

[Original Article]

Increased Utilization of Maternal Health Services by Mothers Using the Maternal and Child Health Handbook in Indonesia

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Abstract

Objective

To assess the effects of the utilization of Maternal and Child Health Handbook (MCHH) in West Sumatra on the utilization of maternal health services.

Methods

A repeated cross sectional study design was used. Three consecutive surveys were conducted in two districts, in 1999, 2001 and 2003, involving respectively 611, 621, and 630 mothers (pregnant and/or with one or more children under age three) as respondents. Respondents for each survey were selected from the same sub-districts and villages, using a multistage random sampling method. Data were collected primarily by using a pre-tested structured questionnaire. Multiple logistic regression analyses were carried out to estimate the net effects of the MCHH on mother's use of maternal health services.

Results

After controlling for other influencing factors, utilization of MCHH was found to be associated with better maternal knowledge regarding antenatal care (ANC), tetanus toxoid (TT) immunization and skilled birth attendance. MCHH utilization was also associated with higher likelihood of mothers' utilizing ANC, TT immunization and family planning services, and of use or planned use of skilled birth attendance. Simply owning the handbook did not affect maternal knowledge and was only associated with higher utilization of skilled birth attendance.

Discussion

The MCHH needs some modification, taking into account the educational level of the targeted mothers. Appropriate health care provider training is needed to promote the use of the MCHH as a tool for encouraging and focusing communication between mothers and health care providers, as well as to ensure that health care providers are able to use the handbook.

Conclusion

Utilization of the MCHH has the potential both to improve maternal knowledge and to increase the utilization of maternal health services. For maximum benefits, the handbook should be actively used by both mothers and health care providers.

Keywords: MCH Handbook, health education, antenatal care, skilled birth attendance, Indonesia

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I. Introduction

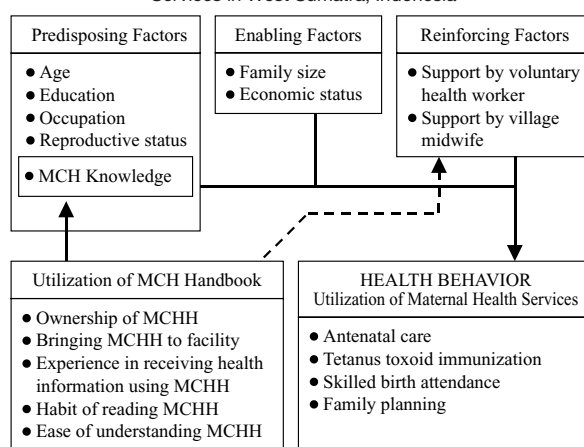
Indonesia, the largest archipelago country in the world, has a total population of about 222,781,000.¹⁾ Approximately 27.4% of the population are females 15-49 years old, and 9.8% are children under five years of age. This country still faces many health problems as indicated by its high Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR). Although Indonesia's IMR has decreased significantly, from 68 per 1000 live births in 1990 to 60 in 1995²⁾ and to 49 in 1998³⁾, there has been much less improvement in the Neonatal Mortality Rate (NMR), which decreased from 28.4 per 1000 live births in 1982-1987 to 21.8 in 1992-1997 and to 22 in 2001⁴⁾. The latest Indonesian Health and Demography Survey (IHDS) 2002-03 reveals an IMR of 35 per 1000 live births and NMR of 20 per 1000 live births⁵⁾. Considering the causes of infant deaths, Indonesia needs to give special attention to perinatal health to reduce its IMR. With adequate attention to and care for pregnant mothers and their newborns, the MMR and IMR could be reduced simultaneously.

