PERCEPTION AND EXPERIENCE OF IMPLEMENTING THE MOTHER AND CHILD TRACKING SYSTEM (MCTS) AMONG AUXILIARY NURSE MIDWIVES (ANMs) IN SELECTED DISPENSARY AND URBAN PRIMARY HEALTH CENTRE OF GUWAHATI, ASSAM

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Abstract: **Introduction:** As frontline health workers, ANMs play a critical role in registering beneficiaries, updating records, and ensuring timely service delivery, yet their voice often remains underrepresented in system evaluations. The effective delivery of maternal and child healthcare services in India has been significantly bolstered by the introduction of digital tracking systems such as the Mother and Child Tracking System (MCTS).
Objectives: To determine the perception and experience of implementing the Mother and Child Tracking System (MCTS) among Auxiliary Nurse Midwives (ANMs) in the selected Dispensary and Urban Primary Health Centre of Guwahati, Assam.
Methodology: A qualitative research approach was adopted to assess the perception and experience of implementing the Mother and Child Tracking System among auxiliary nurse midwives (ANMs). In-depth interviews were conducted with 15 ANMs from different dispensary and urban primary health centre until data saturation was achieved. Interviews were recorded on a smartphone by the investigator and lasted for 30-45 minutes for each participant. Data were analysed through thematic analysis (Inductive approach) using Clarke and Braun's 6-step thematic analysis by listening to the recordings of each participant to determine the central themes.
Results: The participants reported various issues in implementing the MCTS, such as a lack of appropriate training, improper infrastructure, reduced time for practical work and field work, high workload due to double entry of the data both offline and online, non-availability of data entry operators, poor internet connectivity, and slow server speed. On the other hand, they have a basic knowledge of the MCTS. **Conclusion:** The findings of the present study provided critical insights for program planners, health administrators, and policymakers to reorient MCTS implementation strategies by centring the perspectives of those who interact with the system most frequently, the ANMs. Bridging the gap between policy design and grassroots practice is essential for achieving equitable, efficient, and data-driven healthcare service delivery.

***Keywords*- Perception, Experience, Auxiliary Nurse Midwife, Dispensary, Urban Primary Health Centre, Mother and Child Tracking System.**

INTRODUCTION

India's Mother and Child Tracking System (MCTS) is a system that collects vast amounts of data about pregnant women right from conception to 42 days postpartum, and children. It is an initiative by the Ministry of Health and Family Welfare (MoHFW) in India, and was first trialled in 2009. It was then rolled out nationwide in 2011. Its purpose was to facilitate "ensuring timely delivery of a full spectrum of health care services to pregnant women and children up to 5 years of age through name-based tracking of each beneficiary". The system's expected benefit was "to help in the reduction of infant Mortality Rate and Maternal Mortality Rate". The system is comprised of:

- A database "capturing detailed information about beneficiaries, like unique ID, name, address, contact details, location, and cast"; and

- A maternal health card, containing a unique 16-digit identification number, containing the codes on the state, district, block, health centre, woman, and/or child serial code and serial number.
- Mobile-based SMS technology "to communicate with beneficiaries and grassroots level health care service providers as well as health and family welfare policy makers, health managers, and health administrators at different tiers of the health care delivery system".
- A call centre, the Mother and Child Tracking Facilitation Centre, which verifies MCTS records, besides collecting feedback on the provision of services.

It is understood that the system collects data on each visit of the woman from conception to 42 days postpartum. As of 2018, 120 million pregnant women and 110 million children were registered on the portal. [1]

ANMs are the nursing cadre of the Indian public health system, technically trained in auxiliary nursing and midwifery. ANMs are the primary functionaries at the primary health centre and dispensary, providing maternity and child health services. They are frontline health professionals and contribute to reducing maternal and newborn morbidity and mortality. Their expertise in patient care, immunization initiatives, and preventive healthcare is instrumental in strengthening public health systems.

By enrolling pregnant women and children at the grassroots level by ANMs (Auxiliary Nurse Midwives), the program ensures the beneficiaries have access to necessary services, like antenatal check-ups, institutional deliveries, postnatal care, and full immunization. It also enables automatic alerts, SMS (short message service) reminders to the health workers and the beneficiaries to ensure outreach and follow-ups are strengthened.

FHWs (female health workers) write beneficiary and service delivery data on registers and forms, which DEOs (data entry operators) subsequently transport to the closest primary health centre (PHC) for inclusion into the MCTS portal. The site maps all medical facilities, from the state to the most remote health sub-centres (HSCs), and it also assigns FHWs to certain HSCs. The information helps the MCTS to create work plans for FHWs that outline upcoming service delivery requirements, including prenatal exams or vaccinations, for each individual beneficiary. Reports that show MCTS performance (beneficiary registration rates) or service delivery performance (e.g., percentage of children fully immunized) can also be generated by supervisory officials using the MCTS online portal.

The success of the MCTS as a data system relies heavily on processes and practices at the village/HSC level. The field-level data collection, consolidation, and transfer activities ultimately determine MCTS data quality. Rapid desk review of MCTS national aggregate data has produced preliminary results that point to poor performance levels for this ambitious but much-needed endeavor. According to data obtained from the MCTS cell in July 2012, registration rates for pregnant women and children were 63% and 59%, respectively, of the expected numbers of beneficiaries. Significant differences in service delivery rates between the MCTS and HMIS portals were observed. These signs of subpar MCTS performance, along with the possibility that the MCTS could guarantee on-time MCH service delivery, highlight the necessity of the first comprehensive evaluation of the MCTS. In December 2012, PHFI assessed four districts spread over two large states, Rajasthan and Uttar Pradesh, to identify the root causes of the low performance levels. [2]

ANMs play a pivotal role in MCTS implementation. They are the main health provider in dispensaries and sub-centres. An ANM is responsible for registering eligible women and children in MCTS and delivering the corresponding services. In urban Primary Health Centres, ANMs likewise assist with antenatal clinics and immunization sessions. In practice, ANMs must often juggle MCTS data entry (or review) along with their routine duties. For example, ANMs write beneficiary details in MCH registers, which are then re-entered online by data entry staff at the PHC. This dual record-keeping means ANMs face an increased workload. Moreover, frontline workers commonly encounter infrastructure and operational challenges: unreliable electricity or internet access, shortages of register books, or a lack of dedicated data personnel have been documented as problems in various states. [3, 4]

Several evaluations have identified known challenges in MCTS. Early assessments found that data completeness was low; one national review showed only about 60–65% of pregnant women and children were registered in the system relative to expected numbers. Commonly reported hurdles include inadequate training of ANMs and other health staff, overburdened ANMs and data operators (who are often responsible for multiple health programs), and frequent technical issues (such as slow servers and power

cuts). [3, 4] ANMs themselves have reported specific difficulties: the requirement to maintain both paper records and the electronic system, lack of a dedicated data entry operator at their facility, and insufficient resources (for example, computers or Internet). These gaps can lead to delays in data entry and underutilization of the system's reminders and reports. On the other hand, some studies have noted that the MCTS work plans can improve accountability and planning once implemented. [4]

Maternal and child health are critical public health priorities, especially in low-resource settings. Pregnant women and young children in these contexts remain among the most vulnerable groups and require timely, quality healthcare to prevent avoidable deaths. [5] Despite global progress, maternal mortality is still unacceptably high about 287,000 women died from pregnancy or childbirth complications in 2020, and most such deaths are preventable with skilled care. Similarly, childhood mortality remains a concern without sustained intervention. Hence, ensuring that every mother and child receives the full continuum of care (antenatal, delivery, postnatal, and paediatric services) is imperative for public health. [5, 6]

In India, substantial gains have been made, but challenges persist. The maternal mortality ratio has declined in recent years (an estimated 97 per 100,000 live births in 2018–2020), reflecting lives saved from improved services. For example, effective programs have contributed to nearly 8,600 fewer maternal deaths per year by 2020 compared to 2016. [9] Newborn and child survival has also improved; by 2020, India had roughly one million fewer newborn deaths per month than in 2016.[8] These achievements underscore the value of comprehensive interventions, including universal immunizations and facility deliveries. However, gaps remain (especially in hard-to-reach areas) and require robust systems to track every beneficiary through the health system.

