

Research Article

Maternal and Child Health (MCH) Handbook and Its Effect on Maternal and Child Health Care: A Systematic Review and Meta-Analysis

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Abstract

To search the literature for evidence for examining the effect of MCH Handbooks to promote and improve health outcomes of the Maternal and Child Health care in developing countries.

Pub Med, EMBASE, Cochrane, Web of Science, and Google Scholar were searched. Study quality and the risk of bias were evaluated using the Cochrane Handbook. A random effects meta-analysis was performed. The qualitative findings were also presented in a tabular form.

The search resulted in 359 studies and 30 articles were included for full text screening and only seven were included in the meta-analysis. The estimated Risk Ratio (RR) for knowledge, practice and attitude of mothers on Maternal and Child Health Care were better among MCH Handbook users than non-MCH Handbook users. When comparing non-MCH handbook users to MCH handbook users for women's knowledge of antenatal care visits, RR was 0.81 (95% Confidence Interval [CI] 0.78-0.84) and for knowledge of danger signs RR was 0.51, 95% CI 0.45-0.59. Practice-related variables such as birth weight measured within 48hrs found RR 0.81, 95% CI 0.79-0.82. For delivery at health facility the RR when comparing non-MCH handbook users to MCH handbook users was 0.82, 95% CI 0.62-1.08 Finally, attitude-related variables such as positive changes in attitude on pregnancy care calculated RR 0.33, 95% CI 0.14-0.81 when comparing non-MCH handbook users to MCH handbook users.

The positive impacts of the MCH Handbook on knowledge, practice, and attitude-related variables suggest that the MCH Handbook is an effective tool to promote the maternal and child health care. In addition, MCH Handbook may offer an alternative tool for educating mothers for better maternal and child health care. There is a need for additional research to explore gaps identified in the current literature.

Keywords: MCH Handbook; Maternal and Child Health; Utilization of Health Services

Introduction

Improving maternal and child health has been highlighted as a key public health concern since the year 2000, with the development of the Millennium Development Goals (MDGs). Compared to the other six MDGs, goal 4 for children's health and goal

5 for women's health continue to lag behind. To facilitate progress toward achieving these two goals, the global health community now pays special attention to Maternal, Neonates, and Child Health (MNCH) [1-5]. Larger and more effective interventions and investment in MNCH are necessary to achieve these health-related MDGs [6]. Providing quality care during pregnancy and child delivery remain a major challenge [7]. To fill these gaps, both demand- and supply-side interventions are necessary [8]. In this

context, several countries adopted the Maternal and Child Health Handbook (the MCH Handbook) as a tool to promote better knowledge and service-seeking behavior among women [9].

The World Health Organization (WHO) has recommended the use of home-based records as a viable tool for ensuring the continuity of care for mothers and children before and after pregnancy [10]. Specifically, the WHO has identified some key recording tools such child health records, child immunization cards and counseling cards for childcare [10]. The MCH Handbook is a home-based health record for both the mother and child. It records the health condition of the mother throughout pregnancy, delivery, and the postnatal period, as well as the condition of the child before, at, and after birth, including immunization records and growth monitoring. It also contains health education information related to MNCH. The MCH Handbook can be used to monitor the health of a woman and her child, keep record of the utilization of health services, promote health education, and provide information when either mother or child is referred. The MCH Handbook may empower women by facilitating greater participation in their own medical care [11].

The objective of this review was to examine the effect of MCH Handbooks on the promotion of maternal and child health in developing countries.

Methods

Summary of Methods

A systematic literature review and meta-analysis was carried out to examine the effect of the MCH Handbook on maternal and child health care. The focus was on different variables related to maternal health and child health such as changes in mothers' knowledge, practice and attitude. This review was conducted using the methods outlined in the Cochrane Handbook for Systematic Reviews of Interventions [12] and is reported according to the PRISMA Checklist.

Literature Search

A literature search was carried out for articles published in Medline, Pub Med, the Cochrane Library and Google Scholar. The literature search included the following search terms and keywords: "MCH Handbook" OR "Maternal and child health handbook" OR "Home-based record" OR "Paper-based record" OR "personal health record" OR "Child health record/book" OR "maternal health record/book" OR "Maternal and child health record/book" OR "Vaccination record/card". The search term contained both controlled word and free text.

In addition, references were manually identified from the reference lists of key papers found during the searches and a few studies were manually identified as published online but not yet listed in literature databases. The search was not restricted to stud-

ies published in English - although only those with translations to English were included. In order to be included, studies had to identify and measure effects of MCH Handbook on maternal and child health. The included analyses primarily used a meta-analysis of different variables related to maternal and child health in pre and post MCH Handbook situations. Narrative results were also presented if relevant in a separate table. Full papers were obtained and formally assessed for all studies that appeared to be potentially relevant. In addition, available abstracts related to effectiveness of MCH Handbook were also considered if relevant and sufficient for presentations in this review, acknowledging the limitation of this inclusion.