MMR in Indonesia decreased much more slowly than IMR, from 404 per 100,000 live births in 1991 to 373 in 1995²⁾ and to 307 in 2002⁵⁾. To speed up the reduction of MMR and IMR, Indonesians reviewed measures implemented by other countries. In 1993 Japanese experts introduced the Japanese Boshi Kenko Techo (Maternal and Child Health Handbook (MCHH)) as a measure to help reduce MMR and IMR. Initial assessment of a pilot project in Salatiga City, Central Java, showed some promising advantages of using the MCHH. However, scientifically-sound evidence of the handbook's effectiveness is needed before countrywide expansion of its use. Therefore, a larger-scale trial project was carried out in West Sumatra in 1997-2003, with the support from the Japan International Cooperation Agency (JICA) through the "Ensuring Quality of MCH Service through MCH Handbook" Project. This study was carried out to assess the effects of the use of the MCHH on several aspects of maternal health behaviors, taking into account the influence of relevant predisposing, enabling and reinforcing factors. This report describes one part of the study's results, i.e. the MCHH's effect on the utilization of maternal health services.

II. Conceptual Framework

The conceptual framework of this study (Figure-1) is based on Green and Kreuter's framework for determinants of health behavior⁶⁾. The main dependent variable was a maternal health behavior, utilization of basic maternal health services. In the study area, and everywhere in Indonesia, each mother is expected to receive antenatal care (ANC) at least four times, receive tetanus toxoid (TT) immunization at least twice, be attended by a skilled birth attendant during delivery, and to use a modern family planning method.

Figure 1. Conceptual Framework for the Assessment of the Effect of MCH Handbook Utilization on the Utilization of Maternal Health Services in West Sumatra, Indonesia



This conceptual framework was developed based on the Green and Kreuter's Precede-Proceed Model for health program planning and evaluation (Green, L. W and Kreuter, M. W. Health Program Planning: an Educational and Ecological Approach. 4th Edition. New York: McGraw-Hill, 2005; Figure 1-2, page 10).

Determinant variables of maternal health behavior were classified into three groups, predisposing factors, enabling factors and reinforcing factors. Predisposing factors studied included maternal age⁷⁻⁹⁾, maternal literacy and education^{7,8,10)}, maternal occupation^{7,8)}, paternal occupation⁷⁾, maternal reproductive status^{7,11)} and maternal knowledge^{12,13)}. Maternal knowledge was a predisposing factor expected to be affected by the use of the MCHH. Enabling factors considered were economic status¹⁴⁻¹⁶⁾ and family size¹⁷⁾. Economic status, indicated by the average family monthly income and average family daily expenditure for food, was a proxy for resource availability in the family, while family size was a proxy for resource allocation for individual family members.

Among the parties who could influence maternal health behavior, health care provider are the only party who have clear and significant role in the utilization of MCHH and to some extent determine the benefits of

the handbook for mothers. Moreover, utilization of the MCHH was also expected to affect the health care providers' patterns of providing supports and services to mothers, which are reinforcing factors for the mothers' behavior. In this study, health care providers included voluntary health workers and village midwives, and their support was indicated by home visitations during pregnancy^{8,18,19}.

Utilization of the MCHH was the intervention considered in the study. Utilization of the MCHH was indicated by (1) the mother's ownership of the handbook, (2) the mother's bringing the handbook with her when visiting a health facility or attending a health program, (3) the mother's having received information from health care providers who used the handbook to provide such information, (4) the extent to which the mother has read the handbook, and (5) the ease with which the mother could understand the content of the MCHH. Receiving health information and/or health education has been found to be an important determinant of maternal knowledge^{10,20,21} and of health behavior^{8,22}.

III. Materials and Methods

This was a repeated cross sectional study. During the preparatory phase of the project, the West Sumatra Provincial Health Office selected Padang Pariaman District as the intervention area and Tanah Datar District as the control area (the selection of those areas was out of the principal investigator's control). Three consecutive surveys were conducted in 1999 (baseline survey, before introducing the handbook in either area), in 2001 (after 2 years' utilization of the handbook in Padang Pariaman only) and in 2003 (after 4 years' utilization of the handbook in Padang Pariaman and 2 years' utilization of the handbook in Tanah Datar). Mothers who were pregnant or had children under three years of age were eligible to be selected as respondents. Using a multistage random sampling method, 611, 621, and 630 such mothers were selected as respondents, from the same sub-districts and villages, for the three consecutive surveys. Data were gathered using a pre-tested structured questionnaire. Four field supervisors and twenty well-trained data collectors were involved in each survey.

