VALIDATION OF THE INTERPROFESSIONAL COLLABORATIVE COMPETENCY ATTAINMENT SURVEY (ICCAS): A PILOT STUDY IN THE MATERNITY AND CHILD HEALTH CARE SETTING

Nur Zainie Abd Hamid[1,*],Siti Zaleha Abdul Rasid, PhD[2,]

[1]*Azman Hashim International Business School, Universiti Teknologi Malaysia, 54100 Kuala Lumpur, Malaysia & Faculty of Business and Management, Universiti Teknologi MARA Kedah, 08400 Merbok, Kedah Malaysia*
[2]*Azman Hashim International Business School, Universiti Teknologi Malaysia, 54100 Kuala Lumpur, Malaysia*
*For correspondence; Tel. + (60) 01110903040, E-mail: nurzainieabdhamid@gmail.com
*For correspondence; Tel. + (60) 0193756310, E-mail: sitizaleha.utm@gmail.com

ABSTRACT: *Global maternal mortality rates show serious concerns that require active and aggressive action. As a long-term solution, linking the interprofessional competencies and the outcomes of patient care has been emphasized by researchers in the couple of years. This has been a priority discussion in the maternal care. The purpose of this study was to obtain further evidence regarding the validity and reliability of an instrument to measure the self-reported competencies of interprofessional care in a different setting, which is in the Maternity and Child Healthcare in Malaysia. The pilot study of this quantitative and cross-sectional study was done by using the survey as the research instrument. The Interprofessional Collaborative Competency Attainment Survey (ICCAS), an existing instrument was adapted to measure the attitude and behavior of healthcare professionals in the interprofessional collaboration process. Sixty health care professionals in the Maternity and Child Health clinics in Kedah, Malaysia completed the modified instrument. The internal consistency estimates for the reliability of each subscale ranged from 0.745 to 0.920, with an overall reliability of 0.923. The psychometric analysis of this instrument supports its value in measuring interprofessional collaborative competencies within healthcare teams, particularly in the Maternity and Child Healthcare setting.*

Keywords: Interprofessional collaborative competency, Interprofessional collaboration, Maternal care

1. INTRODUCTION

Statistic reported that approximately 830 women die from pregnancy and childbirth-related causes [1]. What is surprising is that all these deaths can be treated and prevented. About 99% of all maternal deaths happen in the developing countries. This includes Malaysia where statistical data show that maternal deaths are 40 per 100,000 live births in the year 2015 (Figure 1). Although mortality rates show a decline in trend compared to the previous year, this still raises concerns among the public as well as the practitioners. Adding another concern is that healthcare needs and demands are becoming more complex and quick adjustment should be taken to deal with this situation.

Today, improving maternal health has been a focus. All women require access to health care before, during and after pregnancy. They need support to ensure the health of the mother as well as the child because both are closely linked. It is realized that, it is particularly important for women to be attended by skilled healthcare workers along these periods so that, unwanted events can be prevented to avoid maternal deaths. Therefore, to always provide safety services, healthcare system cannot rely solely on the ability of an individual health worker, but they need to rely on a more effective way of group work [2]. Investigations in the maternity care in Australia found that, poor collaboration is one of the contributing factors of the maternal death [3]. Therefore, this study suggested Interprofessional Collaboration as the key solution to the issue. IPC is a team-based approach where skilled healthcare workers work together for a common purpose [4]. It has been identified as a key for strengthening the healthcare system, while at the same time improving the outcomes across many healthcare settings [5].
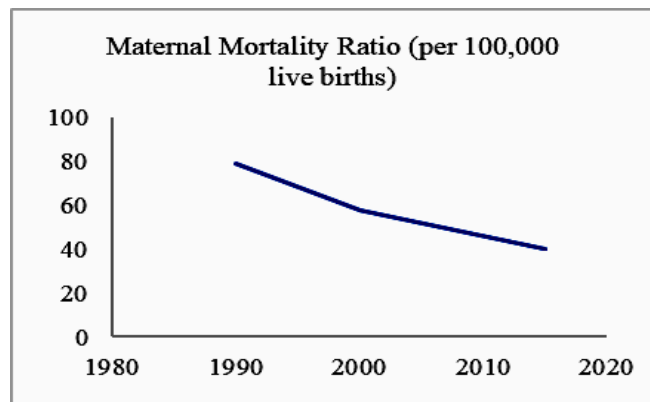
**Fig. (1): The Maternal Mortality Ratio in Malaysia (1990 - 2015)
Source: World Health Organization (2016)**

