

Midwives' intentions regarding use of electronic medical records in health centres in Lebak district, Banten province, Indonesia

Aditya Mahendra , M.P.H.M.

ASEAN Institute for Health
Development, Mahidol University
and Directorate General of Medical
Health Care, Ministry of Health
Indonesia

Jutatip Sillabutra, Ph.D.

ASEAN Institute for Health
Development, Mahidol University
Boonyong Keiwkarnka, Dr.P.H.
ASEAN Institute for Health
Development, Mahidol University

ABSTRACT

Aditya Mahendra, Sillabutra J, Keiwkarnka B. Midwives' intentions regarding use of electronic medical records in health centres in Lebak district, Banten province, Indonesia. *J Pub. Health Dev.* 2011; 9(3): 257-71.

The objectives of this article are to describe a cross-sectional descriptive study of midwives' intentions to use electronic medical records (EMR), and to identify their association with various independent variables (i.e. socio-demographic factors, availability and accessibility of EMR, social support, attitude, knowledge of EMR, and subjective norms). The study group comprised 249 midwives who worked in health centres in Lebak district, Banten province, Indonesia. Data was collected using a self-administered questionnaire, and analyzed using descriptive statistics, chi-square tests and multiple logistic regression.

The midwives' ages ranged from 21 to 50 years, with a median age of 32 years. Almost all of them (94.0%) had graduated from an institute higher than basic midwifery school; 59.4% were full-time employees working in health centres without in-patient care; and 62.6% had had computer experience. Most of the midwives had positive attitudes, moderate knowledge, and 51% had high subjective norms scores regarding use of EMR software; 59.8% felt that they had received high technical support; and 68.3% high emotional support, from colleagues, health centre heads and government. This study found that that 67.9% of the midwives intended to use EMR software, and that knowledge of EMR (p-value=0.004, Adj. OR=2.98) and subjective norms (p-value<0.001, Adj. OR=11.58) were significantly associated with intention to use EMR.

This suggests that midwives' colleagues, government and health centre heads who are involved in the daily practices of midwives need to accept and appraise the EMR software positively in order to successfully implement it in Indonesia. The Indonesian Government should provide on the job training and workshops about EMR to increase midwives' capacity, knowledge and positive attitudes regarding EMR.

Corresponding Author

Jutatip Sillabutra, Ph.D.
ASEAN Institute for Health
Development, Mahidol University.

E-mail : adjac@mahidol.ac.th

Received : 1 June 2011

Accepted : 6 September 2011

Keywords Electronic medical records Intention midwives

ความตั้งใจใช้เวชระเบียนอิเล็กทรอนิกส์ของพยาบาล ผดุงครรภ์ที่ปฏิบัติงานที่สถานอนามัยในเมืองเลบัก จังหวัดบันเตน ประเทศอินโดนีเซีย

บทคัดย่อ

อติตยา มาเหนคา จูทาธิป สีลบุตร บุญยง เกี่ยวการค้า. ความตั้งใจใช้เวชระเบียนอิเล็กทรอนิกส์ของพยาบาลผดุงครรภ์ที่ปฏิบัติงานที่สถานอนามัยในเมืองเลบัก จังหวัดบันเตน ประเทศอินโดนีเซีย. ว.สาธารณสุขและการพัฒนา. 2554; 9(3): 257-71.

การศึกษาแบบตัดขวางนี้มีวัตถุประสงค์เพื่อศึกษาความตั้งใจใช้เวชระเบียนอิเล็กทรอนิกส์และปัจจัยที่มีผลต่อความตั้งใจใช้เวชระเบียนอิเล็กทรอนิกส์ของพยาบาลผดุงครรภ์ โดยเก็บข้อมูลจากพยาบาลผดุงครรภ์จำนวน 249 คนที่ปฏิบัติงานในสถานอนามัยในเมืองเลบัก จังหวัดบันเตน ประเทศอินโดนีเซีย ด้วยแบบสอบถาม และวิเคราะห์ข้อมูลโดยใช้ สถิติเชิงพรรณนาการทดสอบไคว์สแควร์และการวิเคราะห์ลอจิสติก