Effective tracking of mothers and children is therefore essential to close these gaps. Health information and e-health systems can support frontline workers in identifying and following up with beneficiaries. This centralized system generates individualized service schedules and helps officials monitor coverage and service delivery performance. In theory, such tracking should improve continuity of care and health outcomes across communities.

NEED OF THE STUDY

Now, even after more than 20 years since the launch of the computer-based HMIS system over the paper-based system, the Health Information Systems in India is still lagging in desired objectives like proper, adequate, and quality data collection, timely reporting, etc. The most important part is to train the health workers at the grassroots level to generate more efficient data production in these health information systems to improve public health. [9]

In Assam, in the ongoing financial year 2025-2026, the RCH Portal documented the registration of 136,273 eligible couples, achieving 151.27% of the estimated target. It indicates that the number of couples registered exceeded projections, which may be attributable to factors such as underestimation of the target population, migration, or duplicate entries. In contrast, the registration of 199,200 pregnant women reflected 66.75% coverage, while 110,979 children were registered, achieving only 42.55% of the target. Additionally, the portal recorded 50,120 active health workers engaged in service delivery and data entry during the period. The disparity between the high registration rate for eligible couples and the comparatively lower coverage for pregnant women, children, and health workers suggests potential gaps in case identification, outreach, and timely data reporting, indicating the need for strengthened monitoring and follow-up mechanisms. [10]

At the national level, in the ongoing financial year 2025-2026, the RCH Portal recorded 4,527,562 eligible couples, achieving 108.91% of the estimated target. This indicates that registrations slightly exceeded projections, potentially due to better outreach, migration-related factors, or over-reporting. In comparison, the registration of 5,452,259 pregnant women reflected 49.83% coverage, while 3,993,725 children were recorded. Additionally, 1,623,608 active health workers were documented, representing 41.37% of the target. The contrast between the relatively high coverage for eligible couples and the lower coverage rates for pregnant women, children, and health workers points to possible gaps in identification, follow-up, and data reporting processes. These findings highlight the need for targeted interventions to strengthen RMNCH service delivery and improve the completeness and timeliness of data capture across the country. [11]

The Mother and Child Tracking System (MCTS) is an essential health-related digital initiative that provides for improving maternal and child health through several interventions, the objective of which is to track pregnant women and children. By following pregnant

women and children from the ground up, the system has helped lower maternal and infant death rates by keeping tabs on care, delivery, and responsibility. As the backbone of health services, ANMs had an important responsibility in the effective MCTS implementation through beneficiary registration, record updating, and service follow-up.

Despite the system's potential, there are concerns about its practical implementation, especially in urban health settings such as dispensaries and Urban Primary Health Centres (UPHCs). Challenges like inadequate training, limited technological infrastructure, data entry issues, and high workload may affect the ANMs' ability to effectively use the system. It is important to explore the perceptions and experiences of ANMs, which can help in recognizing the operational gaps, barriers, and enablers associated with the implementation of the MCTS.

Nagarajan P, Tripathy PJ, G Sonu (2016) conducted a cross-sectional study on Is Mother and Child Tracking System (MCTS) on the right track? An experience from a northern state of India. The study aimed to understand the opportunities and challenges in the operationalization of the MCTS strategy in a district in Haryana and to understand the stakeholders' perspectives. A semi-structured interview was conducted with 14 ANMs, two DEOs, and a total of 100 clients, which included pregnant and postnatal mothers of less than 6 months in 12 subcentres (SCs) and 2 primary health centres (PHCs). On analysis and interpretation, results revealed a lack of appropriate training, an overburdened DEO (data entry operator), an auxiliary nurse midwife (ANM), poor Internet connectivity, slow server speed, and frequent power failures as major limitations for the effective implementation of MCTS (mother and child tracking system) and around 18% of the clients reported receiving short message service (SMS), and only 6% understood SMS. [12]

By evaluating these insights, further design and features of the system can be enhanced to reflect the realities of service delivery at the field level. The results can offer policymakers and program managers an opportunity to take evidence-based decisions aimed at improving the operational efficiency of MCTS and may, in turn, lead to improved maternal and child health. Therefore, the present work is crucial as a means of connecting policy rhetoric with practical actions.

However, there is minimal evidence in the literature about ANMs' perspectives on MCTS, even after many years of its implementation by the Government of India. Hence, as a first step towards this, the investigator has planned to conduct a study to assess the perception and experience of implementing the Mother and Child Tracking System (MCTS) among Auxiliary Nurse Midwives (ANMs) in the selected Dispensary and Urban Primary Health Centre of Guwahati, Assam. Therefore, it can reveal practical barriers (for example, workload or training gaps) and inform improvements in MCTS implementation.

OBJECTIVES

GENERAL OBJECTIVE

To assess the perception and experience of implementing the Mother and Child Tracking System (MCTS) among Auxiliary Nurse Midwives (ANMs).

SPECIFIC OBJECTIVES

1. To explore the perception of Auxiliary Nurse Midwives (ANMs) in using the Mother and Child Tracking System (MCTS)
2. To understand the experience of Auxiliary Nurse Midwives (ANMs) in using the Mother and Child Tracking System.

RESEARCH METHODOLOGY

The present study was conducted to assess the Perception and Experience of Implementing the Mother and Child Tracking System (MCTS) among Auxiliary Nurse Midwives (ANMs) in selected Dispensary and Urban Primary Health Centre of Guwahati, Assam.

Research approach: Qualitative research approach.

Research design: Phenomenological research design.

Population: ANMs working in the Dispensary and Urban Primary Health Centre of Guwahati, Assam.

Target Population: ANMs working in selected Dispensary and Urban Primary Health Centre of Guwahati, Assam, involved in registration, service delivery, and data entry under MCTS.

Accessible Population: ANMs who meet the set criteria and who are available for the research study.

Sample: 15 ANMs who are working at Capital State Dispensary, Khanapara State Dispensary, Lokhra State Dispensary, Kahilipara UPHC, Guwahati, Assam.

Sampling technique: Non-probability (purposive sampling) technique.

Theoretical framework: The conceptual framework for the study is based on Modified Roy's Adaptation Model.

Tools for data collection: Tool 1- SOCIO-DEMOGRAPHIC PROFORMA, Tool 2- SEMI-STRUCTURED INTERVIEW QUESTIONNAIRES (Part A and Part B)

Data Analysis: I. Descriptive Statistics- Frequency, Percentage, II. Thematic Analysis (Braun and Clarke's 6-Step Thematic Analysis)

Result: NVivo Software is used to analyze the collected data.

