

# Acquisition of Knowledge and Skills about Delivery by Self-Evaluation of Midwifery Students Using the Labor and Delivery Assistance Evaluation Sheets

Yuko Harding 

Faculty of Nursing, Chukyo Gakuin University, Mizunami, Gifu, Japan

Email: [y-harding@chukyogakuin-u.ac.jp](mailto:y-harding@chukyogakuin-u.ac.jp)

**How to cite this paper:** Harding, Y. (2022) Acquisition of Knowledge and Skills about Delivery by Self-Evaluation of Midwifery Students Using the Labor and Delivery Assistance Evaluation Sheets. *Open Journal of Nursing*, 12, 459-480.  
<https://doi.org/10.4236/ojn.2022.127031>

**Received:** March 28, 2022

**Accepted:** July 16, 2022

**Published:** July 19, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution-NonCommercial International License (CC BY-NC 4.0).  
<http://creativecommons.org/licenses/by-nc/4.0/>



Open Access

---

## Abstract

**Aim:** This study aims to clarify the current state of advancement of knowledge and skills in the educational process from self-assessments by midwifery student labor and delivery assistance evaluation sheets. **Method:** Metrology is an observational and retrospective study. Self-assessments in labor and delivery assistance evaluation sheets of midwifery students registered in an advanced midwifery course at Nursing College A from Apr. 2017 to Mar. 2018 were analyzed retrospectively. The end-points were every score of six classifications: health checkups and assessments of women who give birth, preparations for labor and delivery assistance, delivery assistance in the parturient second stage, delivery assistance in the parturient third and fourth stages, midwifery process, and the training manner. Moreover, they also included the scores of 64 evaluation items belonging to any of the six classifications and a comprehensive evaluation score in which students judged the acquisition of all knowledge and skills of delivery assistance. In addition, although not on the evaluation sheet, the average score of all 64 evaluation items was also included. The evaluation criteria were five levels, from one to five. The end-points were examined by comparing the experiences of delivery assistances in two periods of  $<6$  or  $6 \leq$  times. JMP16.2 was used. This study was approved by the institutional review board (IRB). **Results:** 80 among 91 evaluation sheets from eight out of nine students were analyzed. The average score of all 64 evaluation items, every score of the six classifications, and the comprehensive evaluation score was significantly elevated in the experience periods of  $6 \leq$  times ( $P < 0.001$ ). Moreover, in all of the 63 detailed items except the item of being able to tell the adaptation of amniotomy, and to judge and carry it out at an appropriate time, all of the scores were significantly

---

elevated ( $P < 0.05$ ). In the experience periods of  $6 \leq$  times, the items with a median of two are “Being able to tell the adaptation of amniotomy, and to judge and carry it out at an appropriate time” and “Being able to assist with laceration (incision) sutures”. **Conclusion:** Training in adaptation and enforcement of amniotomy and assistance skills for lacerations sutures will be needed in future educational challenges. Self-assessment scores by midwifery students in labor and delivery assistance evaluation sheets were significantly elevated in the experience periods of  $6 \leq$  times.

## Keywords

Evaluation, Labor, Delivery, Education, College/University

---

## 1. Introduction

The study group on training human nursing resources at universities has been working on formulating a core curriculum as a model for nursing education (Ministry of Education, Culture, Sports, Science, and Technology, Japan). The framework is a learning outcome-based education that allows all students to scrutinize what is reachable (evaluable) in common as a “core”. Therefore, it is desirable to clarify the practical abilities that students should acquire by the time of graduation and be able to evaluate them objectively [1]. The number of midwifery schools and training colleges/universities in 2019 in Japan was 216, including 43 graduate schools and professional graduate schools, 39 advanced courses/separate courses at colleges/universities, 85 universities, and four advanced courses in junior colleges, and 45 vocational schools. The number of midwives who passed the national examination (total number) in 2020 was 2,093. In a survey on the number of midwifery assistants handled in midwifery training for midwifery training schools (179 schools) designated by the Minister of Education, Culture, Sports, Science and Technology as stipulated by Act on Public Health Nurses, Midwives, and Nurses [Achievement survey in 2019], the number (mean) of deliveries per midwifery student were 10.2 at all school ( $n = 163$ ), including 11.4 at graduate school ( $n = 38$ ), 9.8 at university ( $n = 82$ ), 10.1 at the advanced course ( $n = 28$ ) and 10.0 at the separate course ( $n = 11$ ) in the college/university, 9.6 at advanced courses in junior college ( $n = 3$ ), and 9.3 at vocational school ( $n = 1$ ) [2].

According to a research study on the current status and issues of clinical training in bachelor’s degree programs at nursing universities commissioned by the Japan Association of Nursing Programs in Universities (JANPU), from member schools, 248 courses in 241 universities in 2018, the status of securing training facilities in the midwifery field was examined. In this previous study, 22% of the respondents said that they could secure them stably, and 57.4% said that they could secure them now but were uncertain after a few years. In addition, 16.7% answered that “securing was still uncertain”, and the rest were un-

answered. Regarding nursing practice problems in our country, 53.3% (n = 646/1211) utilized many training facilities. Hence, 51.4% (n = 622/1211) must secure part-time teachers and TAs (Teaching Assistants) for student guidance in clinical training. Moreover, 47.5% (n = 575/1211) answered that training facilities were far from the university, 34.8% (n = 422/1211) answered that few patients in charge were suitable for practical training, and 34.8% (n = 422/1211) were difficult to secure training facilities [3]. Therefore, the way of practical training is easily affected by the realistic environment in which midwifery students are placed. In an environment where the securing of training facilities is unstable, and there are few patients in charge suitable for training, evaluation in line with the core curriculum for improving the quality of higher education is required in midwifery training.

In a previous study on the degree of acquisition of midwifery student labor and delivery assistance techniques in the past in Japan, Sakamoto *et al.* reported that internal examination, protection of the perineum at the time of delivery of the infant's shoulder, protection of the perineum at the time of delivery of the infant's head, and midwifery records were difficult for midwifery students. These techniques were significantly improved in the 7th and subsequent delivery assistance [4]. Even after graduation, it was known that "midwifery record, protection of the perineum at the time of delivery of the infant's shoulder, protection of the perineum at the time of delivery of the infant's head, and pelvic examination" were difficult techniques [5]. Similarly, Fujii *et al.* also clarified that "delivery assistance techniques were not acquired in proportion to the number of experienced cases, but the self-evaluation score increases significantly in the 6th to eighth cases [6]".

However, there is still little evidence from quantitative research at educational institutions regarding the acquisition of delivery assistance skills. Therefore, in the midwifery student labor and delivery assistance evaluation, which is the key to midwifery training, we comprehensively and quantitatively analyze the self-evaluation of the student's practical ability, the "core" of each midwifery educational institution, and clarify the educational issues which can lead to further improvement in the quality of education. This study aims to clarify the current state of advancement of knowledge and skills in the educational process from self-assessments by midwifery student labor and delivery assistance evaluation sheets.

## 2. Methods

### 2.1. Participants

Eligible participants were midwifery students who registered in the advanced midwifery course (one year course) in Nursing College A in Fukuoka prefecture in Japan from April 2017 to March 2018. Participants' inclusion criteria were 20 years or older Japanese women who had a registered nurse (RN) license in Japan. Exclusively, women were evaluated in this research, as only women can be

midwives in Japan (Act on Public Health Nurses, Midwives, and Nurses) [7]. Moreover, the participants were persons who received sufficient explanation in participating in this study and, after sufficient understanding, consented in autograph signatures of their own free will. Concerning exclusion criteria for participants, no particular settings were made except for midwifery students who refused to consent.

## 2.2. Procedure

This study was approved by the Institutional Ethics Review Board of St. Mary's College and Chukyo Gakuin University. Following the Declaration of Helsinki, the study was conducted. The methodology of this study was an observational and retrospective study. Self-assessments in labor and delivery assistance evaluation sheets with the consent of midwifery students were analyzed retrospectively.

