
ARTICLE REVIEW

The Benefits and Challenges of Paper Handheld Maternal Record in Southeast Asia: A Systematic Review

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ABSTRACT

Introduction	Home-based maternal records were first designed for better monitoring during pregnancy, delivery, and the postpartum period. There are various studies that reported on the benefits of paper handheld record for mothers in across regions. However, majority of the studies on paper handheld record or home-based record were mainly addressing the benefit and very scare on the challenges faced by the users. This study aims to evaluate the benefits and challenges of the maternal paper handheld to users particularly to mothers and healthcare providers in Southeast Asia (SEA) region
Methods	Articles were searched from Scopus, Web of Science, and PubMed using relevant keywords based on the review topic. Based on PRISMA guidelines, the search results were then screened based on inclusion criteria: published between 2012 and 2021 in English language, available in full text, open access, and conducted in Southeast Asia. Six articles were included in the final analysis, which were also appraised for their quality.
Results	There are six articles included in this review. Majority of the studies highlighted the benefits of paper handheld records to mothers. Upon further analysis, there are three major themes emerged from the outcome namely mother's knowledge, maternal health service utilization and breastfeeding practice. Only one study reported on the challenges faced by mothers and care provider while utilising the paper handheld record.
Conclusions	The paper handheld maternal record implementation in SEA exhibited great positive impact to the mothers in terms of knowledge, maternal health service utilization and breastfeeding practice. Nonetheless, it is quite difficult to find studies that addressed the challenges faced by the users in SEA region. It would be best to understand the challenges faced regionally or even locally to make improvement of the maternal health service as it needs to be comprehensive and suited with the local context.
Keywords	Home-Based Record - Paper Handheld Record - Service Utilization - Knowledge - Southeast Asia.

Article history:

Received: 2 February 2023

Accepted: 21 July 2023

Published: 1 September 2023

INTRODUCTION

Home-based maternal records were first designed for better monitoring during antenatal, delivery, and the postpartum period. The idea is to ease health service delivery and the care providers in data collection, having easy access to women's health, better risk detection, timely referral and increase shared communication and care of pregnant women among care providers and health facilities.¹ Hence, the paper handheld record for maternal health has been used extensively in the management of pregnant women across nations globally.

It all started with the recommendation by WHO in 1994 that all childbearing age women should have home-based records. Following that, many countries provided women with their own home-based record to carry during pregnancy either paper handheld record such as card or handbook or it can be in electronic formats.²⁻⁴ In 2016, WHO once again emphasized on the importance of pregnant women to carry her own home-based records and continue to recommend its use.⁵ As for today, ownership of maternal home-based record particularly paper handheld is widely prevalent in some nations while in others still patchy. A study done by Brown & Dobo based on Demographic Health survey data from 1993 to 2013 found that the prevalence of home-based record was 90% or more in all regions globally with the highest in the European region and lowest in Southeast Asia and Western Pacific region.⁶

Despite reports on lower intake of paper handheld record in Southeast Asia region, the maternal health services in the region have prompted various efforts to improve its maternal health. This is evidence by some substantial reduction in maternal mortality, from 355 per 100,000 live births in 2000 reduce to 152 per 100,00 live births in 2017.⁷ However, this remarkable achievement has not yet put some of the countries in the region to meet the SDG's goal. Over the years, countries in this region have not been deterred by it and keep on strengthening their efforts to achieve the target. For example, multiple collaboration has been done between Japan and countries like Indonesia, Thailand, Laos and Vietnam with the introduction of a more comprehensive paper handheld record using the Maternal and Child Handbook to mothers.⁸

There are various studies that reported on the benefits of paper handheld record for mothers in across regions.^{9,10} In Burundi, Africa, the maternal and child handbook appeared to help increase the birth notification and the uptake of postnatal care among the mothers.¹¹ The utilization of paper handheld record is also seen to have empowered women in the sense that they have control over their care and hence increased their satisfaction as they can carry their own health record.^{3,12} Healthcare providers also shared the same positive perceptions toward paper handheld record as it improved

communication between them with mothers and other care providers.¹³

However, majority of the studies on paper handheld record or home-based record were mainly addressing the benefit and very scarce on the challenges faced by the users. To this date, there is no review done on the benefits and challenges of paper handheld maternal record in Southeast Asia region as to the author's knowledge. It has been more than two decades since the adoption and implementation of paper handheld maternal record since its being recommended by WHO. Hence, there may be a need to look into the matter as the paper handheld record may become obsolete as the new age of technology and information resources is advancing. Hence, this review aims to evaluate the benefits and challenges of the maternal paper handheld to users particularly to mothers and healthcare providers in Southeast Asia region.

