

Development and implementation of the maternal and child health Handbook in Angola

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ABSTRACT

Although the maternal and child health (MCH) Handbook is widely used in many countries, its development and implementation process has not been sufficiently documented in scientific publications. This is a report of how the Angola MCH Handbook was developed, what challenges we encountered during its implementation and how they were solved. Leading the process was the MCH Handbook Committee set up to develop the MCH Handbook and implement the programme in liaison with various stakeholders. We developed the MCH Handbook through participatory workshops with the objective of producing user-responsive content and designs, foster healthy interaction and build common understanding among stakeholders. After pilot use in select health facilities, the MCH Handbook programme, which included training, monitoring and supervision, mothers' class and community awareness raising activities, was gradually implemented in three model provinces. Core members of the committee closely observed each step of the programme to identify challenges in each field, and revised the tool and programme throughout the process. As nationwide implementation of the MCH Handbook Programme progresses, it is important to continually identify challenges specific to different localities while taking measures to address them. In our experience, stakeholder involvement from the early planning and preparation stages was critical to ensure their continued commitment at later stages and for programme continuity. Our approach of tool development involving various stakeholders and flexible implementation strategies were key elements for user acceptance and programme sustainability that may be applicable for introduction of similar interventions in other settings.

INTRODUCTION

Home-based records are a form of health record maintained by the patient or caregiver at home and commonly used for maternal and child healthcare services.¹ Home-based records used for maternal and child healthcare services vary across countries. They include programme-specific or stand-alone home-based records such as child vaccination

SUMMARY BOX

- ⇒ This paper provides details of the development and implementation process of the maternal and child health (MCH) Handbook programme in Angola.
- ⇒ To promote its uptake and functional use as a tool for promoting maternal and child healthcare, contents of the MCH Handbook were customised and repeatedly revised to local needs, and adequate training provided to healthcare providers.
- ⇒ The focus on designing and implementing a culturally sensitive and context-specific public health intervention not only proves useful to improve skills of healthcare professionals, but contributes to improvements in MCH awareness among the population.
- ⇒ It is important to continually identify challenges specific to different localities while taking measures to address them for the nationwide scale-up to be successful.
- ⇒ Involvement of various stakeholders in the early preparation and implementation stages of the MCH Handbook programme provided the sense of ownership that fostered continued support for the programme.

cards for immunisation programmes, growth charts for child nutrition programmes and prenatal cards for reproductive and maternal health programmes.¹ Alternatively, the maternal and child health (MCH) Handbook is an integrated record which logs in a single document, the history of antenatal, delivery and postnatal care for both mother and child with health education messages.^{2,3} Past studies show that the MCH Handbook functions as a self-learning material for mothers and their families,² has the potential to reduce the need for multiple health records⁴ and promote improvements in MCH service utilisation.⁵ Recently, the WHO published recommendations on home-based records for maternal, newborn and child health, and indicated that the use of home-based records improves

care-seeking behaviours.¹ Thus, the MCH Handbook has been attracting more attention from health ministries and various professional organisations as a tool for promoting continuity of care^{5 6} and universal health coverage.⁷

Recently, the Government of Angola, introduced the MCH Handbook in the country in collaboration with the Japan International Cooperation Agency (JICA). Prior to introducing the MCH Handbook, home-based records used in Angola included the prenatal handbook and child health card. However, use of these stand-alone home-based records was suboptimal. According to the 2015–2016, Angola DHS reports, only 35% of children aged 24–35 months had child health cards, with ownership lower among mothers with lower socioeconomic status and those living in rural areas.⁸

Previous studies show improved use and retention of the MCH handbook over other alternatives, even among uneducated mothers. For example, compared with other home-based records, mothers in rural Cambodia have been shown to prefer the MCH Handbook due to its appearance, practicality and long-term value.⁹ Also, in Indonesia, introducing the MCH Handbook into maternity care services demonstrated increased ownership rate of home-based maternal health records,¹⁰ while in another study among parents in Korea, retention of the MCH Handbook was shown to relate positively with recognition and use of essential child care services.¹¹

Although used widely in many countries,³ the details of the MCH Handbook development and implementation process have not been sufficiently documented in scientific publications. Governmental reports on MCH Handbook programmes in various countries may not easily assessable, while other reports focus more on surveys to evaluate user acceptance.^{12 13} This is a report of how the Angola MCH Handbook programme was developed, what challenges we encountered during its implementation and how they were solved. We intend for this report to be a reference for MCH Handbook implementation in similar settings in low-income and middle-income countries.

THE MCH HANDBOOK PROGRAMME

Programme overview

The Ministry of Health in Angola implemented the MCH Handbook programme to overcome fragmentation of home-based records, improve record keeping practices, standardise maternity service delivery and promote MCH service use. The programme consisted of three main components: (1) development of the MCH Handbook and healthcare provider training on its use, (2) mothers' classes with community awareness raising activities and (3) monitoring and supervision of programme activities. All three programme components were geared towards national expansion and sustainable programme implementation that might contribute to increase MCH service utilisation, promote continuity of care and improve MCH.