The outline of the contents of the labor and delivery assistance evaluation sheet was as follows (Refer to Labor and Delivery Assistance Evaluation Sheet in Appendix). There was an evaluation item column, a student/instructor as an evaluator, and an evaluation contents/review column. The evaluation items in the labor and delivery assistance evaluation sheet consisted of six classifications and 64 evaluation items belonging to any of the six classifications. A comprehensive evaluation was made by judging the acquisition of all knowledge and skills of delivery assistance. The six classifications and the number of evaluation items of each classification were health checkups and assessments of women who give birth (13), preparations for labor and delivery assistance (4), delivery assistance in the parturient second stage (19), delivery assistance in the parturient third and fourth stages (18), midwifery process (4), and the training manner (6).

In addition, there were the following record columns: student name, number of students' delivery assistance (total number of cases of student' delivery assistance categorized primipara and multiparous woman), date and time of delivery, sex of infant, the weight of infant, Apgar score (after 1 minute, 5 minutes), delivery style (natural, induced, suction, scheduled cesarean section, emergency cesarean section), and indications for abnormal deliveries. The evaluation criteria were five levels, from one to five: 5. I can do it voluntarily with instructions, when necessary; 4. I can do it with instructions and guidance; 3. I can do it with considerable instructions and guidance; 2. I can do it with full instructions and guidance; 1. I cannot do it even with instructions and guidance. There was an evaluation contents/review column, which students freely wrote.

The end-points in this research were every score of six classifications: health checkups and assessments of women who give birth, preparations for labor and delivery assistance, delivery assistance in the parturient second stage, delivery assistance in the parturient third and fourth stages, midwifery process, and the training manner. Moreover, they also included the scores of 64 evaluation items belonging to any of the six classifications and a comprehensive evaluation score

in which students judged the acquisition of all knowledge and skills of delivery assistance. In addition, although not in the evaluation sheet, the average score of all 64 evaluation items was also included. However, the end-points did not include the evaluation contents/review column.

The end-points were examined by comparing the experiences of delivery assistances in two periods of  $<6$  or  $6 \leq$  times.

Midwifery students experienced delivery assistance training in the obstetrics and gynecology department at three hospitals and one clinic in Fukuoka prefecture in the Kyushu region within six months. First, Midwifery students used this evaluation sheet to reflect on their experiences and self-evaluate according to the evaluation criteria in the student column. After that, the clinical instructor who instructed the student's delivery assistance also evaluated the student's delivery assistance in the instructor column of the evaluation sheet. After that, the students received guidance and learned through interviews with the clinical instructors and the advanced course's faculty teachers.

Regarding the content validity of the labor and delivery assistance evaluation sheet, the contents of the evaluation items are reviewed annually by full-time faculty teachers at universities involved in midwifery education with clinical experience and clinical instructors before the start of clinical training. At that time, it was examined whether the construct was sufficient or whether it captures the entire content area of the labor and delivery assistance. This evaluation sheet had been already used for several years in midwifery clinical training, and the content had been approved from at least eight teachers from Nursing College A. Moreover, the chief nurse/instructor of the obstetrics and gynecology department of 3 hospitals and one clinic, which conducted midwifery clinical training in the relevant year, had also examined it. However, the internal consistency reliability in this evaluation table has not been verified in the past.

The translation and back translation of the labor and delivery assistance evaluation sheet from Japanese to English were initially done by a university teacher with a Ph.D., who had a clinical experience as a midwife/nurse, then confirmed by two interpreters who were bilingual in English and Japanese.

The definitions of terms used in this study are as follows. A midwife is a woman licensed by the Minister of Health, Labor, and Welfare and is engaged in midwifery or health guidance for pregnant women, women resting after childbirth or newborns. Midwives must pass the national midwifery exam as well. About Apgar score, this scoring system provides a standardized assessment for infants after delivery [7]. The Apgar score comprises five components: 1) color, 2) heart rate, 3) reflexes, 4) muscle tone, and 5) respiration, each of which is given a score of 0, 1, or 2. Thus, the Apgar score quantitates clinical signs of neonatal depression such as cyanosis or pallor, bradycardia, depressed reflex response to stimulation, hypotonia, and apnea or gasping respirations. The score is reported at 1 minute and 5 minutes after birth for all infants, and at 5-minute intervals thereafter until 20 minutes for infants with a score less than 7 [8]. A

score of 7 to 10 is considered reassuring [9]. Natural childbirth is a spontaneous delivery without routine medical interventions during labor, particularly anesthesia. However, a local anesthetic (xylocaine) is used for episiotomy and suturing of lacerations [10]. In the delivery style of this study, deliveries such as induced deliveries, vacuum extraction delivery (VE), and cesarean delivery were not included in natural childbirth, but the Kristeller maneuver was included in natural childbirth.

In advance, the self-assessments were analyzed with the consent of the midwifery students which would be comprehensively analyzed, and individual participants would not be identified. Regarding obtaining consent from midwifery students, we explained and obtained consent using the informed consent form. The informed consent form stated the research's purpose and method. It also discussed ethical consideration, such as the protection of human rights, benefits for joining the research, and guarantees that there will be no burdens and risks from joining the analysis. It also explained the prospect of the research, such as its appearances in academic conferences and publication in papers. In addition, it was clearly stated in the document that participation in the study was voluntary and would not cause any disadvantage to the individual when they refused to participate. If consent was not obtained, it was excluded from the analysis.

The signature of the participant's consent form was received by mail. In order to respect the free will of the participants, we asked the college clerical staff to distribute and collect the informed consent form, signed consent form, and consent withdrawal form by mail. The college clerical staff were allowed to access the personal information of the student residence, regardless of them not being associated with the research. After receiving the signed consent form through reply envelope, the labor and delivery assistance evaluation sheets were analyzed.

### **2.3. Analysis**

Data were analyzed using JMP (ver. 16.2; SAS Institute Inc., Cary, NC, U.S.). In categorical variables of characteristics of patients at delivery recorded in the Labor and Delivery Assistance Evaluation Sheet, the number and the percentage of all patients are shown by category in each characteristic of parity, birth-time, delivery style, sex of infant, infant's birth weight, Apgar score at one or five minutes after birth for infants, and the number of midwifery students' delivery assistance. The parity variable is categorized into primipara and multipara. The birth-time variable is categorized into daytime (am 8:30-17:00) and nighttime (pm 17:00-am 8:30 on the next day). The delivery style is categorized into natural childbirth (including the Kristeller maneuver) and others (deliveries such as induced deliveries, vacuum extraction delivery, and cesarean delivery). The sex of the infant is categorized into boys and girls. The results of the infant's birth weight and Apgar score at one or five minutes after birth presented are in the median (IQR: interquartile range), range, and mean  $\pm$  SD (standard deviation). The infant's birth weight variable is also categorized into near median infant's birth weight or more and less than median infant's birth weight. An infant's va-

riable's Apgar score at one or five minutes after birth is also categorized into a median Apgar score or more and less than a median Apgar score.

In addition, the number of midwifery students' delivery assistance was classified into two-periods, median times or more and less than median times, by the median cut-off values according to the number of experiences of delivery assistance. Furthermore, the collected Labor and Delivery Assistance Evaluation Sheets were divided into the two-period of groups and compared to quantify student knowledge and skills improvement. The end-points were examined by comparing in the two-period groups.

The Pearson's chi-square test was used for categorical variables of characteristics of patients at delivery between the two-period groups classified by the cut-off value's median. This is according to the number of delivery assistance experienced by the midwifery students. Fisher's Exact Test was used if more than 20% of cells have expected cell counts that are less than five and no expected cell count that are less than in analysis.

