

Development and assessment of the validity and reliability of a scale for measuring the mentoring competencies of Japanese clinical midwives: An exploratory quantitative research study



Yuri Hishinuma ^{a,*}, Shigeko Horiuchi ^b, Haruo Yanai ^b

^a Tokyo Metropolitan University, 7-2-10 Higashi-Ogu, Arakawa-ku, Tokyo 116-8551, Japan

^b St Luke's International University, 10-1 Akashi-cho, Chuo-ku, Tokyo 104-0044, Japan

ARTICLE INFO

Article history:

Received 25 July 2015

Received in revised form 10 March 2016

Accepted 18 March 2016

Available online xxxx

Keywords:

Midwife
Mentor
Mentoring competency
Educational measurement
Factor analysis
Scale development
Validity and reliability

ABSTRACT

Background: Midwives are always involved in educational activities whenever novice midwives are present. Although various scales for measuring the educational competencies of nurses have already been developed in previous studies, a scale for the educational competencies particular to midwives has yet to be developed, or even no previous studies have revealed their functions as clinical educators.

Objectives: The purpose of this study was to develop a scale to measure the mentoring competencies of clinical midwives (MCCM Scale) and to confirm its validity and reliability.

Design: An exploratory quantitative research study.

Methods: Questionnaires were distributed to 1,645 midwives at 148 facilities who had previously instructed novice midwives. 1,004 midwives (61.0%) voluntarily returned valid responses and 296 (18.0%) voluntarily agreed to participate in the survey for test–retest reliability.

Results: Exploratory factor analyses were performed over 41 items and the following seven factors were extracted with a reliability coefficient (Cronbach's α) of 0.953: (i) supporting experimental study, (ii) personal characteristics particularly in clinical educators, (iii) thoughtfulness and empathy for new midwives, (iv) self-awareness and self-reflection for finding confidence, (v) making effective use of the new midwives' own experience, (vi) commitment to educational activities, and (vii) sharing their midwifery practice. Test–retest reliability was measured based on a convenience sample of 246 (83.1%). Pearson's test–retest correlation coefficient for the entire scale was $r = 0.863$. The factor loadings of each item on its respective factor were 0.313–0.925. The total score of the MCCM Scale was positively correlated with that of the Quality of Nurses' Occupational Experience Scale ($r = 0.641$, $p = 0.000$) and was negatively correlated with the total score of the Japanese Burnout Scale ($r = -0.480$, $p = 0.000$).

Conclusion: The MCCM Scale is composed of 41 items and three subscales measured from a total of seven factors. The validity and reliability of the MCCM Scale was supported by the statistical analyses.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Achieving consensus on how to prepare a competent midwifery teacher is an urgent concern being addressed by many countries (World Health Organization (WHO), 2015). The qualities of educators involved in the process of clinical settings greatly influence students' quality of clinical learning and the characteristics the students will have as practitioners in the future (Hand, 2006; Hughes and Fraser, 2011). In light of this, the effectiveness of these educators' practical abilities has been elucidated and their role and functions have been evaluated from various domains (Chow and Suen, 2001; Licqurish and

Seibold, 2008). The English National Board (ENB) and Department of Health (2001) clearly defines a “mentor” as a nurse, midwife or health visitor who facilitates learning and supervises and assesses students in the clinical setting. The qualities and key activities particular to “good mentors” in midwifery have been identified (Jones, 2004; Hughes and Fraser, 2011) and the role and essential functions of such mentors have been outlined (Nursing and Midwifery Council (NMC), 2008).

In Japan, there are various courses for nurses to study to become midwives. In all courses, however, students should first be qualified as nurses. To obtain a midwifery qualification, all nurses must have assisted in about 10 deliveries during their practical training. Clinical midwives offer instruction in all cases where students provide delivery assistance. Midwives simultaneously provide care for parturient women during delivery and coordinate student practical training. They also sometimes provide instruction in the necessary knowledge, skills, and attitudes. In

* Corresponding author.

E-mail addresses: yuri_hs@tmu.ac.jp (Y. Hishinuma), shigeko-horiuchi@slcn.ac.jp (S. Horiuchi), hyantai@slcn.ac.jp (H. Yanai).

other words, midwives responsible for clinical education in midwifery practice must bear the responsibility of both providing care to parturient women and educating students (Hishinuma et al., 2015).

In practical training for delivery assistance, the midwife first confirms that the admitted parturient woman has given her consent to be under the care of a midwifery student. Once the parturient woman has given her consent, the educator contacts the student and the student begins intrapartum care. After the student has greeted the parturient woman and her family, they must promptly gather information to make a diagnosis and devise a nursing plan. The educator provides education to the student while simultaneously continuing to provide care to the parturient woman. As labor progresses, the necessary specialist knowledge and midwifery skills become more complex. Nonetheless, students must provide care by developing various midwifery skills together with the educator. Educators are required to ensure that quality education is provided to students in situations where the safety of the mother and child is of top priority. Hishinuma et al. (2015) defined the features of the mentoring competencies of clinical midwives (MCCM) assuming a construct formed of the following three concepts: “competencies as a professional (CP)”, “competencies as an educator (CE)” and “personal characteristics”. However, a scale for the educational competencies particular to midwives has yet to be developed, or even the features of excellent practical abilities for clinical education that midwives should have remained to be determined.

The aim of this study was therefore to conduct a survey of midwives who have already been involved in educational activities for novice midwives in order to specify the features of the practical abilities possessed by these midwives, and to develop a scale that can objectively evaluate the educational competencies of clinical midwives. The scale developed in this study is expected to be a useful educational resource for hospital organizations aiming to build and advance educational system in their facilities.

1.1. Operating Definitions

In this study, the following definitions were used after the Hishinuma et al.'s (2015) definitions.