METHODOLOGY

This review was done by adopting the established scoping review framework by Arksey and O'Malley¹⁴ and updated recommendation from scoping review by Levac, Colquhoun and O'Brien framework.¹⁵ There are basically five steps involved in conducting this scoping review. The review started by identifying the research question. Followed by identifying and selecting pertinent studies to the research questions, charting the relevant data and collating, summarizing, and reporting the results.

Identifying the research question

There are four research questions developed after reviewing the topic of interest and performing wide search of literature review regarding the topic. Therefore, the following research question will be addressed namely:

1. How paper handheld maternal record contributing to the knowledge and service utilization among expectant mothers in Southeast Asia region?
2. What are the benefits of paper handheld maternal record to healthcare providers in providing service in Southeast Asia region?
3. What are the challenges of paper handheld maternal record to mothers in Southeast Asia region?
4. What are the challenges of paper handheld maternal record to healthcare providers in Southeast Asia region?

Identifying relevant studies

Briefly, the search strategy started by including set of key search terms as shown in Table 1. The key search terms were combined using the Boolean operators such as AND, OR and NOT. Adjacencies and truncations were used as well. Original articles

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were searched from three electronic databases that include: PubMed, Web of Science and Scopus. For studies to be included, they must meet few criteria. First, the study should be published from January 2012 until December 2021 in English language

journals. Second, the study is a primary research article. Third, the study should be conducted in any country in the Southeast Asia region. Any non-accessible article will be excluded.

Table 1 Key search terms

Paper handheld record	Health system	Maternal health
Home based record	Health service	Maternal health services
Manual record	Healthcare system	Maternity care
Paper based record	Healthcare service	Maternity health service
Handheld record	Primary care	
Patient held record	Primary healthcare	
	Primary care service	

Selection of relevant and reliable studies

After applying the eligibility criteria, articles will undergo screening for selection. Starting with importing all records obtained from databases into data management software, Microsoft Excel. Followed by removing all duplicates and excluding all irrelevant articles by screening the title and the abstract. All articles that passed the initial screening, will proceed with full text screening. Once articles were selected, a set of final articles will be recorded in a spreadsheet, ready for analysis and data extraction. The final articles were appraised using the MMAT appraisal tool which was developed in 2006 and revised in 2011. This present review is based on the latest MMAT tool version 2018.¹⁶ Each type of study design is judged on five quality criteria. As a result, any rated study might be given a score of unclassified, 20%, 40%, 60%, 80%, or 100% based on the number of criteria met. Half of the selected articles met 80% of the MMAT criteria,

while the remaining articles met only 60% of the criteria. (Table 2)

Charting relevant data

Important and relevant data to answer the research questions of this presenting review were extracted from the final articles. All the data were sorted and organized in a spreadsheet using Microsoft Excel. The findings were analyzed using the qualitative content analysis and synthesized thematically. The summary of study locations and design were tabulated into Table 3. Then, selected information such as author's name, year of publication and related findings were shown in Table 4.

Collating, summarizing, and reporting of findings

Outcome data extracted were summarized and synthesized using thematic approach since the data on the benefits were broad. Table 4 is developed to present findings that were grouped into specific themes to attenuate the narrative of this review.