Table 1: Frequency and percentage distribution of ANMs working in selected Dispensary and Urban Primary Health Centre of Guwahati, Assam, with selected demographic variables.

n=15

Sl.no.	Demographic Variables	Frequency	Percentage
1.	Age in years		
	a. 21 to 25 years	2	13.33
	b. 36 to 30 years	5	33.34
	c. 31 to 35 years	6	40
	d. 36 years and above	2	13.33
2.	Educational status		
	a. 10^{th} pass	8	53.34
	b. 12^{th} pass	5	33.33
	c. Graduation	2	13.33
3.	Total work experience		
	a. 1-5 years	11	73.33
	b. 6-10 years	4	26.67
	c. 11-15 years	0	0
	d. 16 years and above	0	0
4.	Number of in-service training attended		
	a. 1 times	0	0
	b. 2-4 times	11	73.33
	c. 5-7 times	4	26.67
	d. 8 times or above	0	0
5.	Marital status		
	a. Unmarried	1	6.67
	b. Married	12	80
	c. Widowed	2	13.33
	d. Divorced	0	0

The data in table 1 depict that the majority of the ANMs, i.e., 6 (40%), are in the age group of 31-35 years, followed by 5 (33.34%) in the age group of 26-30 years, 2 (13.33%) in the age group of 21-25 years, and 2 (13.33%) in the age group of 36 years and above.

The majority of the ANMs, i.e., 8 (53.34%), are 10th pass, followed by 5 (33.33%) 12th pass, and the remaining 2 (13.33%) are graduates. The above data also shows that the majority of the ANMs, i.e., 11 (73.33%), have 1-5 years of work experience, followed by 4 (26.67%) with 6-10 years. The majority of the ANMs, i.e., 11 (73.33%), have attended in-service training 2-4 times, followed by 4 (26.67%) who have attended in-service training 5-7 times. Furthermore, the majority of the ANMs, i.e., 12 (80%), are married, followed by 2 (13.33%) who are widows, and 1 (6.67%) who is unmarried.

Table 2: Themes and sub-themes related to perception.

Sl. No.	THEMES	SUB THEMES
1.	Understanding and perception of MCTS	Clarity of purpose
2.	Features and functionalities of MCTS	Registration of beneficiary and unique identification number
		Risk identification and work planning
		Real-time data access
3.	Strengthened service delivery through MCTS	Increased antenatal visits
		Increased immunization coverage
4.	Training and capacity building	Training on system updates
		Need for training in specific areas

Table 2 depicts the findings of 4 major themes and 8 sub-themes, which were identified via thematic analysis. The major themes included understanding and perception of MCTS, features and functionalities of MCTS, strengthened service delivery through MCTS, and training and capacity building. The sub-themes identified were clarity of purpose, registration of beneficiary and unique identification number, risk identification and work planning, real-time data access, increased antenatal visits, increased immunization coverage, training on system updates, and need for training in specific areas

1. Understanding and Perception of MCTS

This theme captures the ANMs' general awareness, conceptual clarity, and perceived purpose of the Mother and Child Tracking System (MCTS). The ANMs showed a good understanding of the system as a digital intervention meant to support service delivery for maternal and child health. Their responses reflected a strong alignment with MCTS's intended function to serve as a real-time monitoring tool for ensuring timely and comprehensive care.

1.1 Clarity of Purpose

Most ANMs demonstrated a clear understanding of the primary aim of the MCTS to ensure systematic tracking of pregnant women and children for timely health interventions. They recognized that the system is designed to reduce missed services, improve follow-up, and strengthen reporting accuracy.

"MCTS ek online portal hai jo pregnant women aur bachon ke health status ko track karta hai, taaki maa aur bacha ko sahi time par health care services mil sakein jaise antenatal check-ups, immunization aur postnatal care." (R1) (R2) (R4) (R7) (R13) (MCTS is an online portal that tracks the health status of pregnant women and children so that mothers and children can receive healthcare services on time, such as antenatal check-ups, immunization, and postnatal care.)

2. Features and Functionalities of MCTS

This theme reflects the way ANMs described the operational design of the MCTS in supporting maternal and child health service delivery. Participants reported that the system enables registration and unique identification of beneficiaries, systematic tracking of services, and generation of due lists and reminders for antenatal care, delivery, postnatal care, and immunization. They also highlighted its reporting function, which consolidates individual records into higher-level data for monitoring and supervision, and its communication features, such as SMS reminders, which improve beneficiary awareness and service uptake. At the same time, ANMs pointed out that regular data entry and updates increased accountability but also added to their workload.

2.1 Registration of Beneficiary and Unique Identification Number

This sub-theme highlights the way ANMs described the process of enrolling beneficiaries into the MCTS. They explained that pregnant women and children are first registered in the system with personal and health-related details, after which a unique identification number is generated. The ID number is viewed as essential in maintaining continuity of care, preventing duplication, and ensuring that no individual is missed during service delivery, thereby helping to track each beneficiary across different stages of maternal and child health services. According to the ANMs, this feature allowed them to follow beneficiaries across different stages of care, from pregnancy to postnatal services and childhood immunization. They perceived the registration and unique ID system as the foundation of MCTS, as it established an organized and traceable record for every mother and child.

"Jab hum pregnant women ko MCTS mein register karte hain, toh system har beneficiary ke liye ek 16-digit ID generate karta hai. Ye number unka record track karne mein help karta hai, jisse unhe bina confusion ke continuous care dena easy ho jaata hai." (R1) (R2) (R8) (R15) (When we register pregnant women in MCTS, the system generates a 16-digit ID for each beneficiary. That number helps us track their record, which makes it easier to provide continued care without confusion.)

2.2 Risk Identification and Work Planning

In this sub-theme, ANMs described how MCTS supports them in identifying high-risk pregnancies and children, allowing for early intervention. It also assists in organizing their daily work plans and field visits.

"Jab hum beneficiary ki health details… jaise age, weight, haemoglobin level, blood pressure level aur blood sugar level MCTS mein enter karte hain…toh system automatically high-risk cases ke liye alerts dikhata hai, jo hume unhe early refer karne mein help karta hai… uske baad hum ek extra visit plan kar lete hain." (R3) (R4) (11) (R13) (When we enter the beneficiary's health details like age, weight, haemoglobin level, blood pressure level, and blood sugar level in the MCTS, the system automatically shows alerts for high-risk cases, which helps us to refer them early. Then we planned for an extra visit.)

2.3 Real-time Data Access

ANMs consistently emphasized the importance of real-time data access through the MCTS in improving the quality, efficiency, and timeliness of service delivery. The ability to retrieve updated health records instantly, either before field visits or during service delivery, was perceived as highly beneficial for planning, monitoring, and making on-the-spot decisions.

"Ab main bas system open karke turant dekh sakti hoon ki kisne apne check-ups ya vaccinations miss kiye hain…..Pehle hume register ke pages palatne padte the ya phir ASHA se poochna padta tha…..Ab ye time save karta hai aur hume better planning mein help karta hai."(R1) (R3) (R7) (R15) (Now I can just open the system and immediately see who has missed their check-ups or vaccinations. Earlier, we had to flip through pages in the register or ask the ASHA. This saves time and helps us plan better.)

3. Strengthened Service Delivery through MCTS

This theme illustrates how ANMs perceive MCTS as more than a digital tool; it is seen as a transformative system that strengthens healthcare delivery and drives measurable improvements in maternal and child health outcomes. By enhancing efficiency, follow-up, and data-informed decision-making, MCTS has enabled timely care, early risk identification, and improved beneficiary engagement. The dual benefit to both service providers and recipients positions MCTS as a central enabler of program effectiveness and accountability.