All completed questionnaires were checked and

edited by the field supervisors in the field, and then rechecked by the principal investigator before being filed. The data were thoroughly cleaned before being analyzed. Univariate analysis was done to provide descriptive information on the variables studied. Multiple logistic regression tests with the backward (Wald) stepwise elimination method were executed on the three pooled data sets to assess the effects of the MCHH utilization on mothers, taking into account the influence of predisposing, enabling and reinforcing factors.

Although this study did not involve invasive interventions and did not deal with issues considered to be sensitive by the targeted population or by most Indonesians, ethical clearance was obtained from University of Indonesia. Formal permission to carry out the research also was obtained from the central as well as the local governments. Collective informed consents were obtained from the Sub-district Heads and Village Heads and verbal informed consent was obtained from each respondent.

IV. Results

1. Utilization of the MCH Handbook, utilization of maternal health services and its predisposing, enabling and reinforcing factors

Table 1 summarizes the descriptions of predisposing, enabling and reinforcing factors, utilization of the MCHH, and utilization of maternal health services. The data showed that literacy rate was quite high, but about 30%-40% of mothers only finished elementary school or lower. The mean scores of maternal knowledge were not increased in either district. Both monthly family income and daily family expenditure for food increased through the study period. Home visitation by the health care providers did not change through the study period.

The MCHH utilization had increased the ownership rate of home-based maternal health record. Before utilizing the handbook, only one fourth of pregnant mothers had any type of home-based maternal health record, while at the end of the study 92.3% of mothers in Padang Pariaman and 85.8% of those in Tanah Datar owned some type of home-based maternal health record. Utilization of the MCHH improved the mothers' habit to bring their home-based maternal health records when taking a health service or

attending a health program. However, using MCHH instead of the previous home-based maternal health record did not improve the usage of the home-based maternal health record by health care providers for providing health information to mothers. At the end of the study 40% of mothers in Tanah Datar and 57% of those in Padang Pariaman had never read or had read any part of the handbook or had read only a small part of it. Moreover, among mothers who had read at least some part of the handbook, 22.4% in Tanah Datar and 27% in Padang Pariaman stated that they found it difficult to understand the handbook.

The data showed that the coverage of ANC, TT immunization, skilled birth attendance and family planning services in both districts increased

Table1. Utilization of the MCH Handbook and Utilization of Maternal Health Services and Its Predisposing, Enabling and Reinforcing Factors in Two Districts of West Sumatra, Indonesia, in 1999, 2001 and 2003

Socio-demographic characteristics	Tanah Datar			Padang Pariaman		
	1999	2001	2003	1999	2001	2003
Predisposing Factors						
Maternal age (mean)	29.9	29.3	29.9	30.5	30.1	31.2
Maternal literacy (%)	97.4	98.7	99.1	94.8	95.3	97.1
% mothers finished Junior High School or more	70.9	73.1	78.6	57.5	63.1	63.5
% working mothers	21.5	15.5	12.9	16.6	22.3	21.8
% mothers had >4 alive children	6.9	5.9	7.2	25.6	23.3	25.0
Maternal knowledge of maternal health services (mean score)	52.0	39.8	42.1	50.1	38.9	39.3
Enabling Factors						
Family size (mean)	4.1	3.9	4.1	4.7	4.5	4.8
Average monthly income (mean in thousands IDR)	365.1	551.3	663.6	350.5	567.6	656.6
Average daily food expenditure (mean in thousands IDR)	10.1	11.1	14.0	12.8	12.8	15.6
Reinforcing Factors						
% mothers home-visited by voluntary health workers during the last pregnancy	19.5	24.0	24.8	14.3	42.3	18.9
% mothers home-visited by village midwives during the last pregnancy	16.2	81.3	21.4	20.5	63.7	27.6
Utilization of MCHH						
% mothers owned home-based maternal health record	25.1	36.8	85.8	24.4	84.9	92.3
% mothers had always brought home-based maternal health record when taking health service or attending health program	19.7	60.7	61.2	29.3	49.2	47.2
% mothers had read most or all part of MCHH	NA	NA	60.3	NA	48.5	43.0
% mothers could understand MCHH easily	NA	NA	77.6	NA	70.2	73.0
% mothers received information from health care providers using home-based maternal health record	51.3	53.6	48.4	38.7	55.7	38.5
Utilization of Maternal Health Services						
% mothers received ANC ≥ 4 times during the last pregnancy	75.9	80.9	86.6	64.3	75.1	76.2
% mothers received TT ≥ 2 times during the last pregnancy	56.4	58.9	70.8	9.4	49.8	56.1
% mothers used (or planned to use) skilled birth attendant in most recent (or next expected) delivery	98.0	98.7	98.7	89.3	92.4	93.3
% mothers practiced family planning	52.1	49.7	59.1	29.2	33.4	40.7

