | 33 | 26–42 | 32 | 28–36 |
| Cumulative years of education (elementary school and higher) | 14 | 12–20 | 14 | 12–20 |
| Cumulative months lived in the US | 22 | 3–95 | 20 | 3–38 |
| Characteristics | *n* | % | *n* | % |
| Household annual income | | | | |
| <$25,000 | 2 | 3 | 1 | 6 |
| $25,001–$50,000 | 14 | 18 | 1 | 6 |
| $50,001–$75,000 | 33 | 42 | 11 | 65 |
| ≥$75,001 | 26 | 33 | 4 | 24 |
| Missing | 3 | 4 | 0 | 0 |
| Marital status | | | | |
| Married | 78 | 100 | 17 | 100 |
| Current occupation | | | | |
| Homemaker | 76 | 97 | 17 | 100 |
| Other | 2 | 3 | 0 | 0 |
| Number of prior births | | | | |
| 0 | 52 | 67 | 11 | 65 |
| 1 | 19 | 24 | 5 | 29 |
| 2 | 6 | 8 | 1 | 6 |
| 3 | 1 | 1 | 0 | 0 |
| Previous childbirth experience in the US | 3 | 4 | 0 | 0 |
| Previous epidural anesthesia experience | 2 | 3 | 0 | 0 |

**Table 2** Type of delivery and methods of pain control by total sample and the sub-sample that participated in qualitative interviews

| | Mail survey ($N = 78$) | | Interview ($N = 17$) | |
|---|---|---|---|---|
| | *n* | % | *n* | % |
| Type of delivery | | | | |
| Vaginal | 74 | 95 | 17 | 100 |
| Vaginal trial followed by C-section | 4 | 5 | 0 | 0 |
| Pain control method(s)[a] | | | | |
| Breathing | 56 | 72 | 9 | 53 |
| Epidural or spinal anesthesia | 49 | 63 | 11 | 65 |
| Massage | 35 | 45 | 6 | 35 |
| IV medication | 17 | 22 | 1 | 6 |
| Bath | 3 | 4 | 1 | 6 |

[a]Multiple responses were possible, so percentages do not add up to 100%

not previously used epidural anesthesia, 36 of 52 (69%) primigravida women used epidural anesthesia and 12 of 24 (50%) multigravida women used epidural anesthesia (Pearson $\chi^2$ value $= 2.61, p = 0.106$, not significant [NS]). Among the interview participants, 11 of 17 used epidural anesthesia. The interviews identified three women who were not given epidural anesthesia when requested, because when they were admitted their labor had progressed too quickly to administer epidural anesthesia.

### Japanese women's preference for epidural anesthesia changed during pregnancy

Table 3 shows changes in participants' preferences for epidural anesthesia before advance consent discussion for the procedure several weeks before their due date compared with their preferences at the onset of labor. Forty-four women did not change their preferences during this period. Of six women who said they would never want epidural anesthesia initially, four developed a more favorable preference at the time of labor. Of 24 women who were uncertain initially or did not remember the advance consent discussion for epidural anesthesia, 10 preferred to have epidural anesthesia as soon as possible and 12 preferred to have epidural anesthesia if pain became intolerable at the time of labor.

### Factors influencing Japanese women's decisions about choosing epidural anesthesia

Table 4 lists factors that influenced Japanese women's decisions about epidural anesthesia. Friends, the epidural anesthesia experiences of others, husbands, outpatient discussions about epidural anesthesia, and prenatal classes were mentioned as more influential than other factors in the respondents choosing to use epidural anesthesia. Husbands and prenatal classes were also influential in the respondents' choosing to avoid epidural anesthesia, as were past labor experiences. A high percentage of women reported no influence on their decision from husbands' parents, anesthesiologists, delivering doctors, obstetrics nurses, parents, and primary care doctors.