3.1 Increased Antenatal Visits

This sub-theme reflects how the use of MCTS has led to more consistent ANC attendance among pregnant women. ANMs reported that the system's due lists and reminder features made it easier to identify women who were due for check-ups and follow up with them promptly. This improved not only the number of visits but also the timeliness of care, allowing for early detection of complications and better monitoring throughout pregnancy.

"Pehle kuch mothers visits skip kar deti thi, lekin ab reminders aur humare follow-up ke wajah se zyadatar mothers apne saare antenatal visits complete karti hain." (R1) (R2) (R4) (R7) (R8) (11) (R12) (R13) (Earlier, some mothers would skip visits, but now with the reminders and our follow-up, most of them complete all the antenatal visits.)

3.2 Increased Immunization Coverage

ANMs express that using MCTS has helped increase service coverage. It helps ensure no pregnant woman or child is missed for check-ups or immunizations. This leads to better health outcomes and fewer dropouts.

"....Ab zyadatar women ko three Td dose mil jaata hai.....pehle bohot si pregnant women immunisation miss kar deti thi, lekin ab wo kam ho gaya hai." (R1) (R5) (R15) (Now, most women receive three Td doses earlier; many pregnant women used to miss immunisation, but now that has reduced.)

"Pehle full immunization ke drop-out cases zyada hote the.....lekin MCTS aane ke baad hum baby ko birth se lekar last dose tak track kar paate hain." (R2) (R10) (12) (R14) (Before drop-out cases for full immunization used to be high, but after the introduction of MCTS, we track the baby from birth till the last dose.)

4: Training and Capacity Building

This theme highlights both the adequacy and gaps in the training process, as well as the impact of capacity building on service delivery. It also captures the perceptions of ANMs regarding the relevance of the training content, the practical challenges of applying it, and the need for ongoing support to strengthen their role in maternal and child health tracking. In this context, training goes beyond initial orientation and involves continuous support, refresher sessions, and supervision that enable health workers to adapt to evolving program needs. Capacity building also reflects the creation of an enabling environment where adequate resources, user-friendly tools, and supportive policies allow ANMs to apply what they have learned in practice.

4.1 Training on System Updates:

Respondents expressed that periodic changes in the MCTS interface or reporting format were usually accompanied by short training updates, either during monthly meetings or through informal supervisory demonstrations. While these updates were helpful in introducing new features, the delivery was often verbal and rushed, leaving limited opportunity for hands-on practice. This sometimes led to confusion of newer functionalities. The data suggests a need for more structured, visual, and interactive training formats to ensure that all ANMs can keep pace with system updates.

"……Kabhi-kabhi portal change ho jaata hai, phir hume ek short update meeting ke liye bulaya jaata hai….. Wahi se hume new features ke baare mein pata chalta hai…." (R1) (R6) (Sometimes the portal changes, and then they call us for a short update meeting. That's how we come to know about new features.)

"Supervisor hume dikhata hai ki naye parts kaise use karna hai. Lekin hume lagta hai ki hands-on sessions verbal instructions se zyada helpful hote." (9) (R12) (Supervisor shows us how to use the new parts. Still, we feel hands-on sessions would help more than just verbal instructions.)

4.2 Need for Training in Specific Areas

ANMs expressed gaps in technical skills, particularly regarding error correction and generating reports. These tasks were described as challenging, especially when they try to edit incorrectly entered records. Many ANMs also reported difficulty in using analytical features such as generating due lists, summary reports, or risk alerts. This indicates that while routine tasks are well understood, there is a strong demand for capacity building in more advanced areas**.**

"Sabse zyada problem tab hoti hai jab data correction karna padta hai, jaise due dates galat enter ho jayein ya follow-ups miss ho jaayein…..aur hume properly kisi ne nahi dikhaya ki edit kaise karna hai." (R4) (R5) (R10) (We struggle the most when data needs correction, like wrong entry of due dates or missed follow-ups, and nobody has shown us properly how to edit.)

"Basic entries toh hum kar lete hain, lekin reports generate karna jaise cheezon mein hume aur help chahiye." (R4) (R11) (R15) (We can do the basic entries, but generating reports, those things we need more help with.)

Table 3: Themes and sub-themes related to experience.

Sl. No.	THEMES	SUB THEMES
1.	Experience with utilization of MCTS	SMS alerts system
		Integration with government schemes
2.	Roles and responsibilities of ANMs	Data collection and system updates
		Maternal and child health services delivery
		Follow-up and health education
3.	Experiences of enrolling beneficiaries in MCTS	Beneficiary cooperation and reluctance
4.	Barriers and systemic challenges	Technical and connectivity issues
		Data quality issue
		High workload
		Limited access to infrastructure
5.	Coping mechanisms and adaptation	Peer support and workarounds
6.	Institutional and community support	Support from health authorities
		Support from community leaders
7.	Suggestions and vision for the future	Manpower
		Optimistic vision for the future

Table 3 depicts the findings of 7 major themes and 15 sub-themes, which were identified via thematic analysis. The major themes included experience with utilization of MCTS, roles and responsibilities of ANMs, experiences of enrolling beneficiaries in MCTS, barriers and systemic challenges, coping mechanisms and adaptation, institutional and community support, suggestions and vision for the future. The sub-themes identified were the SMS alerts system, integration with government schemes, data collection and system updates, maternal and child health services delivery, follow-up and health education, beneficiary cooperation and reluctance, technical and connectivity issues, data quality issue, high workload, limited access to infrastructure, peer support and workarounds, support from health authorities, support from community leaders, manpower, and optimistic vision for the future.

1. Experience with Utilization of MCTS

This theme captures the practical day-to-day experiences of ANMs in utilizing the Mother and Child Tracking System (MCTS) within public health settings.

1.1 SMS Alerts System

In this sub-theme, the participants highlighted the system's capability to send automated SMS reminders for scheduled and missed appointments, such as antenatal check-up (ANC), postnatal care (PNC), and immunization, which was frequently appreciated by them. This feature enhances compliance and supports behaviour change among beneficiaries. The ability to send these reminders was consistently highlighted as a significant benefit, covering antenatal checkups, vaccinations, postnatal visits, and other health screenings. This feature was recognized as a tool for improving service utilization and compliance, particularly for beneficiaries who might otherwise forget or miss critical health appointments.

"…… System automatically maa ke phone par SMS reminders bhejta hai check-up aur vaccines ke liye……bohot auratein si apni dates bhool jaati hain, toh ye messages unhe time par aane mein help karte hain." (R1) (R2) (R4) (R5) (R10) (13) (System automatically sends SMS reminders to the mother's phone for her check-up and vaccines… many women forget their dates, so these messages help them come on time.)

1.2 Integration with Government Schemes

ANMs shared that MCTS is closely linked with other government health schemes, which makes tracking and service delivery more streamlined. Aligning beneficiary data with programs like immunization and maternal health incentives ensures timely benefits, including Janani Suraksha Yojana (JSY) and Pradhan Mantri Matru Vandana Yojana (PMMVY). This integration supports ANMs in coordinating services more efficiently and improves accountability in implementing government initiatives.

"JSY aur PMMVY ka benefit directly MCTS se linked hai… agar galat entry ho jaaye ya update na ho toh beneficiary ko paisa nahi milta…..isi wajah se hum hamesha profile aur bank details carefully check karte hain." (R1) (R3) (R10) (15) (The benefits of JSY and PMMVY are directly linked with MCTS if there is a wrong entry or the data is not updated, the beneficiary does not receive the money that is why we always check the profile and bank details carefully.)