In IPC, healthcare workers require knowledge and skills to work together to assemble respect, values and knowledge. It is believed that healthcare workers should hold sufficient skills for the sake of patient safety. Researchers have recognized three types of competencies from an interprofessional perspective that need to be held by a health practitioner; common competencies, individual professional competencies or complementary competencies and interprofessional collaborative competencies [6]. Among these three, interprofessional collaborative competencies are the most important for practitioners or healthcare workers to engage effectively and collaboratively with others in an interprofessional team. The collaborative competencies are essential to achieving interprofessional collaboration. According to Gilbert, these are referring to a complex integration of knowledge, skills, attitudes, values and

judgments that allow health workers to work in all collaborative environments [7].

The recent study argued that difficulties in working across different disciplines have cause problem to the nature of healthcare system [8]. Together, several recommendations were made for the inclusion of the interprofessional collaborative competencies in the undergraduate curriculum structure. In fact, it has been emphasized to remedy weaknesses in the knowledge and attitude of healthcare workers in the team-based practice. However, at the same time, this may be a loss to healthcare workers who have practised in the industry for years, particularly before the implementation of the new curriculum structure. This is because the traditional health educational system prepared the graduates using the independent-based educational system where they are trained in silos and rely much on the individual competencies [9]. Such practice works separately or individually and causes healthcare needs and demands to be unattainable [10]. Therefore, to work with the gap, the level of interprofessional collaborative competencies should be first examined and identified to determine the required level of improvement.

It is recognized that, a very limited study on IPC and collaborative competencies produced in Malaysia. To the researchers' knowledge, this will be the first study conducted in Malaysia in the Maternity and Child Healthcare setting. In fact, this is the first study that will evaluate and determine the level of collaborative competencies among healthcare workers here. The objective of this paper is to discuss the reliability and validity analysis of the Interprofessional Collaborative Competency Attainment Survey (ICCAS), the instrument that will be used in the study to assess the interprofessional collaborative competencies level of healthcare workers in the Maternity and Child Healthcare setting, Malaysia.

1.1 Existing Measures of Interprofessional Collaborative Competencies

There is a growing body of literature on IPC. Although it has been emerged for several decades [11], however, throughout the effort to search for an established instrument for measuring interprofessional collaborative competencies, the researchers realized that there is a limited number of instrument available to be used. Some of them are Interprofessional Education Collaborative (IPEC) Competency Survey, Interdisciplinary Education Perception Scale (IEPS), Readiness for Interprofessional Learning Scale (RIPLS), Attitudes toward Health Care Teams Scale (ATHCTS), Interprofessional Attitude Scales (IPAS), TeamSTEPPS Teamwork Perceptions Questionnaire (T-TPQ), Attitudes to Health Professional (AHPQ) and Interprofessional Collaborative Competency Attainment Survey (ICCAS). Most of the existing instruments are focusing on evaluating behavioral change [9]. On average, the instruments have been used two to five times. Among the existing instruments, one of the frequently adapted instruments is Interprofessional Education Collaborative (IPEC) Competency Survey. The instrument was developed by a collaborative representative from six national professional associations and disciplines including nursing, osteopathic medicine, public health, pharmacy, dental

education and medical colleges. This instrument is used to measure the level of competence in health specifically.