throughout the study period. Improvement in the coverage of TT immunization was the most obvious change observed after implementing the MCHH program within the areas.

2. The Effect of the MCH Handbook on Maternal Knowledge

Multiple logistic regression tests were used to develop multivariate models for predicting certain aspects of maternal knowledge related to maternal health services, i.e. knowledge on minimal adequate frequency of ANC, knowledge of the importance of TT immunization and the reason for its importance, and knowledge of the safest birth attendant (Table 2). Simply owning a MCHH was not associated with greater knowledge. However, mothers who reported that they usually bring their home-based maternal health record with them when visiting a health facility or attending a health program had a 2.5 times higher likelihood of knowing the minimal adequate frequency of ANC (95% CI 1.236-5.235), and self-report of having received health education involving use of the home-based maternal health record was associated

Table 2. Multivariate Models for Predicting Maternal Knowledge of Maternal Health Services

Predictor variable	B	SE	Sig.	Exp (B)	95% CI for Exp (B)	
					Lower	Upper
Knowledge of adequate minimal frequency of ANC						
Parity	.595	.279	.033	1.813	1.048	3.136
Survey time	.458	.203	.024	1.580	1.061	2.353
Home visitation by village midwife	.408	.202	.043	1.505	1.013	2.234
Habit in bringing MCHH	.934	.368	.011	2.544	1.236	5.235
Constant	-3.321	.446	.000	.036		
Knowledge of the importance of TT immunization						
					1.782	4.022
Maternal education	.985	.208	.000	2.677	.280	.779
District	-.762	.261	.004	.467	1.740	4.139
Mother had received health education using MCHH	.987	.221	.000	2.684		
Ease of understanding MCHH	.725	.232	.002	2.064	1.310	3.252
Constant	.744	.324	.022	2.104		
Knowledge of the reason of the importance of TT immunization						
Maternal literacy	2.069	1.047	.048	7.918	1.018	61.617
Maternal education	.890	.188	.000	2.436	1.685	3.522
Parity	-.742	.243	.002	.476	.296	.766
Family size	.465	.184	.012	1.592	1.109	2.284
Survey time	.567	.160	.000	1.763	1.289	2.411
Practice in reading MCHH	.490	.165	.003	1.632	1.180	2.256
Ease of understanding MCHH	.867	.250	.001	2.380	1.457	3.887
Constant	-3.902	1.054	.000	.020		
Knowledge of the safest birth attendant						
Maternal education	1.677	.541	.002	5.349	1.853	15.436
Survey time	1.678	.511	.001	5.355	1.968	14.568
Experience of receiving health education using MCHH	2.156	.762	.005	8.638	1.938	38.490
Easiness to understand MCHH	1.005	.487	.039	2.731	1.052	7.090
Constant	1.692	.386	.000	5.430		

with a 2.7 times higher chance that the mothers would know the importance of TT immunization (95% CI 1.740-4.139) and a more than 8 times higher chance that they would know the safest birth attendant (95% CI 1.938-38.490).