RESULT

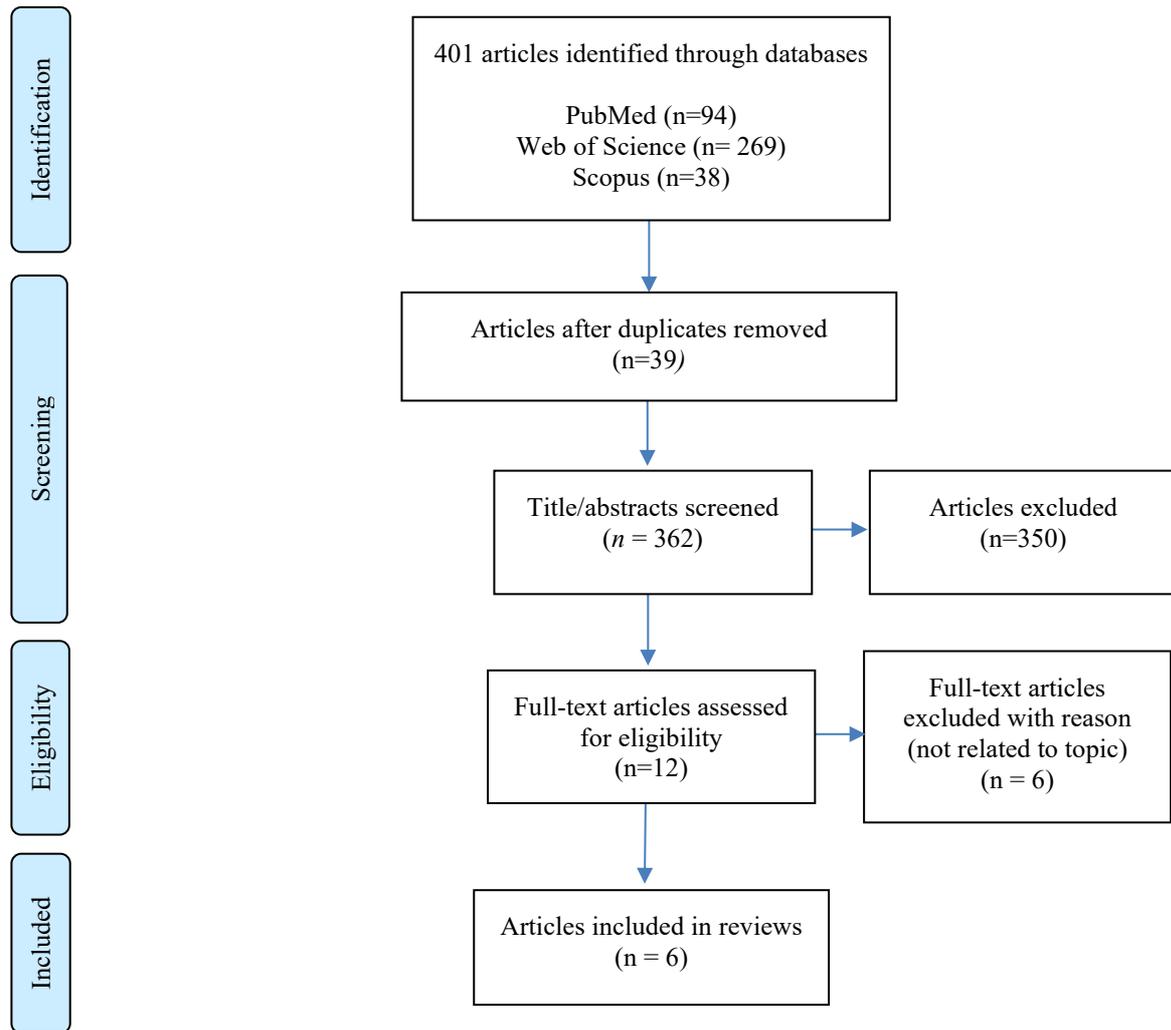


Figure 1 PRISMA flowchart

This review was structured in line with the PRISMA extension as shown in Figure 1. The systematic search has yielded a total of 401 articles from all three databases in which 94 articles from PubMed, 269 articles from Web of Science and 38 from Scopus. 39 articles were removed for duplication

resulting a total of 362 articles that went through title and abstract screening. 350 were excluded and only 12 articles eligible for full test screening and appraised using the MMAT tool. Finally, a total of 6 articles were included in this review as the other half were found to be non-related to this review.