1. New midwife – a pre-registered midwife or a midwife who was newly qualified within the past year.
2. Mentoring competency – the term used for “educational competency” in this study.
3. Mentoring competencies of clinical midwives (MCCM) – the mentoring competency that midwives exercise when they conduct educational activities for new midwives in clinical settings.

2. Methods

2.1. Design

This was an exploratory quantitative research study, planned as a continuation of Hishinuma et al.'s (2015) study, and was implemented in the following three phases: (1) developing a scale for measuring MCCM (hereafter “MCCM Scale”), (2) confirming the construct of the MCCM Scale, and (3) confirming the validity and reliability of the MCCM Scale.

2.2. Settings and Participants

First, 623 obstetrics facilities were selected from a list of 3,200 facilities (large hospitals, small clinics, and maternity centers) compiled by an Internet search with the exception of the facilities that were asked to participate in Hishinuma et al.'s (2015) questionnaire survey. The administrators and nurse managers of each facility were sent a written request explaining the purpose and protocol of the study and asking for permission to conduct the study in their facility. As a result, 238 (38.2%) facilities returned written informed consent and 148 (21.7%) facilities agreed to

participate in the study. The questionnaires were then distributed to the 1,645 midwives who belonged to those 148 facilities and had been involved in educational activities with new midwives at least once.

2.3. Questionnaire

The questionnaire distributed in this study was comprised of the following three items: the initial version of the MCCM Scale (i-MCCM Scale), the Quality of Nurses' Occupational Experience Scale (QNOES) (Suzuki et al., 2004), and the Japanese Burnout Scale (BO Scale) (Kubo and Tao, 1992).

The i-MCCM Scale was comprised of 41 items on a five-point Likert scale, which Hishinuma et al. (2015) proposed as a future instrument for measuring the mentoring competencies of clinical midwives. Hishinuma et al. (2015) assumed that the midwives' practical abilities for clinical education could be defined by three concepts: CP, CE, and PC (Fig. 1). Then, Hishinuma et al. (2015) collected descriptions relevant to the abilities, created a primitive form of a five point-Likert questionnaire and conducted a survey with the resulting questionnaire. In the survey, 694 midwives were asked to participate and 451 (65.0%) valid responses were received and analyzed. Hishinuma et al. (2015) performed exploratory factor analyses and nine sub-concepts and 41 items that described the competencies more specifically were extracted. The reliability of this 41-item questionnaire, as the i-MCCM Scale, was supported by the overall reliability coefficient (Cronbach's $\alpha = 0.944$) and the factorial validity was also supported by the values of the factor contribution ratio of each factor (44.0–81.2%). Hishinuma et al. (2015) concluded that the competencies required for midwives who educate new midwives or who actually develop the behavior, thoughts, and attitudes of midwives in clinical settings could be defined by the three concepts mentioned above and that the 41-item questionnaire could explain the features of such competencies. Therefore, we started this study using the previously developed 41-item questionnaire with a five point-Likert scale as the i-MCCM Scale.

For the purpose of assessing the validity of the i-MCCM Scale, especially the criterion-related validity, we included QNOES and the BO Scale in the questionnaire. QNOES was developed to evaluate the quality of nurses' occupational experiences. 618 valid responses were analyzed and high internal consistency (Cronbach's $\alpha = 0.945$) was indicated. Pearson's test-retest correlation coefficient was $r = 0.811$ ($p = 0.000$). We thought that midwives' educational activities were affected by what they had learned from their senior staff. Therefore, we hypothesized that midwives with high quality occupational experience could exercise their mentoring competencies much better. That is, we supposed that there would be a positive relationship between the MCCM Scale score and that of QNOES.

Additionally, the BO Scale was included for the same purpose. Kubo and Tao (1992) revised the BO Scale developed by Tao (1989). Tao and Kubo (1994) confirmed the structure of the scale with a sample of 976 nurses. Additionally, Kubo (2007) confirmed the factorial and construct validity of the BO Scale with a sample of 1,897 nurses. We presumed that midwives who were not motivated in their jobs would also be unmotivated to be involved in any kind of educational activities. Therefore, we hypothesized that midwives who exhibit excellent practical abilities for clinical education have a lower tendency for burnout. That is, we supposed that there would be a negative relationship between the MCCM Scale score and that of the BO Scale.

When we decided to utilize QNOES and the BO Scale, we contacted the original authors by email and by written form to explain the outline of our study and to ask for permission to use their scales. Both of the authors approved our request.

2.4. Data Collection and Analyses

The procedure for data collection and analysis was threefold. First, we specified the structure of the MCCM Scale. Second, to confirm the

