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The Role of Home-Based Health Records in Enhancing Maternal and Child Health Outcomes: Implications for Reducing Maternal and Infant Mortality

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Abstract

Background: Home-based records are critical tools for improving maternal, neonatal, and child health (MNCH) outcomes globally. These records facilitate continuity of care and empower caregivers with essential health information. However, the effectiveness of these records in reducing maternal and infant mortality remains underexplored.

Methods: This review systematically evaluates the impact of home-based health records on MNCH, focusing on their role in enhancing healthcare service delivery. A comprehensive literature search was conducted across multiple databases, identifying studies that assess the influence of home-based records on maternal and child health outcomes, including vaccination rates, care-seeking behavior, and health education.

Results: The findings indicate that home-based records, particularly the Maternal and Child Health (MCH) handbook, significantly improve healthcare-seeking behaviors and knowledge regarding infant care. While some studies show positive impacts on vaccination rates and maternal care practices, the evidence regarding immediate breastfeeding initiation and neonatal mortality remains inconclusive. Notably, the integration of home-based records into healthcare systems fosters better communication between healthcare providers and families, promoting adherence to health guidelines.

Conclusion: Home-based health records are essential in improving maternal and child health outcomes, yet their effectiveness varies by region and context. There is a need for standardized formats and integration with existing healthcare systems to maximize their impact. Future research should focus on longitudinal studies that assess the long-term effects of home-based records on maternal and infant mortality, as well as the development of tailored interventions that address local health challenges.

Keywords: Home-based records, maternal health, child health, healthcare delivery, MNCH.

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Introduction

Home-based data have been used in more than 163 countries globally to enhance maternity, neonatal, and child health (MNCH) [1]. The records exhibited significant variation in form and content across different nations and regions. Home-based records are either papers or electronic health records maintained by mothers or caregivers inside the family to record the health services obtained for maternal, neonatal, and child health (MNCH). The items included maternity case notes, vaccination-only cards, child health manuals, and integrated child and maternal health handbooks. The record is designed to be included in the standard medical record system and to augment records kept by healthcare institutions [1].

Historically, MNCH programs have created their specialized home-based records. In several nations, a mother's medical card remains an autonomous record, separate from child data [2]. The distinction in target demographics has incited policy discussions over the separate development and distribution of home-based data for mothers and children [2]. The absence of integration and the absence of a common format and design for home-based records may adversely affect health reporting, medical conditions, scalability, and assessment across global health systems [3].

The first comprehensive home-based record was created in Japan in 1948. The Ministry of Health, Labor, and Social Affairs of Japan implemented the Maternal and Child Health (MCH) guidebook to enhance the health of mothers and children. The original MCH handbook included the whole range of pregnancy, delivery, postpartum, and infant care, extending through infancy up to six years of age. In 1991, Japanese municipalities and towns/villages began the distribution of the MCH guidebook subsequent to decentralization [4]. Local governments may include additional material from the national version, which comprises 48 pages, tailored to their specific requirements. Japan's achievement in lowering the death rate of infants led to the global adaptation of the MCH guidebook. As of now, over 50 nations have used the comprehensive MCH guidebook [4], which is especially beneficial when access to healthcare services is limited [5]. The complete integration offers several benefits. It encompasses enhanced guarantee of a continuum of maternal and child health care and substantial cost reductions in the operation of the record [6-10].

Healthcare practitioners may input medical data into the manuals and disseminate their expertise and information about maternal wellness and child development [4]. Moreover, parents may readily access pertinent information and depend on the ongoing assistance provided by the guidebook from pregnancy through childhood [4]. The MCH handbook serves as an essential resource for advancing a life-course perspective in healthcare. This strategy may facilitate the attainment of the Sustainable Development Goals (SDG 3, which aims to "ensure good health and encourage health for all whatsoever ages." [11]

In 2019, the World Health Organization (WHO) revealed that around 7.4 million kids, teens, and youth died mostly from avoidable or curable causes, despite significant advancements over the last two decades. Among these fatalities, 5.2 million include children under five, with the predominant causes being complications from preterm delivery, pneumonia, newborn sepsis diarrhea, as well as malaria [13]. These fatalities may be averted or managed by access to cost-effective and uncomplicated measures, including vaccination, proper nutrition, clean drinking water, and excellent care from a qualified healthcare professional [13]. Although efficient and economical strategies exist to decrease mortality among children under five, there is a paucity of review studies examining the impact of home-based records on enhancing healthcare service delivery for this demographic.