In the univariate analysis, the Mann-Whitney U test and logistic regression analysis indicating Crude odds ratio (OR) were used for comparing the average of all 64 evaluation items from self-assessments by midwifery student labor and delivery assistance evaluation between every two groups of categorical variables in characteristics. Moreover, in Multivariate analysis, adjusted OR were used for comparing the average of all 64 evaluation items adjusted of all categorical variables in characteristics of parity, birth-time, delivery style, sex of infant, infant's birth weight, Apgar score at one or five minutes after birth for infants, and the number of midwifery students' delivery assistance.

Mann-Whitney U test was also used to compare the average score of all 64 evaluation items between the two-period groups classified by the median cut-off values according to the number of delivery assistance experienced by the midwifery students. Moreover, the test was used to compare every self-evaluation scores of the six classifications: health checkups and assessments of women who give birth, preparations for labor and delivery assistance, delivery assistance in the parturient second stage, delivery assistance in the parturient third and fourth stages, midwifery process, and the training manner, which were all between the two-period groups. The test was also used to compare comprehensive evaluation score that students judged about acquisition all knowledge and skills for delivery assistance from self-assessments in midwifery student labor and delivery assistance evaluation, which was between the two-period groups as well.

The univariate analysis and logistic regression analysis indicating Crude odds ratio (OR) were used for comparing the average score of all 64 evaluation items, every self-evaluation scores of the six classifications, and comprehensive evaluation score between the two-period groups classified by the median cut-off values according to the number of delivery assistance experienced by the midwifery students. Moreover, in Multivariate analysis, adjusted OR were used for comparing the average score of all 64 evaluation items, every self-evaluation scores of

the six classifications, and comprehensive evaluation score between the two-period groups adjusted of all categorical variable in characteristics of parity, birth-time, delivery style, sex of infant, infant's birth weight, Apgar score at one or five minutes after birth for infants, and the number of midwifery students' delivery assistance.

Next, in the correlation analysis between each pair's relevance in self-evaluation scores of the six classifications and 64 detailed items, and comprehensive evaluation score, a normality test by Shapiro-Wilk was performed first. Moreover, Pearson's Correlation Coefficient ( $r$ ) on parametric comparisons and Spearman's Rank-Order Correlation Coefficient ( $\rho$ ) on nonparametric comparisons was analyzed in self-evaluation scores of the six classifications and comprehensive evaluation score. Regarding the correlation coefficient, with reference to the standards of the Japan Epidemiological Association, the correlation coefficient is always between  $-1$  and  $1$ , and the closer the absolute value of the correlation coefficient is to  $1$ , the stronger the correlation. The correlation coefficient ( $r$ ) or Spearman's rank correlation coefficient ( $\rho$ ) of  $0.8$  to  $1.0$  was regarded as a strong correlation,  $0.5$  to  $0.8$  was regarded as a moderate correlation, and  $0.2$  to  $0.5$  was regarded as a weak correlation.

Then the Cronbach's alpha coefficient for the Labor and Delivery Assistance Evaluation Sheets was also calculated. The Cronbach's alpha coefficient as internal consistency reliability for self-evaluation scores of the six classifications showed the value of the standardized Cronbach's alpha coefficient when the variance of each item was different. A Cronbach's alpha  $> 0.70$  was considered acceptable, and an alpha  $> 0.80$  was preferred and was considered good reliability.

Scatter plot matrix between classifications of self-evaluation in the Labor and Delivery Assistance Evaluation Sheets were also examined in self-evaluation scores of the six classifications. In sample size calculation, the calculations of this study were not performed because all students who belong to the advanced midwifery course at Nursing College A in 2017 are targeted, and  $P$  values  $< 0.05$  were considered significant.

### 3. Results

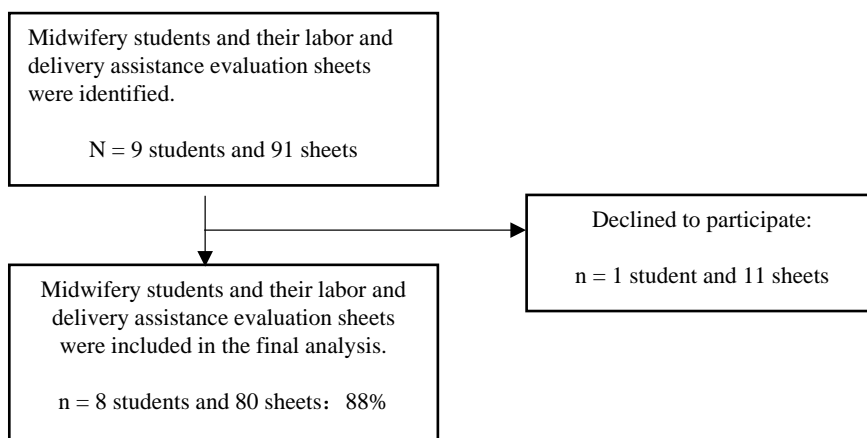
#### 3.1. Flowchart of Participant Eligibility

A process of participants' records data collection is illustrated in **Figure 1**. The final number of eligible participants was 8 out of nine students, and their labor and delivery assistance evaluation sheets were 80 of 91 (88%).

#### 3.2. Characteristics of Patients at Delivery Recorded in the Labor and Delivery Assistance Evaluation Sheets

Characteristics of patients at delivery recorded in the Labor and Delivery Assistance Evaluation Sheets are listed in **Table 1**. Forty (50%) of 80 patients in charge of midwifery students were primipara. Birth-time was 44 (58%) of patients at daytime. Regarding the delivery style, 51 (64%) was natural childbirth.





**Figure 1.** Flowchart of participant eligibility.

**Table 1.** Characteristics of patients at delivery in the labor and delivery assistance evaluation sheets.

Characteristics of patients at delivery		n (%)
Parity	Primipara	40 (50)
	Multipara	40 (50)
Birth-time	Daytime	44 (58)
	Nighttime	32 (42)
Delivery style	Natural childbirth	51 (64)
	Others	29 (36)
Sex of infant	Boys	48 (60)
	Girls	32 (40)
Infant's birth weight, g	Median (IQR)	3094 (2814 - 3353)
	Range	2080 - 3660
	Mean ± SD	3067 ± 348.3
	≥3000	47 (59)
	<3000	33 (41)
Apgar score (at 1 minute after birth for infants)	Median (IQR)	9 (8 - 9)
	Range	7 - 10
	Mean ± SD	8.7 ± 0.5
	≥9	58 (72.5)
Apgar score (at 5 minutes after birth for infants)	<9	22 (27.5)
	Median (IQR)	9 (9 - 10)
	Range	8 - 10
	Mean ± SD	9.2 ± 0.5
Number of midwifery students' delivery assistance, time	≥9	76 (95)
	<9	4 (5)
Number of midwifery students' delivery assistance, time	≥6	40 (50)
	<6	40 (50)

Data show median (IQR). IQR: interquartile range. SD: standard deviation.

Concerning the sex of the infant, forty-eight (60%) was a boy. The median (IQR, interquartile range) of all infants' birth weight was 3094 (2814 - 3353) g. Newborns weighing less than 3000 g accounted for 33 (41%). The median (IQR) Apgar scores at one and five minutes after birth for infants were 9 (8 - 9) and 9 (9 - 10). Concerning the number of midwifery students' delivery assistance, the number of delivery assistance provided by eight midwifery students was 11 times for 2, 10 times for 4, and 9 times for 2, although not shown in the table, hence those mean were ten times. In the table, the number of cases in the two groups divided by the cut-off value 6 of the number of delivery assistance experiences of midwifery students was 40 cases each.