Initially, the instrument was developed with 42 items, comprising of 4 sub-scales; values and ethics, roles and responsibilities, interprofessional communication and teams and teamwork. However, due to a high number of items, this has become a significant weakness to this study as it may affect respondents' responses at the end of the study. Therefore, by considering the uniqueness of healthcare workers (nature of work, limited time etc.), the researchers decided to adopt the ICCAS. The instrument consists of 20 items with 6 sub-scales and works best on behaviour-based evaluation. Archibald, Trumpower and MacDonald offered a promising psychometric value with 0.98 to the researchers [12]. However, the setting and respondents are different from the current research, where the current research focusing on the practising health workers in the Maternity and Child Healthcare. Therefore, further reliability and validity psychometric value are needed.

2. METHODOLOGY
2.1 Research Design

This pilot study took place in December 2017 after six months of instrument development process. This study relied on quantitative and empirical approaches to determine the level of interprofessional collaborative competencies among healthcare workers. These approaches are appropriate to examine the prediction of individual behavior [13]. Cross sectional survey was designed to enable the researchers to get the snapshot of the phenomenon under investigation. The aim of this pilot study was to seek for potential improvement in the initial survey designed.

2.2 Questionnaire Development

The survey development process started with the creation of the preliminary instrument. Kinds of literature were systematically reviewed to identify the common and reliable instrument used in the study field. As a result, the ICCAS was adopted as the instrument to measure the collaborative competencies among healthcare workers. Developed by Archibald, Trumpower and MacDonald, ICCAS is a self-assessment tool that contains 20 items [12]. Initially, the ICCAS is intended to measure the self-reported interprofessional competencies in interprofessional education programs [7]. However, this study employed the instrument in a cross-sectional study to assess the self-report competencies of healthcare professionals who have practised in the industry, particularly in the Maternity and Child Healthcare.

All 20 collaborative competencies measurement items were adapted from the original ICCAS instrument. The competencies were divided into 6 components including communication, collaboration, role and responsibility, collaborative patient/ family-centred approach, conflict resolution and team-based. Each item was assigned to 5-point Likert scale as adopted by a number of researchers to evaluate the human behavior (Table 1).

Table 1: 5-point Likert Scale

Indicator	Scale
1	Strongly Disagree
2	Disagree
3	Neither Agree nor Disagree
4	Agree
5	Strongly Agree

Moreover, there were two validity approaches used in this study; content and construct validity. The instrument was checked by two academicians and two industry experts to identify any error and ambiguity. They were contacted by phone and e-mail to review the measurement items for clarity and comprehensiveness. The feedback from the experts will be used to enhance the depth of understanding of the potential field study respondents. The outcome was strong support for the measurement items with a recommendation for inclusion of a definition for interprofessional collaboration and interprofessional collaborative competencies. Additionally, the experts recommended that the instrument should be prepared in bi-language (English and Malay) to ease the understanding of the respondents. They also agreed that the number of items should be maintained as the study is established for healthcare workers whose nature of work are unique and may not have much time to entertain a time-consuming survey. Revisions were made, and the instrument was finalizing for data collection.

2.3   Ethical Consideration
Prior to the data collection, the researchers have consulted the National Medical Register (NMMR), an organization under the Ministry of Health, Malaysia to know the steps that should be taken to include the public health setting as the population of study. As a result, three levels of ethics approvals were obtained. The initial conversation was done through a phone with the Medical Research Officer. Then, the subsequent conversations were done through e-mail.