Location

The Republic of Angola is a vast country located in the Atlantic coast of Southern Africa.¹⁴ The country is divided into 18 provinces and has an estimated population of about 33 million people as of 2022.¹⁵ The MCH Handbook programme was implemented in three of the most populous provinces in Angola.¹⁵ Luanda, Benguela and Huambo provinces were purposively selected as model provinces for the MCH Handbook implementation because of the population diversity and health indicators that are close to the national average. Portuguese is the official language in Angola and spoken widely across all three provinces. In addition to Portuguese, Umbundu is commonly spoken in Benguela and Huambo (among 57.2% and 67.1% of population, respectively), while people in Luanda predominantly speak Portuguese.¹⁶ According to the 2015/2016 DHS reports, literacy rate among women was 79.3%, 60.3% and 60.3% in Luanda, Benguela and Huambo, respectively. In the same year, the number of women who had at least four ANC consultation visits was 83.2%, 58.1% and 65.4%; while only 70.7%, 47.1% and 37.0% of women had facility delivery in Luanda, Benguela and Huambo, respectively.⁸

Context of the MCH Handbook programme

The MCH Handbook programme was launched through an international cooperation project between the Government of Angola and JICA implemented in two phases. Phase I involved, the 'Project for Strengthening the Health System through Human Resources Development in Josina Machel Hospital and other Health Facilities and Revitalisation of Primary Health Care (PROFORSA)', which ran from 2011 to 2014. The phase II project, 'Project for Improving Maternal and Child Health Services through Implementation of the Maternal and Child Health Handbook (PROMESSA)' lasted from 2017 to 2022. The MCH Handbook was developed and piloted in phase I, and implemented in the three model provinces in phase II (figure 1). The phases I and II projects formed the basis for the nationwide expansion of the MCH Handbook programme. We did an impact evaluation study from June 2019 to September 2020 to assess the programme impact on service use and MCH outcomes,¹⁷ while an implementation study that assessed the barriers and facilitators to the programme delivery done between October and November 2020 showed need to strengthen monitoring and supervision at healthcare facilities and training for healthcare providers.¹⁸

The phase I and II projects were funded by JICA. This report was prepared by the programme implementers, and the funders played no role in the preparation or decision to publish this report. An author reflexivity statement is included (see online supplemental appendix 1) to address the international partnership from this project.

Project team

The phase I and II projects were implemented by the National Directorate of Public Health (DNSP), Ministry

Activity location	PROFORSA												PROMESSA																							
	2013				2014				2015				2016				2017				2018				2019				2020				2021			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1								Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4				
National	↑ Participatory workshop 1 to develop MCHHb																																			
	↑ Pilot use of first version MCHHb																																			
	↑ Participatory workshop 2																																			
	↑ National ToT																																			
Luanda province (9 municipalities)	↑ Luanda provincial and municipal ToT																																			
	↑ Luanda municipality HP training																																			
	↑ M&S and distribution of MCHHb start																																			
	↑ Municipal ToT other municipalities in Luanda province																																			
	↑ HP training in other municipalities in Luanda province																																			
	↑ M&S and distribution of MCHHb started in other municipalities																																			
Benguela province (10 municipalities)	↑ Provincial & municipal ToT																																			
	↑ HP training in five municipalities																																			
	↑ M&S and distribution of MCHHb start																																			
	Provincial & municipal ToT																																			
	↑ HP training in five municipalities																																			
	M&S and distribution of MCHHb started in remaining five municipalities																																			
Huambo province (11 municipalities)	↑ Provincial & municipal ToT																																			
	↑ HP training in five municipalities																																			
	↑ M&S and distribution of MCHHb start																																			

Figure 1 Project timeline showing MCH Handbook planning and development and implementation phases. HP, Healthcare provider; MCHHb, Maternal and child health handbook; M&S, Monitoring and supervision; PROFORSA, Project for Strengthening the Health System through Human Resources Development in Josina Machel Hospital and other Health Facilities and Revitalization of Primary Health Care; PROMESSA, Project for Improving Maternal and Child Health Services through Implementation of the Maternal and Child Health Handbook; ToT, Training of trainers.

of Health, Angola, with support from JICA. Centrally, the PROFORSA and PROMESSA were led by the Director of DNSP with the section Chief of Primary Healthcare Unit as Project Manager (figure 2). Other DNSP officials, provincial and municipal health officers from MCH units managed day-to-day work including communicating with stakeholders, organising project activities and events. Both projects were supported by a team of JICA local staff and technical experts in MCH, nutrition, policy analysis and development, and personnel training and management. The project team led the MCH

Handbook development using a participatory approach and was responsible for developing the following operation guidebooks.

1. The MCH Handbook operation technical guideline manual explaining how healthcare providers use and record information in the Handbook.
2. The MCH Handbook management manual which describes how health administrators distribute and manage Handbook stock, conduct the trainings, monitoring and supervision.