### 3.3. Univariate Analysis and Multivariate Analysis for the Self-Assessment Scores by the Categorical Variable of Characteristics

There was no significant difference between the number of midwifery students delivery assistance classified by the cut-off value's median of 6 and each characteristic variable except infants' birth weight ( $P = 0.04$ ) (Table 2). In the univariate and multivariate logistic regression analysis for the average of all 64 evaluation items in the Labor and Delivery Assistance Evaluation Sheets by characteristic variables, the crude OR and adjusted OR and CI (confidence interval) of the number of student delivery assistance of 6 and more times, was 11.86 [4.15, 33.89] ( $P < 0.001$ ) and 19.50 [4.98, 76.30] ( $P < 0.001$ ). The average of all 64 evaluation items from self-assessments by midwifery student labor and delivery assistance evaluation had been improved by accumulating experience in delivery assistance.

**Table 2.** Univariate analysis and multivariate analysis for the self-assessment scores by the categorical variable of characteristics.

Characteristics at delivery	n	Number of midwifery students' delivery assistance, time			‡P value	§Average of all 64 evaluation items Median (IQR)	Univariate analysis			Multivariate analysis	
		<6 n (%)	≥6 n (%)	†P value			¶P value	Crude OR [95% CI]	P value	Adjusted OR [95% CI]	¶¶P value
Parity	Primipara	40	20 (50)	20 (50)	1.0	2.8 (2.0 - 3.3)	0.56	0.82 [0.34, 1.97]	0.65	0.69 [0.21, 2.21]	0.53
	Multipara	40	20 (50)	20 (50)		2.9 (2.1 - 3.5)		Ref		Ref	
Birth-time	Daytime	44	25 (64)	19 (51)	0.26	2.6 (2.0 - 3.3)	0.12	0.65 [0.26, 1.61]	0.35	0.82 [0.25, 2.71]	0.75
	Nighttime	32	14 (36)	18 (49)		2.9 (2.6 - 3.5)		Ref		Ref	
Delivery style	Natural childbirth	51	24 (60)	27 (68)	0.49	2.9 (2.5 - 3.4)	0.13	1.72 [0.69, 4.41]	0.24	1.85 [0.53, 6.44]	0.34
	Others	29	16 (40)	13 (33)		2.5 (2.0 - 3.2)		Ref		Ref	
Sex of infant	Boys	48	21 (53)	27 (68)	0.17	2.9 (2.1 - 3.4)	0.50	1.52 [0.62, 3.78]	0.36	1.43 [0.42, 4.89]	0.57
	Girls	32	19 (48)	13 (33)		2.8 (2.1 - 3.3)		Ref		Ref	

## Continued

Infant's birth weight, g	≥3000	47	19 (48)	28 (70)	0.04	3.0 (2.4 - 3.5)	0.06	1.11 [0.45, 2.72]	0.82	0.37 [0.10, 1.44]	0.15
	<3000	33	21 (53)	12 (30)		2.7 (1.9 - 3.2)		Ref		Ref	
Apgar score <sup>1</sup>	≥9	58	27 (68)	31 (78)	0.32	2.8 (2.0 - 3.4)	0.88	0.78 [0.29, 2.08]	0.62	0.36 [0.10, 1.33]	0.18
	<9	22	13 (33)	9 (23)		3.0 (2.3 - 3.2)		Ref		Ref	
Apgar score <sup>2</sup>	≥9	76	38 (95)	38 (95)	1.0	2.8 (2.1 - 3.4)	0.71	1 [0.12, 8.68]	1.0	1.77 [0.15, 21.55]	0.65
	<9	4	2 (5)	2 (5)		2.9 (2.1 - 3.2)		Ref		Ref	
Number of midwifery students' delivery assistance, time	≥6	40	-	-		3.3 (2.9 - 3.8)		11.86 [4.15, 33.89]	<0.001	19.50 [4.98, 76.30]	<0.001
	<6	40	-	-	-	2.2 (1.9 - 2.8)	<0.001	Ref		Ref	

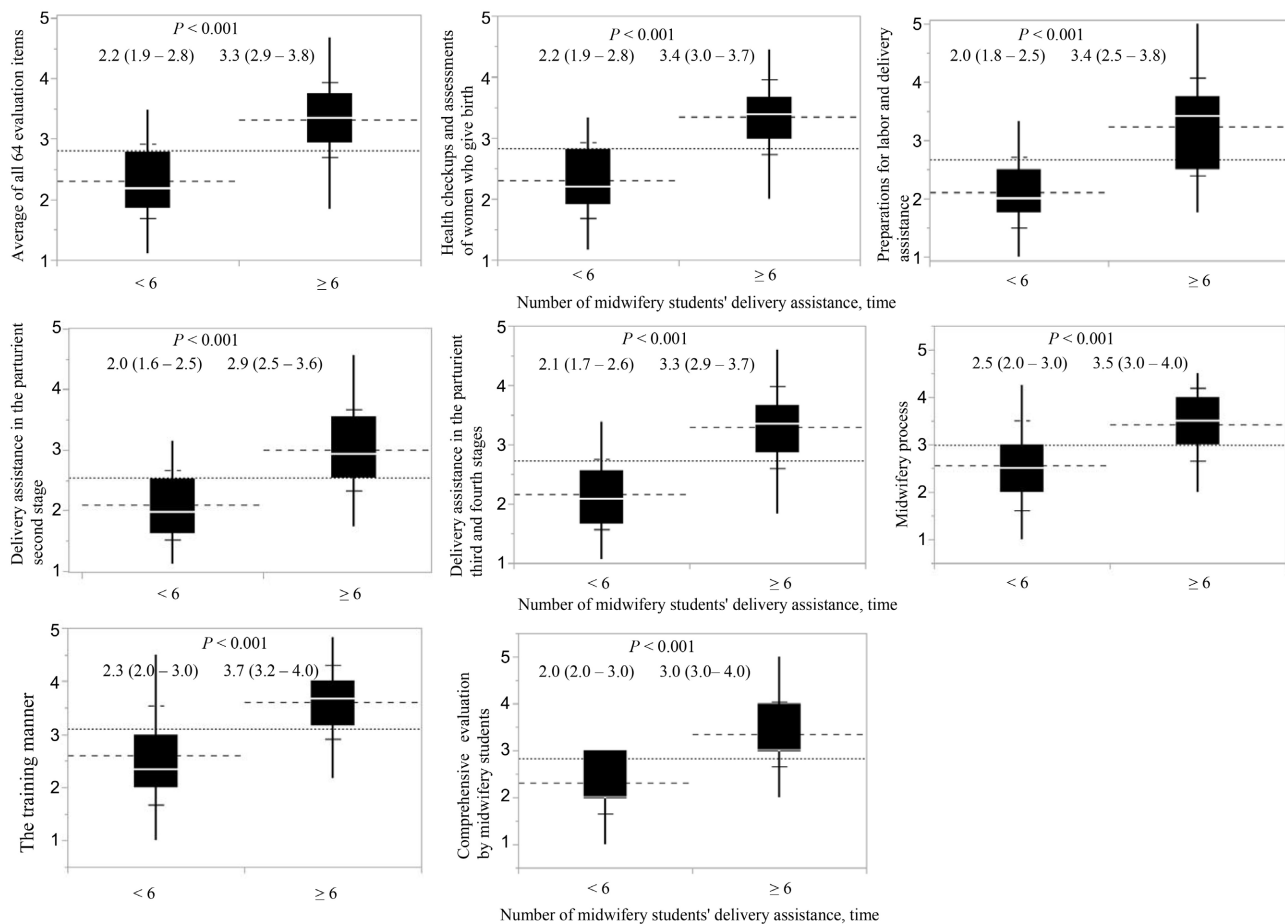
§Average of all 64 evaluation items from self-assessments by midwifery student labor and delivery assistance evaluation. IQR: interquartile range. OR: odds ratio. CI: confidence interval. Ref: Reference. Apgar score<sup>1</sup>: at 1 minute after birth for infants, Apgar score<sup>2</sup>: at 5 minutes after birth for infants. †*P* values are from Pearson's chi-square test analyzed on nonparametric comparisons for categorical variables of characteristics. This analysis concentrates on patients that underwent delivery between the two-period groups classified by the cut-off value's median 6 according to the number of delivery assistance experienced by the midwifery students. However, Fisher's exact test was used to determine differences in the number classified by Apgar score at 5 minutes after birth for infants at delivery. §*P* values are from the Mann-Whitney U test analyzed on nonparametric comparing the average of all 64 evaluation items from self-assessments by midwifery student labor and delivery assistance evaluation between every two groups of categorical variables in characteristics. ||*P* values are from logistic regression analysis indicating Crude odds ratio (OR) comparisons between every two groups of 2.79 or more and the group of that of less than 2.79 by the cut-off value's median 2.79 of the average of all 64 evaluation items from self-assessments. These comparisons were conducted by every two groups of categorical variables in characteristics of parity, birth-time, delivery stile, sex of infant, infant's birth weight, Apgar score at one or five minutes after birth for infants, and the number of midwifery students' delivery assistance. †*P* values are from logistic regression analysis indicating adjusted OR comparisons between each two groups of 2.79 or more and the group of that of less than 2.79 by the cut-off value's median 2.79 of the average of all 64 evaluation items from self-assessments. These comparisons were conducted adjusting all categorical variable in characteristics of parity, birth-time, delivery style, sex of infant, infant's birth weight, Apgar score at one or five minutes after birth for infants, and the number of midwifery students' delivery assistance. ††The whole model test was *P* < 0.001.