First, the approval of the NMMR was obtained. This process involved the submission of application forms online through the organization's website. The researchers were required to submit the research proposal, cover letter as well as the inform consent form to be used in the study. Then, approval was obtained from Kedah State Health Department to indicate that the study can be done across the Health Clinics in the state of Kedah, Malaysia. The letter of approval signed by the Head of Public Health Unit, Kedah State Health Department was then sent to all Health Department in 11 districts to inform about the research and data collection processes being conducted. These two approval processes took about three months to complete. Lastly, after the primary approvals have been obtained, the researchers seek for the willingness to engage in the research at the time the surveys were distributed. Figure 2 shows the approval processes passed by the researchers.
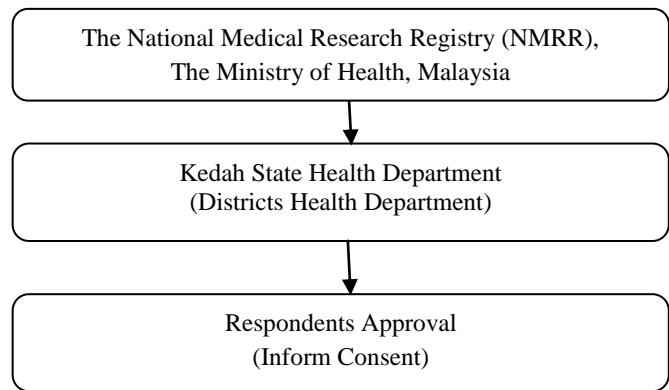
Fig. (2): The Approval Processes

2.4   Sampling and Recruitment
The study population consisted of healthcare workers who involved in the Maternity and Child Healthcare in the state of Kedah, Malaysia. 10 to 30 respondents were suggested appropriate for a pilot study [14], however, the researchers decided to distribute the designed instrument to 60 healthcare workers. Young, Johnson and VanGeest suggested that the survey conducted among healthcare workers should be higher than expected sample size [15]. This is because previous studies involving surveys distribution conducted among them show a decline in the response rate. They appeared reluctant to be the participant due to several factors identified including their heavy and unique workload. In this pilot study, they were conveniently approached in 3 Maternity and Child Health unit at three Health Clinics in Kedah, Malaysia. All medical doctors and nurses at all levels were recruited as the study's respondents.

The data collection method was through survey distribution. Each respondent received a cover letter and a consent form at the time the survey was administered to them by hand. Those who were reluctant to answer the survey are excluded from the study. Only those who were willing and agreed to sign the consent form included in the study. They were approached personally to ensure that, they will be able to understand the purpose of the study and the measurement items. The surveys were completed and collected within five days of working day.

2.5   Data Analysis
For data analysis, the entire responses obtained were analyzed using the Statistical Package for the Social Science Software (SPSS) version 21.0. This is the most common software used by the researchers in the social science field. Descriptive statistics and Cronbach's Alpha reliability coefficient were used.

Table 2: Reliability Analysis

No.	Component	No. of Item	Cronbach's Alpha
Components of Interprofessional Collaborative Competency Attainment Survey (ICCAS)			
1	Communication	4	0.849
2	Collaboration	3	0.865
3	Roles and Responsibilities	4	0.838
4	Patient-centred Care	3	0.745
5	Conflict Resolution	3	0.920
6	Team Functioning	2	0.826

Table 3: Item-to-Total Correlation Analysis

No.	Statement	Item-to-total correlation
1	I promote effective communication among members of an interprofessional (IP) team.	.529
2	I actively listen to IP team members' ideas and concerns.	.809
3	I express my ideas and concerns without being judgmental.	.469
4	I provide constructive feedback to IP team members.	.742
5	I express my ideas and concerns in a clear, concise manner.	.723
6	I seek out IP team members to address issues	.621
7	I work effectively with IP team members to enhance care.	.806
8	I learn with, from and about IP team members to enhance care.	.792
9	I identify and describe my abilities and contributions to the IP team.	.763
10	I am accountable for my contributions to the IP team.	.840
11	I understand the abilities and contributions of IP team members.	.782
12	I recognize how others' skills and knowledge complement and overlap with my own.	.384
13	I use an IP team approach with the patient to assess the health situation.	.636
14	I use an IP team approach with the patient to provide whole person care.	.607
15	I include the patient/family in decision-making.	.484
16	I actively listen to the perspectives of IP team members.	.863
17	I take into account the ideas of IP team members.	.889
18	I address team conflict in a respectful manner.	.768
19	I develop an effective care plan with IP team members.	.703
20	I negotiate responsibilities within overlapping scopes of practice.	.703