2. Roles and Responsibilities of ANMs

This theme captures the evolving and multifaceted role of ANMs as frontline implementers of the MCTS. Beyond their conventional clinical duties, ANMs are now deeply engaged in digital documentation, monitoring, and follow-up activities facilitated by MCTS.

2.1 Data Collection and System Updates

ANMs are responsible for collecting detailed demographic and health-related data from pregnant women and children. This includes names, ages, addresses, last menstrual periods, expected delivery dates, and immunization details. Once collected, the data is entered into the MCTS either during clinic hours or after field visits.

"Zyadatar time hum field visits ke dauraan saari information collect karte hain… jaise woman ka naam, LMP, bachon ki sankhya, aur koi past delivery complications…phir hum usse system mein enter karte hain. Ye hume uske checkups aur due dates track karne mein help karta hai." (R1) (R2) (5) (9) (R14) (Most of the time we collect all the information during field visits… like the woman's name, LMP, number of children, and any past delivery complications… then, we enter it into the system. It helps us keep track of her checkups and due dates.)

"Kabhi-kabhi names repeat ho jaate hain ya families jo information dete hain wo incomplete hoti hai, jisse sahi entry karna mushkil ho jaata hai. Lekin phir bhi hum records ko updated rakhne ki koshish karte hain kyunki ye hume mothers ko check-ups aur immunization ke liye track karne mein help karta hai." (R2) (7) (10) (11) (13) (15) (Sometimes the names are repeated or the information given by families is incomplete, which makes it difficult to enter correctly, but still, we try to keep the records updated because it helps us track the mothers for check-ups and immunization.)

2.2 Maternal and Child Health Service Delivery

ANMs are primarily concentrating on mother/child care. Their work involves taking check-ups during pregnancy, assistance in delivering in cases where there is a need, support upon birth, administration of vaccinations, and provision of tips on healthy eating. They ensure that all mothers and children receive full care through the first pregnancy visit up to a period of time when the child has received all the required vaccines.

".....hamara kaam hai pregnant mothers aur bachon ka dhyaan rakhna, ANC ke first day se lekar jab tak child fully immunized na ho jaaye." (R1) (R5) (R6) (R10) (R11) (Our work is to take care of pregnant mothers and children from the first day of ANC till the child is fully immunized.)

"Hume ensure karna hota hai ki koi mother ya child service schedule se miss na ho, aur hum iron tablets aur vaccines bhi provide karte hain jaise zarurat ho." (R4) (R7) (R14) (R15) (We have to make sure no mother or child is missed in the service schedule, and we also provide iron tablets and vaccines as required.)

2.3 Follow-up and Health Education

Follow-up and health education play a vital role in the successful implementation of the MCTS. This included routine home visits to remind pregnant women and mothers about scheduled antenatal check-ups, immunizations, and other maternal and child health services. Follow-up activities were undertaken to reach those who had missed appointments, with MCTS due lists serving as a key tool for identifying defaulters. ANMs reported providing information on pregnancy care, breastfeeding, nutrition, hygiene, and family planning during home visits. They believed that combining follow-up with health education encouraged better service uptake and promoted positive health behaviours within the community

"Field visits ke dauraan hum women se nutrition, family planning...aur personal hygiene ke baare mein bhi baat karte hain." (R1) (7) (R13) (During field visits, we also talk to women about nutrition, family planning, and personal hygiene.)

"Hum gharon mein visit karte hain taaki mothers aur children ko check kar sakein. Agar unhone koi visit miss kiya ho toh hum unhe turant centre aane ko Kathe hain." (R5) (R6) (We visit the homes to check on the mothers and children. If they have missed a visit, we tell them to come immediately to the centre.)

3: Experiences of Enrolling Beneficiaries in MCTS

This theme focuses on the practical realities of registering new beneficiaries into the MCTS. ANMs report a mix of cooperation and hesitation from community members, compounded by persistent infrastructural challenges.

3.1 Beneficiary Cooperation and Reluctance

Beneficiary cooperation plays a significant role in the successful implementation of MCTS, yet it is often inconsistent. Several ANMs shared that many pregnant women and mothers are supportive and willing to share information, especially when they understand that it helps in getting regular checkups, vaccinations, and other benefits. However, some beneficiaries show reluctance or hesitation, particularly in urban slums and migratory populations.

"Kuch women apna Aadhaar number ya phone number share karne mein hesitate karti hain... unhe lagta hai hum misuse karenge.....yeh usually slum areas mein hota hai." (R2) (R3) (7) (10) (14) (Some women hesitate to share their Aadhaar number or phone number; they think we'll misuse it. This usually happens in slum areas.)

"Zyadatar women cooperate tab kartein jab wo sunte hain ki unhe scheme ke through financial help mil sakta hai...lekin kuch younger mothers shuru mein apne details share karne mein hesitate karti hain." (R5) (R9) (Most women cooperate, especially when they hear they might get financial help through the scheme, but some younger mothers hesitate to share their details at first.)

4. Barriers and Systemic Challenges

This theme expresses the problems that ANMs face while using the MCTS. Although the system is helpful, ANMs shared several difficulties that make their work harder. These challenges are related to technology, workload, and getting the correct information from the community.

4.1 Technical and Connectivity Issues

Technological infrastructure plays a critical role in enrollment efficiency. Many ANMs mentioned that poor network connectivity is one of the biggest issues. When the internet doesn't work properly, they can't enter data into the MCTS on time. Some also said that the MCTS format changes without proper notice or training, and this causes confusion.

"Kabhi-kabhi mujhe pehle sab kuch register mein likhna padta hai aur phir achha signal milne ka wait karna padta hai, tab jaake MCTS update karte hain." (R1) (R2) (R7) (Sometimes I have to write everything in a register first and wait for a good signal to update the MCTS later.)

"Slow network ki wajah se kabhi hume saari cheezein register mein likhni padti hain aur signal ka wait karna padta hai. Jaise hi network restore hota hai, hum system mein data update kar dete hain." (R6) (R14) (R15) (Due to slow network, sometimes we have to write everything in the register and wait for the signal. After the network is restored, we update the data in the system.)

4.2 Data Quality Issues

ANMs shared that sometimes they receive incorrect or incomplete information from beneficiaries, and people often change their phone numbers or move to another place without informing the health workers. This makes it hard to keep their records updated.

"Beneficiaries hume apne phone numbers dete hain, lekin kabhi-kabhi wo apna number change kar lete hain….jab hum call karte hain toh phone switched off ya not reachable hota hai, jiski wajah se hum unhe track nahi kar paate." (R1) (4) (6) (Beneficiaries give us phone numbers, but sometimes they change their phone number…. When we call them, they say it is switched off or not reachable, due to which we are unable to track it.)

"Kuch beneficiaries' delivery ke baad bina bataye doosri jagah shift ho jaati hain, aur review meeting mein hume daant padti hai kyunki data records incomplete ho jaate hain." (R3) (R6) (R8) (11) (Some beneficiaries shift to another place after delivery without informing us, and we get scolded in the review meeting because the data records become incomplete.)

"Kabhi-kabhi beneficiaries ka naam system mein do baar enter ho jaata hai alag-alag spellings ke saath. Yeh duplication hume immunization session ke dauraan confuse karta hai." (R5) (R9) (Sometimes the name of the beneficiaries gets entered twice in the system with different spellings. This duplication confuses us during our immunization session.)