Table 2 Summary of study appraisal using the MMAT tool

References	1. QUALITATIVE STUDIES					2. RANDOMIZED CONTROLLED TRIALS					3. NON-RANDOMIZED STUDIES					4. QUANTITATIVE DESCRIPTIVE STUDIES					5. MIXED METHODS STUDIES					Overall Quality Scores
	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	2.4	2.5	3.1	3.2	3.3	3.4	3.5	4.1	4.2	4.3	4.4	4.5	5.1	5.2	5.3	5.4	5.5	
Osaki et al. (2013)	Y	Y	Y	NS	Y																					****
Yanagisawa et al. (2015)											Y	Y	Y	Y	NS											****
Aiga et al. (2016)																					Y	Y	Y	NS	N	***
Aiga et al. (2016)																					Y	Y	Y	NS	N	***

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Tjandraprawira & Ghozali (2019)	Y	N	Y	Y	Y	****	
Osaki et al. (2019)			Y	N	Y	NS Y	***

* *Meets 20% of MMAT criteria*

** *Meets 40% of MMAT criteria*

*** *Meets 60% of MMAT criteria*

**** *Meets 80% of MMAT criteria*

***** *Meets 100% of MMAT criteria*

Table 3 Summary of study locations and study design

Study location	Author, year
Indonesia	Osaki et al, ¹⁹ Osaki et al, ¹⁷ Tjandraprawira & Ghozali. ¹⁸
Vietnam	Aiga et al, ²⁰ Aiga et al. ²¹
Cambodia	Yanagisawa et al. ²²
Study design	Author, year
Cross sectional	Tjandraprawira & Ghozali, ¹⁸ Osaki et al. ¹⁹
Mixed method	Aiga et al, ²⁰ Aiga et al. ²¹
Quasi experimental	Yanagisawa et al. ²²
Randomized trial	Osaki et al. ¹⁷

The articles included in this review conducted mainly in three countries of Southeast Asia region with half of the studies were from Indonesia,¹⁷⁻¹⁹ two from Vietnam^{20,21} and one from Cambodia.²² Majority of the studies utilized the observational study in which two were two studies

conducted using the cross-sectional design and two using the mixed method design. The remaining studies were experimental with one was a quasi-experimental study and one was a randomized control trial study

Table 3 Summary of study characteristics

No.	Author (Year), Country	Title	Study Design	Samples	Data collection technique	Types of paper handheld	Outcomes
1.	Osaki et al ¹⁹ Indonesia	The role of home-based records in the establishment of a continuum of care for mothers, newborns, and children in Indonesia	Cross-sectional	Data form Indonesia Demographic and Health Survey from 1997, 2002-2003, 2007	Secondary data	Maternal and child handbook	Maternal health service utilization
2.	Yanagisawa et al ²² Cambodia	Effect of a maternal and child health handbook on maternal knowledge and behaviour: A community-based controlled trial in rural Cambodia	Quasi experimental	For experimental study: 320 women from intervention areas, 320 women from control areas. For qualitative study: 20 multiparous women, 10 village health volunteers (VHV) and traditional birth attendants (TBA), 8 midwives and nurses	Questionnaire	Maternal and child handbook	Mother's knowledge, service utilization
3.	Aiga et al ²⁰ Vietnam	Knowledge, attitude, and practices: assessing maternal and child health care handbook intervention in Vietnam	Mixed method	810 mothers of children 6 to 18 months of age	Quantitative survey to compare post and pre, focus group discussion, structured interview to complement data gap	Maternal and child handbook	Mother's knowledge, attitude, and practice, service utilization, breastfeeding practice, challenges on paper handheld record
4.	Aiga et al ²¹ Vietnam	Fragmented implementation of maternal and child health home-based records in Vietnam: need for integration	Mixed method	10 healthcare workers and 10 mothers	Questionnaire and semi structured interviews	Maternal record, Maternal and child handbook	Challenges of paper handheld record
5.	Tjandraprawira & Ghozali ¹⁸ Indonesia	Signs Not Improved by Maternal and Child Health Handbook	Cross-sectional	127 postpartum women	Questionnaire	Maternal and child handbook	Mother's knowledge
6.	Osaki et al ¹⁷ Indonesia	Maternal and Child Health Handbook use for maternal and childcare: a cluster randomized controlled study in rural Java, Indonesia	Randomized control	13 health centers, 50 pregnant women per health center, 5 health centers with 250 respondents for intervention group and 8 health centers with 397 respondents for control group, N=647	Questionnaire	Maternal and child handbook, Maternal record	Mother's knowledge, maternal health service utilization and breastfeeding practice