Research systematically evaluated the efficacy of home-based data on maternal, neonatal, and child health (MNCH), which informed the WHO's recommendations about home-based records. This review study did not thoroughly investigate the impact of home-based data on neonatal and child health. According to the WHO recommendation [1], infant and child health results include morbidity and death rates, care-seeking behavior, care practices, and the usage of health resources. Magwood et al. [3] encompassed just two research pertaining to neonatal health and seven research investigations related to child health

outcomes. No substantial impacts on infant health outcomes, such as neonatal mortality or stillbirths and immediate breastfeeding, were found. Regarding child health outcomes, it was observed that home-based records may enhance vaccination rates, development, and development. Surveys may provide additional details about the impact of home-based recordings on neonatal and pediatric health. They provide data on actual compliance with home-based records, presenting proof of real-world consequences associated with these records. This review aggregated and synthesized information from all research designs available in English to evaluate the impact of home-based documentation on maternity and kid health results.

1. The Function of Home-Based Records in Newborn Health

Eight research evaluated the impact of home-based records on neonatal health [6,7,14-19]. Results indicated a beneficial impact of home-based recordings on the pursuit of infant care and the understanding of newborn care practices. In Burundi, the percentage of women who pursued postpartum care (PNC) from healthcare professionals after childbirth rose markedly from 35.9% to 64.2% after the implementation of the MCH handbook [16]. In South Africa, the percentage of HIV PCR birth tests recorded with the RTH booklet identification exceeded 50% after six months, indicating that the RTH booklet may effectively be used to assign newborns an individual patient number at birth [17]. In Indonesia, the maternal course employed the MCH guidebook as the primary reference for the instructional sessions [18]. Participating women demonstrated enhanced knowledge of initial breastfeeding, administration of colostrum, duration of exclusive breastfeeding, application of antibiotics for infant ocular care, hepatitis B vaccination at delivery, heat protection, cord care, and identification of dangerous symptoms in newborns [18]. Indonesian moms using the MCH guidebook showed a higher propensity for practicing effective infant care compared to the conventional care group [18]. Multi-country research indicated that women using home-based maternal records exhibited increased engagement in managing their health and that of their babies [14].

Nevertheless, studies indicate no substantial impact of home-based records on immediate breastfeeding, infant mortality, or physical appearance, pulse, grimace, activity, and respiration scores. A randomized controlled trial done in the UK revealed no significant difference in breastfeeding rates post-delivery and infant mortality between women in the case note group and those in the cooperation card group [19]. Identical findings were achieved in a cluster randomized controlled trial done in Mongolia [7]. A greater incidence of immediate breastfeeding beginning was seen among moms who got the MCH handbook compared to those who did not; however, the difference was not statistically significant [7]. Furthermore, there was no notable difference in infant mortality or APGAR ratings between the MCH handbook group and the control category [7].

2. The Function of Home-Based Records in Child Health

We discovered data indicating the beneficial impact of home-based documentation on the pursuit of childcare and the acquisition and documentation of vaccinations. Mothers who obtained home-based data showed a higher propensity to use healthcare services and comply with required vaccines and childcare visit guidelines. A mixed impact was seen with age-appropriate vaccination, namely a three-dose regimen of diphtheria, tetanus toxoids, as well as pertussis (DTP) [20-24]. Randomized studies in the UK and USA indicated no significant impact on the DTP3 completion rate among children using home-based records vs those without such documentation [21,22]. Conversely, in a randomized controlled trial conducted in Pakistan, children utilizing a redesigned immunization card exhibited a notable enhancement in the DTP3 completion rate relative to an ordinary developed system of immunization (EPI) cards [23,24].