ผลการศึกษาพบว่า อายุของพยาบาลผดุงครรภ์อยู่ระหว่าง 21-50 ปี โดยมีค่ามัธยฐานของอายุเท่ากับ 32 ปี พยาบาลผดุงครรภ์ส่วนใหญ่จบการศึกษาจากสถาบันการศึกษาในระดับที่สูงกว่าโรงเรียนผดุงครรภ์ (ร้อยละ 94.0) ปฏิบัติงานเต็มเวลาในสถานอนามัยที่ไม่มีการดูแลผู้ป่วยใน (ร้อยละ 59.4) และมีประสบการณ์ในการใช้เครื่องคอมพิวเตอร์ (ร้อยละ 62.6) พยาบาลผดุงครรภ์ส่วนใหญ่มีระดับทัศนคติในเชิงบวก และมีระดับความรู้ในระดับปานกลาง ร้อยละ 51 ของพยาบาลผดุงครรภ์มีระดับความคล้อยตามบุคคลอ้างอิงในเรื่องการใช้เวชระเบียนทางสังคมในระดับสูง ร้อยละ 59.8 ของพยาบาลผดุงครรภ์ได้รับการสนับสนุนด้านเทคโนโลยี และร้อยละ 68.3 ของพยาบาลผดุงครรภ์ได้รับกำลังใจในการใช้เวชระเบียนอิเล็กทรอนิกส์ การศึกษาในครั้งนี้ยังพบว่า ร้อยละ 67.9 ของพยาบาลผดุงครรภ์มีความตั้งใจใช้เวชระเบียนทางอิเล็กทรอนิกส์ และปัจจัยที่ส่งผลต่อความตั้งใจใช้เวชระเบียนทางอิเล็กทรอนิกส์ ได้แก่ ระดับความรู้ของพยาบาลผดุงครรภ์ด้านเวชระเบียนอิเล็กทรอนิกส์ (p-value=0.004, Adj. OR=2.98) และระดับบรรทัดฐานของบุคคลอ้างอิงที่มีความสำคัญต่อการใช้เวชระเบียนทางสังคม (p-value<0.001, Adj. OR=11.58)

ผลการศึกษาชี้ให้เห็นว่า รัฐบาล เพื่อนร่วมงานและหัวหน้างานของพยาบาลผดุงครรภ์ที่มีส่วนเกี่ยวข้องในการปฏิบัติงานของพยาบาลผดุงครรภ์ต้องยอมรับและเห็นคุณค่าของระบบเวชระเบียนอิเล็กทรอนิกส์ ซึ่งจะทำให้เกิดความสำเร็จของการนำระบบเวชระเบียนอิเล็กทรอนิกส์ไปใช้ อีกทั้งรัฐบาลควรจัดอบรมเกี่ยวกับการใช้เวชระเบียนอิเล็กทรอนิกส์ เพื่อให้พยาบาลผดุงครรภ์มีความรู้ และทัศนคติเชิงบวก รวมถึงพัฒนาศักยภาพของพยาบาลผดุงครรภ์ในการใช้เวชระเบียนอิเล็กทรอนิกส์

คำสำคัญ เวชระเบียนอิเล็กทรอนิกส์ ความตั้งใจ พยาบาลผดุงครรภ์

INTRODUCTION

Medical records, health records and medical charts are essential features of a systematic documentation of a patient's individual medical history and care.¹ Medical records in health centres usually mean paper-based medical records. Several weaknesses of paper-based medical records have been identified, such as illegible handwriting, ambiguous and incomplete data, data fragmentation, and poor availability.² In addition, paper-based medical records often become bulky over time, which leads to difficulty in finding relevant information. Handwritten paper medical records can also be associated with poor legibility, which can contribute to medical errors.³

Electronic medical records (EMR) are intended to overcome the perceived limitations of paper-based medical records, and allow manipulations that cannot be realized by a static view of events.^{4,5} One study estimates that EMR can improve efficiency by 6% per year and that the monthly cost can be offset by the elimination of the cost of only a few unnecessary patient tests or hospital admissions.⁶