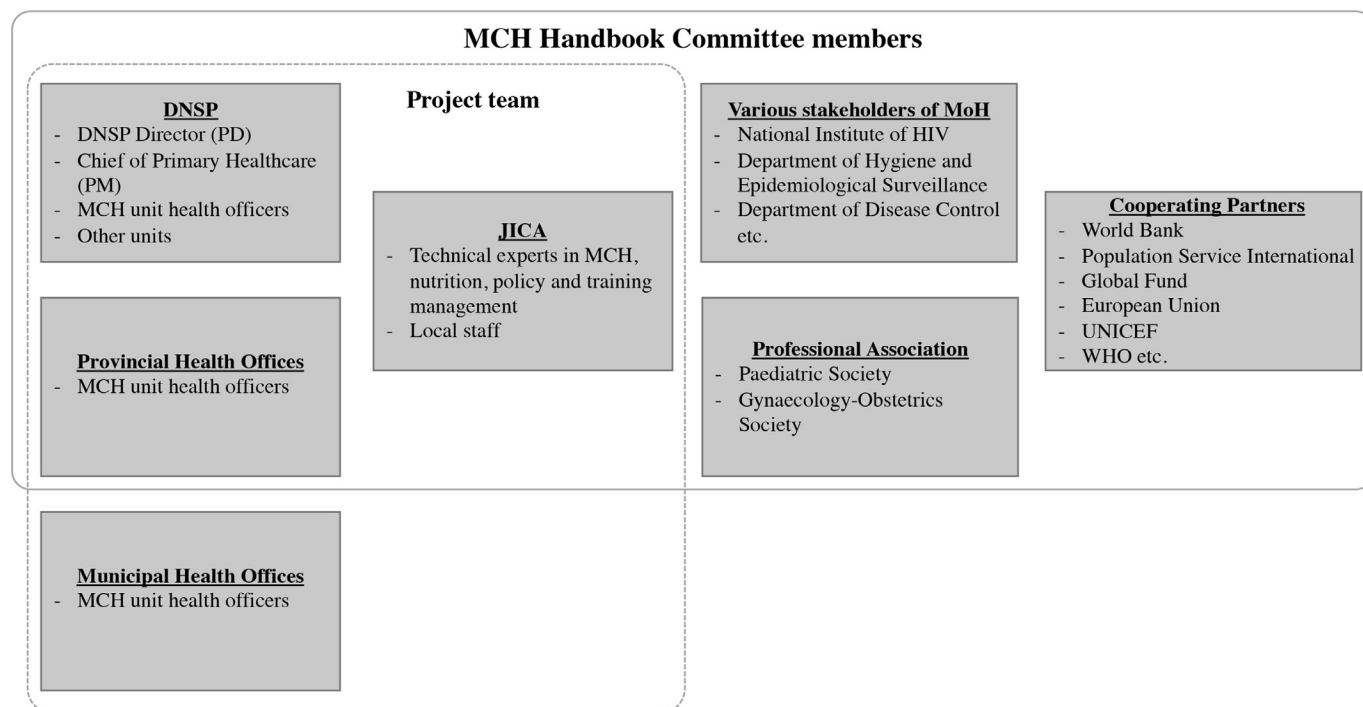


Figure 2 MCH Handbook programme implementation team diagram showing Committee and project team members. DNSP, National Directorate of Public Health; JICA, Japan International Cooperation Agency; MCH, Maternal and child health; MoH, Ministry of health; PD, Project director; PM, Project manager.

THE ANGOLA MCH HANDBOOK DEVELOPMENT PROCESS

MCH Handbook Committee

An MCH Handbook Committee (hereinafter referred to as Committee) was set up to develop the Angola MCH Handbook. Committee members were appointed by the director of DNSP and included health officers from various units of the DNSP such as women's health, child health, nutrition, vaccination and HIV, provincial health officers, and representatives of professional associations such as the Paediatric Society. Other members of the Committee were JICA technical experts and representatives from the World Bank, Population Service International (PSI, supported by United States Agency for International Development), European Union, Global Fund, WHO, UNICEF, UNFPA and other international organisations active locally. The committee was initially tasked to analyse and discuss feasibility of the MCH Handbook in Angola by evaluating the existing home-based records and educational materials against the quality of MCH service provision. A consensus was reached that integrating the various home-based records and educational materials into one Handbook also presented advantages such as an improved and streamlined stock management of the recording tools, standardisation of maternity health service delivery, and promotion of patient engagement and family involvement in maternal and child healthcare. Subsequently, the decision was made to implement the MCH Handbook and the Committee proceeded to design the MCH Handbook and develop the implementation programme.