Six of the sixteen studies demonstrated a beneficial impact of home-based recordings on pediatric medical knowledge. Mothers using home-based records demonstrated enhanced knowledge in general health, vaccination, sole breastfeeding, bile duct obstruction, and baby accident avoidance [25-31]. The MCH guidebook efficiently imparted sufficient information about exclusive breastfeeding among literate, less-educated Japanese mothers [29]. Mothers who had perused the MCH handbook exhibited greater vigilance about newborn accidents compared to those who had not consulted the reference book [30]. Conversely, many investigations indicated no impact or had inconsistent findings concerning vaccination,

the identification of a biliary condition, and the sudden death of an infant [26-30]. Japanese women sought further information on the vaccine schedule, stool color chart, and sudden death of an infant.

The majority of investigations indicated enhancements in child wellness and sickness administration among individuals using home-based records. A significant alteration in exclusive breastfeeding practices was seen among moms who obtained the MCH guidebook in Bangladesh as well as Vietnam [30,31]. Nonetheless, a randomized controlled trial (RCT) performed in Indonesia showed no impact of the MCH guidebook on breastfeeding exclusively for six months [6]. Notwithstanding this contrasting outcome, the authors indicated that Indonesian mothers who utilized the MCH handbook exhibited a propensity for continued nursing, additional feedings, appropriate feeding sequence, diverse food provision, such as fruits and/or fruit extracts, and self-feeding education [6]. In a comparable sample, women who used the MCH handbook were more likely to engage in-home care for cough and to provide vitamin A [6]. The research revealed no statistically significant distinction between the intervention and control groups on home treatment for diarrhea [6]. Conversely, growth tracking seemed to preoccupy moms who obtained a home-based record. Mothers overlooked developmental markers they did not comprehend, including head diameter and growth trajectories [32-34]. Additional clarification may have assisted moms in tackling this problem. In Japan, the completion of the MCH handbook correlated with maternal characteristics, as older mothers and those with little childcare experience were more likely to complete it [35].

Two randomized trials provided findings about infant morbidity and mortality [6,33]. In Indonesia, moms who obtained the MCH handbook exhibited a reduced likelihood of having underweight children and children with stunted development [6]. Nevertheless, no substantial difference was seen among the control and intervention groups for wasting in children [6]. In Mongolia, users of the MCH handbook exhibited a decreased risk of cognitive delay in children compared to the control category at a three-year monitoring [35].

Seven of eight studies have shown a beneficial impact of home-based recordings on the entire chain of care [6,28,30,36-39]. The MCH handbook demonstrated the continuity of maternal, neonatal, and child care throughout all home-based data. In Vietnam, the percentage of pregnant women who attended ≥ 3 antenatal care (ANC) sessions and engaged in exclusive breastfeeding markedly rose between the pre- and post-intervention phases [31]. In Burundi, the percentage of women obtaining birth notifications at health facilities rose markedly from 4.6 percent to 61 percent [30]. In the Dominican Republic, the proportion of women obtaining prenatal and postpartum care in specified clinics or hospitals rose from 13% to 40% [38]. In Japan, moms who had reviewed their own MCH handbook throughout childhood exhibited more continuity consciousness compared to those who had not. The MCH guidebook enhanced collaborative connections among healthcare facilities, governmental agencies, and educational institutions. Nevertheless, further work is required to convert the beneficial use of the MCH manual into individual accountability for health [39].