In Indonesia, "Kartini" software was distributed and installed in some health centres in some districts in some provinces as a pilot EMR project to improve the accuracy and completeness of data for maternal and prenatal health care; and midwives were responsible for collecting and entering data with this software. Lebak district was the one of the districts where it was distributed and installed.⁷ A clear policy to use this software in health centres in the pilot project area was established, and support for this software was provided by the government.⁷ The pilot study identified some problems with this software, such as the fact that only a few health centres in each trial

district used the software and only a few midwives used this software.⁸

The unsuccessful implementation of EMR software in health centres was likely due to various factors. According to a study by Robert et al., health personnel's intentions to use it are an important factor for successful implementation, together with support, time, cost, and technology.⁹ Based on the Theory of Reasoned Action (TRA), an individual's behavioural intention is determined by the individual's attitude towards this behaviour and subjective norms with regard to the performance of this behaviour.¹⁰ Studies by Sheppard et al. and Davis et al. applied the TRA to individual acceptance of technology and found that the variance explained was largely consistent with studies that had employed the TRA in the context of behaviour.¹¹⁻¹³ Other research also found that other variables such as social support, knowledge, availability and accessibility affected the intention to use EMR.¹⁴⁻¹⁵

Successful implementation of EMR software can provide a sufficient database which is needed by policy makers to develop programmes which can improve public health service in health centres. This study aimed to describe midwives' intentions regarding use of EMR software in health centres, and identify the factors affecting such intentions (i.e. socio-demographic factors, availability, accessibility, social support, attitude, knowledge of EMR, and subjective norms) in order to have a better understanding of why midwives do, or do not, use EMR software in health centres. This may be expected to assist the Indonesian Government and other stake-holders in the further development of EMR software in Indonesia.

METHODS

Questionnaires were distributed by the district health officer to 320 midwives in health centres in Lebak district. There was no sampling technique used in this study; the entire population of midwives was selected for the study. Questionnaires were returned by 289 midwives and 249 questionnaires were eligible to be analyzed. Data was analyzed using descriptive statistics, chi-square tests and multiple logistic regression to determine the relationships between the independent variables and the dependent variable.

Intention was categorized into two groups: intention to use EMR software and no intent to use EMR. Accessibility was categorized into "easy to access" ($>$ median score) and "difficult to access" (\leq median score). Social support was categorized into "technical support" and "emotional support". Each type of support was divided into two groups: "high" ($>$ median score) and "low" (\leq median score). Knowledge about EMR was classified into three categories: "good" ($>80\%$ of total score), "moderate" (60-80%) and "poor" ($<60\%$). Attitude was categorized into two groups: "positive" ($>$ median score) and "negative" (\leq median score). Subjective norms were categorized as "high" ($>$ mean score) and "low" (\leq mean score). The self-administered questionnaire used for data collection consisted of 81 questions in seven parts, namely: socio-demographic factors, availability and accessibility to EMR, social support, attitude, knowledge about EMR, subjective norms, and intention to use EMR. Regarding validity and reliability, the questionnaire was submitted to an expert related to this research fields in order to check validity and confirm the content. The questionnaire was revised according to the comments and suggestions given by this expert.

After getting approval from the ethics committee of the Mahidol University Institutional Review Board (COA No. MU-IRB 2009/009.0401), a formal letter from the AIHD was sent to the district health office at Rangkasbitung, Lebak district, Banten province, Indonesia, asking for permission to collect data in the target area. After getting permission, the researcher contacted the chief of the district health office to explain the purposes and processes of this study. The chief of district health office selected some district health officers to help the researcher to distribute the questionnaire to all midwives in all health centre. After the questionnaires were completed, the respondents were asked to return them to the district health office.

The questionnaire was pre-tested for reliability using Kruder Richardson formula 20 (KR20) for knowledge and Cronbach's alpha for attitude. Thirty midwives in six health centres in Pandeglang district were selected for the first pre-test but the results for the knowledge part were not reliable because some midwives did not understand the questions. After modifying questions in the knowledge part, thirty midwives in five health centres in Tangerang district were selected for a second pre-test, and the reliability was more than 0.8 (KR20 = 0.82, Cronbach's alpha = 0.81).

RESULTS

Independent Variables and Dependent Variables

The study found that the age of midwives ranged from 21 to 50 years old. Nearly half (51.4%) were above 31 years old. Most of the midwives (93.4%) had graduated from an institute which was higher than basic midwifery school level and 62.6% had computer experience. More than half (62.6%) were

full-time employees and worked in health centres without in-patient care (59.4%).