Participatory workshops to develop the MCH Handbook

Two participatory workshops involving various stakeholders were held to develop the MCH Handbook. The first 2-day workshop was held in July 2013 with the objective of producing user-responsive content and designs, foster healthy interaction and build common understanding among stakeholders. After this workshop, Committee members finalised the layout and developed the first draft of the Handbook. To achieve continuity and provision of standardised maternity care, content of the MCH Handbook was based on the existing prenatal handbook and child health card, UNICEF educational materials, Ministry of Health documents and other materials. We also reflected known best practices based on experiences of implementing the MCH Handbook in other countries, such as including short sentence text messages, illustrations and other visual aids to make health messages easily understandable, especially for illiterate women.^{9 19 20} A second workshop was held in November 2013 to finalise the draft, and the pilot version of the MCH Handbook was printed in March 2014. Processes followed during the participatory workshop are summarised in box 1.

Pilot use of MCH Handbook

The first version of the Angola MCH Handbook and its operation guidebook was piloted at nine purposively selected health facilities in Luanda municipality from

Box 1 Overview of participatory workshop steps and processes

- Step 1: Set upper limit for the number of pages
⇒ Upper limit set to restrict information and recording pages to a number manageable by the tool end-users.
- Step 2: Determine topics covered by the MCH Handbook and volumes/pages of each topic
⇒ Recording pages.
⇒ Health education pages.
⇒ Others.
- Step 3: Lay out the selected topics to each page
⇒ Large copies of existing home-based records and educational materials were spread on the table. Participants selected necessary items and placed them in order on the wall.
- Step 4: Lay out each page in details
⇒ Replaced and arranged the selected items in each page.
- Step 5: Digitalise the hand-work
⇒ Digitalised each page agreed through steps 2–4.
- Step 6: Draft samples at actual scale
⇒ Made additional corrections on the draft in actual scale.
MCH, maternal and child health.

June to August 2014. Prior to beginning the pilot use of the MCH Handbook, a training of trainers was conducted for national and provincial level health officials, followed by a step-down training for healthcare providers from the nine participating health facilities. The MCH Handbook was then distributed to pregnant women and mothers who visited those facilities for maternal, newborn and child health consultations. User acceptance was assessed by presurvey and postsurvey among women and healthcare providers. The project team (see figure 2), including DNSP and Luanda provincial health officers and JICA technical experts, used data from the pilot study and direct observation during each step of the pilot use to identify:

1. Which topics trainers found challenging to teach on how to use the MCH Handbook.
2. What common difficulties healthcare providers had while recording information in the MCH Handbook, or while providing health education talk to women.
3. What common difficulties pregnant women and mothers had in understanding the health education messages or when they used the MCH Handbook on their own.

Based on the findings from the pilot use, several Committee meetings were held in September 2014 to assess user acceptance and to review the first version of the MCH Handbook and operation guidebook. Evaluation of user acceptance was incorporated into the monitoring and supervision checklist for further assessment during field observation. Subsequently, while diplomatic processes to start the PROMESSA were ongoing between 2015 and 2017, the training programme and other related materials were developed to ensure provision of standardised services while using the MCH Handbook.

IMPLEMENTATION PROCESS OF THE MCH HANDBOOK

Training

Training on the Handbook use and operation in the Phase II project started in March, 2018. The training programme was designed over 5 days to cover: (1) how to use the MCH Handbook; (2) improving healthcare provider attitude to be attentive and supportive towards women and (3) basic skills and knowledge of how to provide maternity and child care services. Details of the training programme is provided in online supplemental appendix 2. The first level of training was a direct training of DNSP health officers by the project team and some Committee members. This first training workshop also served to pilot test the instructional materials and methods to be used to train the programme users. Revisions were made to the training programme and again validated through training for healthcare providers which included role-play and direct observation of antenatal consultations and mothers' classes using the MCH Handbook, to capture users' (both healthcare providers and women) responses.

The series of training workshops that followed used a cascade training approach.²¹ The basic structure consisted of training of trainers at the provincial and municipal levels by trained DNSP and provincial health officers appointed for MCH Handbook programme. Healthcare provider training was achieved in two stages. First, depending on facility size, one to four representatives from each facility within the municipality were invited to a central training workshop facilitated by trained municipal health officers. Next, the trained representatives provided in-facility training to other healthcare providers. To achieve delivery of acceptable level of skill and knowledge acquisition on the MCH Handbook, trainers from the previous level(s) participated in each step-down

training workshop as cofacilitators or supervisors. In-facility refresher training was provided on a needs' basis following periodic monitoring visits by supervisors.

Distribution channel

Distribution of the MCH Handbook started at the end of the training workshops. The DNSP under the directive of the Ministry of Health, was the directorate primarily responsible for the procurement and distribution of the MCH Handbook. Using existing channels, they were distributed from DNSP to the Provincial Health Offices annually and from Provincial Health Offices to Municipal Health Offices twice a year according to projections made by the DNSP. Municipal Health Offices provided the Handbooks to healthcare facilities quarterly.

