Community-Based Training Model for Practical Nurses in Maternal and Child Health Clinics

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Abstract- ***Maternal and child health (MCH) remains a global health priority, particularly in underserved communities where access to skilled healthcare providers is limited. Practical nurses play a crucial role in delivering frontline care; however, traditional training models often lack contextual relevance to community-based settings. This study presents a Community-Based Training Model (CBTM) designed to equip practical nurses with essential competencies for effective service delivery in maternal and child health clinics. The model was developed through participatory engagement with health educators, community health workers, and practicing nurses across four rural districts. Core training modules emphasized antenatal care, postnatal follow-up, immunization, growth monitoring, family planning counseling, and emergency response readiness. A pilot implementation of the CBTM involved 60 practical nursing trainees over a six-month period, using blended learning approaches that combined classroom instruction, simulation-based exercises, and supervised clinical rotations in community clinics. Pre- and post-training assessments were used to evaluate knowledge acquisition, clinical skills, and confidence in handling MCH cases. Results indicated a 47% improvement in overall clinical competence scores and a significant increase in nurse-led community outreach activities. Participants reported greater confidence in managing common maternal and pediatric conditions, improved communication with patients, and stronger collaboration with other health workers. Stakeholders noted enhanced patient trust and continuity of care in clinics where trainees were placed. The CBTM was also found to foster culturally sensitive care and strengthen the pipeline of skilled maternal and child health providers in low-resource areas. Challenges included logistical constraints during field placements and the need for sustained mentorship. Recommendations include integration of the model into nursing curricula, expansion to urban settings, and alignment with national health workforce policies. This study concludes that the CBTM offers a scalable and sustainable approach to improving maternal and child health outcomes by bridging the gap between nursing education and real-world community healthcare demands.***

Index Terms : Maternal And Child Health, Practical Nurse Training, Community-Based Model, Primary Healthcare, Clinical Competence, Rural Health, Nurse Education, Community Clinics, Health Workforce Development, MCH Services.

I. INTRODUCTION

Maternal and Child Health (MCH) remains a critical priority in both global and local healthcare agendas due to its profound impact on population well-being and future societal development. Despite significant advances in medical science and public health, many communities especially underserved and rural areas continue to experience high rates of maternal and infant morbidity and mortality (Khanna, 2019, Klimes, et al., 2014). These adverse outcomes are often linked to limited access to skilled healthcare providers capable of delivering essential prenatal, perinatal, and postnatal care. The shortage of qualified health workers in these settings hampers effective MCH service delivery, leaving vulnerable populations at risk of preventable complications.

Practical nurses occupy a vital role as frontline healthcare providers in many maternal and child health clinics. Their responsibilities often extend

beyond basic nursing care to include patient education, immunization administration, growth monitoring, and community outreach. In resource-limited settings, practical nurses are frequently the primary point of contact for pregnant women and young children, positioning them uniquely to influence health outcomes positively (Agulnik, et al., 2017, Cherry & Jones, 2015). However, the traditional training of practical nurses may not adequately prepare them for the complex demands of community-based MCH care, where cultural sensitivity, adaptability, and practical problem-solving skills are essential (De Meester, et al., 2013, Mohammed Iddrisu, Considine & Hutchinson, 2018). Recognizing these challenges, the development of a Community-Based Training Model (CBTM) for practical nurses is both timely and relevant. The CBTM aims to bridge the gap between formal education and real-world practice by providing practical nurses with targeted skills and knowledge tailored to the specific needs of maternal and child health in community settings. This model emphasizes experiential learning, cultural competence, and hands-on clinical training within the local context, enhancing the readiness of practical nurses to deliver effective, empathetic, and culturally appropriate care. By focusing on community engagement and capacity building, the CBTM seeks to strengthen the healthcare workforce and ultimately improve maternal and child health outcomes in underserved areas (Haahr-Raunkjær, et al., 2017, Khanna, et al., 2019).

2.1. Literature Review

Training practical nurses to provide effective maternal and child health (MCH) services has long been recognized as a critical component of improving health outcomes in underserved populations. Across various countries and healthcare systems, practical nursing education has traditionally relied heavily on classroom-based instruction, supplemented by clinical placements in hospitals or urban health centers. These conventional training approaches typically emphasize foundational nursing theory, anatomy, pharmacology, and standard clinical skills, often delivered in centralized institutions (Almatrafi, Al-Mutairi & Alotaibi, 2019, Jeskey, et al., 2011). While this method establishes essential knowledge and technical ability, it frequently falls short in preparing practical nurses for the unique challenges they will face in community-based maternal and child health settings, especially in rural or resource-limited areas.

One of the primary limitations of traditional classroom-based training in the MCH context is the disconnect between theoretical instruction and the realities of community healthcare delivery. Practical nurses trained predominantly in hospital environments may lack exposure to the broader social, cultural, and environmental factors influencing maternal and child health in community settings. Issues such as cultural beliefs about pregnancy and childbirth, varying health literacy levels, accessibility barriers, and resource constraints often remain unaddressed in standard curricula (De Meester, et al., 2013, Mohammmed Iddrisu, et al., 2018). As a result, nurses may be underprepared to engage effectively with the community, conduct home visits, or deliver health education tailored to local needs. Moreover, the rigid structure of classroom training can limit opportunities for active learning, problem-solving, and skill adaptation, which are crucial in the dynamic and diverse contexts of maternal and child health.

In response to these challenges, community-based healthcare delivery models have gained prominence as effective strategies for addressing the health needs of mothers and children outside traditional hospital settings. These models emphasize care that is accessible, culturally sensitive, and integrated within the community's social fabric. Community health workers, midwives, and practical nurses often form the backbone of these systems, providing essential services such as antenatal care, immunizations, nutritional counseling, and early detection of complications (Flynn & Hartfield, 2016, Stewart & Bench, 2018). The success of community-based approaches depends heavily on the capacity of healthcare providers to understand local contexts, build trust, and collaborate with community leaders and families. Consequently, training models that incorporate community engagement and hands-on experience in real-life settings have been increasingly advocated as necessary complements or alternatives

to traditional educational paradigms (Grant, 2019, McGrath, et al., 2018).