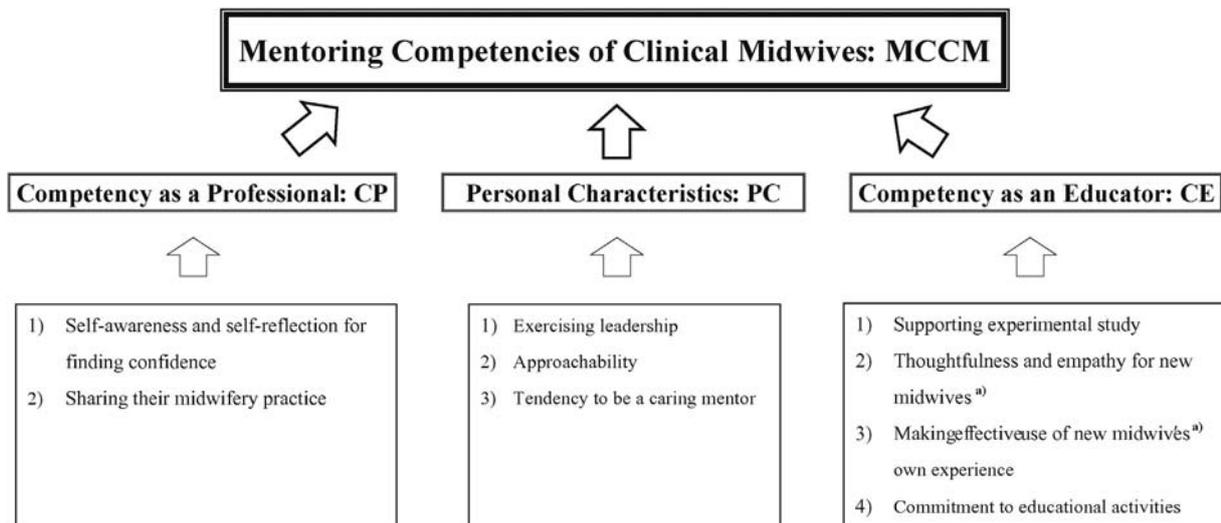


Fig. 1. Conceptual framework of the mentoring competencies of clinical midwives. a) “New midwives” refers to “student midwives and midwives that have been licensed within the past year”.

validity of the MCCM Scale, we assessed the construct validity and criterion-related validity. Finally, to confirm the reliability, we assessed the internal consistency and stability.

We decided to refer to Hishinuma et al. (2015) questionnaire as the i-MCCM Scale and to conduct an exploratory factor analysis. Then, the results of our analyses were compared with Hishinuma et al. (2015) study to identify the structure of the i-MCCM Scale. Additionally, the conceptual framework of the i-MCCM Scale was developed referring to Fig. 1.

In the second phase, to assess the conceptual integrity of the factors extracted in the first phase, principal component analysis was performed on the groups containing each concept and each factor respectively, and the factor contribution ratio of the principal component was extracted. Moreover, to confirm the criterion-related validity, the scores of the three scales (the i-MCCM Scale, QNOES and BO Scale) were compared.

Finally, in the third phase, to confirm the internal consistency, Cronbach's α was calculated for the entire i-MCCM Scale and for each extracted factor. Moreover, to confirm the stability, midwives were asked to participate in a test–retest survey and to provide their contact information if they consented. Then, Pearson's test–retest correlation coefficient was verified. All data were analyzed using SPSS 19.0 for Windows.

2.5. Ethical Considerations

Along with the request to cooperate in the study, administrators and nurse managers were provided with an explanation of the purpose, outline, and ethical considerations of the study in writing, and orally if necessary. In particular, it was explained that participation in the study was voluntary, that returning the questionnaire was taken as consent to participate in the study, and that the anonymity of the facilities and persons involved would be protected. In addition, all of the processes involved in this study were conducted in accordance with the research plan as approved by the ethics review committee at the authors' institutions (approval number 09–1001).

3. Results

Requests to participate in the study were sent and data were collected in July–October 2009. 61.3% of the midwives ($n = 1009$) returned the questionnaires and 1004 valid responses (61.0%) were analyzed.

3.1. Descriptive Statistics

Of the total 1004 subjects, 60.1% were in their 20s or 30s, and 77.8% worked in a hospital. 75.9% had already assisted in more than 100 deliveries. With respect to educational activities, 37.2% had been responsible for pre-registered midwives' clinical education. In particular, 40.2% had experience as an instructor in assisting deliveries (Table 1).

After classifying the 41 items into each factor and concept, each factor consisted of 3 to 10 items and the three concepts consisted of 7, 24, and 10 items, respectively. Computing scores on each element, the subjects had an average score of 63.3% as a whole, an average score of 57.2–68.6% for each concept, and an average score of 68.6–82% for each factor (Table 2).

3.2. Determinants of the Structure of the Scale

To determine the structure of the MCCM Scale, exploratory factor analysis was performed. Principle component analysis with Promax rotation was conducted for the 41-item i-MCCM Scale. First, to determine the initial solution, an eigenvalue of 1 or more was taken to indicate a factor. Items were adopted for single factors if the factor loading was 0.40 or more and for multiple factors if the factor loading was less than 0.40.

As a result, the following seven factors were generated and named according to the theoretical underpinning of the study and to reflect the theme of the factor items themselves: (i) supporting experimental study, (ii) personal characteristics particularly in clinical educators, (iii) thoughtfulness and empathy for new midwives, (iv) self-awareness and self-reflection for finding confidence, (v) making effective use of the new midwives' own experience, (vi) commitment to educational activities, and (vii) sharing their midwifery practice (Tables 2, 3).

Referring to the results described above and considering the relationships between the main concept of this study (MCCM) and the three concepts and seven factors assumed as sub-concepts of MCCM, the conceptual framework of MCCM was modified (Fig. 2). The validation and reliability of the i-MCCM Scale was assessed based on the modified framework.

3.3. Assessment of the Validity of the Scale

As mentioned above, the concept of MCCM was described by seven factors. To confirm the construct validity of the scale, the correlation

Table 1
Characteristics of the respondents and descriptive findings (N = 1,004).