3. Discussion

Utilization of home-based records resulted in enhanced care-seeking behavior, knowledge, and practices for newborns and childcare. Nonetheless, home-based data may not substantially influence the implementation of immediate breastfeeding or the mitigation of prenatal death and morbidity. We also noted a mixed impact on age-appropriate vaccination, including the DTP3 completion rate. Notwithstanding this mismatch, home-based records supplied critical information on the child's immunization status. Moreover, across all home-based documents, the MCH guidebook had a beneficial impact on facilitating the continuum of care and managing pediatric illnesses.

Home-based records, particularly the MCH handbook, might enhance mothers' understanding and behaviors about infant and childcare. This research identified the beneficial outcome as attributable to instructional sessions, regular use of documents, and the engagement of healthcare practitioners. In Indonesia, moms who participated in the MCH handbook instructional sessions showed a greater propensity for immediate breastfeeding, heat security, cord care, and recognizing danger indications in newborns compared to those who did not participate [32]. This discovery is novel since Magwood et al. [3]

indicated no statistically significant impacts on neonatal health outcomes. The disparity in outcomes arises from the exclusion of quasi-experimental research in the choice of criteria. Additionally, Indonesian women consulted and transported the MCH manual to various healthcare institutions many times [6]. Various healthcare practitioners documented health information in a shared handbook, facilitating more regular monitoring of the child's health [6].

Regular usage and consultation may have enhanced the exchange of information among healthcare practitioners and moms. As a result, moms exhibit increased motivation and awareness about their children's health and requirements, hence enhancing the likelihood of applying their knowledge in practice. They generally engaged in appropriate feeding practices, used vitamin A, and administered home care for coughs [6]. Users of the guidebook had a lower prevalence of stunted development and underweight children in comparison to non-users [6]. In Mongolia, the likelihood of cognitive delay is decreased among handbook users, maybe due to mothers exhibiting more care for developmental milestones and increased interaction with their children [40]. The review results indicate that the MCH guidebook may decrease infant and child morbidity while promoting growth and development. This demonstrates the handbook's potential for integration with the administration of newborn and pediatric illnesses (IMNCI). The guidebook may enhance the IMNCI worldwide plan by advocating a comprehensive, child-centered methodology for addressing childhood illnesses [41].

Individuals using home-based records had inadequate knowledge and practices about vaccination, biliary atrophy, sudden infant mortality syndrome, and development surveillance. These results are novel and need more scrutiny. The poor measles vaccination coverage rate in Japan may be attributed to mothers' misconceptions and insufficient information, especially apprehensions about side effects [32,33]. Moreover, Japanese women are unfamiliar with the stool color card used for detecting bile duct obstruction [35,37] and are unaware of sudden infant deaths [30]. Despite demonstrating significant interest in the condition, further information and clarification may facilitate the appropriate use of the stool color card. In Australia as well as Brazil, moms expressed anxiety overgrowth monitoring. Mothers often overlooked developmental signs that they did not comprehend [28,29]. This review emphasized the need to provide sufficient textual information in home-based recordings and clarification from healthcare practitioners to enhance mothers' comprehension.

Although home-based records enhanced the pursuit of neonatal and childcare, shown by the consumption of medical care, we identified discrepancies in the administration of age-appropriate immunizations. Two randomized controlled trials in the UK and USA indicated no significant impact on the DTP3 achievement rate in children employing home-based recordings vs those without such records [35,36]. In Pakistan, two randomized controlled trials demonstrated a significant enhancement in the DTP3 achievement rate using newly designed vaccination cards and instructional programs compared to the usual Expanded Program on vaccination cards [37,38]. Magwood et al. [3] corroborated these results in their systematic study. The study results provide moderate proof that enhanced home-based data and center-based teaching, tailored for low literacy populations, successfully educated caregivers in LMIC on vaccine uptake, as observed in Pakistan. Home-based records generally supply crucial information on the child's immunization status, irrespective of poverty level [42-44]. A greater percentage of youngsters employing a home-based record maintained an up-to-date vaccination status relative to non-users, indicating the records' potential to promote healthcare service usage and monitor children's vaccination background in both LMIC and HIC. This analysis's findings differ from a different study [40] that indicated a favorable correlation between the implementation of home-based records as well as child vaccination rates in low- and middle-income countries, but not in high-income countries. The discrepancy may be attributed to the evidence provided in the review.