Table 4 Summary of study findings

No.	Author (Year), Country	Title	Knowledge	Benefit	Service Utilization	Breastfeeding practice	Patients	Challenges
1.	Osaki et al ¹⁷ Indonesia	The role of home-based records in the establishment of a continuum of care for mothers, newborns, and children in Indonesia	N/A	The aOR for having assisted delivery was 2.1 times higher (95% CI: 1.05-4.25) among owners of both records than among those with no record or a single record. Possession of both records remained as a predictor of continuous maternal care (aOR: 3.92, 95% CI: 2.35-6.52)	N/A	N/A	N/A	N/A
2.	Yanagisawa et al ²² Cambodia	Effect of a maternal and child health handbook on maternal knowledge and behaviour: A community-based controlled trial in rural Cambodia	The MCH handbook increased the knowledge of all topics addressed except risk of severe bleeding (Obstetric emergency) possible due to cultural belief. The MCH handbook enhanced ANC participation, SBA delivery, and health-care facility delivery.	The intervention improved ANC attendance by four visits or more in intervention areas, as well as delivery with SBAs and delivery at a health facility. The intervention had a particularly strong impact on deliveries attended by SBAs.	N/A	N/A	N/A	N/A
3.	Aiga et al ²⁰ Vietnam	Knowledge, attitude, and practices: assessing maternal and child health handbook intervention in Vietnam	The MCH guide has been well received and is culturally relevant. There was no significant difference in pregnant women's knowledge of the requirement for ≥3 prenatal care visits. Between pre- and post-interventions, the proportion of mothers who understood the importance of exclusive breastfeeding during the first six months increased dramatically. Pre-intervention: 66.1%, post-intervention: 86.7% (P 0.001).	In the post-intervention period, the proportion of pregnant women who attended ≥3 antenatal care appointments were considerably greater than in the pre-intervention period.	The proportion of mothers who exclusively breastfeed their children until they were six months old increased dramatically, from 18.3% pre-intervention to 74.9% post-intervention (P 0.001).	N/A	N/A	
4.	Aiga et al ²¹ Vietnam	Fragmented implementation of maternal and child health home-based records in Vietnam: need for integration	N/A	N/A	N/A	N/A	The usage of numerous HBRs is likely to cause confusion among mothers as to which HBR they should consult and rely on at home.	By requiring health workers to record the same data on various HBRs, the implementation of many HBRs is likely to confuse them.

<p>Mothers were likely to mishandle or lose some of the HBRs</p> <p>Mothers who had multiple HBRs at home were deterred from referring to them because they were unsure which one to use and rely on. They often ended up putting all the HBRs in a drawer, referring to them only infrequently, and even mistreating them</p> <p>N/A</p>	<p>It took longer to record data in province specific HBRs since the format, language, and types and order of items for entry were different from what they were used to.</p>
<p>5. Tjandraprawira & Ghozali¹⁸ Indonesia</p> <p>Knowledge of Pregnancy and Its Danger Signs Not Improved by Maternal and Child Health Handbook</p>	<p>High degree of awareness about pregnancy (number of ANC visits, necessity of TT injection during pregnancy), obstetric danger signs (antepartum hemorrhage, postpartum hemorrhage, seizure), postpartum danger signs (puerperal infection), and breastfeeding benefits</p> <p>No association between how much the participants have read the MCH book with the level of knowledge.</p> <p>Sociodemographic also no association with the level of knowledge.</p> <p>Respondents in both groups improved their knowledge, but those in the intervention area got a higher score to close the knowledge gaps between baseline and follow-up.</p> <p>N/A</p>
<p>6. Oski et al¹⁷ Indonesia</p> <p>Maternal and Child Health Handbook use for maternal and childcare: a cluster randomized controlled study in rural Java, Indonesia</p>	<p>Respondents in intervention more likely to receive two doses of TT immunization, four times antenatal care, assisted birth and ensure children take vitamin A supplementation (OR = 2.03, 95% CI: 1.19–3.47)</p> <p>No significant difference in GLMM analysis in exclusive breastfeeding for 6 months</p> <p>Respondents in the intervention area more likely to seek care for complications, although difference was non-significant.</p>