The study found that 67.9% of the midwives had the intention to use electronic medical records software. Most of the midwives who intend to use

EMR had been informed that the EMR software would help them work properly in organizing maternal and prenatal records (76.3%) and also help them work efficiently in recording and reporting on maternal and prenatal records (58.6%).

Table 1 Frequency and percentage distribution of respondents by socio-demographic characteristics.

Socio-demographic characteristics	Number (n) n = 249	Percentage (%)
Age group		
21 – 31	121	48.6
32 – 50	128	51.4
Median = 32 QD = 12 Min = 21 Max = 50		
Marital Status		
Single	37	14.9
Married	212	85.1
Education level		
Basic Midwifery school	15	6.0
More than Basic Midwifery school	234	94.0
Had computer experience		
Yes	156	62.6
No	93	37.3
Employee Status		
Part-Time	93	37.3
Full-Time	156	62.6
Working Years		
≤ 4 years	126	50.6
> 4 years	123	49.4
Mean = 7.127 Min = 0.1 Max = 30 SD = 6.713		
Income		
< 2,143,299 IDR	165	66.4
≥ 2,143,300 IDR	84	33.7
Mean = 2,143,300 SD = 1,462,067 Min = 590,000 Max = 15,000,000		
Current position in Health Centre		
General / Practical Midwives	233	93.2
Others (administration)	16	6.8
Current Workplace		
HC with In-patients	101	40.6
HC without In-patients	148	59.4

In terms of availability of EMR, 96.8% of the midwives replied that they had specific computers which were dedicated only to run the EMR software in their health centres. In terms of accessibility, 65.9% felt that they had easy access to EMR software. However, 92.4% replied that the computers were located in the rooms of the health centre heads or in computer rooms, and 63.7% shared a computer with others.

Less than half of the midwives (47.0%) had moderate levels of knowledge about EMR software; 28.11% had good knowledge; and 24.90% had poor knowledge. A majority of the midwives (65.4%) had a positive attitudes towards EMR.

Just over half of the midwives (52.6%) felt that they had a high levels of technical support; 58.63% felt that they had a high levels of emotional support. In addition, 69.18% of the midwives had received high technical support from the government. This could be because 81.9% replied that they had regularly received updates from the government and 6.7% of the midwives replied that a government officers had frequently shared guidelines or manuals for EMR software; 45.4% of the midwives also replied that the government frequently helped them to use that software.

More than two-thirds of the midwives (68.3%) felt that they had high levels of emotional support, and more than half of midwives (55.4%) had received high emotional support from health centre heads. This could be because 39.0% of the midwives replied that they had been frequently encouraged to use EMR software by health centre heads and 95.2% of midwives replied that they had frequently received rewards from health centre heads.

From this study, over half of the midwives (51.0%) had high subjective norms scores; 56.2% replied that they were most influenced by health centre heads. However, the influence of colleagues, health centre heads and the government also motivated the midwives to use EMR software. These influences contributed to their confidence in performing various activities, such as entering data (53.0%), exporting data (59.4%), creating reports (57.0%), backing up data (64.0%), modifying data (69.9%), and searching for specific data (59.5%).

Relationship between the independent variables and intention to use EMR software.

Midwives with experience in operating computers were almost three times more likely to intend to use EMR software compared to midwives with no computing experience. Midwives who worked in health centres without in-patient care were also more likely to intend to use EMR software (OR=1.91; 95% CI=1.11-3.28).

Midwives with dedicated computers to run EMR were almost three times more likely to intended to use EMR software compared to midwives without dedicated computers. In terms of accessibility, even though 70.1% of the midwives with easy access to EMR also had intention to use EMR software, there was no statistically significant relationship between accessibility and intention to use EMR software.

Midwives with positive attitudes were three times more likely to have intention compared to midwives with negative attitudes. As shown in Table 3, 74.3% of the midwives with good knowledge of EMR intended to use EMR software. They were around two times more likely to have the intention to use EMR

as midwives with poor knowledge. This study found that there was a statistically significant relationship between attitude towards EMR and intention to use EMR software (p-value<0.001), and also between knowledge of EMR and intention to use EMR (p-value=0.003).

Table 2 Association between the socio-demographic factor of midwives and intention to use EMR software.