Active usage of the MCHH by the mothers was found to be strongly associated with maternal knowledge. Having read most or all part of the MCHH was found to be associated with higher probability that the mother would know the reason why TT immunization for pregnant mothers is important (OR=1.925; 95% CI 1.180-2.256). Being able to understand the handbook easily was associated with a higher probability that the mother would know about the importance of TT immunization (OR=2.064; 95% CI 1.310-3.252) and the reason for that importance (OR=2.380; 95% CI 1.457-3.887) and could identify the safest birth attendant (OR=2.731; 95% CI 1.052-7.090).

3. The Effect of the MCHH on Utilization of Maternal Health Services

The effect of MCHH on utilization of maternal health services was assessed with regard to four services, i.e. ANC, TT immunization, skilled birth

attendance and family planning (Table 3). Owning a home-based maternal health record was associated with a 3 times higher probability that the mother would use a skilled birth attendant (95% CI 1.031-9.477). Mothers' reporting that they usually bring the home-based maternal health record with them to health facilities or programs was associated with a 2.5 times higher probability of their practicing family planning (95% CI 1.520-4.184). Receiving health education involving use of the home-based maternal health record was not associated with mothers' utilization of any of the maternal health services studied. However, having read most or all part of the MCHH was found to be associated with mothers' receiving ANC at least 4 times (OR=1.736; 95% CI 1.194-2.522) and with their receiving at least two TT immunizations (OR=1.576; 95% CI 1.146-2.166). Being able to understand the MCHH easily was found to be associated with a higher likelihood of using a skilled birth attendant (OR=2.627; 95% CI 1.260-5.475).

Maternal knowledge was found to be strongly associated with a mother's utilization of maternal health services. Significant positive knowledge – practice associations were found for TT immunization (OR=6.015; 95% CI 3.779-9.573) and skilled birth attendance (OR=30.540; 95% CI 10.472-89.070).

4. The Influence of Predisposing, Enabling and Reinforcing Factors

Results of multiple logistic regression tests showed that maternal literacy and paternal occupation had little influence on the main outcomes. This is due to the fact that there was little variation in these variables. To analyze the influence of maternal education, comparison was made between mothers who had not finished Junior High School and those who had. Mothers who had finished Junior High School were more likely to recognize the importance of TT immunization (OR=2.677; 95% CI 1.782-4.022) and to know the reasons for its importance (OR=2.436; 95% CI 1.685-3.522) and to be able to indicate the safest birth attendant (OR=5.349; 95% CI 1.853-15.436). Moreover, mothers who had completed Junior High School were more likely to receive ANC at least four times (OR=1.526; 95% CI 1.0288-2.265) and to use a skilled birth attendance (OR=2.333; 95% CI 1.063-5.117). Parity (number of pregnancies) – as

Table 3. Multivariate Models for Predicting the Utilization of Maternal Health Services

Predictor variable	B	SE	Sig.	Exp (B)	95% CI for Exp (B)	
					Lower	Upper
Utilization of ANC						
Maternal education	.423	.201	.036	1.526	1.028	2.265
Parity	.661	.215	.002	1.936	1.269	2.954
District	-.426	.216	.048	.653	.428	.997
Practice in reading MCHH	.551	.191	.004	1.736	1.194	2.522
Knowledge of minimal adequate frequency of ANC	-.553	.232	.017	.575	.365	.905
Constant	.759	.271	.005	2.136		
Utilization of TT immunization						
Parity	.899	.241	.000	2.457	1.531	3.942
Family size	-.506	.200	.012	.603	.407	.893
District	-.396	.175	.023	.673	.478	.948
Knowledge of the adequate frequency of TT immunization	1.794	.237	.000	6.015	3.779	9.573
Practice in reading MCHH	.455	.162	.005	1.576	1.146	2.166
Constant	-1.424	.310	.000	.241		
Utilization of skilled birth attendance						
Maternal education	.847	.401	.035	2.333	1.063	5.117
Parity	.850	.395	.031	2.340	1.079	5.072
Ownership of MCHH	1.140	.566	.044	3.126	1.031	9.477
Ease of understanding MCHH	.966	.375	.010	2.627	1.260	5.475
Knowledge of the safest birth attendant	3.419	.546	.000	30.540	10.472	89.070
Constant	-2.968	.784	.000	.051		
Utilization of family planning						
District	-.914	.153	.000	.401	.297	.541
Ownership of MCHH	-.757	.384	.049	.469	.221	.995
Habit in bringing MCHH	.925	.258	.000	2.522	1.520	4.184
Constant	.318	.353	.367	1.374		