Variable frequency (%)		
Age (years)	20–29	269 (26.8)
	30–39	334 (33.3)
	40–49	266 (26.5)
	50–59	118 (11.8)
	Over 60	15 (1.5)
	No response	2 (0.2)
Affiliation	National and public hospitals	214 (21.3)
	Academic medical center	140 (13.9)
	Private hospital	427 (42.5)
	Clinic	127 (12.6)
	Maternity center	17 (1.7)
	No response	79 (7.9)
Number of deliveries assisted in after receiving midwife qualification	Less than 10	13 (1.3)
	10–99	222 (22.1)
	100–499	540 (53.8)
	Over 500	222 (22.1)
	No response	7 (0.7)
Educational activity experience ^a	Mentor of pre-registered nurses	563 (56.1)
	Length of experience (years)	6.91 ± 5.93 (range: 1–34)
	Mentor of pre-registered midwives	373 (37.2)
	Length of experience (years)	5.56 ± 5.19 (range: 1–30)
	Instructor of assisting deliveries	403 (40.2)
	Length of experience (years)	5.73 ± 5.46 (range: 1–30)
	Faculty member	50 (5.0)
	Length of experience (year)	4.04 ± 3.33 (range: 1–13)

^a Multiple answers permitted.

coefficients between two factors were assessed and no combination showed a coefficient of 0.70 or more (Table 3). That is, it was concluded with certainty that the seven latent factors of the concept of MCCM were distinguished and that they expressed the different respective aspects of the MCCM concept. Then, matching these seven factors with the original conceptual framework (Fig. 1), it was determined that the concept of “CP” was governed by the two sub-concepts of <self-awareness and self-reflection for finding confidence> and <sharing their midwifery practice>, and the concept of “CE” was governed by four sub-concepts including <supporting experimental study>. For the concept of “PC”, it was determined that there was only a single factor with

items for specializing in the traits of midwives involved in clinical education; this factor was named <personal characteristics particularly in clinical educators> (Fig. 2). Additionally, the factor loadings of each item on their respective factors were 0.313–0.925. All items were confirmed to have high factor loadings of 0.45 or more on a single factor. No items were confirmed to have factor loadings of 0.40 or more on multiple factors. However, item 56 adopted in factor v showed a loading of only 0.313 on its respective factor. Additionally, the square sums of factor loadings of each factor were 4.235–11.786.

Secondly, confirming the criterion-related validity, the total score of the i-MCCM Scale was positively correlated with that of QNOES ($r = 0.641$, $p = 0.000$) and was negatively correlated with the total score of the BO Scale ($r = -0.480$, $p = 0.000$) (Table 2).

3.4. Assessment of the Reliability of the Scale

The internal consistency using Cronbach's α was 0.953 for the entire i-MCCM Scale, $\alpha = 0.822$ –0.947 for the three concepts, indicating high internal consistency, and $\alpha = 0.662$ –0.916 for each factor (Table 2).

Subsequently, to assess stability, test–retest reliability was conducted after a 19.5-day period and was based on a convenience sample of 246 midwives from among the 296 subjects who voluntarily agreed to participate and provided their contact information when returning the questionnaire. Pearson's test–retest correlation coefficient for the entire scale was sufficient at $r = 0.863$ ($p = 0.00$).

4. Discussion

4.1. Structure of the MCCM Scale derived from the present results

Hishinuma et al. (2015) hypothesize that the MCCM assuming a construct formed of the three concepts (Fig. 1). Hishinuma et al. (2015) first created 142 items representing the characteristics of the behaviors and thoughts of clinical midwives providing clinical education and then, examined the face and content validity. Thereafter, a nationwide pilot study survey was conducted and an exploratory factor analysis was performed, revealing nine latent factors defining MCCM. The present study was considered a basic study to further develop the MCCM Scale created in Hishinuma et al. (2015) study. Moreover, the reliability and validity of the scale to be developed was examined by developing exploratory quantitative research with a different target group of midwives than that used by Hishinuma et al. (2015). Factor

Table 2
MCCM scores, and the validity and reliability of the MCCM Scale; factor contributions of the principal component, coefficients of correlations (r) between scores of the MCCM Scale, QNOES and BO Scale, internal consistency reliability coefficients (Cronbach's α), and the Pearson's test–retest correlation coefficient (r).

Items (number of items: full points)	MCCM Score Mean ± SD	FCPC (%)	Coefficients of correlation		ICRC	T-RCC
			MCCM–QNOES	MCCM–BO		
Construct concept: Mentoring competencies of clinical midwives (41 items: 205)	129.8 ± 19.2	35.9	0.641 ($p = 0.00$)	–0.480 ($p = 0.00$)	0.953	0.863 ($p = 0.00$)
Concept 1: competencies as a professional: CA (7 items: 35)	26.7 ± 4.43	49.0	0.532 ($p = 0.00$)	–0.323 ($p = 0.00$)	0.822	0.850 ($p = 0.00$)
Factor iv Self-awareness and self-reflection for finding confidence (4 items: 20)	14.5 ± 3.07	66.0	0.580 ($p = 0.00$)	–0.386 ($p = 0.00$)	0.823	0.869 ($p = 0.00$)
Factor vii Sharing their midwifery practice (3 items: 15)	12.2 ± 1.98	60.2	0.431 ($p = 0.00$)	–0.307 ($p = 0.00$)	0.662	0.721 ($p = 0.00$)
Concept 2: competencies as an educator: CE (24 items: 120)	68.7 ± 10.4	45.8	0.586 ($p = 0.00$)	–0.408 ($p = 0.00$)	0.947	0.796 ($p = 0.00$)
Factor i Supporting experimental study (10 items: 50)	38.5 ± 6.86	57.4	0.498 ($p = 0.00$)	–0.287 ($p = 0.00$)	0.916	0.752 ($p = 0.00$)
Factor iii Thoughtfulness and empathy for new midwives ^a (4 items: 20)	16.4 ± 2.59	72.1	0.348 ($p = 0.00$)	–0.250 ($p = 0.00$)	0.871	0.662 ($p = 0.00$)
Factor v Making effective use of new midwives ^a own experience (6 items: 30)	23.5 ± 3.93	59.7	0.472 ($p = 0.00$)	–0.284 ($p = 0.00$)	0.863	0.689 ($p = 0.00$)
Factor vi Commitment to educational activities (4 items: 20)	14.4 ± 3.25	61.8	0.469 ($p = 0.00$)	–0.392 ($p = 0.00$)	0.791	0.828 ($p = 0.00$)
Concept 3: personal characteristics: PC (10 items: 50)	34.3 ± 7.17	51.5	0.557 ($p = 0.00$)	–0.530 ($p = 0.00$)	0.894	0.851 ($p = 0.00$)
Factor ii Personal characteristics particularly in clinical educators (10 items: 50)	34.3 ± 7.17	51.5	0.557 ($p = 0.00$)	–0.530 ($p = 0.00$)	0.894	0.851 ($p = 0.00$)