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) (1946 to April 16 2017), Embase (1974 to April 16 2017) were systematically searched and also were searched in Google Scholar, Cochrane data base and were reviewed the 350 hits for potentially eligible studies (see PRISMA). Moreover, 10 articles were identified from additional sources.

Selection of studies

All identified articles were merged into a common file, and duplicates were deleted. Results were divided among two reviewers who independently examined the assigned articles and classified each as "Exclude", "Include", or "Unsure." A third reviewer settled discrepancies. Initial screening began with a title screen. Articles needed to include the words "MCH Handbook", "Maternal and Child Health Care". Next, abstracts were retrieved and screened to determine eligibility. Finally, full-text articles were retrieved and screened for inclusion.

Eligibility Criteria

Inclusion criteria

For title and abstract screening process, first we looked for existing Systematic Reviews (SR) on the MCH Handbook and its effectiveness Inclusion criteria for Title and Abstract Screening

Study type: We excluded reviews that were clearly narrative reviews or overviews of a topic that do not include reporting and synthesis of results of trials. We included relevant conference abstracts (and checked for follow-up publications), as far as they described to be a SR or original studies. We were looking for any primary study identified to conduct this systematic review.

Population: Studies including mothers using MCH Handbook and not using MCH Handbook (control). Intervention and comparison related: Intervention and comparison were mothers using the MCH Handbook and mothers not using the MCH Handbook. Interventions that were not relevant were excluded at the full-text screening stage.

Reported information (outcomes): The articles reporting mater-

nal and child health-related variables in relation to MCH Handbook's effect were included. Variables included knowledge of mother on antenatal care visits, danger signs, breast feeding, and vaccination. Practice-related variables were practice of antenatal care visits/continue of care, birth weight measured within 48hrs, delivery at health facility, trained attendant at birth, mother's tetanus toxoid, breast feeding, child vaccination, vitamin A and iron supplementation. Finally, attitude-related variables included positive changes in attitude on pregnancy care, support of health staff during pregnancy, child care, and the role of their husband during the pregnancy period.

Exclusion criteria

Non-original studies, structured abstracts, project records, letters/commentary, case reports, and case series were excluded.

Duplicates: When we came across duplicate citations, moved into the specific folder.

Full text screening

The first step was title and abstract screening to identify studies appearing to meet the inclusion criteria, potentially relevant, or with sufficient information to make a clear judgment to be included. The second step was screening those studies after retrieving the full texts.

Data extraction and management

The included full text articles were randomly shuffled using Endnote X6 and then the articles were assigned to each reviewer for data extraction. A third reviewer handled dissension. Studies meeting the inclusion criteria were included for data extraction. A standardized data extraction form was developed, which was pilot tested on two full-text articles. Each team member independently reviewed the full-text article and the following details were Extracted: basic characteristics including first author, publication year; study population (type of population either mother using MCH Handbook or not, age), setting, country, interventions, outcomes (knowledge, practice and attitude related to maternal and child health/care), and additional comments (if any).

Data Analysis (Quantitative and Narrative synthesis)

Two investigators independently collected data for patient characteristics, diagnosis, treatments, setting, follow-up, and outcomes using a pretested data abstraction form. The quality/risk of bias was assessed for each outcome from the studies using the Cochrane risk of bias tool for RCTs [13]. Data were analyzed by using RevMan 5.2 (The Nordic Cochrane Center, Copenhagen, Denmark). Relative risks (e.g. Risk Ratios [RRs]) were calculated by pooling results from RCTs and non-RCTs comparing MCH Handbook and not MCH Handbook. Also, a narrative summary of the included studies with narrative findings were presented in a Table 1 with all other study characteristics such as basic study information characteristics- first author, publication year; study population (type of population either mother using MCH Handbook or not, age), setting, country, interventions, findings as a result of MCH Handbook utilization and additional comments (if any).

Assessment of methodological quality of included studies

Two investigators evaluated the certainty of the evidence for each outcome using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach, and resolved any discrepancies [13]. The following GRADE domains were assessed: risk of bias, inconsistency, imprecision, indirectness, publication bias, magnitude of effect, and opposing plausible confounding [13].