a proxy for reproductive status — was significantly associated with mothers' receiving ANC at least 4 times (OR=1.936; 95% CI 1.269-2.954), receiving TT immunization at least twice (OR=2.457; 95% CI 1.531-3.942), and selecting medical professional such as midwife, nurse, or doctor as birth attendant (OR=2.340; 95% CI 1.079-5.072).

Economic status as measured by financial availability has been found factoring other studies to be strongly associated with various aspects of maternal health. In this study the use of financial availability became inappropriate due to sharp changes and instability in the Indonesian overall macro-economic and monetary situation. In multivariate analysis it was found that family size was significantly associated with maternal knowledge as to why TT immunization is important and also with mothers' receiving TT immunization at least twice. Home visitation during pregnancy by voluntary health workers or village midwives was not significantly associated with utilization of maternal health services by mothers.

V. Discussion

The importance of maternal education and parity

Maternal literacy and paternal occupation was found to have less influence to the main outcomes, i.e. utilization of ANC, TT immunization, skilled birth attendance and family planning services. Maternal education and parity were found to be the factors most strongly associated with those main outcomes. Mothers' education was positively associated with mothers' knowledge of the safest birth attendant, utilization of ANC and utilization of skilled birth attendance. Mother's education was also associated with mother's knowledge of TT immunization, which was positively related to utilization of TT immunization. These findings are similar to those of many previous studies, which revealed that maternal education has close association with various aspects of maternal knowledge and behaviors.^{10,11,23)} Maternal education cannot be modified by any brief health education program intended to improve the mothers' knowledge and behavior, and in fact maternal education influences mothers' attendance to antenatal education^{24,25)} as well as mothers' ability to absorb and understand information provided during the educational sessions.^{10,23)} This findings re-emphasize

the importance of considering maternal education when implementing health education programs. When developing health education materials and programs, it should be taken into consideration that about 30%-40% of the targeted mothers in the study area (and in most other areas in Indonesia) have never completed elementary school. Mothers' low educational levels limit their ability to understand messages delivered through health education materials and/or sessions and to follow the advice they are given.

The findings of this study provide additional evidence in support of health sector leaders who want to assure or promote adequate education for girls and women. Referring to the McCarty and Maine model²⁶⁾, education is among the contextual determinants of maternal mortality. Other factors include women's status and family status in the community, which are very much affected by educational levels and economic status of the women and the family. In Indonesia, the impacts of many health-related efforts to reduce MMR are slowed by the very slow rates of improvement in these beyond-health determinants of MMR, especially in the wake of the severe multi-dimensional crises that Indonesia experienced in 1997-1998. To accelerate the reduction of MMR, Indonesia's development efforts should consistently focus on improving health and education.

In line with the results of other studies^{11,17)}, this study found that lower parity is associated with better maternal knowledge (i.e. knowledge of adequate minimal frequency of ANC and of the importance of TT immunization) and with better maternal health behavior (i.e. utilization of ANC, TT immunization and skilled birth attendance). It seems that mothers who have higher parity are less aware of specific needs for health care during pregnancy. This finding suggests that when designing and providing maternal health services, including health education services, health care providers should pay more attention to the needs of mothers with higher parity.^{17,24,25)}

The MCHH effect on maternal knowledge and utilization of maternal health services

Taking into account of other influencing factors, utilization of MCHH was found to be associated with better maternal knowledge of the maternal health services studied. Simply owning a copy of the MCHH was not associated with better maternal knowledge. To

acquire better knowledge, mothers need to be aware of the handbook, to read it, to be able to easily understand its contents, to make use of it (as indicated by bringing it with them when visiting health facilities or attending health program), and to be given health information by health care providers who use the handbook in providing such information.