A growing body of evidence supports the effectiveness of experiential learning and local engagement in preparing practical nurses for community-based maternal and child health roles. Experiential learning theories highlight the value of learning through reflection on doing, emphasizing active participation, contextual learning, and problem-solving. Training programs that integrate supervised clinical rotations in community clinics, home visits, and involvement in health promotion activities allow practical nurses to apply theoretical knowledge in authentic situations. Such exposure enhances clinical decision-making skills, cultural competence, communication abilities, and adaptability (Fennell, et al., 2010, Gullick, et al., 2019). Studies have demonstrated that nurses trained in community-based settings report greater confidence, improved practical skills, and better preparedness for addressing complex maternal and child health issues compared to those trained exclusively in hospital environments.

Community engagement within training also fosters a deeper understanding of social determinants of health and the barriers faced by vulnerable populations. Involving community members in curriculum development, providing opportunities for nurses to participate in outreach programs, and promoting partnerships with local organizations enrich the learning experience and improve service relevance. Additionally, these practices contribute to building sustainable healthcare delivery systems by strengthening relationships between providers and communities, thereby improving health-seeking behaviors and adherence to care protocols (Boydston, 2018, Reyes-Alcázar, et al., 2012). Research has shown that community-based training models not only improve provider competencies but also positively influence maternal and child health indicators such as antenatal care coverage, immunization rates, and early identification of growth faltering.

Despite the growing recognition of community-based training's benefits, the literature also highlights challenges in scaling and standardizing such models. Variability in resources, faculty expertise, and institutional support can affect the quality and consistency of community placements (Curry & Jungquist, 2014, Joshi, et al., 2019). Ensuring adequate supervision and assessment in dispersed settings remains a logistical hurdle. Furthermore, balancing the demands of classroom instruction with community-based experiences requires careful curriculum design to avoid overburdening students or diluting core content. Nevertheless, hybrid models that blend classroom theory with structured community engagement and reflective practice have been proposed as effective solutions. These models leverage technology, such as mobile learning and virtual mentorship, to support students and faculty in geographically dispersed locations (Cahill, et al., 2010, Halvorson, et al., 2016). Figure 1 shows figure Linking the Places Where Care Is Given presented by Lassi, Kumar & Bhutta, 2016.

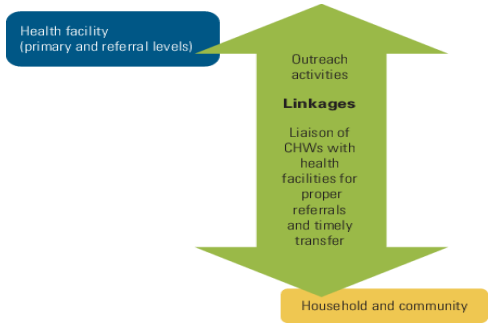

Figure 1: Linking the Places Where Care Is Given (Lassi, Kumar & Bhutta, 2016).

In summary, the literature reveals that while traditional classroom-based training provides essential nursing foundations, it is insufficient on its own for preparing practical nurses to meet the multifaceted demands of maternal and child health in community contexts. Community-based healthcare delivery models offer a valuable framework for addressing this gap by embedding training within the lived realities of the populations served. Experiential learning and active local engagement emerge as critical components in enhancing the competence, confidence, and cultural sensitivity of practical nurses (McFarlane, et al., 2018, Ozekcin, et al., 2015). Moving forward, developing comprehensive Community-Based Training Models (CBTMs) that integrate classroom instruction with immersive

community experiences is essential for building a skilled maternal and child health workforce capable of improving health outcomes in underserved areas.

2.2. Methodology

The development of a community-based training model for practical nurses in maternal and child health (MCH) clinics utilized a multi-phase, evidence-driven approach. Initial needs assessment was conducted through localized surveys and focus group discussions to identify competency gaps in prenatal care, infant health monitoring, and maternal safety protocols, building on frameworks from Agarwal et al. (2010) and Perry et al. (2017). These findings informed the design of a modular curriculum integrating culturally adapted educational tools, simulation-based training, and early warning response protocols such as PEWS (Agulnik et al., 2017; Cherry & Jones, 2015).

Trainer capacity was enhanced using high-fidelity simulations and immersive learning environments, leveraging the decision-making models and teamwork training reviewed by Armenia et al. (2018) and Alison et al. (2013). Training delivery occurred within community health settings to ensure contextual learning and direct applicability, supported by hands-on demonstrations and feedback loops (Borrow et al., 2011; Uzondu et al., 2015).

Digital and checklist-based monitoring tools, including those modeled after Cherry & Jones (2015) and Berna (2019), were deployed for real-time performance tracking. The evaluation phase included participant feedback, maternal/child health indicators, and quality audits of clinical practices (Freeman et al., 2017; Perry et al., 2017).

The model was iteratively refined and integrated with local health systems by engaging district health authorities, nursing educators, and community leaders. This sustainability component emphasized long-term policy adoption and resource allocation to institutionalize the model (Grant et al., 2017; Perry et al., 2015). The entire methodology is grounded in cross-national implementation science, simulation pedagogy, and community-centered care philosophies.