BO: the Japanese Burnout Scale; FCPC: factor contribution ratio of the principal component (extracted from principal component analysis); ICRC: internal consistency reliability coefficients (represented by Cronbach's alpha); MCCM: mentoring competencies of clinical midwives; QNOES: the Quality of Nurses' Occupational Experience Scale; SD: standard deviation; T-RCC: the Pearson's test–retest correlation coefficient.

^a “New midwives” refers to “student-midwives and midwives licensed within the past year”.

Table 3
Factor structure matrix of the concept of “mentoring competencies of clinical midwives” with factor loadings, square sum of factor loadings, and correlation coefficients (N = 1,004).

Items	Factor loadings						
	i	ii	iii	iv	v	vi	vii
Factor i: supporting experimental study							
108. Toward new midwives ^a , ask a new midwife the reasons “why she practiced that way”.	0.925	0.034	-0.101	-0.104	0.117	-0.202	-0.017
60. Toward new midwives ^a , explain what they experienced in connection with knowledge or theory based on the textbooks.	0.817	-0.083	0.007	0.116	-0.100	0.056	-0.080
73. Toward new midwives ^a , tell new midwives directly about their growth as a midwife.	0.764	0.063	0.076	-0.128	0.021	0.023	-0.003
72. Toward new midwives ^a , judge the right moment to give feedback to new midwives ^a .	0.753	0.026	-0.019	-0.024	0.066	0.060	-0.020
106. Toward new midwives ^a , identify “what the new midwife has learned” while practicing with me.	0.752	0.025	-0.055	-0.079	0.084	0.081	-0.041
45. Toward new midwives ^a , convey my expectations clearly.	0.714	-0.032	0.058	0.125	-0.131	0.050	0.014
91. Toward new midwives ^a distinguish situations in which to mentor kindly or harshly.	0.699	-0.049	-0.100	0.109	-0.129	0.151	0.008
107. Toward new midwives ^a , identify “the new midwife’s successes” while practicing with me.	0.638	0.010	0.092	-0.073	0.255	-0.131	0.007
61. Toward new midwives ^a , explain the rationale underlying my own practical care.	0.563	0.030	0.002	0.072	0.058	0.071	0.014
68. Toward new midwives ^a , encourage new midwives to be proactive and independent in my own way.	0.524	0.000	0.027	0.142	0.047	0.177	-0.021
Factor ii: personal characteristics particularly in clinical educators							
119. Have a friendly conversation with anybody.	0.050	0.850	0.137	-0.048	-0.015	-0.225	0.064
121. Have a wide circle of acquaintances.	0.031	0.778	0.020	0.046	-0.050	-0.113	-0.005
120. Be the first to talk when meeting someone new.	0.063	0.775	0.133	-0.070	-0.150	-0.004	0.029
122. Have a cheerful and amusing personality.	-0.071	0.756	0.047	0.017	0.035	-0.204	0.099
125. Work on anything aggressively.	0.005	0.730	-0.063	0.124	0.044	0.054	-0.022
132. Take care of others for the fun of it.	0.098	0.653	-0.037	-0.196	-0.060	0.244	-0.018
129. Take action soon after coming up with an idea.	-0.030	0.620	-0.111	0.041	-0.014	0.166	-0.080
128. Always enthusiastic.	-0.068	0.589	-0.056	0.153	0.005	0.251	-0.091
131. Always willing to assist those in need.	-0.083	0.559	0.016	-0.202	0.080	0.374	0.031
126. Taking the lead in certain tasks.	-0.022	0.464	-0.164	0.392	0.098	0.117	-0.001
Factor iii: thoughtfulness and empathy for new midwives ^a							
90. Toward new midwives ^a , show an empathetic attitude.	-0.013	0.040	0.806	-0.008	-0.041	0.156	-0.015
89. Toward new midwives ^a , try to match their pace.	-0.054	-0.065	0.797	0.129	0.096	0.051	-0.006
98. Toward new midwives ^a , make conversation caring about their feelings.	0.028	0.023	0.775	0.039	0.017	0.094	-0.077
86. Toward new midwives ^a , respect their position as students or new midwives.	-0.018	0.026	0.746	0.148	0.055	0.057	-0.027
Factor iv: self-awareness and self-reflection for finding confidence							
2. Handle the situation calmly even if there are several tasks to perform at the same time.	0.028	-0.070	0.103	0.882	0.012	-0.074	-0.029
5. Have sufficient expert knowledge necessary for practice.	-0.002	-0.101	0.103	0.845	-0.021	0.031	0.046
27. Realize my own growth as a midwife when reflecting on my clinical experience.	0.000	0.054	0.097	0.713	0.055	-0.090	0.037
127. Ability to act decisively among colleagues.	-0.048	0.386	-0.133	0.598	0.105	-0.022	-0.123
Factor v: making effective use of the new midwives ^a own experience							
58. Monitor new midwives ^a engaged in practical care on their own initiative.	-0.025	-0.037	0.083	0.058	0.759	0.052	0.041
55. Coordinate circumstances to enable new midwives ^a to engage in as many practical opportunities as possible.	-0.048	-0.084	-0.050	-0.026	0.674	0.416	0.060
63. Respond carefully and accurately to new midwives ^a questions.	0.242	-0.045	0.048	0.116	0.605	-0.052	-0.093
71. Provide appropriate feedback when monitoring new midwives ^a engaged in practical care.	0.268	0.012	-0.021	0.085	0.593	0.001	0.009
62. Confirm that new midwives ^a understand the explanations that are given.	0.386	0.068	0.015	-0.080	0.563	-0.181	0.048
56. Toward new midwives ^a , encourage them to participate in my practical care opportunities.	0.232	0.030	0.105	-0.202	0.313	0.215	0.139
Factor vi: commitment to educational activities							
81. Toward new midwives ^a , make an effort to engage them in conversation.	0.049	0.076	0.273	-0.193	-0.075	0.691	0.025
52. Perceive the challenge and enjoyment of instructing new midwives ^a .	-0.067	0.042	0.048	0.033	0.269	0.653	-0.010
8. Toward new midwives ^a , communicate the challenge, enjoyment and other appealing aspects of being a midwife.	0.201	0.063	0.136	0.044	-0.154	0.580	0.056
43. Make preparations to instruct new midwives ^a .	0.171	-0.142	-0.090	0.147	0.259	0.501	-0.009
Factor vii: sharing their midwifery practice							
13. Talk with my colleagues about circumstances experienced at the clinical placement.	-0.172	0.011	-0.034	-0.102	0.184	0.008	0.915
6. State my own opinion when other staff are developing midwifery diagnoses or nursing processes.	0.164	-0.016	-0.121	0.187	-0.192	0.129	0.654
14. Ability to tell others exactly how I felt at that time when reflecting on a situation.	0.102	0.031	0.047	0.407	-0.040	-0.061	0.450
Square sum of factor loadings after Promax rotation	11.786	8.439	6.074	8.420	8.247	8.341	4.235
Correlation coefficients between factors							
i	-	0.388	0.447	0.556	0.611	0.554	0.383
ii		-	0.270	0.465	0.292	0.439	0.287
iii			-	0.180	0.369	0.362	0.261
iv				-	0.409	0.469	0.370
v					-	0.408	0.217
vi						-	0.283
vii							-