Monitoring and supervision

Monitoring and supervision was one of the most important components of the MCH Handbook implementation programme. The supervision activities were designed to support trained healthcare providers in the effective application of their acquired skills to use the MCH Handbook. It consisted of healthcare facility visit done once every 3 months by the supervisors to check stock management for the Handbook, maternity and child healthcare devices and medicines, conduct live clinical observations, review recording in women's Handbook, and assess user acceptance. Additionally, supervisors provided support for in-facility training and distribution of the Handbook from municipal health offices to facilities. The team structure and main objectives of supervision at each stage is shown in the table 1.

National and provincial health officers who served as the main supervisors provided guidance and support to municipal health officers on how to conduct supervision.

Table 1 Team structure and main objectives of monitoring and supervision by implementation stage

Implementation stage	Team structure	Main objectives
Introduction stage	<ul style="list-style-type: none"> ▶ DNSP officers ▶ Provincial health officers ▶ Municipal health officers 	<ul style="list-style-type: none"> ▶ Support in-facility training ▶ Distribute MCH Handbook from municipal health office to facility ▶ Check whether facility is equipped with minimum devices and medicines ▶ Give guidance at the actual consultations with the new tool ▶ Post the short-term goals on the wall
3 months after introduction	<ul style="list-style-type: none"> ▶ DNSP officers ▶ Provincial health officers ▶ Municipal health officers 	<ul style="list-style-type: none"> ▶ Check whether the MCH Handbook is properly recorded ▶ Check whether facility is equipped with minimum devices and medicines ▶ Monitor MCH Handbook stock management ▶ Post the short-term goals on the wall
6 months after introduction and thereafter	<ul style="list-style-type: none"> ▶ Municipal health officers 	<ul style="list-style-type: none"> ▶ Check whether the MCH Handbook is properly recorded ▶ Check whether facility is equipped with minimum devices and medicines ▶ Monitor stock management ▶ Check whether short-term goals are achieved ▶ Post new short-term goals on the wall
DNSP, National Directorate of Public Health; MCH, maternal and child health.		

Initially monitoring and supervision was conducted by the project team along with provincial and municipal level supervisors. At the end of each visitation, debriefing sessions were held to address emerging challenges. According to the original plan, municipal health officers were supposed to be responsible for conducting supervision of the MCH Handbook programme within their localities 6 months post implementation and thereafter. However, more time was required until capacity of supervisors was sufficiently strengthened. Also, most municipalities faced challenges in securing the budget and transportation for monitoring visits.

Mothers' class and community awareness

One of the MCH Handbook programme goals was to promote MCH service utilisation among pregnant women and mothers. Therefore, group and/or individual mothers' class at health facilities and community awareness raising activities were included in the programme as a way to reach out to the community and encourage more pregnant women and mothers to visit health facilities for antenatal, delivery, postnatal and child care services. At each health facility, healthcare providers were required to provide regular group sessions to pregnant women, mothers and their family members as well as individual health education during the antenatal consultations. Community outreach activities was done by existing Community and Health Development Agents ((Agentes de Desenvolvimento Comunitário e Sanitário) (ADECOS)) who visited communities to promote health-seeking behaviour. To complement grassroot activities by ADECOS and to facilitate communication with women and their families, we held advocacy meetings with traditional leaders such as village chiefs (Sobas) in the community.

Various problems were encountered at each stage of the MCH Handbook programme implementation. The most common problems related to healthcare provider knowledge and capacity to provide basic maternity services. There was also a wide disparity in healthcare provider capacity depending on location. A summary of problems encountered and solutions at each implementation stage is shown in [table 2](#).

FEEDBACK FOR NATIONWIDE EXPANSION

Nationwide expansion of the MCH Handbook programme required a high level of commitment from all stakeholders. Involvement of various stakeholders in the preparation and implementation stages of the MCH Handbook programme in the three model provinces provided the sense of ownership that fostered continued support for the programme. Indeed, more international organisations and several private sector entities in Angola signalled their interest in collaborating with the Ministry of Health, through DNSP to scale up the MCH Handbook programme in the country. Hence, the World Bank, PSI, European Union, Global Fund and TOYOTA de Angola

financed the mass printing MCH Handbook towards a nationwide expansion of the programme. Additionally, PSI and the World Bank supported training, monitoring and supervision in their target areas. Population Service International further supported conversion of the MCH Handbook training manual to an e-learning platform while, UNITEL, a major local mobile network carrier, offered free internet access for healthcare providers to access the e-learning system through an existing cooperation with PSI.

LESSONS FROM THE FIELD: A MESSAGE FOR PROGRAMME IMPLEMENTERS AND OTHER COUNTRIES

The MCH Handbook programme was a pragmatic public health intervention aimed at improving MCH service utilisation and health outcomes. Development of most home-based records used around the world is often based on expert opinion. While it was vital to depend on expert opinion in developing the Angola MCH Handbook, we found that relying on this approach alone would have resulted in suboptimal use of the tool. Consequently, the consensus was reached to widen the stakeholder involvement in the tool development workshops and several Committee meetings. The workshops and technical working group meetings promoted cooperation between stakeholders following better understanding of each other's activities and programmes, thus making for efficient use of resources. Involving all relevant stakeholders from the planning and preparatory phase was important to ensure their continued commitment at later stages.