Interviews identified other factors. Six women mentioned that labor pain played a major role in their decision to request epidural anesthesia. Among them, five preferred to avoid epidural anesthesia if possible. Three women mentioned that learning that anesthesia during labor is well established in the United States and knowing that an anesthesia specialist would administer the epidural anesthesia decreased their anxiety about epidural anesthesia. Two women mentioned that their primary doctors' positive opinion of epidural anesthesia helped them decide to have epidural anesthesia. Of those who declined epidural

**Table 3** Japanese women's preferences for epidural anesthesia before advance consent discussion several weeks before their delivery date compared with their preferences at the onset of labor

| $N = 78$ | Preference for epidural anesthesia at the onset of labor | | | | | | |
|---|---|---|---|---|---|---|---|
| | EA ASAP | EA if can't bear pain | Emergency only | Never EA | Uncertain | Other | Total |
| Preference for EA weeks before due date | | | | | | | |
| EA ASAP | 28 | – | – | – | – | – | 28 |
| EA if can't bear pain | 3 | 9 | – | 2 | 1 | – | 15 |
| Emergency only | – | – | 5 | – | – | – | 5 |
| Never EA | 1 | 1 | 2 | 2 | – | – | 6 |
| Uncertain | 8 | 10 | – | – | – | 1 | 19 |
| No discussion | 2 | 2 | – | – | 1 | – | 5 |
| Total | 42 | 22 | 7 | 4 | 2 | 1 | 78 |

*EA* epidural anesthesia, *EA ASAP* prefer to have EA as soon as possible, *EA if can't bear pain* prefer to avoid EA first, and to have EA if pain is intolerable, *Emergency only* prefer to have EA only when emergency procedures needed, *Never EA* prefer not to have EA for any reason, *No discussion* do not think they discussed the consent for epidural anesthesia several weeks before their due date, or do not remember whether they had this discussion

**Table 4** Factors Japanese women reported that influenced their decision about using epidural anesthesia (EA) during labor

| $N = 78$ | Influence to use EA $n$ (%) | No influence $n$ (%) | Influence not to use EA $n$ (%) |
|---|---|---|---|
| Husband[a] | 32 (42) | 34 (44) | 11 (14) |
| Parents | 9 (12) | 63 (81) | 6 (8) |
| Husband's parents | 2 (3) | 74 (95) | 2 (3) |
| Other family[a] | 3 (4) | 73 (96) | 0 (0) |
| Friends | 45 (58) | 29 (37) | 4 (5) |
| Prenatal class | 26 (33) | 43 (55) | 9 (12) |
| Media/books | 22 (28) | 53 (68) | 3 (4) |
| Obstetrics nurse | 11 (14) | 65 (83) | 2 (3) |
| Anesthesiologist | 6 (8) | 69 (89) | 3 (4) |
| Primary doctor | 15 (19) | 59 (76) | 4 (5) |
| Delivering doctor | 8 (10) | 68 (87) | 2 (3) |
| Past labor experience | 15 (19) | 53 (68) | 10 (13) |
| Friends' labor with EA | 39 (50) | 37 (47) | 2 (3) |
| Friends' labor without EA[a] | 17 (22) | 53 (69) | 7 (9) |
| Outpatient discussion about EA | 29 (38) | 44 (56) | 5 (6) |

[a] Valid percentages are reported. One respondent did not respond to the items "husband" and "friends' labor without EA", and two did not respond to "other family"

anesthesia, three women said that they had already experienced labor without anesthesia in Japan. Some women expressed concerns about the side effects described during the advance consent discussions. Table 5, 5.1 lists the factors discussed in this section.

### Evolution of Japanese women's knowledge and views about epidural anesthesia

#### *Knowledge of epidural anesthesia during labor while in Japan*

Among the interviewees, six women reported having no knowledge of epidural anesthesia while in Japan. Eight women had heard of epidural anesthesia, but knew little about it. In short, many women knew very little about epidural anesthesia, and incorrect rumors dominated their perceptions (Table 5, 5.2).