Home-based records indicated no substantial impact on the initiation of rapid breastfeeding and the reduction of prenatal death and morbidity. This review noted an enhancement in the "knowledge" of immediate breastfeeding between MCH book people in Indonesia [32] and Cambodia [33]; however, we did not observe a significant difference in the "practice" of instantaneous breastfeeding in the UK (pregnancy case notes vs. typical card) [34] and Mongolia (MCH guide vs. no guide) [7]. This outcome requires cautious

interpretation; statistically, there was no impact, although the percentage of moms who engaged in immediate nursing was greater in the treatment category. Additional variables may have impacted the outcomes. In the UK experiment, women in the control category had accessibility to their case histories during healthcare visits, potentially benefiting from this knowledge [34]. The Mongolia study lacked masking, and memory bias is likely present in the analysis due to data collection occurring one-month post-birth [7]. Ultimately, home-based data indicated no impact on stillbirth or infant mortality [7,34] and no variation in APGAR ratings [7]. Both studies indicated a maximum of two stillbirths/neonatal deaths among the control and intervention groups, suggesting a minimal impact size.

The MCH handbook serves as documentation for enabling the continuity of care across home-based records. The manual encourages the use of various services from prenatal through early childhood development. Magwood et al. [3] documented the same findings in Indonesia, where women noted the advantages of using qualified birth attendants throughout the birth and recognized appropriate feeding procedures [6]. We discovered more data regarding the handbook's significance in the chain of care. The guidebook was well received by pregnant women in the Dominican Republic because to its simplicity, user-friendliness, durability, and portability, resulting in an improved rate of antenatal and postnatal care at specified clinics or hospitals [38]. The guidebook may also promote the welfare of future parents. Japanese moms who had previously encountered their guidebook in youth were more inclined to provide it as a gift to their children upon wedding or pregnant [38]. The guidebook has enhanced cooperation between hospitals, municipalities, and educational institutions in Japan [39]. These results are novel and need more inquiry. Home-based records, especially the MCH guide, may improve communication and facilitate the use of health care from pregnancy through childhood (continuity of care) while transmitting healthy practices to subsequent generations. These data demonstrate the comparative superiority of using a unified home-based record in contrast to standalone records.

The study has many limitations. Initially, results from observational studies must be regarded cautiously due to their higher potential for bias compared to randomized controlled trials (RCTs). Our primary aim was to broaden beyond a review only based on randomized controlled trials; thus, we used observational studies to demonstrate the impact of home-based records on neonatal and child health. The Cochrane guide indicated the advantages of using empirical research when the review topic cannot be fully addressed by RCTs [27]. Secondly, we included a wide array of outcomes, although only a limited number of research were accessible for each outcome group. The quantity of research available was inadequate to perform subgroup analysis for comparing HIC and LMIC. Third, there was significant variation in the research populations, intervention types, comparator categories, and outcome assessments, all of which may influence the efficacy of the therapies. The ten randomized controlled trials considered in this study exhibited a significant risk of bias owing to the absence of blinding. Due to the diversity and/or bias, we performed a narrative analysis to elucidate the impact of home-based recordings and provided the GRADE table to illustrate the quality evaluation and reliability of evidence. The existing evidence was inadequate to do an internet meta-analysis to evaluate the comparative benefits of various home-based records, complicating the comparisons.

4. Conclusion

The utilization of home-based health records, particularly the Maternal and Child Health (MCH) handbook, is a promising approach to improving maternal and child health (MNCH) outcomes. By empowering caregivers with essential health information and facilitating better communication with healthcare providers, these records can enhance care-seeking behaviors and promote adherence to health guidelines. The evidence gathered from various studies indicates that home-based records contribute positively to aspects such as vaccination rates, maternal care practices, and overall health knowledge among caregivers. However, the findings also highlight significant variability in effectiveness, influenced by regional healthcare systems, cultural contexts, and the existing infrastructure for health data management.