4.3 Work Overload

The majority of ANMs expressed that they are overworked. They not only visit the field for check-ups and vaccinations but also have to come back and enter data into MCTS. There is no separate person to do the data entry work. This increases their stress and workload.

"Hum sab kuch karte hain….immunization se lekar ANC check-ups, family planning, health education, field visits, aur data entry (online aur offline dono). Data entry operator na hone ya kam hone ki wajah se humara workload aur badh jaata hai." (R1) (R2) (R11) (R13) (We do everything from immunization to ANC check-ups, family planning, health education, field visits, and data entry (both online and offline). Due to the absence or lack of a data entry operator, our workload increases.)

4.4 Limited Access to Infrastructure

Most participants reported a lack of proper infrastructure to support their work. Many mentioned that there were no computers available. Additionally, ANMs often did not have dedicated rooms or adequate space to carry out their tasks, which made using the system difficult and affected their overall efficiency.

"Hamare paas dedicated room nahi hai……zyadatar hume chote corners ya shared spaces mein kaam karna padta hai, jisse privacy maintain karna aur data entry pe concentrate karna mushkil ho jaata hai." (R1) (R2) (R6) (R9) (We don't have a dedicated room……we often work in small corners or shared spaces, which makes it difficult to maintain privacy and concentrate on data entry.)

"Hamare paas computer ya tablet nahi hai data update karne ke liye….hum apne mobile phone ka use karke hi system mein data entry aur updates karte hain." (R8) (R11) (15) (We don't have a computer or tablet to update the data…we are using our mobile phone for data entry and updates in the system.)

5. Coping Mechanisms and Adaptation

This theme focuses on how ANMs manage the difficulties they face while using the MCTS. Despite technical problems, heavy workload, and other challenges, most ANMs showed strong commitment and found practical ways to handle their duties effectively.

5.1 Peer Support and Workarounds

Many ANMs said they rely on help from colleagues, ASHA workers, or more experienced staff. If the system is down or the network is weak, they first record the details manually in a register and enter it into the system later. Some also mentioned learning from each other when they face technical issues.

"Main abhi nayi hoon, jab bhi mujhe koi problem hoti hai, main apne seniors se help leti hoon. Woh hamesha meri madad karte hain." (R8) (I am new now, whenever I face any problem, I ask my seniors for help. they help me.)

"Kabhi-kabhi app kaam nahi karta…..us time main dusre ANMs se poochti hoon jinhone same problem face kiya hota hai, aur hum ek dusre ki madad kar lete hain." (R1) (4) (10) (Sometimes the app doesn't work…..At that time, I asked other ANMs who had faced the same problem, and we helped each other.

6. Institutional and Community Support

Health authorities' and community leaders' support is very important while using the system and conducting the antenatal and immunization sessions. ANMs often feel that this help is irregular or limited, especially when it comes to solving technical problems or getting timely guidance while conducting a health camp.

6.1 Support from Health Authorities

Most ANMs said they do get immediate support from supervisors. This includes training, feedback during review meetings, and distribution of registers and data entry formats. However, many also said that technical help (like fixing mobile issues or solving software problems) is not available when urgently needed.

"They give us training and check our reports…..But when the phone hangs….or the app doesn't open, we don't get immediate help on time." (3) (R4) (R7)

"We get registers and formats, but not always on time…..Sometimes we use old sheets." (6) (8) (12)

6.2 Support from Community Leaders

The success of any program is all upon community participation. The "Alma-Ata Declaration of Health for All" stated the importance of community participation in achieving health Goals. The majority of ANMs in interviews had given positive responses regarding

support from the community and community leaders of the areas. These leaders help encourage people to attend checkups, follow immunization schedules, or participate in health camps.

"Hamare area mein humein ASHA workers aur community leaders ka achha support milta hai….immunization sessions ke time community leaders jagah provide karte hain, aur ASHA workers beneficiaries ko mobilize karke unhe session ke bare mein inform karte hain." (R1) (R2) (R7) (In our area, we receive good support from ASHA workers and community leaders during immunization sessions. Community leaders help by providing the venue, while ASHA workers assist in mobilizing the beneficiaries and informing them about the session.)

7. Suggestions and Vision for the Future

In this theme, ANMs express their ideas for improving MCTS and their hopes for how the system can grow in the future. While they appreciate the usefulness of the system, they also shared clear suggestions on how to make it more practical and effective for field use.

7.1 Manpower

Most participants highlighted the shortage of data entry operators in many facilities, which placed an additional burden on ANMs. In the absence of dedicated staff for data entry, ANMs had to update records in the MCTS after completing their field visits and service delivery duties. This dual responsibility caused delays, increased workload, and reduced the time they could spend on direct patient care.

"Har UPHC mein kam se kam ek DEO (Data Entry Operator) appoint hona chahiye. Agar nahin, toh government humein salary badhani chahiye, kyunki data entry operator ke shortage ki wajah se humein double kaam karna padta hai." (R1) (R3) (R5) (R7) (R12) (At least one DEO (Data entry operator) should be posted in each UPHC; if not, then the government should increase our salary because we used to do double work due to a lack of data entry operators.)

7.2 Optimistic Vision for the Future

Despite all the challenges, most ANMs believe MCTS is a valuable tool. They hope it becomes more advanced and better supported over time so that it can help reach more mothers and children with timely care.

"Hum log sochte hain ki future mein MCTS fully digital ho jaye, kyunki abhi humein data do jagah enter karna padta hai (offline aur digital records mein), jo humare liye bahut difficult ho jata hai." (R1) (2) (4) (10) (R14) (We think that in the future, it would be better if the MCTS becomes fully digital, because right now we have to enter data in two places (offline and in the digital records), which is very difficult for us.)

DISCUSSION

OBJECTIVE 1: To explore the perception of Auxiliary Nurse Midwives (ANMs) in using MCTS.

- The present study showed that most of the ANMs have a good understanding of MCTS as a valuable digital health tool, and they recognize its importance in improving maternal and child healthcare services at the community level. This is contrary to the findings of the present study, which was conducted by **Verma P, Kansal S, Sarkar M, Kesh N. (2020)** to "Explore the gap between knowledge and practices of health care workers about MCTS." Findings revealed that the majority of the ANMs were not aware of the meaning of the Tracking System. [13] Another study, contrary to the findings of the present study, was conducted by **Nayak MSDP, Veni AK, Madhavi S, Naidu SAA (2013)** to "know the knowledge and practice of ANMs regarding MCTS." The findings revealed that only 47% of ANMs know the purpose of MCTS.[14]

- The study revealed that ANMs know the importance of early registration of beneficiaries and the importance of the 16-digit unique ID generated by the MCTS, which helps them to track maternal and child health services. The above findings were supported by a study conducted by **Dudala SR, Ponna SN, Upadrasta VP, Bathina H, Sadasivuni R, Geddam JJB, et al. (2021)** on "Assessment of gaps of knowledge and practices of frontline community workers in Chandragiri Mandal, Chittoor district, Andhra Pradesh: maternal and child health services." The findings revealed that the ANMs had knowledge about the early registration of beneficiaries. [15] Another study conducted by **Nayak MSDP, Veni AK, Madhavi S, Naidu SAA (2013)** aimed to "know the knowledge and practice of ANMs regarding MCTS." Findings revealed that the majority (92.0%) of ANMs had knowledge about MCTS ID.[16]