^a “New midwives” refers to “student-midwives and midwives licensed within the past year”.

analysis was performed in both studies using the same 41 items; however, in Hishinuma et al.'s (2015) study, exploratory factor analysis was only conducted in each concept in compliance with the hypothesis that MCCM were defined by three concepts. However, items were not classified according to each concept in the present study; seven latent factors defining MCCM were first revealed in a factor analysis of all 41

items for the MCCM construct. Thereafter, the seven latent factors were regarded as sub-concepts of the MCCM, unlike the hypothesis made by Hishinuma et al. (2015), and the conceptual framework of the MCCM was created (Fig. 2). This conceptual framework was confirmed as the construct of the MCCM Scale in the present study and examination of the scale validity and reliability was continued.

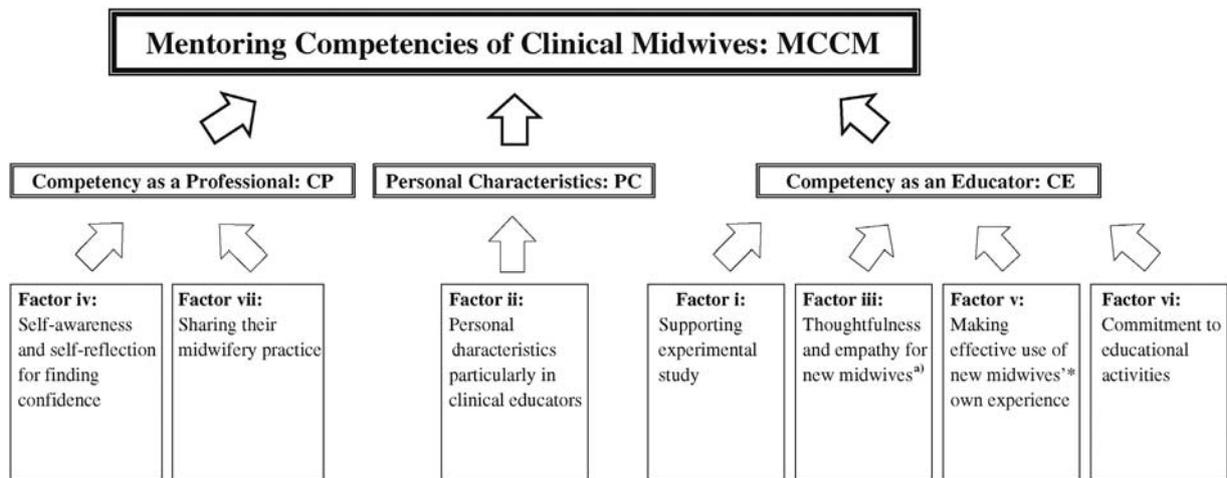


Fig. 2. Modified conceptual framework of the mentoring competencies of clinical midwives, indicating the structure of the MCCM Scale. a) “New midwives” refers to “student midwives and midwives that have been licensed within the past year”.

4.2. Validity of the MCCM Scale

Validity was examined by principal component analysis in which MCCM was regarded as a single component. This analysis found that the factor contribution ratio of the first principal component was 35.9%, revealing that the MCCM ratio explained by the 41 items was less than 40%. However, the fact that about 50% of the CP, CE, and PC were explained by their respective constituent item groups, and that 51.5–72.1% of each sub-concept (factor) was explained by the respective constituent item group suggested that factorial validity was mostly supported.

Moreover, a significantly high positive correlation was seen between the MCCM score and the QNOES score ($r = 0.641$, $p = 0.00$). These findings supported the hypothesis that midwives with high quality occupational experience exhibit better practical abilities for clinical education. Meanwhile, a significant negative correlation was seen between the MCCM score and BO score ($r = -0.480$, $p = 0.00$). This supported the hypothesis that midwives who exhibit excellent practical abilities for clinical education have a lower tendency for burnout.