### 3.4. Advancement of Knowledge and Skills in the Experience Periods of Labor and Delivery Assistance by Midwifery Students

The result of comparing the average score of all 64 evaluation items, self-evaluation scores of the six classifications, and comprehensive evaluation score between the two-period groups classified by the median cut-off values, which were according to the number of cases of delivery assistance experienced by the midwifery students were shown in **Figure 2**.

The average score of all 64 evaluation items, self-evaluation scores of all six classifications, and comprehensive evaluation score were significantly higher in the number of delivery assistance experienced by the midwifery students of 6 or more times than in less than six times by the cut-off value's median 6. In addition, the self-evaluation scores of all six classifications by the students using this evaluation sheet had been improved by accumulating experience in delivery assistance.

Not shown in the table, in the experience periods of  $6 \leq$  times, the items with



**Figure 2.** Advancement of knowledge and skills in the experience periods of labor and delivery assistance by midwifery students. Each self-evaluation score in the six classifications of health checkups and assessments of women who give birth, preparations for labor and delivery assistance, delivery assistance in the parturient second stage, delivery assistance in the parturient third and fourth stages, midwifery process, the training manner, and comprehensive evaluation that students judged about acquisition all knowledge and skills for delivery assistance from self-assessments in midwifery student labor and delivery assistance evaluation is the average score of each evaluation item belonging to each classification. *P* values are from the Mann-Whitney U test analyzed on nonparametric comparing the average score of each evaluation item belonging to each of six classifications by the midwifery students of 6 or more times and the group of that of less than six times by the cut-off value median 6. Data show median (IQR: interquartile range).

a median of two are “Being able to tell the adaptation of amniotomy, and to judge and carry it out at an appropriate time” and “Being able to assist with laceration (incision) sutures.” The median (IQR) of the item “Being able to tell the adaptation of amniotomy, and to judge and carry it out at an appropriate time” by comparing the experiences of delivery assistances in two periods of <6 or 6 ≤ times was 1.5 (1 - 2.75) (n = 12) or 2 (1 - 3) (n = 10) (*p* = 0.30). The median (IQR) of the item “Being able to assist with laceration (incision) sutures.” by comparing the experiences of delivery assistances in two periods of <6 or 6 ≤ times was 1 (1 - 1) (n = 29) or 2 (1 - 2) (n = 17) (*p* = 0.045). Moreover, in all 63 detailed items except the item being able to tell the adaptation of amniotomy, and to judge and carry it out at an appropriate time, all scores were significantly elevated (*p* < 0.05).

### 3.5. Univariate Analysis and Multivariate Analysis for Self-Evaluation Scores in the Labor and Delivery Assistance Evaluation Sheets by the Number of Midwifery Students' Delivery

In the univariate logistic regression analysis for the average score of all 64 evaluation items, self-evaluation scores, and comprehensive evaluation score, the crude OR and CI of the number of midwifery students' delivery assistance of 6 and more times was 22.22 [7.47, 76.43],  $P < 0.001$  of delivery assistance in the parturient third and fourth stages that was the highest, and 7.43 [2.81, 21.50],  $P < 0.001$  of midwifery process that was the lowest in **Table 3**.

Moreover, in Multivariate analysis, adjusted OR comparing the average score

**Table 3.** Univariate analysis and multivariate analysis for self-evaluation scores in the labor and delivery assistance evaluation sheets by the number of cases of midwifery students' delivery.

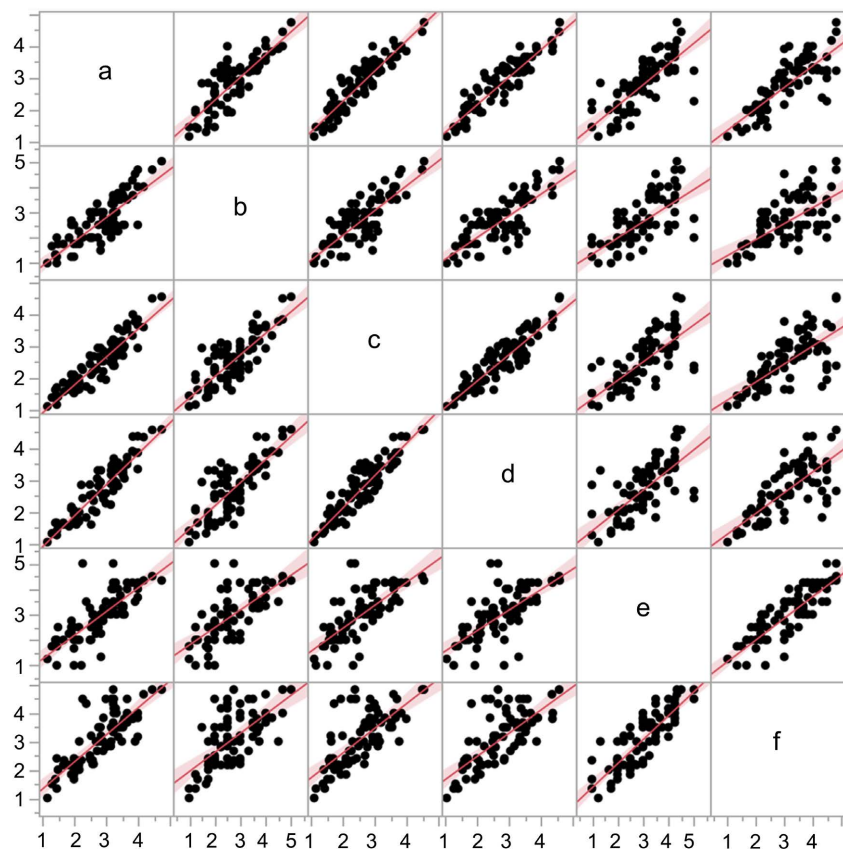
Classifications of the Labor and Delivery Assistance Evaluation Sheets	N	Number of midwifery students' delivery assistance, time $\geq 6$ or $< 6$				
		Crude OR [95% CI]	*P value	Adjusted OR [95% CI]	†‡P value	
Average of all 64 evaluation items	$\geq 2.79$	40	11.86 [4.15, 33.89]	$< 0.001$	19.50 [4.98, 76.30]	$< 0.001$
	$< 2.79$	40	Ref		Ref	
Health checkups and assessments of women who give birth	$\geq 2.92$	39	13.78 [4.95, 42.91]	$< 0.001$	19.09 [5.12, 71.28]	$< 0.001$
	$< 2.92$	41	Ref		Ref	
Preparations for labor and delivery assistance	$\geq 2.5$	48	10.52 [3.76, 33.60]	$< 0.001$	9.31 [2.78, 31.24]	$^{\$} < 0.001$
	$< 2.5$	32	Ref		Ref	
Delivery assistance in the parturient second stage	$\geq 2.53$	39	10.33 [3.83, 30.56]	$< 0.001$	12.68 [3.71, 43.37]	$< 0.001$
	$< 2.53$	41	Ref		Ref	
Delivery assistance in the parturient third and fourth stages	$\geq 2.75$	40	22.22 [7.47, 76.43]	$< 0.001$	28.51 [6.71, 121.03]	$< 0.001$
	$< 2.75$	40	Ref		Ref	
Midwifery process	$\geq 3$	46	7.43 [2.81, 21.50]	$< 0.001$	12.52 [3.10, 50.52]	$< 0.001$
	$< 3$	34	Ref		Ref	
The training manner	$\geq 3$	47	16.33 [5.51, 57.31]	$< 0.001$	20.49 [5.08, 82.62]	$< 0.001$
	$< 3$	33	Ref		Ref	
Comprehensive evaluation by midwifery students	$\geq 3$	52	17.25 [5.11, 80.45]	$< 0.001$	22.51 [4.25, 119.27]	$< 0.0001$
	$< 3$	26	Ref		Ref	