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Type of paper handheld record studied

The included articles used a variety of paper handheld record terminology to study the maternal health record. The commonest type of paper handheld record is the maternal and child handbook being the focused in all the articles included in this study. There is other type of paper handheld record being studied: n=2 explored maternal record on its own. (Table 3)

Type of outcomes assessed

The outcomes that emerged from data analysis were grouped into four categories namely mother's knowledge and behavior, maternal health service utilization, breastfeeding practice, and challenges of paper handheld maternal record usage. Majority of articles measured entirely or partly on the mother's knowledge and behavior. There are four articles that partly assesses the maternal health service utilization and only one study reported findings on maternal health service utilization solely. Besides that, there are two articles that investigated the breastfeeding practices outcome and only one study looking into challenges of paper handheld record either on the care provider's perspective or both care providers and mothers. (Table 3)

Types of samples and data collection technique

Participation of respondents from studies included in this review varies from expecting mothers (n=1), mothers (n=3), postpartum mothers (n=1) and care providers involving not only healthcare workers, but health volunteers and traditional birth attendants (n=2). There is only one particular study that utilized secondary data for assessment. In terms of data collection technique, majority of the articles conducted surveys using questionnaires (n=5) while there are some articles conducting mixed method design used wide variety of measures to collect data such as semi structured interviews individually, focus group discussion and surveys using questionnaires. (Table 3)

Benefits of paper handheld maternal record

Overall, majority of studies selected for final analysis in this review constitute reports regarding the benefits of implementing the paper handheld maternal records in few Southeast Asia countries. There are three themes arise from the reported benefits encountered from the selected studies.

1. Knowledge of mothers

Among the studies that investigated knowledge of mothers, three out of four reported findings that demonstrated the positive benefits in terms of knowledge improvement that related to pregnancy (number of antenatal care visit, importance of tetanus toxoid injection during pregnancy), obstetric danger signs (antepartum hemorrhage, postpartum hemorrhage, seizure), postpartum danger sign and

benefits of breastfeeding.(17,18,22) One study reported no significant different in knowledge related to pregnancy between pre and post implementation of paper handheld record for mothers, however, there is significant changes about knowledge on exclusive breastfeeding among them.(20)

2. Service utilization

There are four studies that explored maternal health service utilization after the implementation of paper handheld record for maternal health. All the studies reported an increase antenatal care service among the mothers especially in terms of number of antenatal care visits.(17,19,20,22) One study provided evidence that possession of paper handheld records is a strong predictor for continuous maternal care.(19) Other than that, two studies also reported positive influence in intake of assisted delivery and birth at healthcare facilities.(17,22) In terms of vaccination during pregnancy, one study found that mothers with paper handheld records are more likely to complete two doses of tetanus toxoid immunization.(17) Despite that, this study also reported that there is no significant different in care for complications between mothers who owned paper handheld record and those who did not.

3. Breastfeeding practice

Out of six studies, two studies addressed breastfeeding practice among mothers.^{17,20} Aiga et al²⁰ found that the use of paper handheld records which is the maternal and child handbook pose significant dramatic changes in breastfeeding practice. Proportion of mothers who exclusively breastfeed increased from 18.3% to 74.9% post provision of the maternal and child handbook. However, other author reported that there is no significant difference in exclusive breastfeeding between pre and post implementation of the paper handheld maternal and child record.¹⁷

Perceived challenges related to paper handheld maternal record

There is only one study that addressed and discussed the challenges faced by the mothers or care providers during the paper handheld record provision.²¹ Among the main challenges discussed among the care providers are time constrains, demotivated and lack of confidence in recording information into the paper handheld record. As for mothers, the main concerns are confusion, risk of losing or mishandling and underutilization.