#### *Methods for obtaining knowledge about epidural anesthesia*

Among many interviewees, friends or others who had given birth in the United States often provided them their first detailed information about epidural anesthesia. Most women acquired this information soon after becoming pregnant, although some acquired the information before becoming pregnant but after moving to the United States. Still, prenatal classes or discussions with their doctors provided half of these women with either more or initial information about epidural anesthesia (Table 5, 5.3).

#### *Response after receiving detailed information about epidural anesthesia for labor*

Many women who heard about epidural anesthesia from friends had positive impressions about the method. Still, two-thirds ($n = 11$) of the interviewed participants, including women who previously had positive impressions, expressed some degree of fear or concerns about side effects. Despite these concerns, many study participants remained interested in using epidural anesthesia. One expressed relief in knowing that she would not necessarily experience pain during labor. Three others developed little interest in epidural anesthesia even after detailed discussions with doctors; one expressed concern about the cost. All of the participants with negative views on epidural anesthesia use had previously given birth in Japan (Table 5, 5.4).

#### *Views about future births after experiencing childbirth in the United States*

Thirteen out of fourteen women who had or who wanted epidural anesthesia expressed the desire to use it for their next deliveries. Still, two participants expressed hesitance about using epidural anesthesia if they delivered in Japan. Their reasons included cost, concerns about the safety of epidural anesthesia there, and the knowledge that few women in Japan receive epidural anesthesia (Table 5, 5.5).

## Discussion

While cultural factors are purported to be a significant barrier to the use of epidural anesthesia for labor pain by Japanese women in Japan, in our setting where epidural anesthesia is routinely available, usage was quite high. Our data showing 63% of Japanese women giving birth with epidural anesthesia in the United States represents a higher percentage than any data known in the literature about Japanese women giving birth with epidural anesthesia in Japan. The qualitative findings suggest that the proportion of participants desiring epidural anesthesia was even higher than 63%, because some women wanted epidural anesthesia, but could not receive it due to timing or hospital issues.

While these women ultimately chose to have epidural anesthesia for their labor pain, many cultural concerns did

**Table 5** Evolution of Japanese women's knowledge and views about epidural anesthesia: quotations from qualitative interviews