Results

Search results

Among 359 non-duplicate records identified from the electronic database search and from other sources, 30 articles in full text were retrieved after title and abstract screening (Figure 1). After exclusion of articles that were not relevant, 14 studies were included. Seven articles were found for the quantitative analysis, and seven articles were found for the narrative summary. Only one article was an RCT and the rest were nonrandomized studies comparing effect of MCH Handbooks to non- MCH Handbooks or pre and post-MCH Handbook situations. Figure -1

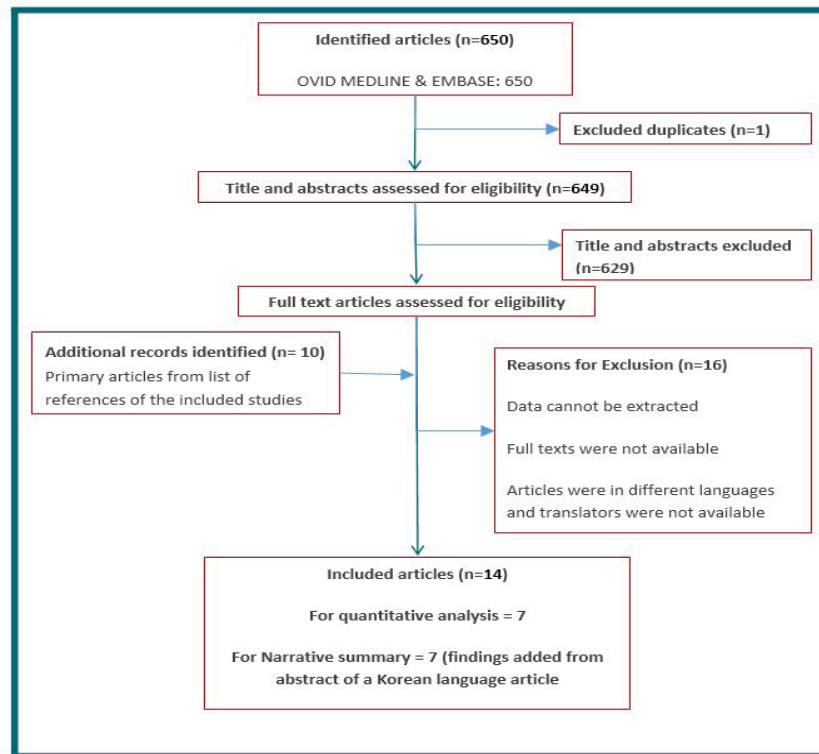


Figure 1: PRISMA.

Comparisons of effect of MCH Handbook and Non-MCH Handbook

Only one RCT and six non-RCTs were identified for comparing the effect of MCH Handbook and non-MCH Handbook. These seven studies compared the effects of MCH Handbook and non-MCH Handbook on maternal knowledge, practice and attitude on MCH health care. [14-20]. when direct comparisons within studies were available, relative risks and risk differences were calculated (Figures 2-4) and also variables measured related to knowledge, practice and attitude were shown in the same figures. When comparing women’s knowledge of antenatal care visits between non-MCH Handbook and MCH handbook scenarios, the RR was 0.81 (95%CI 0.78-0.84).

Similarly, when comparing non-MCH Handbook Users to MCH handbook users, MCH handbook users had lower knowledge of a range of topics including danger signs (RR 0.51; 95% confidence interval [CI] 0.45-0.59), breast feeding (RR 0.73; 95% CI 0.69-0.78), and vaccination (RR 0.18; 95% CI 0.11-0.28). In situations where the MCH Handbook was not used, practice-related events were less likely to occur such as practice of antenatal care visits/continue of care (RR 0.76; 95% CI 0.67-0.87), birth weight measured within 48hrs (RR 0.81; 95% CI 0.79-0.82), delivery at health facility (RR 0.82; 95% CI 0.62-1.08), trained attendant at birth (RR 0.85; 95% CI 0.78-0.93), mother’s tetanus taxied(RR 0.47; 95% CI 0.42-0.53), breast feeding (RR 0.24; 95% CI 0.03-1.68), child vaccination (RR 0.37; 95% CI 0.25-0.57), vitamin A and iron supplementation (RR 0.08; 95% CI 0.03-0.20).

Finally, studies examined the impact of the MCH handbook use compared to situations where the MCH Handbook was not used on attitude-related variables. It was found that non-MCH Handbook users were less likely to experience positive attitude-related variables such as positive changes in attitude on pregnancy care (RR 0.33; 95% CI 0.14-0.81), support of health staff during pregnancy (RR 0.58; 95% CI 0.32-1.05), child care (RR 0.43; 95% CI 0.21-0.90), and the role of their husband during the pregnancy period (RR 0.89; 95% CI 0.38-0.2.08) Detailed results are shown in Figures 2-4. The study characteristics of all these seven studies are also presented in (Table 1).