Prior to starting the MCH Handbook programme in Angola, several MCH projects were underway, implemented by the Ministry of Health and supported by various international organisations. The MCH Handbook programme, which includes all stages of maternal newborn and child health services, successfully integrated many projects and promoted cooperation between stakeholders. While international cooperation is not a requisite for implementing health programmes such as this, support from development partners and strong political will from the Angolan government in tandem facilitated the MCH Handbook programme launch and nationwide expansion. Senior health officers from the DNSP demonstrated unwavering commitment and strong leadership from the early planning phases and throughout the programme implementation in the model provinces. This not only increased stakeholder morale, but led to the nationwide scale-up starting earlier than planned. JICA technical experts supported the direction provided by the DNSP and lent expertise in developing the operation guidebook and supplementary materials. The decision to customise the programme implementation (ie, training, monitoring and supervision, and mothers' class and community awareness) to meet the needs and capacity of healthcare providers in Angola may also have been central to the programmes rapid uptake.

Table 2 Challenges and measures taken during training, monitoring and supervision and mothers' class and community awareness

Implementation stage	Challenges	Measures
Training	Many healthcare providers faced challenges in manual calculation of expected delivery date (EDD) and gestational age.	Pregnancy wheel was developed and introduced to determine EDD and gestational age more accurately and faster.
	There was a big discrepancy in basic knowledge and understanding between healthcare providers in urban area and rural area.	Pretest and post-test were added to the programme to evaluate participants' understanding.
	Healthcare providers had difficulties in recording the MCH Handbook accurately.	More exercises and role-plays were included in the training programme.
	Training was not standardised but it depended more on individual ability of supervisors. Healthcare providers had to ask supervisors when there were queries. Distributed training materials were often left at home or misplaced.	Through e-learning platform, training was more standardised. Healthcare providers were able to review the e-learning training anytime they need. All materials and forms were downloadable from the e-learning system.
Monitoring and supervision	Many healthcare providers had difficulties in conducting in-facility training and found more challenges at their first consultation with the new tool.	First M&S was scheduled right after the training so that supervisors were able to support in-facility training and actual consultations using the new tool.
	Both healthcare providers and supervisors did not have clear goals to improve challenges at each health facility.	Based on the advice from supervisors, healthcare providers come up with short-term goals, written up and posted on the wall so that it is clear for everyone what should be achieved by the time supervisors visit health facility in 3 months.
	Many municipal health officials had challenges in reporting the results of M&S to their municipal health directors or provincial health officers.	Summary format was created so that municipal health officials were reminded about what to report and it was easier to capture the trend within each municipality.
	Allocating budget for vehicle and fuel for M&S was challenging for the municipal health offices.	Telephone M&S was conducted at some municipalities. It was suggested to combine M&S with other health programmes.
Mothers' class and community awareness	There was no standardised educational material for mothers' class at health facility and in the community.	Flipchart based on MCH Handbook content was developed.
	Mothers' class was not systematically operated. ► Mothers received the same information at every class. ► Some mothers did not receive any class. ► It was unknown if mothers' class were held	A monthly class plan form showing which two topics healthcare providers were expected to cover every month was developed and displayed at the facility where it could be viewed by multiple healthcare providers. They could also record their name and date against topics they conducted in each mother's class.
	Healthcare providers did not have time to conduct awareness raising activities in the community.	As healthcare providers were too busy to do outreach activities in the community, a collaboration with existing Community and Health Development Agent was piloted.
MCH, maternal and child health; M&S, monitoring and supervision.		

The e-learning training module is a cost-effective and time efficient platform that allows healthcare providers to self-train and improve their skills in use of the MCH Handbook and maternity and child service delivery. The introduction of short-term goal setting within facilities has become an important component for achieving programme targets, while communication between healthcare providers and municipal health officers during supervision has become enhanced. As a result, difficulties in programme implementation are quickly identified and support provided.

Although a standardised MCH Handbook implementation programme was developed based on the experience from three model provinces, continuous assessment and revisions to the programme protocol are still required during scale-up. Angola is a vast country that is culturally

and socially diverse. It is important to continually identify challenges specific to different localities while taking measures to address them for the nationwide scale-up to be successful. Overall, we think our approach of tool-development and flexible implementation were key elements for implementation success and will be applicable for introduction of similar interventions in other settings.

CONCLUSION

Here, we described how MCH Handbook programme was developed and implemented in Angola. The development and implementation of the MCH Handbook programme was a long-term project, which required repeated trials and revisions to accommodate the needs of the Angola

healthcare system and population. The ownership of the MCH Handbook programme by the DNSP and task sharing with provincial and municipal health authorities were key contributors to the programme's implementation success and sustainability. Several components of the programme were shown to have positive impact on practice of maternity and child healthcare service delivery and may enhance maternal and child healthcare service utilisation in Angola.