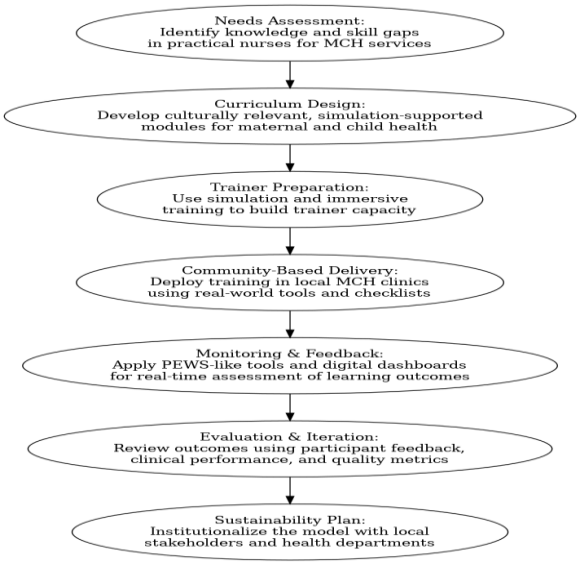

Figure 2: Flowchart of the study methodology

2.3.Components of the Community-Based Training Model (CBTM)

The Community-Based Training Model (CBTM) for practical nurses in maternal and child health (MCH) clinics is designed as a comprehensive and multifaceted approach to preparing nurses for the complex demands of frontline healthcare delivery in diverse community settings. The model's components are carefully structured to ensure that trainees acquire the essential knowledge, practical skills, and contextual understanding necessary to provide high-quality, culturally sensitive care to mothers, infants, and children. The core components of the CBTM encompass well-defined training modules, diverse delivery methods, and a robust system of supervision and mentorship, each contributing to the holistic development of nursing competence within the maternal and child health domain (Kyriacos, Jelsma & Jordan, 2011, Saab, et al., 2017).

Central to the CBTM are its training modules, which cover critical areas of maternal and child health care that practical nurses must master to meet community needs effectively. The antenatal and postnatal care module focuses on equipping nurses with skills to monitor and support women throughout pregnancy, childbirth, and the postpartum period. This includes routine assessments of maternal health, identification

of risk factors, counseling on nutrition and lifestyle, and monitoring infant well-being after birth (Gilhooly, et al., 2019, Ndoro, 2014). Emphasis is placed on recognizing signs of complications such as preeclampsia, infections, or neonatal distress, and on facilitating timely referrals to higher levels of care. The immunization and growth monitoring module trains nurses to implement national immunization schedules accurately, administer vaccines safely, and track child growth parameters to identify malnutrition or developmental delays. This module highlights the importance of preventive care and early intervention in reducing child morbidity and mortality.

Family planning counseling is another essential component of the training, as it addresses the reproductive health needs of women and couples within the community. Practical nurses learn to provide accurate information on contraceptive options, address myths and cultural concerns, and support clients in making informed decisions that align with their health goals and values. This module fosters communication skills and cultural sensitivity, recognizing the diversity of beliefs around family planning (Francis, 2016, Mo, 2014). Lastly, the emergency preparedness module prepares nurses to respond effectively to maternal and neonatal emergencies common in community settings, such as postpartum hemorrhage, eclampsia, and neonatal resuscitation. Practical skills in emergency assessment, stabilization, and coordination with referral systems are emphasized to improve survival outcomes.

The delivery methods of the CBTM are designed to create an engaging and practical learning environment that bridges theory and real-world application. Classroom instruction provides the foundational knowledge and theoretical underpinnings necessary for understanding maternal and child health concepts (Chevaliez & Pawlotsky, 2018, Thursz & Fontanet, 2014). These sessions use interactive lectures, case discussions, and multimedia resources to enhance comprehension and retention. Complementing classroom learning, simulation-based training offers hands-on experience in a controlled environment where nurses can practice clinical skills such as newborn resuscitation, injection techniques, or emergency response without risk to patients (Aljohani, 2018, Berna, 2019). Simulations foster critical thinking, teamwork, and confidence, enabling trainees to translate knowledge into action.

Supervised clinical rotations in community-based MCH clinics constitute a vital experiential learning component. These rotations immerse trainees in the day-to-day realities of community health work, exposing them to a range of patient encounters, health promotion activities, and interdisciplinary collaboration (Akpan, Awe & Idowu, 2019). Practical nurses gain direct experience in conducting antenatal visits, immunization drives, family planning counseling, and managing common MCH conditions under the guidance of experienced practitioners. This exposure is crucial for developing clinical judgment, cultural competence, and adaptability. Additionally, community outreach and patient interaction opportunities allow nurses to engage with families in their homes or community centers (Perkins, 2018, SVIMS, 2010). These interactions deepen understanding of social determinants of health and strengthen communication skills, empathy, and trust-building abilities essential for effective health education and behavior change facilitation. Conceptual framework for maternal and child health community-based interventions presented by Hounton, Byass & Brahima, 2009 is shown in figure 3.

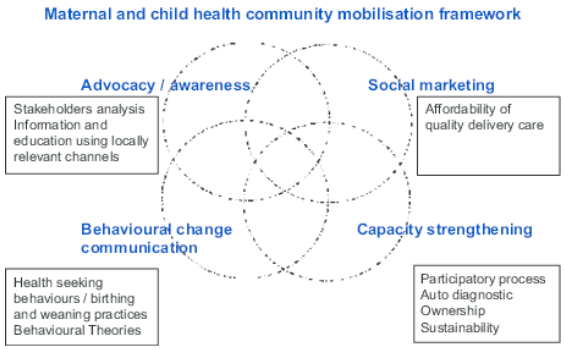

Figure 3: Conceptual framework for maternal and child health community-based interventions (Hounton, Byass & Brahima, 2009).

Integral to the success of the CBTM is the establishment of a structured supervision and mentorship framework. Each trainee is paired with a preceptor an experienced nurse or midwife assigned within the community clinic setting. The preceptor

provides direct oversight, guidance, and feedback during clinical rotations, ensuring that learning objectives are met and patient safety is maintained. This one-on-one mentorship supports skill refinement, problem-solving, and professional socialization. The ongoing relationship between preceptor and trainee fosters a supportive learning environment where questions can be addressed promptly and confidence is gradually built (Alketbi, 2018, Moghimi, Wickramasinghe & Adya, 2019).

Beyond clinical supervision, the CBTM incorporates mechanisms for ongoing support and skill reinforcement. Regular debriefing sessions, reflective practice discussions, and continuing education workshops are embedded within the program to consolidate learning and address emerging challenges. These activities encourage critical reflection, knowledge sharing, and peer support among trainees and trainers (Awe, 2017). The model also emphasizes the importance of monitoring trainee progress through structured assessments and competency checklists aligned with the training modules. Feedback from these assessments informs individualized learning plans, ensuring that gaps are addressed before trainees assume independent practice (Bloch, Vermeulen & Murphy, 2012, Drain, et al., 2014). Elliott, et al., 2012 presented figure of new Community Nurse Mode shown in figuge 4.