3. RESULTS
3.1 Respondent Characteristics
A total of 60 respondents completed and volunteered to participate and answer the ICCAS instrument. The relatively high participation rate was due to the ability of the researchers to entertain each respondent during the data collection process. 1.67% (n=1) was male and 98.33 (n=59) were female. On average, most of them aged between 31 to 40 years old (55.0%) and married (96.7%). One-third (33.3%) have working experience of 5 to 9 years in the industry and 36.7% have working experience of 10 years and above in the Maternity and Child Health setting.

3.2 Reliability Analysis
The purpose of this research paper was to develop a psychometric support and evidence of the ICCAS instruments employed. The reliability analysis was conducted by computing the Cronbach's alpha for each measurement variable before the researchers can proceed with the actual

study [16]. It is applied to measure the consistency of instrument used for the population under study, in ensuring the stability of the measurement items used in the study.

In order to guarantee the reliability of the instrument, 60 set surveys were analyzed. Table 2 shows the reliability result run for all the sub-components of ICCAS. As depicted in Table 2, the reliability analysis found that the Cronbach's alpha value of all sub-components ranged from 0.745 to 0.920, with the overall reliability of 0.923. According to Magal et al. and Nunnally, value above 0.70 is acceptable and therefore, all sub-components measures were found to have significant values and above the acceptable level [17-18].

Then, to confirm the coefficient alpha results, item-to-total correlations were calculated for all 20 items (Table 3). The value will determine the degree of correlation for each item. All 20 items were found to have an acceptable item-to-total correlation above the acceptable limit 0.3 and the correlation ranged from 0.384 to 0.889. Therefore, the results of the analysis indicated that there will be no single item removed from the research scale for further study and all sub-components in ICCAS are reliable and valid to be used in the actual study.

4.   DISCUSSION
This study produced a further psychometrically sound measure for self-reported competencies of ICCAS in the new setting. The instrument consists of 20 items representing by 6 sub-scale of interprofessional collaborative competencies (1) communication - 5 items, (2) collaboration - 3 items, (3) Roles and Responsibilities - 4 items, (4) patient-centered care - 3 (5), conflict resolution - 3 items and (6) team functioning - 2 items. The results of the item-to-total correlation and Cronbach's alpha are presented and summarized in Table 1 and 2.

The study results provide evidence and suggest strong support for internal consistency reliability and construct validity, showing promise for the instrument practical utility. All the values confirmed that the study instrument and scales used possess a satisfactory level of reliability and acceptable for conducting further data collection process. These reliability findings are in line with the findings by Archibald, et al who recommend the use of the instrument to evaluate the individual behavior of healthcare workers with related to the interprofessional collaborative competencies [12].

5.   CONCLUSION
In summary, interprofessional collaborative competencies are believed by many researchers to be the key to unlock and transform the healthcare workers capabilities to work in a meaningful teamwork. Thus, it is utmost important for the healthcare workers to acquire such competencies to work effectively in today's challenging healthcare system.

This pilot study met the objective of the researchers. Based on the reliability results, the ICCAS survey is reliable to be used in further study. The finding of this paper strengthens the existing psychometric value of the instrument. The field study will provide a description of the level of interprofessional collaborative competencies among healthcare workers in the Maternity and Child Healthcare

setting, in Malaysia. The researchers hoped that this work will act as an early initiator to promote discussion about the importance of IPC and collaborative competencies in Malaysia, particularly among the regulators.

7.   DECLARATION OF INTEREST
The authors report no conflict of interest.   The authors alone are responsible for the writing and content of this research paper.