Included study characteristics Table 1								
Study Year Country	Type of Study Design	Population	Age Mean (Sd), Range	No. Of Participants	Interventions	Inclusion Criteria	Exclusion Criteria	Outcomes
Aiga 2016 Vietnam [14]	Comparison of pre & post intervention	Pregnant women/ mothers of children 6-18 months of age	15->34	MCHHB (n=810..) NonMCHHB (n=810)	MCHHB Vs. No MCHHB	Women from four specific provinces (selected as pilot provinces) were randomly selected	Not mentioned	Practice: antenatal care visits, promotion of ANC attendance, delivery with SBAs, delivery at a health facility Knowledge: antenatal care visits, danger signs breast feeding Attitude: on support of health staff during pregnancy
Bhuiyan 2006 Bangladesh[15]	Case Control study using pre & post intervention	Pregnant women visiting Maternal and Child Health Training Institute first time during the current pregnancy	>20	Case (with) MCHHB (n=240) Control (without MCHHB) (n=360)	Use (introduction) of MCH booklet vs. traditional health cards	Pregnant women visiting Maternal and Child Health Training Institute first time during the current pregnancy	Not mentioned	Practice: antenatal care visits, promotion of ANC attendance, delivery with SBAs, delivery at a health facility Knowledge: antenatal care visits, danger signs breast feeding, child vaccination, vitamin A and iron supplementation, Family planning Attitude: positive attitude on pregnancy care, support of health staff during pregnancy, child care
Kawakatsu 2015 Kenya [16]	A community-based cross-sectional survey	Mothers who had children aged 12–23 months	>20	Treatment (N=1331) Control (N=652)	Treatment ('Possess an MCH Handbook' Control (or 'Lost or never owned a Handbook')	The study population comprised all mothers in the research area who had children aged 12-23 months	Not mentioned	Practice: antenatal care visits Knowledge: antenatal care visits Practice: delivery at health facility
Included study characteristics (continue of Table 1)								
Study Year Country	Type of Study Design	Population	Age Mean (Sd), Range	No. Of Participants	Interventions	Inclusion Criteria	Exclusion Criteria	Outcomes (No Need To Include The Numbers)

Mori 2015 Mongolia [17]	Cluster Randomized Controlled Trial	Pregnant women and their infants	Interven- tion group =27.3 (6.13) Control group= 27.7 (5.67)	Intervention group-253 women and control group 248 women	MCHH group, control group	Pregnant women living in the Bulgan province of Mongolia	Not men- tioned	Practice: antenatal care visits, healthy behaviors such as drinking water dur- ing pregnancy, breast feeding Knowledge: antena- tal care visits
Osaki 2015 Indonesia [18]	Cross-sec- tional	Respondents with 0 to 23-month-old children	Interven- tion group 28.89(6.2) Control group 29.54(6.8)	MCHHB N=4816 Single/no re- cord n=3679	MCHHB, Single/no record	Mothers with 0 to 23-month-old children	Not men- tioned	Practice: antenatal care visits, pro- motion of ANC attendance, delivery with SBAs (skill birth attendant), birth weight mea- sured within 48hrs, delivery at a health facility Attitude: mother's tetanus taxied, child vaccination
Osaki 2013 Indonesia [19]	Cross-sec- tional study	Respondents with 0 to 23-month-old children	Interven- tion group 28.89(6.2) Control group 29.54(6.8)	MCHHB N=301 Single/no record n=96	MCHHB, Single/no record	Mothers with 0 to 23-month-old children	Not men- tioned	Practice: antenatal care visits, promo- tion of ANC atten- dance, delivery with SBAs (skill birth attendant), delivery at a health facility Attitude: mother's tetanus taxied, child vaccination
Yanagisawa 2014 Cambodia [20]	Case Con- trol study using pre & post inter- vention	Women who have given birth one year earlier	15-49	MCHHB (n=.320.) NonMCHHB (n=320)	Introduction of MCHHB in selected study areas vs Non MCHHB	Living in the intervention and control areas	Not men- tioned	Practice: promotion of ANC attendance, delivery with SBAs, delivery at a health facility Knowledge: danger signs, breast feeding Attitude: on support of health staff during pregnancy

Table 1: Study characteristics of included studies for meta-analysis

Eleven studies examined narrative findings on the same issues. [9,21-27] The available data suggested that there is positive effect of MCH Handbook on maternal and child health the quality of the evidence for almost all outcomes was low because there was only one RCT (with small sample size). The rest of the studies were non-randomized studies that compared the non-MCH Handbook with MCH Handbook and had low quality because of imprecise results due to few events and participants in the studies (Figure -2-4).