Figure 4: New Community Nurse Mode (Elliott, et al., 2012).

Together, these core components form a cohesive and adaptive training ecosystem that prepares practical nurses to meet the multifaceted demands of maternal and child health care in community settings. The modular structure of the training content ensures that all essential areas of MCH are comprehensively covered, while diverse delivery methods balance knowledge acquisition with practical skill development. The supervision and mentorship system guarantees that trainees receive personalized guidance and continual reinforcement, which are critical for safe and effective clinical performance (Muraina & Ahmad, 2012, Olszak & Batko, 2012). By integrating these elements, the Community-Based Training Model not only enhances the competencies of practical nurses but also contributes to building resilient health systems capable of improving maternal and child health outcomes in underserved populations.

2.4.Results and Outcomes

The implementation of the Community-Based Training Model (CBTM) for practical nurses in maternal and child health (MCH) clinics has yielded significant and multifaceted improvements, reflecting its effectiveness in addressing gaps in knowledge, skills, and community engagement. Across a range of settings where the CBTM has been introduced, measurable gains have been observed in clinical competence and confidence among nurses, nurse-patient communication quality, expansion of nurse-led services, and overall continuity and quality of care as reported by stakeholders. These outcomes collectively underscore the potential of the CBTM to strengthen frontline MCH care and contribute meaningfully to improved health outcomes for mothers and children in underserved communities (Dacombe, et al., 2016, Ravi, 2013).

One of the most striking results of CBTM implementation is the marked improvement in clinical competence and confidence among practical nurses. Before the training, many nurses reported feeling inadequately prepared to manage complex maternal and child health scenarios, particularly those requiring rapid assessment or emergency intervention such as postpartum hemorrhage or neonatal distress. Post-training evaluations consistently demonstrated that nurses gained enhanced skills in conducting antenatal assessments, monitoring fetal growth, managing immunization protocols, and providing family planning counselling (Méhaut & Winch, 2011, Nandan, et al., 2018). Competency assessments

showed significant improvements in both theoretical knowledge and practical skills, with trainees able to correctly perform key procedures and apply clinical reasoning more effectively. This boost in clinical capacity was closely linked to increased confidence reported by nurses during simulated scenarios and actual patient care situations. Nurses expressed greater assurance in their ability to identify early warning signs, communicate findings clearly, and initiate appropriate referrals or interventions. This confidence translated into more proactive and independent clinical decision-making, thereby strengthening the role of practical nurses as vital contributors to MCH service delivery (Awe, Akpan & Adekoya, 2017).

Beyond clinical skills, the CBTM had a profound impact on nurse-patient communication and community engagement. Training components that emphasized cultural sensitivity, active listening, and health education techniques enabled nurses to interact more effectively with diverse patient populations. Many nurses reported developing stronger rapport with clients, which facilitated open dialogue about sensitive topics such as reproductive health, breastfeeding, and newborn care. The model's focus on experiential learning within community settings helped nurses better understand the social determinants of health affecting their patients, fostering empathy and tailored counseling approaches (Agarwal, Malhotra & Bolton2010, Huot, et al., 2018). This enhanced communication improved patients' trust in healthcare providers and increased adherence to recommended care plans and immunization schedules. Community outreach activities incorporated into the training further extended nurses' influence beyond clinic walls, allowing them to educate families in their homes and local gathering places. Such outreach was credited with raising awareness about maternal nutrition, hygiene practices, and danger signs in pregnancy and infancy, contributing to broader health promotion within the community.

The empowerment of practical nurses through the CBTM also led to an expansion of nurse-led services within MCH clinics. In many settings, practical nurses traditionally played a supportive role under the direct supervision of midwives or physicians. However, following CBTM training, nurses took on greater responsibility for independently managing routine antenatal visits, conducting immunizations, providing family planning counseling, and monitoring child growth and development (Byrne, 2016, Sliwa, et al., 2017). This shift not only optimized the use of limited human resources but also improved access to timely care, as nurses were able to deliver essential services without delays caused by waiting for higher-level staff availability. Some clinics reported an increase of up to 30% in nurse-led consultations, freeing more specialized providers to focus on complicated cases or emergency care. Moreover, nurse-led health education sessions became more frequent and better received, further enhancing the clinic's capacity to address preventive health needs (Papali, et al., 2019, Xie, 2011). The expansion of practical nurses' roles was facilitated by the model's emphasis on clearly defined protocols and standardized care pathways, which ensured safe and consistent practice.

Stakeholder observations from healthcare managers, supervisors, and community representatives reinforced the positive impact of the CBTM on continuity and quality of care. Managers noted reductions in missed appointments, improved documentation accuracy, and fewer cases of delayed referrals due to the enhanced competence and confidence of trained nurses. Supervisors observed that practical nurses displayed greater initiative and accountability, which contributed to smoother clinic workflows and better coordination of care across the maternal and child health continuum. Community leaders and patients expressed appreciation for the approachable and knowledgeable nursing staff, noting that the clinics felt more welcoming and responsive to local needs (Kable, et al., 2018, Kaga, Bennett & Moss, 2010). The strengthened relationship between healthcare providers and community members was seen as instrumental in building trust and fostering sustained engagement with health services.

Importantly, the model also contributed to system-level improvements by enhancing the integration of MCH services within the broader primary healthcare framework. Practical nurses trained through the CBTM were more adept at linking clients to

complementary services such as nutrition programs, HIV testing and counseling, and early childhood development initiatives. This holistic approach aligned with national health policies emphasizing comprehensive maternal and child health strategies and helped bridge gaps between facility-based and community-based care. The model's emphasis on mentorship and ongoing support further ensured that improvements were maintained over time, creating a foundation for continuous professional development and service enhancement (Hannigan, et al., 2018, Hinds, Liu & Lyon, 2011).