8. REFERENCES
[1]   World Health Organization (2016). *Maternal mortality*. Retrieved   from http://www.who.int/mediacentre/factsheets/fs348/en/
[2]   Nisbet, G., Lee, A., Kumar, K., Thistletwaite, J. E., Dunston, R. (2011). *Interprofessional Health Education: A Literature Review Overview of International and Australian Developments in Interprofessional* Health Education (IPE): Sydney.
[3]   Watkins, V., Nagle, C., Kent, B., & Hutchinson, A. M. (2017). Labouring Together: collaborative alliances in maternity care in Victoria, Australia-protocol of a mixed-methods study. *Obstetrics and Gynaecology*, 7(3), 1-11.
[4]   D'Amour D, Ferrada-Videla M. San Martin Rodriguez L, Beaulieu MD. The conceptual basis for interprofessional collaboration: core concepts and theoretical frameworks. *Journal of Interprofessional Care*. 2005;(suppl 1):116–131.
[5]   World Health Organization (2013). *Interprofessional Collaborative Practice in Primary Health Care: Nursing and Midwifery Perspectices: Six Case Studies, Human Resources for Health Observer*. Retrieved   from http://www.who.int/hrh/resources/IPE_SixCaseStudies.pdf?ua=1
[6]   Barr, H. (1998). Competent to Collaborate: Towards a Competency-based Model for Interprofessional Education, *Journal of Interprofessional Care*, 12 (2), 181-187.
[7]   Gilbert, J. H. V. (2010). *A National Interprofessional Competency Framework*. Canada: University of British Columbia.
[8]   Nurhanis Syazni Roslan, Muhamad Saiful Bahri Yusoff & Ahmad Fuad Abd Rahim (2016). Together we stand, divided we fall: Interprofessional collaborative practice competencies from Malaysian medical professionals' perspectives, *Journal of Taibah University Medical Sciences*, 11 (6), 533-540.
[9]   Shrader, S., Farland, M. Z., Danielson J., Sicat, B. & Umland, E. M. (2017). A systematic review of

assessment tools measuring interprofessional education outcomes relevant to pharmacy education, *American Journal of Pharmaceutical Education*, 81 (6), 1-20.

[10] Green, B. N. & Johnson, C. D. (2015). Interprofesional collaboration in research, education and clinical practice: working together for a better future, *Journal Chiropr. Education*, 29 (1), 1-10.

[11] Interprofessional Education Collaborative Expert Panel (2011). *Core Competencies for Interprofessional Collaborative Practice: Report of an Expert Panel*. Washington, DC: Interprofessional Education Collaborative.

[12] Archibald, D., Trumpower, D. & MacDonald, C. J. (2014). Validation of the Interprofessional Collaborative Competency Attainment Survey (ICCAS), *Journal of Interprofessional Care*, 28 (6), 553-558.

[13] Cavana, R., Delahaye, B., & Sekaran, U. (2001). *Applied Business Research: Qualitative and Quantitative Methods*. (3rd ed.). Australia: John Wiley & Sons Australia, Ltd.

[14] Isaac, S. & Micheal, W. B. (1995*). Handbook in research and evaluation*. San Diego, CA: Educational and Industrial Testing Services.

[15] Young, I. C., Johnson, T. P. & VanGeest, J. B. (2013). Mail Surveys of Reluctant Profesionals. *Evaluation Review*, 93, 349-359.

[16] Salkind, N. J. (2012). *Exploring Research*. 8th ed. Pearson: New York.

[17] Magal, E., Goldin, E., Harel, S., Yavin, E. (1988). The acute uteroplacental ischemic embryo: Lactic acid accumulation and prostaglandin production in the fetal rat brain. *Journal of Neurochem*. 51: 75–80

[18] Nunnally, J. C. (1978*). Psychometric theory* (2nd ed.). New York: McGraw-Hill.

●

*For correspondence; Tel. + (60) 01110903040, E-mail:nurzainieabdhamid@gmail.com