We were able to support the criterion-related validity and the validity of the MCCM Scale together with the above-mentioned factorial validity by using two existing scales with supported reliability and validity.

4.3. Reliability of the MCCM Scale

In the examination of reliability, the reliability coefficient (Cronbach's α) calculated from the score of all 41 items composing the MCCM was high ($\alpha = 0.953$) and the reliability coefficient calculated for each concept was similarly high (CP, $\alpha = 0.822$; CE, $\alpha = 0.947$; PC, $\alpha = 0.894$). This confirmed that the reliability of the scale was supported. However, a reliability coefficient of 0.70 or higher is said to be preferable (Nunnally and Bernstein, 1994), suggesting the need to perform another examination of the items composing <sharing their midwifery practice>, which was extracted as the seventh factor.

On the other hand, 246 of the 1004 subjects took the i-MCCM Scale again after an average of 19.5 days. Comparison of the results for the first and second tests (test and retest) revealed a strong correlation in the MCCM score ($r = 0.863$, $p = 0.00$) and strong correlations in each of the three concepts (CP, $r = 0.850$, $p = 0.00$; CE, $r = 0.796$, $p = 0.00$; PC, $r = 0.851$, $p = 0.00$). Meanwhile, the correlation between the test and retest was weak at $r < 0.70$ when the third factor, <thoughtfulness and empathy for new midwives>, and fifth factor, <making effective use of the new midwives' own experience>, were compared with the

other factors. We assumed that the majority of participants were engaged in midwifery training when this study was conducted in 2009 because 37.2% of the 1004 subjects had experience in midwifery training and 403 subjects had experience in providing education on delivery assistance. We also speculated that the period during which subjects answered the questionnaires overlapped with the period during which they were providing midwifery training (including delivery assistance training) from July to October. This suggested that the 246 subjects who participated in this study and answered the 41 questions included some individuals who were strict in their self-assessments when they looked back on their attitudes and the quality of their educational activities. These facts need to be taken into account when examining the practical applications of this scale.

4.4. Practical Abilities for Clinical Education Expected of Midwives

Professional competence has been focused from the viewpoint of evaluating the educational activities (Johnsen et al., 2002). The concept of “CP” was set also as a factor defining the practical abilities for clinical education of midwives in the present study; however, the features of this concept were summarized into two sub-concepts: self-insight to raise confidence and sharing midwifery practices. To date, clinical educators have been expected to be role models (Richmond, 2006; Hughes and Fraser, 2011) and to develop their own knowledge, skills, and behavior (NMC, 2008; WHO, 2014) through knowledge-based practice and demonstrating effective relationships with patients and clients (English National Board and Department of Health, 2001). However, the results of the present study suggest that when midwives fulfill the role of clinical educator, they not only possess extensive expert knowledge and develop excellent clinical judgment and an ability to take action (items 2, 5), but they also reflect on their practice as a professional and place great significance on experiencing self-growth with a positive attitude (item 27). Moreover, as midwives grow, they place greater significance on sharing each other's clinical practices (item 127). Hughes and Fraser (2011) reported that students also expect their mentors to be evidence-based reflective practitioners. The act of reflecting on actions and experiences has recently attracted interest (Burns and Bulman, 2000). This reflection is said to be founded on the importance of skills such as “self-awareness” and “description” through narrative or writing (Burns and Bulman, 2000). Miwa (2006) discussed that the significance of talking about each other's experiences and that the topics discussed can serve as learning resources. Lennox (2013) described the effectiveness of mentors and mentees sharing their life experiences, and the importance of nurturing reflective conversations among mentors. In Japan, mentors customarily facilitate “*furikaeri* (reflection)” each time students provide delivery

assistance. Hishinuma (2010) concluded that “*furikaeri*” is an essential teaching/learning strategy for supporting and promoting reflection in students, using discussions to share experiences. This implies that sharing richer learning resources by reflecting on individual clinical experiences, devoting oneself every day to one’s work to gain confidence, and discussing individual experiences is what helps midwives grow as practitioners.

Meanwhile, the educational activities of nurse educator have also been evaluated from the perspective of teaching skills (Johnsen et al., 2002). Mentors are expected to facilitate and assess students’ leaning and to create a learning environment (NMC, 2008). As an example of these educational elements, the present study demonstrated the importance of clearly presenting what students have achieved and learned (items 106, 107) by linking what students have practiced with existing learning (item 60) and providing feedback at the appropriate time (item 72) in order to render students’ learning experiences as teaching materials (factor 1). This particularly applies to midwives providing clinical education. Moreover, in clinical settings where students are prone to nervousness and anxiety, respecting that students are in the position of “pupil” (item 86), sympathizing with the students’ circumstances (item 90), and making an effort to match one’s pace to that of students if the circumstances permit (item 89) were found to be important in order to nurture trainees.

The human nature required of clinical educators has been discussed from the perspectives of personality and relationships with students (Johnsen et al., 2002). Students regard their relationships with their mentors as fundamental to their confidence in midwifery practice (Hughes and Fraser, 2011). Furthermore in Japan, the turnover rate of full-time nursing staff has been viewed as a problem in recent years (Japanese Nursing Association, 2014). Reported reasons for the turnover of novice nurses in particular include factors attributed to human relations in the workplace (Mizuta, 2004). Meanwhile, the NMC (2008) expects mentors to exercise leadership and to establish effective working relationships. Licqurish and Seibold (2008) noted that supportive student–mentor relationships enhance the student’s learning in practice. The MCCM factors found in the present study were similarly composed of item groups representing the exhibition of leadership qualities (items 125, 126, 127, 128), sociability (items 119, 120, 121), and good nurturing abilities (item 131, 132). As stated before, we were able to characterize the top nine practices of midwives into approaches such as questioning the reasons behind the actions of new midwives and confirming the achievements and learning of new midwives in their own words. These approaches of educators are assumed to skillfully elicit reflection and verbalization of new midwife practices. The findings of this study also suggested that <personal characteristics particularly in clinical educators> are an important element in order to smoothly and effectively develop these approaches.