Utilization of the MCHH had both direct and indirect effects on the utilization of maternal health services. After controlling for other relevant influencing factors, the study indicated that mothers' utilization of the MCHH increased the likelihood that they would utilize maternal health services directly. However, it also affected the utilization of maternal health services indirectly by affecting maternal knowledge. Owning the MCHH had only little influence on the utilization of maternal health services. To improve maternal health behavior, the MCHH should be used properly not only by the targeted mothers, but also by their health care providers. Furthermore, multivariate modeling indicated that in most cases improvements in maternal health service utilization were attributable in part to improvements in maternal knowledge. Therefore, utilization of the handbook within the health care system should be designed and carried out in such a way as to ensure improvement of maternal knowledge.

Evidence from this study supports the idea that the MCHH can be used as a tool in maternal education, particularly in antenatal education. However, utilization of the MCHH will be effective only if the content is appropriate for the targeted community and if the community is concerned with maternal and child health and aware that it can be improved²⁷⁾. There is need to review and modify the contents of the Indonesian MCHH, to guarantee its appropriateness for the targeted population. Particular attention should be paid to its manner of presenting its messages, since about one fourth of mothers who had read at least some parts of the handbook stated that they found it difficult to understand its contents. The MCHH should incorporate attractive, interesting, and easy-to-understand ways to deliver its messages.

The low rates of active usage of the MCHH by mothers need to be increased. The literacy rate was high in both districts and literacy is a prerequisite to a mother's reading the handbook. However this study

showed that literacy did not lead the mothers to read the whole parts of the handbook. Moreover, due to at least some mothers' reported difficulties in understanding the handbook's contents, there is no assurance that even mothers who do read the handbook will acquire adequate knowledge. Specific efforts should be made to allow mothers to understand the handbook's messages. Utilizing the MCHH during health education sessions could be an effective measure as well as an opportunity to learn what messages and what parts of the handbook mothers do and do not understand. The full advantages of MCHH will only be attained when its utilization is supported by an effective health care delivery system,²⁷⁾ which must include effective health education programs. Previous studies have demonstrated that health education can effectively improve both maternal knowledge^{28,29)} and behavior.^{22,30)} In the study area, as in most areas of Indonesia, several community-based activities such as Dasa Wisma (a group of ten households, through which mothers can share, discuss and solve various health problems) and Posyandu (Integrated Health Post which operates once a month and provides basic maternal and child health services) are available and provide opportunities to improve maternal knowledge and maternal health behavior. Utilizing the MCHH during health education sessions involving these community-based activities could help encourage communication between mothers and health care providers and could also help improve the functioning of the activities.

Implications for future application of MCHH

To reap the advantages of the MCHH, simply distributing the handbook is not enough. Ideally, the handbook should be carefully read by the mothers and they should understand its contents. Furthermore, the MCHH should be used by health providers when conducting health education sessions. Health authorities should ensure the availability of adequate inputs and resources to review and modify the MCHH, as well as assuring its availability and distribution. Availability of adequate inputs has to be ensured to carry out related training for health care providers. Such training is crucial in order to promote the use of MCHH in health education sessions, as well as to assure the health provider's capability to utilize the handbook effectively, including its use in such

sessions. The Indonesian Government at the central, provincial and district levels should take adequate initiatives to activate all relevant stakeholders to support appropriate and sustainable utilization of the MCHH.

VI. Conclusion

Utilization of the MCHH in West Sumatra, Indonesia, has a potential to improve both maternal knowledge and the utilization of maternal health services. However, to reap these benefits the handbook should be actively used both by the mothers and by health care providers. The MCHH needs to be modified, particularly in terms of incorporating attractive, interesting, and easy-to-understand ways to deliver its messages, taking into account the educational levels of the targeted populations. The effectiveness of existing community-based activities in promoting maternal knowledge and behavior can be improved by utilizing the MCHH during their health education sessions. Utilization of the MCHH in health education sessions will encourage and focus communication between mothers and health care providers. The Indonesian Government needs to assure adequate availability of the various inputs necessary to support appropriate and sustainable utilization of the MCHH.

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