Socio-demographic Variables	Intention to use		No intention to use		Crude OR	Chi- square p-value
	n = 169	%	n = 80	%		
Age group						
21 – 31	87	71.9	34	28.10	1.44	0.186
32 – 50	82	64.1	46	35.9	1	
Marital Status						
Single	24	64.9	13	35.1	1	0.671
Married	145	68.4	67	31.6	1.28	
Education Level						
Basic Midwifery School	9	60.0	6	40.0	1	0.501
More than Basic Midwifery School	160	63.4	74	31.6	1.45	
Computer experience						
Yes	119	76.3	37	23.7	2.77	<0.001**
No	50	53.8	43	46.2	1	
Employee Status						
Part-Time	67	72.0	26	28.0	1.36	0.276
Full -Time	102	65.4	54	34.6	1	
Working Years						
≤ 4 years	89	70.6	37	29.4	1.36	0.345
> 4 years	80	65.0	43	35.0	1	
Income per month						
< 2,143,300	114	69.1	51	30.9	1.43	0.564
≥ 2,143,300	55	65.5	29	34.5	1	
Mean = 2,143,300 SD = 1,462,067 Min = 590,000 Max = 15,000,000						
Current position in Health Centre						
General / Practical Midwives	156	67.0	77	33.0	1	0.215
Others (administration)	13	81.2	3	18.7	2.14	
Current workplace						
HC with in-patient care	60	59.4	41	40.6	1	0.018*
HC without in-patient care	109	73.6	39	26.4	1.91	

* p-value < 0.05 ** p-value<0.001

Table 3 Association between availability, attitude, and knowledge and intention to use EMR software.

Factors	Intention to use		No intention to use		Crude OR	Chi- square p-value
	n =	%	n =	%		
	169		80			
Availability of dedicated computers to run EMR						
Available	167	67.6	80	32.39	3.02	0.039*
Not available	6	42.9	8	57.14	1	
Accessibility						
Easy (> Median)	115	70.1	49	29.88	1.35	0.293
Difficult (\leq Median)	54	63.5	31	36.47	1	
Median = 2 QD = 1 Min = 0 Max = 3						
Attitude						
Positive attitude (> Median)	119	72.3	45	47.37	3.06	<0.001
Negative attitude (\leq Median)	50	52.6	35	22.73	1	
Median = 31 QD = 5.5 Min = 17 Max = 43						
Knowledge of EMR						
Good	52	74.3	18	25.71	2.38	0.003*
Moderate	83	70.9	34	29.06	2.03	
Poor	34	54.8	28	45.16	1	
Mean = 7.86 SD=2.61 Min = 2 Max = 15						

* p-value < 0.05

As shown in Table 4, 69.8% of the midwives who had high levels of technical support had the intention to use EMR software, and 69.4% of midwives with a high level of emotional support, also had the intention to use EMR software. However, the results revealed that neither technical support

nor emotional support had a statistically significant relationship with intention to use EMR software. Most of the midwives (90.5%) with high subjective norms scores also had the intention to use EMR software and were around 12 times more likely to have such an intention than other groups.

Table 4 Association between respondents' technical support and emotional support, and subjective norms and intention to use EMR software.

Factors	Intention to use		No intention to use		Crude OR	Chi- square p-value
	n = 169	%	n = 80	%		
Technical Support						
High (>Median)	104	69.8	45	30.2	1.24	0.427
Low (≤Median)	65	65.0	35	35.0	1	
Median = 42 QD = 7 Min = 22 Max = 48						
Emotional Support						
High (>Median)	118	69.4	52	30.6	1.25	0.445
Low (≤Median)	51	64.6	28	35.4	1	
Median = 20 QD = 4 Min = 10 Max = 24						
Subjective Norm						
High (>Mean)	115	90.5	12	9.4	12.07	<0.001
Low (≤ Mean)	54	44.23	68	55.7	1	
Mean = 31.28 SD = 10.55 Min = 18 Max = 54						

Predicting factors of intention to use EMR software.

As shown in Table 5, of all the independent variables which had a significant relationships with the dependent variable were tested again. Using multiple logistic regression, knowledge of EMR software (p-value=0.004) and subjective norms regarding EMR (p-value<0.001) were found to be predicting factors

for the midwives' intentions to use EMR software. Midwives who had good knowledge of EMR were almost three times more likely to intend to use EMR software than midwives with poor knowledge. Midwives with high subjective norms scores were almost 12 times more likely to intend to use EMR software than midwives with low subjective norms scores.