While the outcomes of the CBTM have been overwhelmingly positive, evaluations also highlighted areas for further refinement. Some nurses expressed a need for additional training in complex clinical decision-making and management of less common complications. Others suggested expanding community engagement components to address broader social determinants such as domestic violence and mental health. Nonetheless, these feedback points underscore the model's adaptability and commitment to iterative improvement based on field experience (Alison, et al., 2013, Bleetman, Aet al., 2012).

In conclusion, the Community-Based Training Model for practical nurses in maternal and child health clinics has demonstrated substantial success in building clinical competence, enhancing communication, expanding nurse-led services, and improving continuity and quality of care. By grounding training in community realities and emphasizing experiential learning, the model effectively prepares practical nurses to meet the diverse and pressing needs of mothers and children in underserved areas (Dacombe, et al., 2016, Elbireer, 2012). The strengthened capacity and confidence of practical nurses not only improve service delivery but also foster deeper connections with the communities they serve, supporting broader public health goals. As maternal and child health remains a global priority, scaling and adapting the CBTM across diverse settings offers a promising pathway to building resilient healthcare workforces capable of delivering equitable, culturally sensitive, and high-quality care.

2.5. Challenges and Lessons Learned

The implementation of the Community-Based Training Model (CBTM) for practical nurses in maternal and child health (MCH) clinics has revealed a variety of challenges and valuable lessons that are crucial for refining and scaling this approach. While the model has shown great promise in enhancing clinical competencies and community engagement, several logistical, resource-related, and cultural obstacles have emerged, particularly when training is conducted in rural and underserved areas. Understanding these challenges and the insights gained from overcoming them is essential for improving the effectiveness and sustainability of community-based nurse training programs (Sakeah, et al., 2014, Uzondu, et al., 2015).

One of the most pervasive challenges encountered in community-based training is the logistical and transportation barriers associated with rural placements. Practical nurses undergoing training in remote or hard-to-reach areas often face difficulties in accessing clinical sites due to poor road infrastructure, limited public transportation options, and long travel distances. These barriers can lead to irregular attendance at clinical rotations and community outreach activities, reducing the consistency and continuity of the learning experience. Additionally, the time and financial costs of transportation can be burdensome for trainees, especially those from economically disadvantaged backgrounds (Hamman, Beaudin-Seiler & Beaubien, 2010, O'Donnell, et al., 2011). In some instances, adverse weather conditions or safety concerns further complicate travel, causing delays or cancellations of scheduled training sessions.

These logistical challenges not only impact the trainees but also affect the ability of supervisors and mentors to provide consistent oversight and support. Supervisors based in urban centers may find it difficult to regularly visit remote training sites, limiting opportunities for direct observation, feedback, and hands-on guidance. The reduced physical presence of experienced practitioners can hinder the quality of clinical instruction and weaken the mentorship relationship, which is critical for skill development and professional confidence (Armenia,

et al., 2018, Nicksa, et al., 2015). Furthermore, irregular trainee attendance complicates scheduling and coordination of group learning activities, such as workshops and community engagement projects, which thrive on consistent participation.

To address these issues, programs have learned the importance of incorporating flexible training schedules and providing logistical support to trainees. For example, organizing training blocks that cluster clinical rotations and community activities within concentrated time frames helps minimize travel frequency and related costs. Where possible, provision of transportation stipends or arrangements for shared transport have improved accessibility. The use of mobile training units or temporary rural training hubs has also been explored as a means to bring educational resources closer to learners. Additionally, leveraging technology through tele-supervision, video conferencing, and virtual mentoring has shown promise in mitigating the gap caused by geographic distances (Carron,Trueb & Yersin, 2011, Flowerdew, et al., 2012). These adaptations highlight the necessity of context-sensitive planning and the willingness to innovate beyond traditional models to ensure equitable access to quality training.

Resource limitations for simulations and mentorship present another significant challenge in the implementation of the CBTM. High-quality simulation-based training is recognized as a cornerstone of experiential learning, allowing trainees to practice complex clinical scenarios such as neonatal resuscitation and postpartum hemorrhage management in a safe environment. However, many community clinics and rural training sites lack the financial and material resources to establish and maintain simulation labs equipped with mannequins, audiovisual equipment, and consumables (Kerner Jr, et al., 2016, Patterson, et al., 2013). This scarcity restricts opportunities for practical skill acquisition and may force reliance on theoretical learning or opportunistic clinical exposure, which may not be sufficient for mastering critical competencies.

Similarly, mentorship is vital for bridging classroom knowledge and real-world practice, yet resource constraints often limit the availability and capacity of skilled preceptors. In many settings, experienced nurses and midwives who could serve as mentors are themselves overburdened with clinical duties and have limited time for teaching. This situation is compounded by insufficient formal recognition or incentives for mentorship roles, which can affect motivation and retention of preceptors. Without adequate mentorship, trainees may struggle to develop confidence and clinical judgment, potentially affecting patient safety and care quality (Black, et al., 2017, Perry, et al., 2017).

In response, programs have explored creative solutions to resource limitations. Collaborative partnerships with academic institutions and non-governmental organizations have helped secure funding and technical support for simulation equipment and training of trainers. Portable or low-cost simulation kits have been introduced as feasible alternatives that can be used in remote settings. Additionally, establishing peer mentorship networks and group-based supervision models helps distribute the mentorship workload and foster collaborative learning environments (Chang, et al., 2018, Cowperthwaite & Holm, 2015). These approaches demonstrate that while resource limitations are a formidable barrier, strategic partnerships and innovative thinking can expand access to essential training components.

Cultural and language variations within community settings add another layer of complexity to the CBTM implementation. Practical nurses are often deployed to serve diverse populations characterized by distinct languages, dialects, beliefs, and health practices. Navigating these cultural differences requires not only clinical competence but also cultural sensitivity and effective communication skills. Trainees unaccustomed to local customs may face challenges in building trust with patients and community members, which can hinder the delivery of health education, adherence to care plans, and acceptance of interventions such as immunizations or family planning (Borrow, Munns & Henderson, 2011, Freeman, et al., 2017).