DISCUSSION

This systematic review documented the findings on paper handheld maternal record by analyzing the geographic scope, the type of paper handheld records assessed and key findings on benefits and challenges reported. Below, this review will provide

information on the implications and gaps that arise from the result that is relevant for providers, authorities, and policy makers. The results from selected articles revealed some substantial evidence on the positive gain of paper handheld maternal records on mother's knowledge, maternal health service utilization and breastfeeding practices.

Mother's knowledge

Impacted knowledge the most as evidence by the findings in this review. Despite varies form of paper handheld records used for maternal health such as maternal record or maternal and child handbook, both proved to be beneficial to the mothers. We postulated that the usage of maternal and child handbook in majority of the studies selected instead of maternal record solely might have contributed to the positive impact on the knowledge. This is an initiative to integrate all sorts of maternal and child health cards, records and immunization record into one comprehensive record which was first introduced in Japan²³ in line with the WHO recommendations on home based records.²⁴ This type of paper handheld record has been used in more than 30 countries ever since and served not just as health records but constitute information on safe pregnancy, delivery and child health.²⁵ Hence assisting expectant mothers and mothers to properly care for themselves. The findings from this review echoed a meta-analysis study by Baequni and Nakamura in 2012 which mentioned mothers who use this handbook tend to have better knowledge than those who do not.⁹ This however contradict with one study in this review which reported no significant changes in mother's knowledge between mothers who perceived to read more than 50% of their handbook and those who read less than 50%¹⁸ and another one study by Kusumayati and Nakamura in 2007 that found owning a handbook did not affect maternal knowledge.²⁶ This disparity is probably due to the differences of mother's background such as levels of education and upbringing.

Maternal health service utilization

Another important aspect that was observed from this review is service utilization. The evaluation for the effectiveness of the paper handheld record intervention effectiveness can be measured by service utilization. According to the findings from this review, implementation of paper handheld records for mothers increases maternal health utilization in terms of antenatal care, assisted delivery and delivery at health facilities. This is supported by another study conducted in Mongolia by Mori et al. which found that pregnant women who utilized the MCH handbook went to antenatal clinics 6.9 times on average, compared to 6.2 times for the control group.²⁷ It is also worthy to note this benefit can be vice versa in which increase maternal

service utilization could increase the uptake of the paper handheld maternal record.

Breastfeeding practice among mothers

Since most of the studies included in this review assessing the maternal and child handbook, breastfeeding practice became one of the predictors of benefit in these researches. Information on breastfeeding is added in the paper handheld record so that mothers learn the importance of breastfeeding and practice this method of feeding. Despite information on the benefits of breastfeeding to the child, the benefits that associated with breastfeeding mothers are also included to increase the interest among mothers to practice it. This can be seen in for example the maternal and child handbook in Republic of Mauritius in collaboration with WHO.¹³ According to one study by Aiga et al²⁰ in this review, adopting the MCH handbook increased the number of expectant mothers who understands the importance of exclusive breastfeeding thus translated into a shift in attitude and practice whereby the percentage of mothers who nursed their babies until they were six months old went from 18.3% to 74.9% after the intervention. Being knowledgeable has led to positive beliefs and positive perception if the benefits of exclusive breastfeeding has lowered the risk of premature breastfeeding cessation among mothers in rural Kenya.¹⁴ Interestingly there is one study in this review that reported no significant changes in breastfeeding practice despite owning a paper handheld maternal and child record. However, the reasons for this are not discussed but it might be related to factors such as increasing numbers of working mothers nowadays.