Table 5 Multiple logistic regression between variables and respondents' intentions to use EMR software.

Factors	Adjusted Odds Ratio	95% CI		p-value
		Lower	Upper	
Current Workplace				
HC with in-patient care	1.19	0.59	2.41	0.619
HC without in-patient care	1			
Computer experience				
Yes	1.03	0.47	2.23	0.948
No	1			
Having dedicated computer to run EMR				
Yes	4.04	0.84	19.37	0.081
No	1			
Attitude towards EMR				
Positive	1.83	0.92	3.63	0.084
Negative	1			
Median = 31 QD = 5.5 Min = 17 Max = 43				
Knowledge of EMR				
Good	2.98	1.41	6.33	0.004*
Moderate	2.38			
Poor	1			
Subjective Norm				
High	11.58	5.30	25.28	<0.001**
Low	1			
Median = 31 Min = 18 Max = 54				

* p-value < 0.01 ** p-value < 0.001

DISCUSSION

This study found that 67.4% of the midwives had the intention to use EMR software. More than half (76.33%) explained that they intended to use EMR software because it helped them to work effectively and efficiently to organize maternal and prenatal records. This study also found that 65.8% of the midwives had positive attitudes; 62.6% had already had computer experience; and 51% had high subjective norms scores. Only 24.9% had poor knowledge of EMR; and 96.8% replied that they had computers dedicated to run EMR software. These factors were found to be statistically significantly associated with intention to use EMR software. (p-value<0.005)

Accordingly, it seems to be promising to continue implementation of EMR in Indonesia. A study by Nicholas et al. about EMR in developing countries found that if a society takes steps towards EMR, the implementation of EMR can be accomplished quite easily and efficiently.¹⁶

From the ten socio-demographic variables, only two, current workplace and computer experience, were found statistically significantly associated with intention to use EMR software. Other variables (i.e. age, education level, employee status, working years, income per month, and current position in health centre) were not found significantly associated with intention to use EMR. These findings are inconsistent with Fishbein's explanation of the TPB.¹⁵ Part of the theory explains that personality traits, intelligence, socio-demographic variables, values and other variables of this kind are considered "background factors". They are assumed to influence intentions and behaviour indirectly by affecting behavioural, normative and/or control beliefs.

Current workplace had a statistically significant association with the intention to use EMR software. The midwives who worked in health centres without in-patient care were almost two time more likely to have the intention to use EMR software. This could be due to lower workloads in health centres without in-patient care as compared to health centres with in-patient care. This is supported by Tambun's study in Indonesia,¹⁷ and the study of Shaadoun Faris et al. in 2008 which concluded that high workload will affect low intention.¹⁸

The present study shows that the majority of midwives had experience in using computers, and that they were almost three times more likely to have the intention to use EMR software. This is similar to the studies by Shoham et al. and Ludwick et al. which found that previous experience with computer health information technology affected midwives' intentions to use information technology.¹⁹⁻²⁰ This could be because most computer skills are gained by experience in using the EMR software, and midwives may learn EMR from the trial and error experience.

Regarding availability of EMR, the midwives who had computers dedicated only to run EMR software were about three times more likely to have the intention to use EMR software. This could be because facilitating conditions affect usage, either directly or through behavioural intention.^{14,21-22} The Indonesian Government already provided computers for administration in health centres. Some health centres were also assigned at least one computer dedicated only to run EMR software.

Regarding accessibility, 65.9% of the midwives felt that it was easy access to EMR software; furthermore, 70.1% of midwives with easy access to EMR had

the intention to use EMR software. This study found that there was no significant association between accessibility and intention to use EMR software. This result is inconsistent with a study by Illie et al which found that when faced with a decision between alternative IT systems, individual users tended to select and use the technology systems that were most readily accessible.¹⁴ The present results might not be similar with those of the previous study because other factors such as computer location and persons who can use computers for EMR in health centres were not found to be statistically associated with the intention to use EMR.