Language barriers, in particular, can impede accurate patient assessment, counseling, and documentation. Misunderstandings due to linguistic differences may

result in incomplete histories, missed symptoms, or non-compliance with treatment recommendations. Moreover, cultural norms regarding gender roles, pregnancy, childbirth, and child-rearing practices can influence how care is received and interpreted, requiring nurses to adapt their approach respectfully and flexibly. Without appropriate preparation and support, nurses may experience frustration or reduced effectiveness, and communities may remain underserved despite clinical efforts (Alfa, 2019, Dancer, et al., 2012).

Addressing cultural and language challenges has necessitated the inclusion of cultural competence training within the CBTM curriculum. Modules focused on local customs, communication strategies, and community engagement principles help prepare nurses to navigate cultural dynamics more effectively. Role-playing, case studies, and community immersion experiences enhance cultural awareness and empathy. Recruiting trainers and mentors from the local communities or those fluent in relevant languages has proven invaluable for bridging cultural divides (de Melo Costa, et al., 2018, Ryan, et al., 2016). Additionally, employing community health workers as cultural liaisons during training and clinical activities fosters mutual understanding and facilitates health messaging. These lessons emphasize that cultural competence is not an optional add-on but an essential component of effective community-based nurse training.

In summary, the implementation of the Community-Based Training Model for practical nurses in maternal and child health clinics has illuminated several challenges related to logistics, resources, and culture that must be carefully managed to maximize the model's impact. Transportation and accessibility barriers in rural placements require flexible scheduling, logistical support, and technological solutions to ensure consistent training participation and supervision. Resource constraints for simulation and mentorship call for innovative partnerships, low-cost alternatives, and shared responsibility models to provide practical skills training and professional guidance. Cultural and language variations demand comprehensive cultural competence preparation and local engagement strategies to ensure respectful, effective care delivery (Ojemeni, et al., 2017, Perry, et al., 2017). The lessons learned from addressing these challenges underscore the importance of adaptability, stakeholder collaboration, and context-sensitive design in developing sustainable and impactful community-based nurse training programs. By embracing these insights, future implementations of the CBTM can enhance nurse preparedness, improve maternal and child health outcomes, and contribute to more equitable healthcare access in underserved communities.

2.6. Recommendations

To maximize the impact and sustainability of the Community-Based Training Model (CBTM) for practical nurses in maternal and child health (MCH) clinics, several strategic recommendations are crucial. These recommendations address the need for institutional commitment, policy backing, geographic expansion, and alignment with broader health workforce strategies. By embedding the CBTM into formal nursing education programs, securing supportive policy environments, extending its reach beyond rural areas, and integrating it into national planning, stakeholders can ensure that the model contributes meaningfully to strengthening MCH services and addressing healthcare workforce gaps (Grant, et al., 2017, Perry, et al., 2015).

A fundamental recommendation is the institutional adoption of the CBTM within nursing education curricula. Nursing schools and training institutions should formally incorporate community-based experiential learning as a core component of practical nurse training programs. This means restructuring curricula to balance classroom instruction with substantial clinical rotations in community MCH settings, including clinics, home visits, and outreach activities. By institutionalizing this approach, schools signal the importance of community engagement and prepare students for the realities of frontline care delivery (Ling, et al., 2018, O'Hara, et al., 2015). Additionally, community-based training should be accompanied by clear competency frameworks, standardized learning objectives, and rigorous assessment methods aligned with national and international nursing standards. Institutional adoption also implies investing in faculty development to equip educators with the skills and knowledge needed

to facilitate community placements effectively and to supervise experiential learning. Partnerships between academic institutions and community health providers should be formalized to support logistical coordination, resource sharing, and quality assurance. Such institutionalization ensures that community-based training is not an optional or peripheral activity but a valued and systematically delivered aspect of practical nurse education.

Policy support is equally vital to enabling and sustaining community placements and mentorship structures. Governments and health ministries should develop policies that recognize and incentivize community-based training as an essential strategy for health workforce development, particularly in underserved areas. This includes allocating funding for transportation, accommodation, and stipends for trainees undertaking rural or community rotations, thereby reducing financial barriers and enhancing participation. Policies should also mandate or encourage the establishment of structured mentorship programs within community clinics, ensuring that practical nurses receive ongoing guidance and supervision from experienced practitioners. Recognizing mentorship as a formal role with appropriate training, workload allocation, and professional recognition can motivate mentors and improve the quality of supervision (Alfa, 2016, Forrester, et al., 2018). Regulatory bodies and nursing councils should incorporate requirements for community-based training experiences and mentorship into licensing and accreditation standards to reinforce their importance. Furthermore, policies that promote collaboration between educational institutions, health services, and local communities foster an enabling environment for comprehensive and contextually relevant training. Strong policy frameworks also facilitate monitoring and evaluation mechanisms, helping to track the effectiveness and impact of the CBTM and guiding continuous improvement (Osabuohien, 2019).

While the CBTM has been primarily implemented in rural and remote settings where MCH workforce shortages are most acute, expanding its reach to urban and peri-urban areas is a critical recommendation. Urban populations often include marginalized groups living in informal settlements or slums who face barriers to accessing quality maternal and child health services. Practical nurses trained through community-based models can play a pivotal role in outreach, health education, and service delivery within these populations. Adapting the CBTM for urban and peri-urban contexts requires attention to different health challenges, cultural dynamics, and resource availability (Bertholf, 2016, Mohan, et al., 2017). For instance, community-based training in urban areas may focus more on managing communicable diseases, adolescent reproductive health, or supporting women experiencing domestic violence. Partnerships with urban primary healthcare centers, non-governmental organizations, and community groups can provide diverse training sites and enrich experiential learning. By broadening the geographic scope of the CBTM, health systems can create a versatile nursing workforce capable of addressing MCH needs across the entire population spectrum (Osabuohien, 2017).