Challenges to mothers and care providers

One of the challenges reported was confusion among mothers and care providers. Mothers become discouraged by the confusion to which paper handheld record they need to rely on and refer to. Thus, the paper handheld record ended up being lost or mishandled. Confusion seems to happen among the care providers too. Care providers felt demotivating and inefficient as they need to record the same data to several paper handheld record and had to relearn the skill for filling out different type of paper handheld record. Apparently, these challenges happened due to multiple implementation of paper handheld record based on several provinces in the country.²¹ Failure to address this issue would lead to underutilization of the paper handheld record. In addition to that, a study found that utilization of the paper handheld record among mothers could also be associated by family support which influenced by good family knowledge and good attitude.²⁸

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Opportunities for future research

Findings from this review highlight the need for in depth understanding of the challenges faced by the end users such as the healthcare providers, patients, and families with the existing paper handheld maternal record. Paper handheld maternal record has been reformatted and redesigned according to the passage of time. It is crucial that the implementation of this newly constructed or formatted paper handheld record be evaluated to achieve the desired outcome and better use in current practice by reflecting the need of the targeted population of end users. There is also lacking in studies that focused on the benefits of this type of record to the healthcare providers in this region, therefore calling for more research to acknowledge this gap. This should be addressed by not just quantitatively but qualitatively as this mean of research can provide greater understanding of the issues. Future research should also be more focused on producing compact and uniform format of paper handheld maternal record based on local settings as it is still relevant to be used for low- and middle-income countries in this region despite the increasing trend of digitalization of health record. This review demonstrates lack of literatures availability related to paper handheld maternal record in Southeast Asia region. Hence, prompt efforts need to be made to prove the relevancy of paper handheld maternal record as a tool in current practice especially in terms of practicality and continuum of information in shared care as paper handheld record is widely and vastly used for maternity care in this region.

Implications to policy making

These findings reinforce the role of paper handheld maternal record not just in healthcare utilization among the mothers but also the knowledge, attitude, and practice among them thus improving the quality of care. This should assist the policy makers to develop improved version of the paper handheld maternal record that is timely without jeopardizing needs of the end users and standard of care.

Strength and Limitation

To the best of author's knowledge, this study is the first paper to report on the benefits in terms of service utilization, mother's knowledge, and breastfeeding practice among mothers. The final analysis of this review also specifically investigated the challenges on a paper handheld in Southeast Asia region. The reported challenges encountered during the provision of paper handheld record identified from this review could assists corresponding authorities and policy makers in setting up a more comprehensive and up to date approach in line with the technology advancement for improving maternal health service. Despite that, there are some limitations encountered during the conduct of this review which mostly due to

operational concerns. First, there is a possibility of reporting bias as the articles included are mostly from two countries in the region which are Indonesia and Vietnam. This might be due to financial aid received by these countries to fund large studies hence more obliged to report and publish the report. Therefore, this might limit the generalizability of results. Majority of the studies that were included were done in rural areas. This might cause lacking in a fair representation of true experience of paper handheld maternal record between rural and urban population. Since this review only considered articles from three databases without assessing evidence form grey literature which could lead to location bias and might restricts the findings. There are also concern on language bias as this review only included publication in English language. Hence, high quality studies published in regional language might be neglected. The result should also be interpreted with caution as most of the studies were conducted in observational study thus limited the inference of causal relationships between the paper handheld record and the reported benefits. In addition to that, most studies rely on self-reported questionnaires which might lead to response bias. Some of the studies were done with rather small sample size population which could point to under coverage of demographic of population. Hence, lead to the inability to generalize beyond a small population. In addition to that, this study only focused on studies conducted for the past 10 years, so it might miss several related studies that have been conducted earlier. However, this review is trying to extract the latest and contemporary issues related to the topic with the intention to assist future planning for maternal health service.

CONCLUSION

The paper handheld maternal record implementation in Southeast Asia exhibited great positive impact to the mothers in terms of knowledge, maternal health service utilization and breastfeeding practice. Many studies have reported the benefit not just in Southeast Asia region like in this review, but other review done globally. Nonetheless, it is quite difficult to find studies that addressed the challenges faced by the users in Southeast Asia region. Yes, it is undeniable that paper handheld book implementation proved to have significant positive impact to mothers, but one must also point out the issues and barriers that might come along the way of implementation to improve the utilization and increase the efficiency of the paper handheld record. The introduction and usage of paper handheld records are already more than two decades; hence it is recommended to acknowledge and understand the challenges faced regionally or even locally. There is still room of improvement of the maternal health service as it needs to be comprehensive and suited with the local context.

ACKNOWLEDGMENTS

The authors wish to thank Department of Community Health, Faculty of Medicine, Universiti Kebangsaan Malaysia.

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