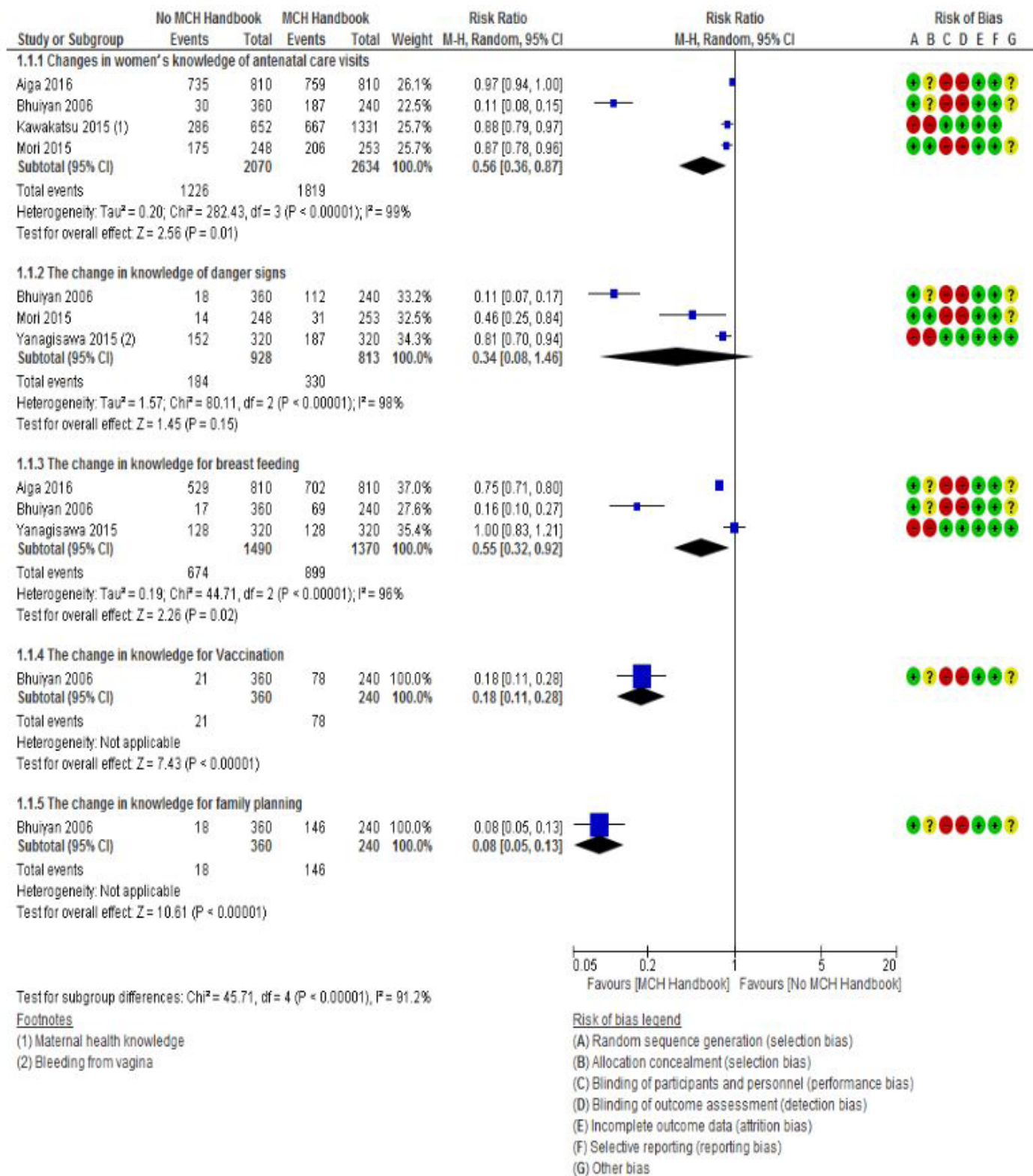


Figure 2: Comparison between MCH Handbook vs No MCH Handbook: Impact on Knowledge.