A critical strategic priority is the integration of the Community-Based Training Model into national health workforce development plans. Many countries face significant shortages of skilled MCH providers, particularly in rural and underserved areas, which undermine efforts to achieve global health goals such as reducing maternal and child mortality (Awe & Akpan, 2017, Isa & Dem, 2014). Embedding the CBTM into national workforce policies aligns practical nurse education with broader health system objectives, enabling coordinated planning, resource mobilization, and sustainable scaling. National health workforce plans should explicitly recognize community-based training as a priority strategy for improving the distribution, skills, and retention of nursing personnel in priority areas (Drayton Jackson, et al., 2019, Yip, et al., 2017). This integration facilitates the inclusion of CBTM-related indicators within health management information systems, enabling better tracking of workforce capacity and training outcomes. Moreover, national plans can leverage the CBTM framework to harmonize education standards, optimize deployment strategies, and foster intersectoral collaboration between ministries of health, education, and social services. Such alignment ensures that community-based training efforts contribute to comprehensive and

sustainable solutions for strengthening maternal and child health service delivery.

To operationalize these recommendations, several practical steps are necessary. Academic institutions should establish dedicated units or focal persons responsible for coordinating community-based training programs, managing partnerships, and monitoring trainee progress. Ministries of health and education should collaborate to develop joint guidelines and protocols that facilitate smooth transitions between classroom learning and community practice (Akpan, et al., 2017). Funding mechanisms, including government budgets, donor support, and public-private partnerships, must be mobilized to finance infrastructure, training materials, and incentives for both trainees and mentors. Continuous capacity building for educators, preceptors, and community health workers is essential to maintain the quality and relevance of training (Mijailovic, et l., 2014, Morrison, et al., 2011). Additionally, investing in research and data collection to evaluate the CBTM's impact on nurse competencies, service coverage, and health outcomes will provide evidence to inform policy and program adjustments.

In conclusion, the sustainability and scalability of the Community-Based Training Model for practical nurses hinge on its formal adoption within nursing education programs, supported by enabling policies that prioritize community placements and mentorship. Expanding the model's reach to urban and peri-urban areas ensures that diverse populations benefit from skilled MCH services (Dilts & McPherson, 2011, Huang & Klassen, 2016). Crucially, integrating the CBTM into national health workforce development plans anchors it within broader strategies aimed at addressing healthcare workforce shortages and improving maternal and child health outcomes. By embracing these recommendations, countries can develop a resilient, well-prepared nursing workforce capable of delivering culturally sensitive, high-quality care across all communities. This comprehensive approach not only strengthens health systems but also contributes to achieving global commitments for maternal and child well-being (Le, et al., 2014, Yip, et al., 2016).

CONCLUSION

The Community-Based Training Model (CBTM) for practical nurses in maternal and child health clinics has demonstrated a meaningful impact on improving maternal and child health outcomes, particularly in underserved communities. By grounding nurse training in real-world community settings and emphasizing experiential learning, the model enhances nurses' clinical competence, cultural sensitivity, and ability to deliver responsive, patient-centered care. This comprehensive approach addresses critical gaps in traditional training programs, preparing practical nurses to meet the complex and diverse needs of mothers and children in their local contexts. The improved clinical skills, communication, and community engagement fostered by the CBTM translate into higher quality service delivery, better health education, and more timely identification and management of maternal and neonatal health risks.

Beyond improving individual competencies, the CBTM significantly contributes to workforce readiness by equipping practical nurses with the skills, confidence, and adaptability necessary for frontline maternal and child health service provision. The model's emphasis on mentorship, supervision, and integration within community health systems supports the development of a resilient and sustainable nursing workforce that can effectively navigate the challenges of resource-limited environments. By fostering stronger connections between nurses and the communities they serve, the CBTM promotes a community-centered approach to care that respects local values and enhances trust, ultimately leading to greater utilization and adherence to essential maternal and child health services.

Looking forward, future research should focus on evaluating the long-term outcomes of CBTM implementation across diverse geographic and cultural settings to better understand its scalability and adaptability. Studies examining cost-effectiveness, impact on health indicators, and mechanisms for sustaining mentorship and supervision structures will provide valuable insights for policymakers and educators. Additionally,

exploring innovative strategies such as digital learning platforms, tele-mentoring, and interprofessional collaboration can further enhance the model's reach and effectiveness. As maternal and child health remains a global priority, scaling the CBTM thoughtfully and strategically will be vital to strengthening health systems and advancing equitable care for vulnerable populations worldwide.

REFERENCES

[1] Agarwal, J., Malhotra, N. K., & Bolton, R. N. (2010). A cross-national and cross-cultural approach to global market segmentation: An application using consumers' perceived service quality. Journal of International Marketing, 18(3), 18-40.

[2] Agulnik, A., Mora Robles, L. N., Forbes, P. W., Soberanis Vasquez, D. J., Mack, R., Antillon-Klussmann, F., ... & Rodriguez-Galindo, C. (2017). Improved outcomes after successful implementation of a pediatric early warning system (PEWS) in a resource-limited pediatric oncology hospital. Cancer, 123(15), 2965-2974.

[3] Akpan, U. U., Adekoya, K. O., Awe, E. T., Garba, N., Oguncoker, G. D., & Ojo, S. G. (2017). Mini-STRs screening of 12 relatives of Hausa origin in northern Nigeria. Nigerian Journal of Basic and Applied Sciences, 25(1), 48-57.

[4] Akpan, U. U., Awe, T. E., & Idowu, D. (2019). Types and frequency of fingerprint minutiae in individuals of Igbo and Yoruba ethnic groups of Nigeria. Ruhuna Journal of Science, 10(1).

[5] Alfa, M. J. (2016). Current issues result in a paradigm shift in reprocessing medical and surgical instruments. American journal of infection control, 44(5), e41-e45.

[6] Alfa, M. J. (2019). Medical instrument reprocessing: current issues with cleaning and cleaning monitoring. American journal of infection control, 47, A10-A16.