4.5. Study Limitations and Future Prospects

The MCCM Scale developed in this study was found to be supported in terms of validity, but in terms of internal consistency, some sub-concepts (factors) exhibited a reliability coefficient of less than 0.70, suggesting the need to select items more carefully.

This scale was designed to evaluate MCCM. It is not easy for clinical midwives to calmly answer all 41 items in the free time between their busy duties. If this scale is to be put into practical use as an educational or evaluation instrument in the future, items will need to be selected more carefully and a scale with fewer items and higher reliability and validity will need to be created.

5. Conclusions

We propose the MCCM Scale for measuring the mentoring competencies of midwives involved in clinical education as the outcome of this study. This scale is composed of 41 items rated on a 5-point scale and three subscales measured from a total of seven factors. The reliability and validity of the MCCM Scale was supported by the statistical analyses.

Acknowledgments

The authors would like to thank the administrators, nurse managers and midwives who participated in this study.

References

- Burns, S., Bulman, C., 2000. *Reflective Practice in Nursing*. Blackwell Science, Oxford.
- Chow, F.L., Suen, L.K., 2001. Clinical staff as mentors in pre-registration undergraduate nursing education: students’ perceptions of the mentors’ roles and responsibilities. *Nurse Educ. Today* 21 (5), 350–358.
- English National Board, Department of Health, 2001. *Preparation of Mentors and Teachers: A Framework of Guidance*. Department of Health and English National Board, London.
- Hand, H., 2006. Promoting effective teaching and learning in the clinical setting. *Nurs. Stand.* 20 (39), 55–63.
- Hishinuma, Y., 2010. The meaning of students’ learning through debriefing sessions during clinical practice from the perspectives of midwives’. *Maternal Health* 50 (4), 637–645 (Japanese).
- Hishinuma, Y., et al., 2015. Factors defining the mentoring competencies of clinical midwives: an exploratory quantitative research study in Japan. *Nurse Educ. Today* <http://dx.doi.org/10.1016/j.nedt.2015.08.024>.
- Hughes, A.J., Fraser, D.M., 2011. “There are guiding hands and there are controlling hands”: student midwives experience of mentorship in the UK. *Midwifery* 27 (4), 477–483.
- Japanese Nursing Association, 2014. *The Turnover Rate of Full-time Nursing Staff in 2013*. (Available from: <http://www.nurse.or.jp/home/opinion/news/2014/03-02.html> [Accessed 8th March 2015]).
- Johnsen, K.O., et al., 2002. Nurse educator competence: a study of Norwegian nurse educators’ opinions of the importance and application of different nurse educator competence domains. *J. Nurs. Educ.* 41 (7), 295–301.
- Jones, D., 2004. An evaluation of midwifery mentors and their perception of mentoring. *MIDIRS Midwifery Dig.* 14 (2), 157–162.
- Kubo, M., 2007. The factorial and construct validity of the Japanese burnout scale. *J. Sci. Labour* 83, 39–53 (Japanese).
- Kubo, M., Tao, M., 1992. The measurement of burnout. *Jpn. Psychol. Rev.* 35 (3), 361–376 (Japanese).
- Lennox, S., 2013. Top ten tips for mentoring in midwifery. *Essent. MIDIRS* 4 (5), 27–31.
- Licqurish, S., Seibold, C., 2008. Bachelor of midwifery students’ experiences of achieving competencies: the role of the midwife preceptor. *Midwifery* 24 (4), 480–489.
- Miwa, S., 2006. Teaching power of teachers expected in the twenty first century. *Educ. Med.* 54 (9), 4–11 (Japanese).
- Mizuta, M., 2004. Job adjustment among new graduate nurses: factors which influence reality shock and recovery. *J. Jpn. Soc. Nurs. Res.* 91–99.
- Nunnally, J.C., Bernstein, I.H., 1994. *Psychometric theory*, third ed. New York, McGraw-Hill.
- Nursing and Midwifery Council, 2008. *Standard to Support Learning and Assessment in Practice: NMC Standards for Mentors, Practice Teachers and Teachers*, second ed. Nursing and Midwifery Council, London.
- Richmond, H., 2006. Mentoring in midwifery. *Off. J. R. Coll. Midwives* 9 (11), 434–437.
- Suzuki, M., et al., 2004. A study on quality of occupational experiences which hospital nurses have: development of the quality of nurses occupational experience scale (QNOES). *Jpn. Acad. Soc. Nurs. Educ.* 13 (1), 37–50 (Japanese).
- Tao, M., 1989. Burnout — organizational stress held in a person engaged in human service. *Jpn. J. Soc. Psychol.* 4, 91–97 (Japanese).
- Tao, M., Kubo, M., 1994. The study of burnout among nurses — relationships between stress and burnout. *Jpn. J. Exp. Soc. Psychol.* 34(1), 33–43.
- World Health Organization, 2014. *Midwifery Educator Core Competencies*. (Available from: http://www.who.int/hrh/nursing_midwifery/13012WHO_Midwifery_educator_core_competencies.pdf (Accessed 10th March 2016)).
- World Health Organization, 2015. *Midwifery Educator Core Competencies: Building Capacities of Midwifery Educators*. (Available from: http://www.who.int/hrh/nursing_midwifery/14116_Midwifery_educator_web.pdf (Accessed 10th March 2016)).