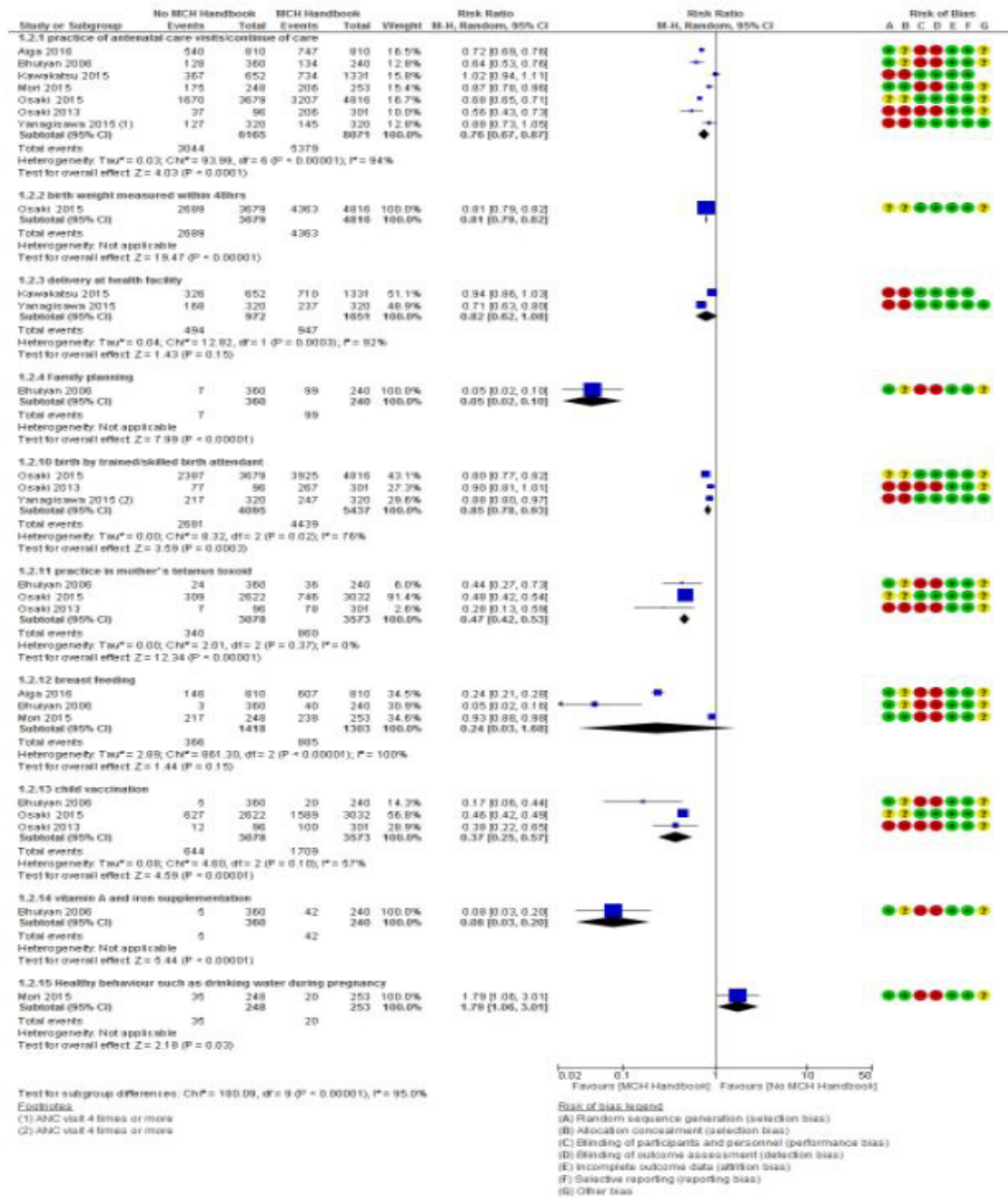
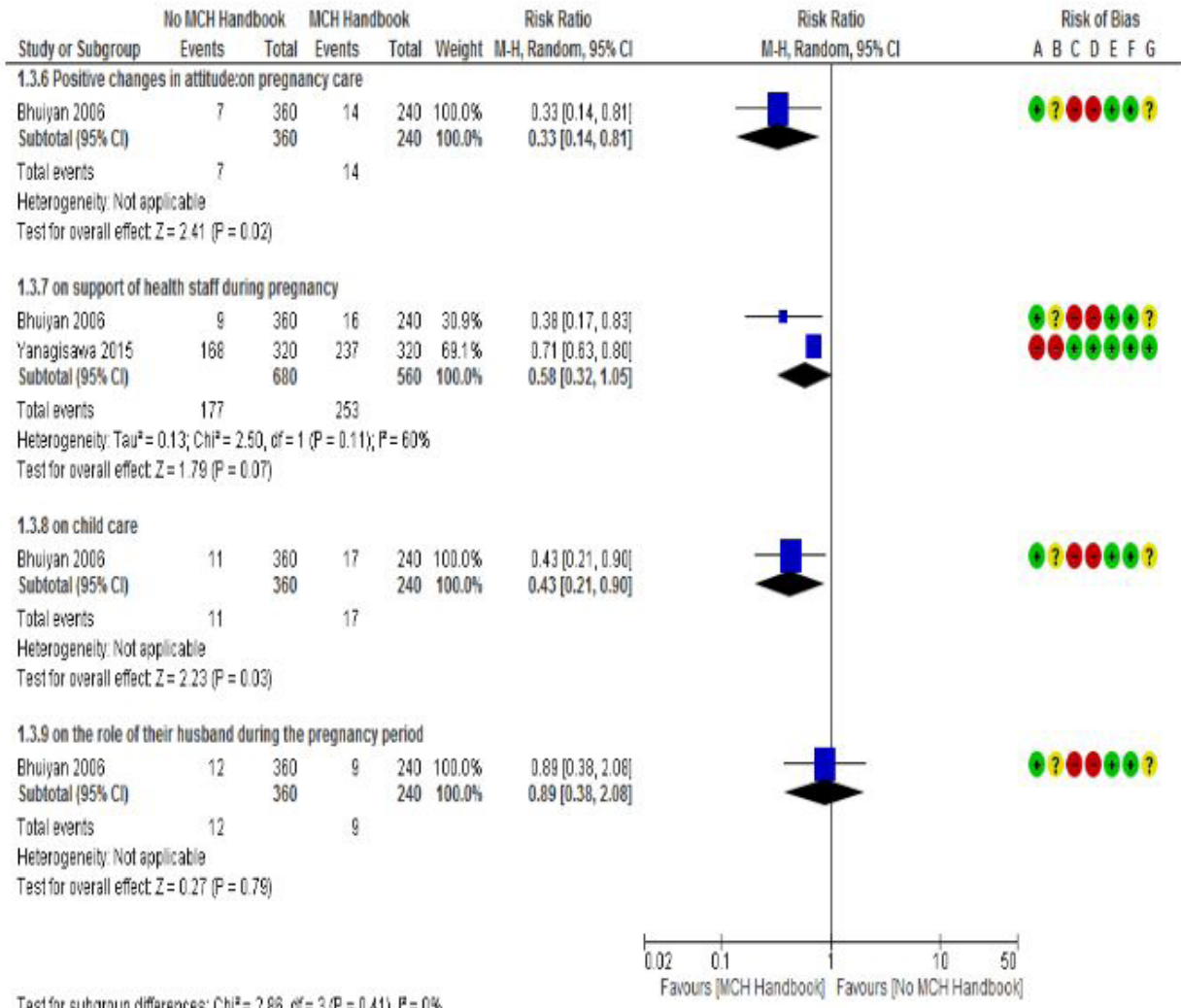