OR: odds ratio, CI: confidence interval, Ref: Reference. Comprehensive evaluation by midwifery students means that midwifery students judged about the acquisition of all knowledge and skills for delivery assistance from self-assessments in midwifery student labor and delivery assistance evaluation. \*P values are from logistic regression analysis indicating Crude odds ratio (OR) comparisons self-evaluation scores in the six classifications and comprehensive evaluation, and the average score of all 64 evaluation items between the two group of the number of cases of delivery assistance experienced by the midwifery students of 6 or more times and the group of that of less than six times by the cut-off value's median 6. †P values are from logistic regression analysis indicating adjusted OR comparisons between self-evaluation scores in the six classifications, the comprehensive evaluation, and the average scores of all 64 evaluation items between the two group of the number of cases of delivery assistance experienced by the midwifery students of 6 or more times and the group of that of less than six times by the cut-off value's median six adjusted of all categorical variable in characteristics of parity, birth-time, delivery style, sex of infant, infant's birth weight, Apgar score at one or five minutes after birth for infants, and the number of midwifery students' delivery assistance. ‡The whole model test was  $P < 0.001$ . §The whole model test was  $P < 0.002$ . Each of the six classifications was divided into two, with the median score as the cut-off.

of all 64 evaluation items, self-evaluation scores of the six classifications and comprehensive evaluation score, the adjusted OR, and CI (confidence interval) of the number of midwifery student' delivery assistance of 6 and more times adjusted of all categorical variable in characteristics of parity, birth-time, delivery style, sex of infant, infant's birth weight, Apgar score at one or five minutes after birth for infants, and the number of midwifery students' delivery assistance was also shown in **Table 3**. The table showed that 28.51 [6.71, 121.03],  $P < 0.001$  of delivery assistance in the parturient third and fourth stages was the highest, and 12.52 [3.10, 50.52],  $P < 0.001$  of Midwifery process was second lowest, and then 9.31 [2.78, 31.24],  $P = 0.002$  of preparations for labor and delivery assistance was the lowest.

### 3.6. Correlation Between self-Evaluation Scores of the Six Classifications in the Labor and Delivery Assistance Evaluation Sheets

The correlation coefficient and scatter plot matrix concerning the correlation between self-evaluation scores of the six classifications in the Labor and Delivery Assistance Evaluation Sheets were shown in **Table 4** and **Figure 3**.



**Figure 3.** Scatter plot matrix between classifications of self-evaluation in the labor and delivery assistance evaluation sheets. a: Health checkups and assessments of women who give birth; b: Preparations for labor and delivery assistance; c: Delivery assistance in the parturient second stage; d: Delivery assistance in the parturient third and fourth stages; e: Midwifery process; f: The training manner.

**Table 4.** Correlation between classifications of self-evaluation in the labor and delivery assistance evaluation sheets.

Valuable vs.	Valuable	Frequency	r	95% CI		*Pvalue	$\rho$	†Pvalue
Preparations for labor and delivery assistance	Health checkups and assessments of women who give birth	80	0.83	0.74	0.88	<0.001	0.81	<0.001
Delivery assistance in the parturient second stage	Health checkups and assessments of women who give birth	80	0.92	0.87	0.95	<0.001	0.91	<0.001
Delivery assistance in the parturient second stage	Preparations for labor and delivery assistance	80	0.81	0.72	0.88	<0.001	0.77	<0.001
Delivery assistance in the parturient third and fourth stages	Health checkups and assessments of women who give birth	80	0.92	0.87	0.95	<0.001	0.91	<0.001
Delivery assistance in the parturient third and fourth stages	Preparations for labor and delivery assistance	80	0.79	0.69	0.86	<0.001	0.76	<0.001
Delivery assistance in the parturient third and fourth stages	Delivery assistance in the parturient second stage	80	0.92	0.88	0.95	<0.001	0.91	<0.001
Midwifery process	Health checkups and assessments of women who give birth	80	0.78	0.68	0.85	<0.001	0.82	<0.001
Midwifery process	Preparations for labor and delivery assistance	80	0.66	0.52	0.77	<0.001	0.70	<0.001
Midwifery process	Delivery assistance in the parturient second stage	80	0.73	0.60	0.82	<0.001	0.76	<0.001
Midwifery process	Delivery assistance in the parturient third and fourth stages	80	0.72	0.59	0.81	<0.001	0.76	<0.001
The training manner	Health checkups and assessments of women who give birth	80	0.80	0.71	0.87	<0.001	0.80	<0.001
The training manner	Preparations for labor and delivery assistance	80	0.65	0.50	0.76	<0.001	0.65	<0.001
The training manner	Delivery assistance in the parturient second stage	80	0.70	0.57	0.80	<0.001	0.70	<0.001
The training manner	Delivery assistance in the parturient third and fourth stages	80	0.73	0.61	0.82	<0.001	0.73	<0.001
The training manner	Midwifery process	80	0.85	0.77	0.90	<0.001	0.85	<0.001
Comprehensive evaluation by midwifery students	Health checkups and assessments of women who give birth	78	0.86	0.79	0.91	<0.001	0.84	<0.001
Comprehensive evaluation by midwifery students	Preparations for labor and delivery assistance	78	0.81	0.72	0.88	<0.001	0.78	<0.001
Comprehensive evaluation by midwifery students	Delivery assistance in the parturient second stage	78	0.89	0.83	0.93	<0.001	0.87	<0.001
Comprehensive evaluation by midwifery students	Delivery assistance in the parturient third and fourth stages	78	0.89	0.83	0.93	<0.001	0.88	<0.001

**Continued**

Comprehensive evaluation by midwifery students	Midwifery process	78	0.68	0.54	0.78	<0.001	0.72	<0.001
Comprehensive evaluation by midwifery students	The training manner	78	0.68	0.54	0.79	<0.001	0.66	<0.001

r: Pearson's correlation coefficient,  $\rho$ : Spearman's rank-order correlation coefficient. \* $P$  value are from Pearson's correlation coefficient (r). † $P$  value are from Spearman's rank-order correlation coefficient ( $\rho$ ). Cronbach's alpha reliability (Standardized alpha) in the valuables of six classifications of health checkups and assessments of women who give birth, preparations for labor and delivery assistance, delivery assistance in the parturient second stage, delivery assistance in the parturient third and fourth stages, midwifery process, the training manner was 0.96. Cronbach's alpha reliability (Standardized alpha) with the valuable of comprehensive evaluation by midwifery students added to the valuables of six classifications was also 0.96. The two valuables for preparation for labor and delivery assistance and comprehensive evaluation by midwifery students do not have a normal distribution in the normality test by Shapiro-Wilk ( $P = 0.0507$  and  $P < 0.001$ ). However, every five valuables except those two items have a normal distribution.