| Major themes regarding epidural anesthesia (EA) during labor |
|---|
| 5.1 Selected factors influencing the choice about using epidural anesthesia |
| 5.1.1 Factors affecting the choice to have epidural anesthesia |
| 5.1.1.1 Positive experiences others had with epidural anesthesia |
| 'I heard from a woman who had a childbirth earlier than me and had an epidural. A (Japanese) woman who experienced epidural anesthesia told me that it was comfortable and the experience was good. So I was wondering if I should try it for my second baby.' |
| 5.1.1.2 Knowing other people who used epidural anesthesia |
| 'Because epidural was unfamiliar, or there were not many people who had it, so my husband also wanted to avoid it at that time (at the discussion for consent). Then, after I knew (about epidural), I heard that a good number of my neighbors or Japanese women had it. Since I heard about it, my mind changed a little (to have epidural).' |
| 5.1.1.3 Supportive health care providers |
| '(My doctor) said that she believed people do not necessarily have to bear the pain and she supported the idea of anesthesia.' |
| 5.1.1.4 Pain |
| 'When I first heard about it, because it was anesthesia, I didn't want to have it, … but when I started feeling labor pain, I thought I wanted to receive it.' |
| 5.1.1.5 Hearing epidural anesthesia providers are specialists or well-trained |
| '"In America, it is safe (to do *mutsu*) since everybody received (epidural) and doctors are good at it," was what I was told. I thought it would be safe, then.' |
| 5.1.2 Factors affecting the choice not to have epidural anesthesia |
| 5.1.2.1 Past experience without epidural anesthesia |
| 'Friends who already delivered a baby told me, "It was good". But I already delivered my first baby without it in Japan, so I was listening (about epidural), thinking that I don't need it.' |
| 5.1.2.2 Fear of side effects |
| 'I had heard only good things about the epidural until I attended a prenatal class where I learned that some people may have allergic reactions, and a number of aspects which were bad. Then I wondered a little if I should (have an epidural or not).' |
| 5.2 Knowledge of epidural anesthesia during labor while in Japan. |
| 5.2.1 No knowledge |
| 'No, I didn't know about it.' |
| 5.2.2 Limited knowledge |
| 'I heard by hearsay that *mutsu bunben* exists, but I believe it wasn't well known in Japan. Nobody I knew had *mutsu*, so I didn't know more than the hearsay.' |
| 'I knew by reading a book that *mutsu bunben* exists. But because my doctor never mentioned nor explained it, I just thought *mutsu* was used only for unusual patients.' |
| 5.2.3 Rumor of side effects |
| 'Well, because I didn't hear good rumors (about *mutsu bunben*) in Japan, I was a little frightened to hear that in the worst case, nerve damage could cause paraplegia.' |
| 'I heard affection to a child would be different if one had *mutsu bunben*, or the relationship between a parent and a child might be difficult in the future…' |
| 'One of my friends said because Japanese (doctors) did not have much experience (with epidural anesthesia), therefore they were not familiar with the procedure. So they are poor at doing it….' |
| 5.3 Methods for obtaining knowledge about epidural anesthesia |
| 5.3.1 From friends |
| 'I think it was after I came here (US) that I got to know about such a childbirth, *mutsu* style…. I got to know from people around me, when they discuss such a thing.' |
| 5.3.2 From health care providers |
| 'It was explained in detail at a prenatal class, wasn't it? … I received various information about this anesthesia, such as the location of the injection, or pain associated with the injection. So I was ready for it.' |
| 'In the text of the consent form, good and bad aspects (of epidural anesthesia) were clearly described and it was good because I could confirm those for myself beforehand.' |
| 5.4 Response to detailed information about epidural anesthesia for labor |
| 5.4.1 Fear of the side effects |
| 'I wondered what happened if it failed because a needle would stick in the spine.' |
| 'While thinking about signing consent, I thought this is an extraordinary thing with risks and I felt anxious to some degree.' |

**Table 5** continued

| Major themes regarding epidural anesthesia (EA) during labor |
|---|
| 5.4.2 Willingness to have epidural anesthesia |
| 'I decided to have one from the beginning if I became pregnant, and would deliver a baby. |
| 5.4.3 No interest |
| 'What a pity that women could not endure giving birth… It is considered normal (to give birth without pain control) in Japan.' |
| 5.5 Views about future births |
| 5.5.1 Want to have epidural anesthesia for next childbirth |
| 'Of course. I will sign (the consent for epidural) from the beginning.' |
| 5.5.2 Want to avoid if possible |
| 'I will try not to have (an epidural) because of consideration for my health, but I want to have one if labor gets long.' |
| 5.5.3 May not want if I deliver in Japan |
| 'I probably won't have it if it were in Japan…. I don't hear many people around me use it in Japan, and I think natural birth (without epidural) is the mainstream in Japan.' |
| 'I think I will have it if I deliver here (in the US)…. I am a little concerned if it is safe in Japan |

have a bearing on their decision-making about epidural anesthesia use for labor pain. Similar to findings in previous research from Japan [18], many Japanese women in our study knew little about epidural anesthesia and many worried about its side effects. Their concerns seemed disproportionate to reality, an issue that raises concern for us as investigators. A unique aspect of Japan is the large number of births that occur in small facilities where an anesthesia specialist would not be available [19]. Not being able to offer epidural anesthesia while advocating for its benefits by a solo practitioner would not make sense. Moreover, without an anesthesiologist present, it would be more dangerous due to a lack of hands but not due to the procedure itself [19]. Our analysis suggests the lack of availability of epidural anesthesia for labor in small hospitals in Japan may contribute to the distorted representation and exaggeration of the potential risks. Further research is needed to explore this issue.