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Contributors MK, KM, OOB and KT developed the concept for the article. MK, KM, SF, TS, MS, KRF, and HRF provided all information related to the MCH Handbook implementation programme. MK and KM wrote the first draft with help from OOB and KT. All authors read, contributed to and provided a critical review of the final manuscript.

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Competing interests MK and TS are members of Samauma Consulting. KM was previously, SF and MS are currently employed by TA Networking. These private consulting firms were contracted by JICA to conduct the 'Project for improving maternal and child health services through implementation of the MCH Handbook'. OOB and KT were investigators of the impact evaluation designed within the scope of the same project funded by JICA.

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Appendix 1 - Author Reflexivity Statement

1. How does this study address local research and policy priorities?

This article addresses the need for documenting the development and implementation process of the MCH Handbook program in a scientific manner. Although there are several recommendations or guides for home-based records, details were seldom documented in scientific journals. Detailed experience of Angola in introducing the MCH Handbook program would address the process of developing and implementing other programs in Angola. Furthermore, it would contribute to other countries in similar settings to develop and implement new programs.

2. How were local researchers involved in study design?

The project was originally the idea of the Ministry of Health in Angola where KRF and HRF are based. In their capacities, both researchers are well connected and capable of conducting, leading, and organising local and international research collaborations. There was also a researcher who is currently a migrant in high-income country, but with experience of working as a local researcher within international research collaborations involving high-income country researcher (OOB in Nigeria). In addition, there were high-income country researchers with extensive experience of conducting, leading, or organising international research collaborations involving low- and middle-income countries (MK, KM, TS, SF, MS and KT). Even though many of the authors have diverse cultural heritages originating from low- and middle-income countries, high-income country researchers are over-represented on the list of authors of this article. However, the authors based in high-income countries continued to communicate with researchers from Angola and provided support in writing scientific reports.

3. How has funding been used to support the local research team?

There was no funding for writing this manuscript. However, the funding for the projects were mainly used to conduct the MCH Handbook program (i.e., conducting workshops, training, M&S, community awareness raising activities and printing the MCH Handbook and related materials).

4. How are research staff who conducted data collection acknowledged?

This study does not include data collection; however, the projects' semi-annual progress reports and final reports were compiled with the decision makers of the MCH Handbook program (i.e., project manager and the project director from the National Directorate of Public Health, Ministry of Health, Angola). They were included as authors as a form of acknowledgement.

5. Do all members of the research partnership have access to study data?

All members of the partnership have access to data. Data in this study includes semi-annual progress reports and final reports of the two cooperating projects, training program (Appendix 1), the contents of the MCH Handbook programs etc.

6. How was data used to develop analytical skills within the partnership?

KRF and HRF were the implementers and decision makers of the MCH Handbook program in Angola. Several meetings were held between KRF, HRF and MK, KM, TS, SF, MS to interpret findings in context of local settings. The exchange during these meetings provided opportunities to develop analytical skills.

7. How have research partners collaborated in interpreting study data?

KRF on Angola side and MK, KM, TS, SF and MS on Japan side had regularly communicated to review the development and implementation process of the MCH Handbook program. Recommendations were extracted

through regular communications and occasional larger meetings included HRF. MK, KM, OOB and KT had four meetings to design the manuscript. Final reviews were done online.

8. How were research partners supported to develop writing skills?

The research team on the current manuscript include early, mid and senior level researchers. The early career researchers (MK, SF, and MS) on the authorship team were supported by senior researchers to develop and refine their writing skills. Guidance and support entailed writing style, discussion techniques, language editing and formatting of the manuscript.

9. How will research products be shared to address local needs?

The article will be published as open access. Additionally, lessons learned and recommendations were shared with the Angola Ministry of Health, provincial and municipal health officers and local stakeholders involved in the MCH Handbook program.

10. How is the leadership, contribution and ownership of this work by LMIC researchers recognised within the authorship?

Authors KRF and HRF contributed as part of the authorship team in developing this manuscript and has been recognised as joint author. We acknowledge, however, that the authorship team is predominantly based in a high-income country.

11. How have early career researchers across the partnership been included within the authorship team?

We have included early career researchers (MK, SF and MS) within the authorship team. They contributed to implement the project, write reports with close observation on the field and provided information and insights necessary for the manuscript. MK took an initiative to draft the manuscript with support from mid and senior level authors.

12. How has gender balance been addressed within the authorship?

Five authors are female (MK, SF, MS, HRF, and OOB) and four authors male (KM, TS, KRF and KT).

13. How has the project contributed to training of LMIC researchers?

Authors from Angola (KRF and HRF) are middle to senior researchers.

14. How has the project contributed to improvements in local infrastructure?

This project has not directly contributed to improvements in local infrastructure.