This study found that the proportion of intention to use EMR software of the midwives who had replied that only specific person can use EMR computer was 5% higher than other groups. Findings in this study might be similar to the findings of Wiggins et al. who studied about prior experience and physicians' intentions to adopt EMR and who found that 59.4% of physicians replied the EMR would be better if someone else could enter the information while they interacted with patients.²³

This study found that there was a statistically significant association between attitude to EMR and intention to use EMR software (p -value <0.001). Furthermore, midwives who had positive attitudes were about three times more likely to have the intention to use EMR software. This finding was similar to Shoham's study which found that the better the nurses' attitudes and assessment of their abilities related to computer use, the higher their intention to use computers.²⁰ Previous study conducted by Chau et al. and Abdel-Wahab also found that attitude appeared to be the second most important determinant

of a physician's intentions for accepting telemedicine technology.²⁴⁻²⁵

Regarding social support for using EMR software, 69.80% of the respondents with high technical support also intended to use EMR software. Although there was no significant association with intention, findings in this study might be inconsistent with Esmaeilzadeth's study which found that perceived organizational support, namely the ability of hospitals to provide health care professionals with proper tools such as technical support, made healthcare professionals perceive less threat and stress concerning the use of new clinical information and technology, and lead to strong intentions to use it¹⁵. Similarly, 69.41% of the midwives who received high emotional support also had intention to use EMR software, although no significant association was found between intention to use EMR software and emotional support. Findings in this study might be inconsistent with research by Miller et al.⁹ which found that physicians' intentions to use EMR were affected by lack of financial incentives as the key barrier in EMR use.

This study found that 74.3% of the midwives who had good levels of knowledge were two times more likely to have the intention to use EMR. The result shows a significant association between knowledge of EMR and intention. This could be because midwives with good knowledge perhaps perceived it was easy to use EMR software. Perceived ease of use affects their intentions to use EMR; this would be consistent with findings by Brumini et al.²⁶

In this study, the midwives with high subjective norms scores were 12 times more likely to have intentions than other groups. Abdel-Wahab's study showed that subjective norms as social pressure was

significantly associated with intention to use EMR software.²⁵ This study finding is inconsistent with a previous study by Chau et al. which showed that subjective norms appeared to have no significant effect on behavioural intention.²⁴ This could be because in this study most of the midwives were government officers who were required to use the EMR software in their health centres.

RECOMENDATIONS

This study found that midwives' prior experience in using computers was found to have a significantly relationship with the intention to use EMR software. The Indonesian Government should provide and organize on the job training or workshops for all midwives in health centres in order to give them experience in using EMR software and improve their knowledge of EMR software.

This study clearly indicates that subjective norms will influence intention to use EMR. Therefore, midwives' colleagues, health centre heads and government officials who matter in the daily practice of midwives need to accept and appraise the use EMR software positively.

Since midwives already had the intention to use the EMR software, it seems promising for the Indonesian Government to continue implementation of EMR in health centres in Indonesia. Successful implementation of EMR in health centres will also increase the quality of service in health centres, thus providing the government with adequate data which is needed for policy makers to improve public health programmes.

Since this was a cross-sectional descriptive study, only quantitative information was collected through the structured questionnaire about the intentions of midwives regarding use of EMR. To obtain more comprehensive information about the intention to use EMR software, qualitative techniques are also needed to generate in-depth information.

This study was conducted in only one district. It may not be representative of midwives generally in Indonesia; Future research needs to be conducted on a wider geographical basis in health centres in all provinces of Indonesia.