- The findings of the study show that ANMs know about high-risk pregnancies and children, and they refer the high-risk cases for pregnant women to Guwahati Medical College and Hospital (GMCH). The above findings were supported by a study conducted by **Ghosh A., Ghosh S., Dutta J., et al. (2021)** on "Understanding the awareness, perception, and practices of community healthcare workers for high-risk antenatal cases." A score-based questionnaire was used to assess the perceptions of ninety health workers. The findings revealed that the health workers were aware of high-risk pregnancies. [17]

- The study revealed that real-time data access is an important feature that helps ANMs to work more efficiently and make timely, accurate decisions. It is useful in areas where people often move from one place to another, and paper records can be unreliable. It also helps ANMs feel more confident and improves coordination with other health workers. These insights show the need for strong digital support, including reliable internet, proper devices, and training, so ANMs can fully use the system's real-time features. To support the present study findings, a study conducted by **Wang D, Kerh R, Jun S, Haque MD, Yih Y, Oumer A, et al. (2022)** on "Demand sensing and digital tracking for maternal child health (MCH) in Uganda: a pilot study for Electronic Tracking system for healthcare commodities (E+TRA health)." The results showed that it prompts frontline stakeholders to generate efficient, reliable, and sustainable strategic healthcare plans with real-time data and improves patient outcomes through better commodity availability by sensing true patient demands. [18]

- The study findings showed an increase in the number of antenatal visits among pregnant women. ANMs reported that the systematic reminders created by the platform motivated beneficiaries to attend check-ups more consistently. According to the report of the **National Family Health Survey-5 (NFHS-5) (2019-2021),** around 64% of women received antenatal care during the pregnancy. [19] The above findings were supported by a cross-sectional study conducted by Baruah A **and Boruah B (2016)** on "Utilization of antenatal care services among pregnant women in Assam, India." A total of 1845 women were studied using a predesigned, pretested proforma. It was found that 57.98% of women had done more than three ANC visits during the pregnancy. [20] Another study conducted by **Roy MP, Mohan U, Singh SK, Singh VK, Srivastava AK (2013)** to "Assess the determinants of utilization of antenatal services by rural beneficiaries, Lucknow, India." The result showed that 85.5% of the beneficiaries received at least three ANC visits during pregnancy. [21]

- The present study revealed that immunization coverage has increased due to the implementation of the MCTS by ensuring timely follow-ups, reducing dropouts, and improving overall health outcomes for mothers and children. The above findings were supported by a cross-sectional study conducted by **Mane VS, Jatti GM, Gaikwad LL, and Mulje SM (2024)** to "Determine the immunization coverage in the field practice area of the urban health training centre." It was found that 75.24% of the children were fully immunized. [22] According to the report of the **National Family Health Survey-5 (NFHS-5) (2019-2021),** around 66.4% of children aged 12-23 months in Assam were fully vaccinated. [23] Another study's findings were supported by a cross-sectional study conducted in rural and urban areas of Puducherry by **Gopalakrishnan S, Eashwar VMA, and Muthulakshmi M (2019)** to "Assess the antenatal, intranatal, and postnatal maternal health

services received by JSY beneficiaries." A total of 144 participants were selected for the study. The findings revealed that most pregnant women had received tetanus toxoid immunization. [24]

- In the present study, it was found that ANMs often receive brief verbal updates about changes in the MCTS system during meetings or from supervisors. While these updates keep them informed, many ANMs feel that hands-on training would be more effective. They also expressed a need for step-by-step demonstrations rather than just being told about new features. This indicates a gap between information sharing and practical skill-building, which impacts their confidence in using updated parts of the system. The above findings were supported by a cross-sectional study conducted by **Nagarajan P, Tripathy PJ, and G Sonu (2016)** to "Understand the opportunities and challenges in the operationalization of MCTS strategy in a district in Haryana and to understand the stakeholders' perspectives." Results revealed that the main reason for incomplete data and its poor quality was the lack of proper training for health care providers (HCPs).[25]

- This study found that there is a need for training in specific areas, as they were only trained for basic data entry in MCTS. They struggle when mistakes happen, such as incorrect due dates or missed follow-ups, because they don't know how to fix them. Some also mentioned that they don't know how to generate reports. They need more hands-on, practical training to use the system fully and accurately. No similar study was found by the investigator to relate to the present sub-theme.

Objective 2: To understand the Experience of Auxiliary Nurse Midwives (ANMs) in using the Mother and Child Tracking System (MCTS).

- The present study found that the MCTS's SMS alert feature ensures that beneficiaries receive services on time. It enhances service compliance, reducing missed appointments and facilitating follow-up. This is contrary to the present study findings, which were conducted by **Nagarajan P, Tripathy PJ, and G Sonu (2016),** to "Understand the opportunities and challenges in the operationalization of MCTS strategy in a district in Haryana and to understand the stakeholders' perspectives". The results revealed that only 22.0% of them had received some short message service (SMS) about the services. [26] Another cross-sectional study conducted by **Sharma A, Shinde A, and Kar Anita (2016)** to "Determine the prevalence of use of SMS by beneficiaries of MCTS from Pune district, Maharashtra". It was found that only 14.0% of the beneficiaries confirmed receiving text messages on the mobile phone numbers provided by them during registration. [27]

- The study found that MCTS supports better coordination with government health programs by linking beneficiary data with schemes such as Janani Suraksha Yojana (JSY) and Pradhan Mantri Matru Vandana Yojana (PMMVY). No similar study was found by the investigator to relate to the present study.

- The present study findings revealed that systematic data collection and timely entry into the MCTS are key responsibilities of ANMs. They collect all the essential information, such as name, last menstrual period, parity, and any history of complications during their field visits, which helps accurate and continuous tracking of maternal and child health through the MCTS. The present findings supported by a study conducted by **Dr. Singh P (2022)** to "Explore the barriers and enablers in using Digital Health Initiatives among Auxiliary Nurse-Midwives (ANMs) of Delhi." The findings revealed that ANMs were collecting the essential data from the beneficiary and entered the data, both electronically and on a register. [28]

- Regarding maternal and child health services, it is found that their role is to provide comprehensive care for mothers and children, starting from the first pregnancy check-up until all vaccinations are completed. This includes monitoring health, providing iron tablets, vaccines, and ensuring no one is left out of the service schedule. The present study findings supported by a quasi-experimental study, which was done in the Sawla-Tuna-Kalba District in the Savannah

Region of Ghana by **Nuhu, AGK, Dwomoh D, Amuasi SA, Apraku EA, Timbire J K, Kubio C, et al. (2023)** to "Assess the impact of technology for maternal and child health (T4MCH) intervention on MCH services utilization and continuum of care. The study showed that 95% of pregnant women and children received proper health care services. [29] Another cross-sectional study conducted in four states of Germany by **Demuth, IR, Martin A, and Weissenborn A (2018)** to "Investigate the prevalence of iron supplement intake among pregnant women." Findings revealed that 65.2% pregnant women had received supplemental iron. [30]

- The present study results showed that follow-up and health education remain essential parts of the ANM's role in improving maternal and child health outcomes. Through home visits, awareness meetings, and individual counselling, ANMs work to ensure that beneficiaries receive timely services and understand their importance. The integration of MCTS into this work has made follow-up easier by identifying service gaps. However, balancing extensive field activities with administrative and data entry duties continues to be a challenge. **Maldonado LY, Songok JJ, Snelgrove JW, Ochieng CB, Chelagat S, Cole DC, et al. (2020),** conducted a study on "Promoting positive maternal, newborn, and child health behaviours through a group-based health education and microfinance program: a prospective matched cohort study in western Kenya". The findings revealed that Chamas's participation was linked to better maternal and child health practices, i.e., 84.4% of participants delivered in health facilities, 64.0% attended at least four ANC visits, 82.0% exclusively breastfed to six months, and 75.8% received a postpartum home visit within 48 hours. [31]