Despite the positive outcomes associated with home-based records, several challenges persist. The lack of standardization in record formats and the integration of these records into existing healthcare systems

can hinder their full potential. Moreover, while some studies have shown improvements in health outcomes, others have reported inconclusive results regarding immediate breastfeeding initiation and neonatal mortality rates. This inconsistency underscores the need for further research to explore the nuances of how home-based records impact health outcomes, especially in diverse settings.

To maximize the benefits of home-based health records, it is crucial to develop standardized protocols that facilitate their integration into healthcare systems. Additionally, future research should focus on longitudinal studies that assess the long-term effects of these records on maternal and infant mortality rates, as well as the development of context-specific interventions tailored to local health challenges. Overall, the implementation of effective home-based health records presents a viable strategy for enhancing MNCH outcomes and achieving global health objectives. As healthcare practices evolve, leveraging the strengths of home-based documentation can contribute significantly to reducing preventable maternal and infant deaths worldwide.

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دور السجلات الصحية المنزلية في تعزيز صحة الأم والطفل: الآثار المترتبة على خفض وفيات الأمهات والرضع

الملخص

الخلفية :تُعد السجلات الصحية المنزلية أدوات حاسمة لتحسين نتائج صحة الأم والوليد والطفل (MNCH) على مستوى العالم. تساهم هذه السجلات في استمرارية الرعاية الصحية وتُمكّن مقدمي الرعاية من الوصول إلى معلومات صحية أساسية. ومع ذلك، لا تزال فعالية هذه السجلات في تقليل وفيات الأمهات والرضع غير مستكشفة بشكل كافٍ.

الطرق :يستعرض هذا البحث بشكل منهجي تأثير السجلات الصحية المنزلية على صحة الأمهات والأطفال، مع التركيز على دورها في تعزيز تقديم خدمات الرعاية الصحية. تم إجراء بحث شامل في عدة قواعد بيانات لتحديد الدراسات التي تقيم تأثير السجلات الصحية المنزلية على نتائج صحة الأم والطفل، بما في ذلك معدلات التطعيم، وسلوك البحث عن الرعاية الصحية، والتعليم الصحي.

النتائج :تشير النتائج إلى أن السجلات الصحية المنزلية، ولا سيما سجل صحة الأم والطفل(MCH handbook) ، تعزز بشكل كبير السلوكيات المتعلقة بالبحث عن الرعاية الصحية والمعرفة برعاية الرضع. في حين أظهرت بعض الدراسات تأثيرًا إيجابيًا على معدلات التطعيم وممارسات رعاية الأم، لا تزال الأدلة المتعلقة ببدء الرضاعة الطبيعية المبكرة ووفيات حديثي الولادة غير حاسمة. ومن الجدير بالذكر أن دمج السجلات الصحية المنزلية في الأنظمة الصحية يعزز التواصل بين مقدمي الرعاية الصحية والأسر، مما يساهم في تحسين الامتثال للإرشادات الصحية.

الاستنتاج :تُعد السجلات الصحية المنزلية ضرورية لتحسين صحة الأمهات والأطفال، إلا أن فعاليتها تختلف حسب المنطقة والسياق. هناك حاجة إلى تطوير تنسيقات موحدة ودمجها في الأنظمة الصحية القائمة لتعظيم تأثيرها. ويوصى بإجراء أبحاث مستقبلية تركز على دراسات طولية لتقييم التأثيرات طويلة الأجل للسجلات الصحية المنزلية على وفيات الأمهات والرضع، بالإضافة إلى تطوير تدخلات مخصصة لمعالجة التحديات الصحية المحلية.

الكلمات المفتاحية :السجلات الصحية المنزلية، صحة الأم، صحة الطفل، تقديم الرعاية الصحية، MNCH.