Figure 3: Comparison between MCH Handbook vs No MCH Handbook: Impact on Practice.



Risk of bias legend

- (A) Random sequence generation (selection bias)
- (B) Allocation concealment (selection bias)
- (C) Blinding of participants and personnel (performance bias)
- (D) Blinding of outcome assessment (detection bias)
- (E) Incomplete outcome data (attrition bias)
- (F) Selective reporting (reporting bias)
- (G) Other bias

Figure 4: Comparison between MCH Handbook vs No MCH Handbook: Impact on Attitude. Table 2

Citation: Bhuiyan S, Begum H, Deena, Ehsan S, Jamal Shah S, et al. (2017) Maternal and Child Health (MCH) Handbook and Its Effect on Maternal and Child Health Care: A Systematic Review and Meta-Analysis. J Community Med Public Health: CMPH-109.

Study, Year, Country	Type of Study Design	Population	Age, Mean Sd Range	No. Of Participants	Interventions	Inclusion Criteria	Findings
Bhuiyan 2009 Bangladesh [9]	Cross sectional survey	Pregnant women	Not mentioned	240	MCH Handbook	pregnant women of MCH Handbook areas	Improvement in maternal knowledge, attitude, and utilization of MCH services. In 2007 study, 91% mothers could read, understand, make notes on the MCH Handbook, and also carried it to consultations, and only 0.5% mothers lost their handbooks.
Dagvadorj 2017, Mongolia [21]	Longitudinal Randomised Control Trial (RCT) 2010-2013	Mothers who gave birth and the three-year follow-up if they still lived in the area.	Not mentioned	Intervention group n= 214 control group n=172	MCHHB* Vs. No MCHHB	All women living in the Bulgan province of Mongolia who gave birth between March–August 2010 participated in the study	Active usage of the MCH Handbook by the mothers for three years helped to lower the risk of impaired cognitive development
Fujimoto 2001 Japan [22]	Questionnaire survey	Guardians who visited health stations for 18-month examinations of their children and agreed to participated in the research	Not mentioned	10,900 guardians	MCHHB	13,271 guardians who visited health stations for 18-month examinations of their children and agreed to participated in our research	87.0% of respondents answered that MCH Handbook was helpful for child bearing and 81.6% said that the record for immunization was useful. However, 34.1% of respondents answered it was not simple to utilize MCH Handbook and 60.6% of them requested more detail on child bearing. As for dental health, the completion rate for information was low and only 21.3% of respondents reported for the dental record was useful.