- The present study showed that ANMs often encounter mixed reactions from beneficiaries. Most women are hesitant to share personal details like contact numbers, account numbers, and Aadhaar cards due to fear of misuse. However, women cooperate once they understand the benefits, such as financial support linked to MCTS. This is contrary to the present study findings, which were conducted by **Scott K, Ummer O, Chamberlain S, Sharma M, et al. (2021)** to "Understand accurate and timely registration of mobile phone numbers is necessary for beneficiaries to receive mobile health services". Findings revealed that pregnant women were comfortable sharing their mobile numbers with health workers. [32]

- The present study found ANMs using the MCTS faced major technical and connectivity issues, including poor network connections causing delays in data entry, system slowdowns during busy times disrupting workflow, reliance on personal smartphones that were unreliable, and delays in device replacements. These issues impacted data entry speed, accuracy, and service delivery**.** The present findings were supported by a study conducted by **Dr. Singh P (2022)** to "Explore the barriers and enablers in using Digital Health Initiatives among Auxiliary Nurse-Midwives (ANMs) of Delhi." The findings revealed that ANMs were facing slow servers and system hangs, which were major obstacles in using DHI (digital health intervention). [33] Another study conducted by **Verma P, Kansal S, Sarkar M, Kesh N (2020),** to "Explore technical, behavioral, and organizational factors affecting the performance of the Mother and Child Tracking System in the rural areas of Varanasi District, Uttar Pradesh." The findings revealed that poor internet connectivity, slow server speed, software issues, and frequent power outages were identified as major reasons for the poor performance of MCTS. [34] Another cross-sectional study conducted by **Nagarajan P, Tripathy PJ, and G Sonu (2016)** to "Understand the opportunities and challenges in the operationalization of the MCTS strategy in a district in Haryana and to understand the stakeholders' perspectives." The results showed poor Internet connectivity, slow server speed, and frequent power failures as major limitations for the effective implementation of MCTS. [35]

- The present study results showed that several data quality issues affect the effectiveness of the MCTS. Many ANMs shared that beneficiaries often change mobile numbers, making it difficult to contact them for follow-ups. Moving from one place to another after delivery without informing the health worker, which leads to incomplete records, which later raise questions during review meetings. Some ANMs also highlighted duplicate entries due to name variations, which

confuse service delivery. These issues stress the need for better data verification processes and user-friendly correction features within the system. The above findings are supported by a cross-sectional study conducted in Jaleswar Block of Balasore District, Odisha, India, by **Dehury RK and Chatterjee SC (2018),** the results showed difficulties in producing high-quality data, due to inconsistencies between HMIS data and actual field data. [36]

- In the present study, Findings revealed that ANMs are overburdened with the dual responsibilities of field duties and MCTS data entry. In addition to managing immunization, antenatal check-ups, family planning, and health education, they are also expected to complete digital reporting without any dedicated staff support. Several ANMs shared that after long field visits, they still had to remain late to update MCTS records, which affected their health and well-being. During periods of high activity, such as health camps, data entry was often delayed, leading to backlogs. This highlights the need for additional support, including dedicated data entry personnel, to reduce workload pressure and improve efficiency. The above findings supported by a study which were conducted by **Monika, Kaur S, and Singh A (2020),** to "Assess the annual workload of ANMs." Out of 21 dispensaries, 9 were determined to have a heavy workload, and it was extremely high in 4 dispensaries where ANMs spent all of their yearly working hours performing MCTS-related tasks, leaving them with no time to perform tasks under other national health programs. [37]

- In the present study, most ANMs reported working in inadequate conditions, lacking dedicated rooms and often having to use cramped or shared spaces. This environment made it difficult to maintain privacy and focus on data entry tasks. Additionally, many did not have access to computers or tablets and were instead relying on smartphones to update the system, which limited their efficiency and affected the quality of their work. The study findings were supported by a study conducted by **Monika, Kaur S, and Singh A. (2019)**, to "Explore the perceptions of ANMs in implementing Mother Child Tracking System (MCTS) in Civil dispensaries of Chandigarh." The findings revealed a lack of facilities and resources and inadequate infrastructure. [38]

- Regarding peer support and workarounds, it is found that they support one another and adapt to challenges in using the Mother and Child Tracking System (MCTS) effectively. To support the present sub-theme, no similar study has been found by the investigator.

- The present study found that they do not get immediate support from the health authorities. For example, when phones hang or the app doesn't open, they don't get quick help. During meetings, they feel supported, but on normal days, they have to manage problems on their own. No similar study was found by the investigator to relate to the present sub-theme.

- ANMs who were using the MCTS highlighted that support from community leaders, ASHA workers, Anganwadi workers, and mahila mandals is beneficial. ANMs shared that while some leaders help gather people for health camps or spread awareness about vaccines, this support depends on their interest and involvement, which varies from place to place. The study findings were supported by a study conducted by **Monika, Kaur S, and Singh A. (2019)**, to "Explore the perception of ANMs in implementing Mother Child Tracking System in Civil dispensaries of Chandigarh." Five to six participants participated in each FGD, which lasted 40 to 45 minutes. The findings revealed that ANMs got support from community leaders and have a good relationship with the community. [39]

- The present study reveals a lack of data entry operators in the health care centre, and the majority of ANMs strongly suggested appointing a dedicated data entry operator. The above findings were supported by a study conducted by **Gupta M, Bosma H, Angeli F, Kaur M, Chakrapani V, Rana M, et al. (2017)** on "Impact of a Multi-Strategy Community Intervention to Reduce Maternal and Child Health Inequalities in India: A Qualitative Study in Haryana." The findings revealed that a lack of manpower was a major barrier to the health system. [40] Another study conducted by **Gera**

R, Muthusamy N, Sharma A, et al. (2015) to "Evaluate the performance of MCTS and identify implementation challenges in areas in Rajasthan and Uttar Pradesh." It was found that there was a lack of dedicated data entry personnel. [41]

- The present study found that ANMs expressed a strong, shared desire for complete digitization of the MCTS system. They noted that maintaining both manual and digital records at the same time creates an unnecessary burden. They believe that switching to a fully digital system would greatly simplify their tasks and reduce the likelihood of data entry errors. No similar study was found by the investigator to relate to the present sub-theme.

CONCLUSION

The present study attempts to assess the perception and experience of implementing the Mother and Child Tracking System (MCTS) among Auxiliary Nurse Midwives (ANMs) in selected Dispensary and Urban Primary Health Centre of Guwahati, Assam. In-depth interviews were conducted with the 15 ANMs. The results revealed that the majority of ANMs recognized MCTS as a useful tool for registering pregnant women and children, tracking services, and planning their daily work. It was found that AMNs were spending considerable time on record maintenance and online data entry. From the study, it was found that ANMs were facing challenges such as work overload, poor internet connectivity, no data entry operators or a lack of data entry operators, and inadequate infrastructure. A few ANMs strongly prefer full digitization of MCTS, as maintaining both manual and digital records creates an extra burden; they believe a fully digital system would ease their work and reduce errors. Furthermore, the findings suggest that with adequate hands-on practice, regular training, and sufficient manpower support, the MCTS can function more effectively and achieve better outcomes in the future.

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