Moderate to strong correlations were found among all variables. The items with the highest correlations were delivery assistance in the parturient second stage vs. health checkups and assessments of women who give birth ( $r = 0.92$ ,  $P < 0.001$ ), or delivery assistance in the parturient third and fourth stages vs. health checkups and assessments of women who give birth ( $r = 0.92$ ,  $P < 0.001$ ). Moreover, the items with the highest correlations were delivery assistance in the parturient second stage vs. delivery assistance in the parturient third and fourth stages ( $r = 0.92$ ,  $P < 0.001$ ). The relationship with the lowest correlation coefficient was between the training manner vs. preparations for labor and delivery assistance ( $r = 0.65$ ,  $P < 0.001$ ). Cronbach's alpha reliability (Standardized alpha) in the valuables of six classifications of health checkups and assessments of women who give birth, preparations for labor and delivery assistance, delivery assistance in the parturient second stage, delivery assistance in the parturient third and fourth stages, midwifery process, the training manner was 0.96. Cronbach's alpha reliability (Standardized alpha) with the valuable of comprehensive evaluation by midwifery students added to the valuables of six classifications was also 0.96.

#### 4. Discussion

Self-assessments in labor and delivery assistance evaluation sheets of midwifery students registered in an advanced midwifery course at Nursing College A were analyzed to clarify the current state of advancement of knowledge and skills in the educational process from self-assessments. The average score of all 64 evaluation items, every score of the six classifications, and the comprehensive evaluation score was significantly elevated in the experience periods of  $6 \leq$  times. There is little evidence in Japan of research on the relationship between the number of experiences of labor and delivery assistance by students and the improvement of students' knowledge and skills. With the declining birthrate, securing pregnant women to assist in delivery from 2020 to recent years was challenging due to the effects of the coronavirus pandemic. Based on our research results, assuming



that the cut-off value for the number of labor and delivery assistance to improve knowledge and skills is 6, it seems that midwifery students need at least six times, preferably ten times of labor and delivery assistance experience.

In the multivariate analysis by adjusting the categorical variable of characteristics of patients at delivery: parity, birth-time, delivery style, sex of infant, infants' birth weight Apgar score at one or five minutes after birth for infant, the average of all 64 evaluation items in the labor and delivery assistance evaluation sheets had been improved by accumulating experience of delivery assistance.

In addition, the delivery assistance technique was significantly improved in the variable of all six classifications. In Japan, the delivery assistance sheet used by midwifery students for practical training differs depending on the educational institution. However, the students' delivery assistance sheet in clinical training used in this study had a Cronbach's alpha reliability of 0.95. If it is assumed that there is reliability if it is 0.8 or more, it can be judged that it has sufficient internal consistency. Therefore, it is good to use this evaluation sheet for student education in the future.

Furthermore, since there was a strong correlation between the preparation for delivery assistance and the techniques for delivery assistance in the second and third stages of labor, it is necessary to master both techniques in parallel. Moreover, training in adaptation and enforcement of amniotomy and assistance skills for lacerations sutures will be needed in future educational challenges.

As the limit of this research, the study surveyed a few midwifery students; hence, it is necessary to continue using this labor and delivery assistance evaluation sheet and build further evidence. Since this evaluation sheet was conducted in Japanese, it is necessary to verify the quality of the evaluation sheet in English for medical facilities and educational institutions overseas, and also for international students in Japan. Therefore, in addition to the content validity by the experienced staff and the internal consistency of Cronbach's alpha, it will need to be verified as the quality of the evaluation sheet. It will also be necessary to clarify the relevance of 64 evaluation items in the future.

The core curricula of midwifery education are diverse, with an eye on social trends and health, medical and welfare directions, and being able to contribute to society as a midwife for lifelong sexual and reproductive health. Consequently, it is required for students to accept these values. Students must connect with the community based on multidisciplinary collaboration, be aware of the roles and responsibilities of midwives, and become autonomous and independent during training [11].

## 5. Conclusion

Self-assessments in labor and delivery assistance evaluation sheets of midwifery students registered in an advanced midwifery course at Nursing College A from 2017 to 2018 were analyzed to clarify the current state of advancement of knowledge and skills in the educational process from self-assessments. The average

score of all 64 evaluation items, every score of the six classifications, and the comprehensive evaluation score was significantly elevated in the experience periods of  $6 \leq$  times. This evaluation sheet has sufficient internal consistency and it is good to use this evaluation sheet for student education in the future. Moreover, training in adaptation and enforcement of amniotomy and assistance skills for lacerations sutures will be needed in future educational challenges.

### Author's Contribution

Yuko Harding participated in the conception and design, analysis, and interpretation of data, drafting the article, revising it for intellectual content, and final approval of the finished article.

### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

### References

- [1] Ministry of Education, Culture, Sports, Science and Technology (2017) Nursing Education Model-Core Curriculum-Regarding the Formulation of Learning Goals to Acquire "Practical Nursing Ability, which is The Core of The Bachelor's Degree Program". (In Japanese)  
[http://www.mext.go.jp/b\\_menu/shingi/chousa/koutou/078/gaiyou/1397885.htm](http://www.mext.go.jp/b_menu/shingi/chousa/koutou/078/gaiyou/1397885.htm)
- [2] Medical Education Division, Higher Education Bureau, Ministry of Education, Culture, Sports, Science and Technology-Japan (2020) The 11th Public Interest Incorporated Association, Japan Society Midwifery Education (Annual General Meeting, 2020 June 13), Current Status and Issues of Nursing Universities, Including trends in midwifery education. (In Japanese)  
[https://www.zenjomid.org/wp-content/uploads/2021/01/sokai20200613\\_takahashi.pdf](https://www.zenjomid.org/wp-content/uploads/2021/01/sokai20200613_takahashi.pdf)
- [3] Medical Education Division, Higher Education Bureau, Ministry of Education, Culture, Sports, Science and Technology-Japan (2017) The 8th Public Interest Incorporated Association, Japan Society Midwifery Education (Annual General Meeting, 2017 June 10) , Trends and Challenges in Midwifery Education at Nursing Universities. (In Japanese)  
[http://zenjomid.sakura.ne.jp/activities/img/2017sokai\\_seminar2.pdf](http://zenjomid.sakura.ne.jp/activities/img/2017sokai_seminar2.pdf)
- [4] Sakamoto, Y., Sakanashi, K., Yamamoto, Y. and Tajima, C. (1998) Degree of Midwifery Students' Acquisition of Delivery Assistant Skills and Number of Cases of Assistance. *Maternal Health*, **39**, 26-31. (In Japanese)  
<https://cir.nii.ac.jp/crid/1570854174713644032>
- [5] Tajima, C., Yoshida, K., Sakanashi, K. and Teraoka, S. (2007) A Study on the Advancement in the Midwifery Students' Assisting Technique: Based upon a Comparison of Their Self-Assessment Score between School Days and at Present. *Bulletin of Kumamoto University, School of Health Sciences*, **3**, 55-66. (In Japanese)  
<https://cir.nii.ac.jp/crid/1050282812905184512?lang=en>
- [6] Fujii, H., Mameishi, T., Ameko, H., Takigawa, S., Akamatsu, M., Shitami, C. (2012) A Study about Acquisition of Skills to Assist in Labor and Delivery of Midwifery Students: Self-Evaluation by Students of the Graduate Program in Midwifery. *Hu-*