15. What safeguarding procedures were used to protect local study participants and researchers?

There was no primary data collection as part of this study, therefore this question is not directly applicable.

Appendix 2: Training program (updated for COVID-19 prevention)

Day	Topic	Contents	Class type	Materials
1	Opening session	Check participants' temperature and distribute mask		
	Maternal and child health in normal and abnormal time (COVID-19)	Explanation on COVID-19 Important measures to prevent COVID-19 infections to mothers and children	Lecture	Flipchart for COVID-19
	Pre-test	Evaluation of knowledge on maternal and child health	Lecture	Pre-test
	Role of participants on the training	Roles of healthcare providers, directors/administrators of the facility, municipal health officers	Lecture	MCHHb
	Overview of MCHHb	Objectives and benefits of the MCHHb Basic information on how to implement the MCHHb	Lecture	MCHHb Technical Manual
	How to use the MCHHb	MCHHb related materials How to use the technical manual	Lecture	MCHHb Technical Manual
	How to use the pregnancy wheel	Overview of pregnancy wheel How to determine expected date of delivery and gestational age using pregnancy wheel	Lecture Exercise	MCHHb Technical Manual Pregnancy wheel
	Antenatal consultation 1	How to record women's basic information, delivery history and medical history in MCHHb	Lecture Exercise	MCHHb Technical Manual Pregnancy wheel
	Antenatal consultation 2	How to conduct and record antenatal consultation in MCHHb Basic ANC techniques: how to measure uterine height, fetal heart rate and Leopold Maneuvers	Lecture Exercise Practice	MCHHb Technical Manual Pregnancy wheel Pinard, measuring tape, pregnant woman mannequin
2	Recap of previous day			
	Antenatal consultation 3	How to record anti-tetanus vaccine, malaria prevention with Fansidar, complementary diagnostic test in MCHHb How to record criteria for special care and/or referral in MCHHb	Lecture Exercise	MCHHb Technical Manual
	Antenatal consultation 4	How to conduct an effective one-on-one health education for mother/family using the MCHHb Necessary preparation for delivery Practical ANC exercises with MCHHb	Lecture Exercise Practice	MCHHb
	Importance of the first 1,000 days of nutrition and breastfeeding	Importance of nutrition in the first 1,000 days Negative cycle of malnutrition Definition of malnutrition indicators	Lecture	MCHHb Technical Manual

		Breastfeeding and colostrum		
	Delivery	How to record summary of birth and newborn assessment in MCHHb How to record birth data in MCHHb	Lecture Exercise	MCHHb Technical Manual
	Postpartum consultation and attentive support for mothers with special needs	How to conduct and record postpartum consultation around 6 days postpartum in MCHHb Family planning Attentive support for mothers with special needs	Lecture Exercise	MCHHb Technical Manual
	Overview of childcare	Time needed for childcare consultation Child endangerment signals	Lecture	MCHHb Technical Manual
3	Recap of the previous day			
	Childcare (up to 2 years old)	How to conduct and record childcare consultation up to 2 years old in MCHHb Giving guidance on oral hygiene for children using MCHHb	Lecture Exercise	MCHHb Technical Manual
	Childcare (over 2 years old)	How to conduct and record childcare consultation over 2 years old using MCHHb	Lecture	MCHHb Technical Manual
	Measuring child growth	How to measure weight, height, cephalic circumference, brachial circumference (MUAC) How to calibrate scale	Lecture Exercise	MCHHb Technical Manual Scale, altimeter, measuring tape, brachial tape, child mannequin
	Growth monitoring chart	How to plot the growth monitoring curve How to assess the growth monitoring chart	Lecture Exercise	MCHHb Technical Manual
4	Recap of the previous day			
	Growth monitoring chart (review)	How to plot the growth monitoring curve How to assess the growth monitoring chart	Exercise	MCHHb Technical Manual
	Vaccination and careful support for children with special needs	Vaccination calendar, lot/batch number Attentive support for children with special needs	Lecture	MCHHb Technical Manual
	Educational activities for mothers and the community	How to use the flipchart Plan and report of the educational sessions at facility	Lecture Practice	MCHHb Flipchart
	Target group and distribution plan	Description of MCHHb target population MCHHb distribution flow and frequency	Lecture	MCHHb Management Manual
	Inventory management	MCH Handbook delivery and receipt voucher Inventory control sheet	Lecture	MCHHb Management Manual
5	Recap of the previous day			
	Monitoring and supervision	Objectives of M&S	Lecture	MCHHb

		Frequency of M&S M&S checklist How to set short-term goals		Management Manual
	Humanization	Importance of supportive maternity care at delivery	Lecture	
	Facility-based registration book (Log book)	How to fill in facility-based ANC registration book	Lecture Exercise	ANC registration book
	Post-test	Evaluation of gained knowledge and understanding		Post-test
	Closing Ceremony	Delivery of certificate		

MCHHb=Maternal and Child Health Handbook; ANC=Antenatal care; M&S= Monitoring and supervision