REFERENCES

1. Illinois MHC-Uo. The Medical Record - McKinley Health Centre. [Online] Available from: http://www.mckinley.illinois.edu/handouts/medical_records_faq.htm. [Accessed 2010 Dec 12]
2. Detmer WM, Friedman CP. Academic physicians' assessment of the effects of computers on health care. *Journal of the American Medical Informatics Association*. 1994;558-62.
3. Kohn LT, Corrigan JM, Donaldson MS, editors. *To err is Human: Building a Safer Health System*: National Academy Press; 1999.
4. Graham S, Estrin D, Horvitz E, Kohane I, Mynatt E, Sim I. *Information Technology Research Challenges for Healthcare: From Discovery to Delivery*. Computing Community Consortium. 2010 May : 1-8.
5. Iyer PW, Levin BJ, Shea MA. *Medical legal aspects of medical records*. Danver, MA : Lawyer & Judges Publishing Company; 2006.
6. Evan DC, Nichol W, Perlin JB. Effect of Implementation of an enterprise-wide Electronic Health Record on Productivity in the Veterans Health Administration. *Health Economics, Policy and Law*. 2006 Apr ;1(Pt.2):163-9.
7. MOH Indonesia. *Guideline Monitoring Area for Mother and Child Care*. Indonesia : the ministry; 2009.
8. MOH Indonesia. *Data PWS-KIA*. 2009 [Online] Available from: http://www.kesehatanibu.depkes.go.id/index.php?option=com_ckforms&view=ckformsdata&layout=data&controller=ckdata&Itemid=48&id=f1. [Accessed 2010 Dec 5]
9. Miller RH, Sim I. Physicians' Use Of Electronic Medical Records: Barriers And Solutions. *Health Affairs (Millwood)*. 2004 Mar-Apr;23(2):116-26.
10. Fishbein M, Ajzen I. *Belief, attitude, intention and behaviour: An introduction to theory and research*. Boston : Addison-Wesley; 1975.
11. Sheppard BH, Hartwick J, Warsaw P.R. The Theory of reasoned action: A meta-analysis of past research with recommendation for modifications and future research. *Journal of Consumer Research*. 1988;15:325-43.
12. Davis FD, Bagozzi RP, Warshaw PR. User acceptance of computer technology: a comparison of two theoretical models. *Management of Science*. 1989;35:982-103.
13. Davis FD. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quaterly*. 1989;13(3):319-40.
14. Nicholas A, Kalogriopoulos JB, Amit J, Nimunkar, John G, Webster. *Electronic Medical Record System for Developing Countries*. 2009. Report No.: 978-1-4244-3296-7.
15. Fishbein M. *Understanding attitudes and predicting social behaviour*. Upper Saddle River, N.J. : Prentice Hall; 1980.
16. Tambun L. *Hubungan Beban Kerja Dengan Kinerja Koordinator Sp2tp Puskesmas Di Kota Medan Tahun 2005*: South Sumatera University; 2005.

17. Fariz S. Physicians perceptions about the newly EMR in primary health care centres in kuwait Alexandria Faculty of Medicine. 2008;44(1):303-11.
18. Ludwick DA, Doucette J. Adopting electronic medical records in primary care: Lessons learned from health information systems implementation experience in seven countries. *International Journal of Medical Informatics*. 2009 Jan; 78 (1):22-31. Epub 2008 Jul 21
19. Shoham S, Gonen A. Intention of hospital nurses to work with computers. *Computer, Informatics, Nursing*. 2008;26:106-16.
20. McAlearney AS, Schweikhart SB, Medow MA. Doctor's experience with handheld computers in clinical practice: qualitative study. *British Medical Journal*. 2004 May 15;328(7449):1162.
21. Venkatesh V, Morris MG, Davis GB, Davis FD. User acceptance of information technology: Toward a unified view. *MIS Quaterly*. 2003;27:425-78.
22. Illie V, Slyke CV, Parikh MA, Courtney JF. Paper versus Electronic Medical Records: The effects of access on Physicians Decision to use Complex Information Technologies. *Decision Sciences*. 2009;40(2):213-41.
23. Wiggins C, Trimmer K, Beachboard J, Peterson T, Woodhouse W, Prior Experience and Physicians' Intentions to Adopt EMR. *Proceedings of the 42nd Hawaii International Conference on System Sciences*. 2009; 1-9.
24. Chau PYK, Hu PJ-H. Investigating healthcare professionals' decision to accept telemedicine technology: an empirical test of competing theories. *Information and Management Elsevier*. 2002;39:297-311.
25. Abdel-Wahab A.G., Omer R.O.A., Attalla S. M. Factors Affecting Doctors' Intention to Adopt Electronic Medicine: A case from Egypt. *The Internet Journal of Medical Informatics*. 2009;5(1).
26. Esmaeilzadeh P, Sambasivan M, Kumar N. To use or not to use new IT: the effect of healthcare professional's OCB on intention to use new clinical IT. *IEEE*. 2010.
27. Brumini G, Kovic I, Zombori D, Lulic I, Petrovecki M. Nurse' attitudes towards computers: Cross sectional questionnaire study. *Croatian Medical Journal*. 2005 Feb;46(1):101-4.