- 
- manity, and Science. *Journal of the Faculty of Health and Welfare*, **12**, 117-127.  
<https://cir.nii.ac.jp/crid/1050564287423473280>
- [7] Ministry of Education, Culture, Sports, Science and Technology (2002) Act on Public Health Nurses, Midwives, and Nurses (Act No. 203 of July 30, 1948, Chapter I General Provisions, Article 3). [In Japanese]  
<https://www.mhlw.go.jp/shingi/2005/04/s0428-7f.html>
- [8] The American College of Obstetricians and Gynecologists (2015) The Apgar Score. *Committee Opinion*, No. 664, e52-e55.  
<https://www.acog.org/-/media/project/acog/acogorg/clinical/files/committee-opinion/articles/2015/10/the-apgar-score.pdf>
- [9] Simon, L.V., Hashmi, M.F. and Bragg, B.N. (2022) APGAR Score. StatPearls [Internet], Treasure Island (FL), StatPearls Publishing.  
<http://www.ncbi.nlm.nih.gov/books/nbk470569/>
- [10] Shishido, E., Yaju, Y. and Horiuchi, S. (2018) The Gap between Expectations and Realities of Pain and Fatigue in Women Receiving Epidural Anesthesia versus No Anesthesia. *Journal of Japan Academy of Midwifery*, **32**, 101-102.  
<https://doi.org/10.3418/jjam.IJAM-2017-0043>
- [11] Public Interest Incorporated Association, Japan Society Midwifery Education (2020) Concept of Core Curriculum in Desirable Midwifery Education. (In Japanese)  
[https://www.zenjomid.org/wp-content/uploads/2021/02/202006\\_corecurri\\_thinking.pdf](https://www.zenjomid.org/wp-content/uploads/2021/02/202006_corecurri_thinking.pdf)

## Appendix

### Labor and Delivery Assistance Evaluation Sheet

Student name:

Number of delivery assistance: Total cases ( cases of primiparas, cases of multiparous women)

Date and time of delivery: Year , month , day , am/pm hour min.

Sex of infant: male/female, Weight of infant: g, Apgar score: / (after 1 minute/5 minutes)

Delivery style (natural, induced, suction, scheduled cesarean section, emergency cesarean section), indications for abnormal deliveries:

Evaluation criteria: 5: I can do it voluntarily with instructions, when necessary, 4: I can do it with instructions and guidance, 3: I can do it with considerable instructions and guidance, 2: I can do it with full instructions and guidance, 1: I cannot do it even with instructions and guidance.

Evaluation item	Evaluator		Evaluation contents review
	Student	Instructor	
<b>Health checkups and assessments of women who give birth</b>			
1	I can grasp the pregnancy and delivery process of the maternity woman so far and grasp the whole picture of the maternity woman.		
2	I can observe the general condition and diagnose the time of delivery by interviewing and external examination.		
3	I can diagnose the progress of labor by pelvic examination (cervical dilation, effacement, station, consistency, position, etc).		
4	I can observe and diagnose the state of progress of labor and the fetus's health by the state of labor and CTG.		
5	I can observe and assist in inducing and promoting labor.		
6	I can observe and assist in membrane rupture (spontaneous rupture of membranes).		
7	I can diagnose the degree of fatigue and help with relaxation.		
8	I can diagnose and assist with nutritional intake.		
9	I can diagnose the progression inhibition due to bladder filling and assist in excretion.		
10	I can care for and help with cleanliness.		
11	I can teach breathing methods and assist related movements as well as explain the process of labor and delivery.		
12	I can be considerate and supportive of the maternity woman's family.		
13	I can give psychological support and supportive/receptive attitudes.		
<b>Preparations for labor and delivery assistance</b>			
14	I can prepare and arrange the delivery room and instruments at the time according to the condition of the mother.		
15	I can determine when to enter the delivery room and help a mother move.		
16	I can clean the vulva at the right time and in the prescribed way.		
17	I can judge and carry out hand washing and wearing gowns and gloves at the right time.		

---

**Continued****Delivery assistance in the parturient second stage**

- 18 I can prepare instruments and clean areas by utilizing the sterile technique.
- 19 I can observe the progress of labor due to pelvic examination and uterus contractions, and diagnose whether there is any abnormality.
- 20 I can diagnose the need for urinary catheterization and carry it out at the appropriate time and method.
- 21 I can tell the adaptation of amniotomy and judge and carry it out at an appropriate time.
- 22 I can do anal protection at the right time and in the right way to avoid anal lacerations.
- 23 I can adjust and guide the maternal pushing, breathing, and posture according to contractions and labor progress.
- 24 I can provide manual perineal protection at the right time and in the right way given the progress of labor.
- 25 I can adjust the delivery rate of the infant's head with my left hand to pass the 3rd rotation with the minimum circumference.
- 26 I can keep the infant in flexion until the occipital nodule slides under the pubic arch.
- 27 I can suppress the maternal pushing and adjust her breathing when the infant's head is delivered.
- 28 I can clean the area around the nose of the infant after the maternal delivery of her infant's head.
- 29 I can check the nuchal cord and assist when it occurs.
- 30 I can diagnose and assist the timing of the 4th rotation of the infant.
- 31 I can assist with delivery of the anterior shoulder and posterior shoulder.
- 32 I can get rid of perineal protective cotton.
- 33 I can adequately grasp the infant's trunk and deliver it along the pelvic lead.
- 34 I can check the delivery time.
- 35 I can lay the infant down in a safe place and the right direction.
- 36 I can clean the infant's face and help establish the first breath (suction when needed).

---

**Delivery assistance in the parturient third and fourth stages**

- 37 I can observe the whole body (existence of external malformations/delivery injuries, scoring Apgar score) while trying to keep the infant warm.
  - 38 I can perform umbilical cord clamping and omphalotomy appropriately.
  - 39 I can observe and disinfect after omphalotomy.
  - 40 I can carry out a face-to-face meeting with the mother and infant while watching the condition of the mother and infant.
  - 41 I can safely transfer the infant to an infant warmer.
  - 42 I can observe the state of uterine contractions and bleed after delivery of the infant.
-

**Continued**

---

- 43 I can see signs of placental abruption.
  - 44 I can help to deliver the placenta.
  - 45 I can do the first scrutiny of the placenta.
  - 46 I can observe uterine contractions after placental delivery.
  - 47 I can check for bleeding and point out any abnormalities.
  - 48 I can confirm the presence and degree of damage to the soft birth canal.
  - 49 I can assist with laceration (incision) sutures.
  - 50 I can observe general conditions, uterine contractions, and bleeding conditions and assist (comfort, bath, change clothes) at 1-hour and 2-hour postpartum.
  - 51 I can explain to the postpartum mother the process after the delivery until and after returning to their own room.
  - 52 I can measure the amount of bleeding and placenta.
  - 53 I can maintain, inspect, replenish, and clean up items of delivery.
  - 54 I can report to the instructor.
- 

**Midwifery process**

- 55 I can make a midwifery plan (initial plan).
  - 56 I can implement a midwifery plan, amend it, and re-plan it.
  - 57 I can look back on my midwifery care I have provided and evaluate the process.
  - 58 I can submit records (when necessary, I will submit after correction with the advice of the instructor).
- 

**The training manner**

- 59 I can understand the psychology of mothers and their family members, and am receptive and supportive of them.
  - 60 I can diagnose and implement priority items according to the mother's condition.
  - 61 I can maintain a relationship of trust with the mother and family.
  - 62 I always consider safety and comfort when conducting health checkups and treatments.
  - 63 I can learn actively and autonomously as well as practice responsibly and ethically.
  - 64 I can reflect on the pregnancy and childbirth experience with the mothers (reflection) and think about assistance for satisfying childbirth in the future.
- 

**Comprehensive evaluation**

---