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Study, Year, Country	Type of Study Design	Population	Age, Mean Sd Range	No. Of Participants	Interventions	Inclusion Criteria	Findings
Hagiwaraa, 2013 Palestine [23]	Case control study	Women coming to MCH treatment centers	Not mentioned	MCHHB n=270; No MCHHB n= 70	MCH Handbook vs No MCHHB	Women coming to MCH treatment centers	Knowledge related on exclusive breastfeeding and how to cope with the risks of rupture of membranes during pregnancy increased among MCH Handbook users, especially among less-educated women.
Jeong 2003 Korea [24]	Cross-sectional	women whose children were between four and six years old	Not mentioned	312	MCH Handbook	Women with children between four and six years old, and residing in six provinces of Gyung-sangnam, Korea	The awareness and rate of DPT (Diphtheria, Pertussis, Tetanus vaccine) additional immunization was significantly higher in the women who retained the MCH Handbook than their counterparts.
Kusumayati 2007 Indonesia [25]	Cross Sectional Study	mothers(pregnant or with one or more children under age 3)	NA	No MCHHB n=611; MCHHB n= 630	MCH Handbook	Mothers (pregnant or with one or more children under age 3)	Utilization of MCHH has the potential both to improve maternal knowledge and to increase utilization of maternal health services
Osaki 2009 Indonesia [26]	Retrospective review	Records of Children 12-23 months	12-23 months	n= 865 (2002-3) and n=974 (1997)	MCH Handbook	Children 12-23 months	Ownership of home-based immunization records among children aged 12-23 months increased from 30.8% (n = 954) in 1997 and 30.7% (n = 865) in 2002-3 to 37% in 2007. This ownership of immunization record is associated with greater immunization coverage
*MCHHB: Maternal and Child Health Handbook.							

Table 2: Narrative summary of results from different studies.

Discussion

The present systematic review of the literature was conducted to inform decision making about effect of the MCH Handbook on maternal and child care. Unfortunately, although not unexpectedly, only one RCT was found that compared MCH Handbook and its effect on maternal and child care and measured only one outcome important to decision making. Thus, due to the lack of RCTs and scarcity of outcomes, the search also included nonrandomized studies. Nonetheless, results from this study suggest that users of the MCH Handbook tended to have better outcomes of knowledge, practice, and attitude-related variables compared to non-users of the MCH Handbook. Further, narrative findings highlighted the MCH Handbook as a tool to increase ownership of immunization records, increase use of maternal health services, and increase knowledge related to topics such as exclusive breastfeeding. Thus, results from the meta-analysis and the narrative summary suggest that the MCH Handbook may have a positive effect on maternal child health and ultimately may be a useful tool to improve maternal and child health care and outcomes.

Similar results were found in a systematic review on the effect of the MCH Handbook. A systematic review conducted by Baequni and Nakamura (2012) [27] found that mothers who used the MCHHB during pregnancy had higher levels of knowledge (OR 1.44, 95% CI: 1.22 -1.70) than those who did not use MCHHB during pregnancy. However, although the MCH Handbook may be a useful tool, evidence suggests varying uptake and utilization among various populations. One study found that utilization of the MCH Handbook is still less widespread than expected, especially among clients of private health services in Thailand [28]. A retrospective review by Nakamura (2010) [29] showed that 13,271 of guardians in Japan who visited 18-month health examinations of their children in 1999 used the MCH Handbook. As well, almost all guardians had read and written in their MCH Handbook, which shows that the MCH Handbook was highly utilized in Japan.

However, many guardians felt that the MCH Handbook was not so easy to utilize and the articles on dental health were not widely used. Thus, further research may be needed to examine the appropriateness of content and how the tool can be designed to ensure the tool is user-friendly. The results from this systematic review also align with the conclusions from the Tokyo Declaration, which noted that the MCH Handbook is critical to facilitate reciprocal communication between families and health care providers, and to empower women and their families to take an active role in their health care.

The MCH handbook may be an effective tool for communication with health providers and husbands, for both highly educated and less-educated women during their first pregnancy. Results suggested that although less-educated women rarely read the handbook themselves at home, they became familiar with health

information and options related to MCH through personalized guidance that was provided by health providers at health facilities utilizing MCH handbook [30,31]. Research has also shown that women with lower education have received more of their health information from the MCH Handbook than women of other educational groups, which demonstrates that the MCH Handbook can be a beneficial health education tool even if a mother is not highly educated [29]. Thus, the MCH Handbook can be an effective tool to promote the maternal and child health care, and may offer an alternative tool to existing, fragmented home record tools for educating mothers for better maternal and child health care.

Similarly, Bhuiyan (2009) noted that the MCH handbook provides mothers and families with valuable information that can empower women to participate in their health care and actively engage with primary health care providers. The present review used a comprehensive and systematic search strategy. Rigorous procedures were used to screen potential papers, and quality of papers was thoroughly assessed using GRADE criteria. However, there are some notable limitations of this review. The quality of many of the studies was relatively low due to small sample sizes. Although restricting the search to only randomized controlled trials could have potentially provided the highest quality of evidence, there was a dearth of RCTs on this topic. Thus, the present search included nonrandomized controlled trials, which can be heavily influenced by confounders.

As can be seen in Figures 2-4, many studies were likely heavily influenced by selection bias, performance bias, and detection bias. Additionally, there was a broad range of variables reported in the studies included in the meta-analysis. The range of variables reported resulted in difficulty determining heterogeneity. Additional research from other countries where the MCH Handbook has been implemented to further discern the effect of the MCH Handbook in maternal and child health care at a global level, since results from a few selected countries may not be generalizable to all mothers around the world.

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