These data illustrate that Japanese women's views were influenced by a number of factors, and how their thinking about whether to have epidural anesthesia evolved. Of the factors influencing the choice to receive epidural anesthesia, friends were the most influential. Many women sought information about others' experiences with epidural anesthesia and might have felt reassured by these confirmations of the safety of epidural anesthesia. Interestingly, while family pressure was offered as a reason for the infrequent use of epidural anesthesia, our study showed that the influence of parents and husbands not to use epidural anesthesia was relatively small. Rather, 40% of women reported that their husbands influenced them to have epidural anesthesia. This may have reflected the setting where most of the women were isolated from previous-generation extended family members.

These data highlight that epidural anesthesia is commonly available and acceptable to the population of Japanese women in this United States setting, while data from the Japanese literature suggest that epidural anesthesia is not commonly available and not commonly accepted. Two key differences in this area between the United States and Japan are: (1) routine availability of epidural anesthesia in the United States versus highly limited availability in Japan; and (2) an environment in the United States with broader cultural consensus about the appropriateness of epidural anesthesia versus an environment in Japan with negative cultural views. Regarding the role of the latter, experience from the JFHP where this research was conducted is informative.

When the JFHP was first established over 15 years ago and its providers began offering prenatal and birthing care to Japanese women, most were very reluctant to have epidural anesthesia. However, a few "pioneer women" chose to have epidural anesthesia, and most had a positive experience. We observed the prevailing community view about epidural anesthesia change over time. We feel that routine access and continued positive experiences have caused this change in the local Japanese community view about epidural anesthesia use during labor.

We believe that a process of "micro-cultural consensus" about the desirability of epidural anesthesia has developed in Southeastern Michigan. By this, we mean that within a small community, a "micro-community" of the larger community in this region, a general agreement has emerged consequential to both accessibility and a gradual social acceptance. This general agreement evolved gradually based on favorable personal experiences and spread through the social network of the region to form a cultural consensus. An additional element

supporting the acceptance of epidural anesthesia may be the evolving sense about patient participation in medical decision-making that has been occurring in Japan [20]. If access had been the only barrier, we would have expected complete acceptance 15 years prior when we consistently offered epidural anesthesia to the population of Japanese women here. This process of gradual acceptance appears similar in many regards to the process of cultural consensus described by Susan Long about cancer disclosure in Japan [20].

Thus, the authors believe that if epidural anesthesia became routinely available and provided by anesthesiology specialists, many Japanese women would use it, and even request it. Based on our experience, access is a necessary, but not sufficient, condition for acceptance. Although an older Japanese cultural view may persist that enduring the pain of childbirth "naturally" without pharmacologic pain relief is virtuous, the pain relief and contemporary positive experiences, in our experience, outweigh antagonistic cultural views.

### Study limitations

We acknowledge potential study limitations. First is generalizability, though the subjects are from both rural and metropolitan areas in Japan. Second, as the time between delivery and survey completion varied, this could influence the accuracy of self-reports. Third, other social factors, e.g., insurance coverage differences between Japan and the United States, could affect epidural anesthesia use, though the evolution in usage over time suggests no substantive influence of this factor.

While there is a perception that Japanese women will not use epidural anesthesia for labor pain, in this United States setting where it is routinely accessible, health professionals support its use, and accurate educational information is provided, a majority of Japanese women chose epidural anesthesia. While cultural factors weighed negatively in their decision-making, support from the social network in their micro-community and the desire for pain relief ultimately were more important. This suggests that accessibility and a supportive environment for women in Japan could improve their access to pain relief during labor. Holding discussions on the facts about epidural anesthesia early in pregnancy might benefit Japanese women living in Japan.

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