[7] Alison, L., Van Den Heuvel, C., Waring, S., Power, N., Long, A., O'Hara, T., & Crego, J. (2013). Immersive simulated learning environments for researching critical incidents: A knowledge synthesis of the literature and experiences of studying high-risk strategic decision making. Journal of Cognitive Engineering and decision making, 7(3), 255-272.

[8] Aljohani, A. (2018). An investigation into the impacts of adopting HIT-related EHRs/EMRs on Saudi healthcare systems among private and public hospitals: a comparative analysis (Doctoral dissertation, Dublin City University).

[9] Alketbi, O. H. (2018). Assessing information value for harnessing knowledge needed for improving decision-making and effectiveness of a government organisation: A Case study of Abu Dhabi Police Force (Doctoral dissertation).

[10] Almatrafi, A. S., Al-Mutairi, R. M. H., & Alotaibi, A. M. (2019). Integrating nursing and emergency strategies for managing post-operative infections: Enhancing prevention and patient outcomes. Tennessee Research International of Social Sciences, 1(1), 63-85.

[11] Armenia, S., Thangamathesvaran, L., Caine, A. D., King, N., Kunac, A., & Merchant, A. M. (2018). The role of high-fidelity team-based simulation in acute care settings: a systematic review. The Surgery Journal, 4(03), e136-e151.

[12] Awe, E. T. (2017). Hybridization of snout mouth deformed and normal mouth African catfish Clarias gariepinus. Animal Research International, 14(3), 2804-2808.

[13] Awe, E. T., & Akpan, U. U. (2017). Cytological study of Allium cepa and Allium sativum.

[14] Awe, E. T., Akpan, U. U., & Adekoya, K. O. (2017). Evaluation of two MiniSTR loci mutation events in five Father-Mother-Child trios of Yoruba origin. Nigerian Journal of Biotechnology, 33, 120-124.

[15] Berna, K. J. (2019). Development and Evaluation of a Nurse Practitioner-Directed Screening, Brief Intervention, and Referral to Treatment (SBIRT) Program in an Urgent Care Clinic. Wilmington University (Delaware).

[16] Bertholf, R. L. (2016). Laboratory structure and function. In Clinical core laboratory testing (pp. 1-23). Boston, MA: Springer US.

[17] Black, R. E., Taylor, C. E., Arole, S., Bang, A., Bhutta, Z. A., Chowdhury, A. M. R., ... & Perry, H. B. (2017). Comprehensive review of the evidence regarding the effectiveness of community–based

[18] Bleetman, A., Sanusi, S., Dale, T., & Brace, S. (2012). Human factors and error prevention in emergency medicine. Emergency Medicine Journal, 29(5), 389-393.

[19] Bloch, E. M., Vermeulen, M., & Murphy, E. (2012). Blood transfusion safety in Africa: a literature review of infectious disease and organizational challenges. Transfusion medicine reviews, 26(2), 164-180.

[20] Borrow, S., Munns, A., & Henderson, S. (2011). Community-based child health nurses: an exploration of current practice. Contemporary Nurse, 40(1), 71-86.

[21] Boydston, J. (2018). Use of a standardized care communication checklist during multidisciplinary rounds in pediatric cardiac intensive care: a best practice implementation project. JBI Evidence Synthesis, 16(2), 548-564.

[22] Byrne, B. M. (2016). Adaptation of assessment scales in cross-national research: Issues, guidelines, and caveats. International Perspectives in Psychology, 5(1), 51-65.

[23] Cahill, N. E., Suurdt, J., Ouellette-Kuntz, H., & Heyland, D. K. (2010). Understanding adherence to guidelines in the intensive care unit: development of a comprehensive framework. Journal of parenteral and Enteral Nutrition, 34(6), 616-624.

[24] Carron, P. N., Trueb, L., & Yersin, B. (2011). High-fidelity simulation in the nonmedical domain: practices and potential transferable competencies for the medical field. Advances in medical education and practice, 149-155.

[25] Chang, D. F., Mamalis, N., Cionni, R. J., Hoffman, R. S., Mah, F. S., Shorstein, N. H., ... & Hurley, N. (2018). Guidelines for the cleaning and sterilization of intraocular surgical instruments. Journal of Cataract & Refractive Surgery, 44(6), 765-773.

[26] Cherry, P. G., & Jones, C. P. (2015). Attitudes of nursing staff towards a Modified Early Warning System. British Journal of Nursing, 24(16), 812-818.

[27] Chevaliez, S., & Pawlotsky, J. M. (2018). New virological tools for screening, diagnosis and monitoring of hepatitis B and C in resource-limited settings. Journal of hepatology, 69(4), 916-926.

[28] Cowperthwaite, L., & Holm, R. L. (2015). Guideline implementation: surgical instrument cleaning. AORN journal, 101(5), 542-552.

[29] Curry, J. P., & Jungquist, C. R. (2014). A critical assessment of monitoring practices, patient deterioration, and alarm fatigue on inpatient wards: a review. Patient safety in surgery, 8(1), 29.

[30] Dacombe, R., Bates, I., Bhardwaj, M., Wallis, S., & Pulford, J. (2016). Fleming Fund: supporting surveillance capacity for antimicrobial resistance An analysis of approaches to laboratory capacity strengthening for drug resistant infections in low and middle income countries.

[31] Dacombe, R., Bates, I., Bhardwaj, M., Wallis, S., & Pulford, J. (2016). An analysis of approaches to laboratory capacity strengthening for drug resistant infections in low and middle income countries. Liverpool School of Tropical Medicine, Capacity Research Unit, Liverpool, United Kingdom.

[32] Dancer, S. J., Stewart, M., Coulombe, C., Gregori, A., & Virdi, M. (2012). Surgical site infections linked to contaminated surgical instruments. Journal of Hospital Infection, 81(4), 231-238.

[33] De Meester, K., Haegdorens, F., Monsieurs, K. G., Verpooten, G. A., Holvoet, A., & Van Bogaert, P. (2013). Six-day postoperative impact of a standardized nurse observation and escalation protocol: a preintervention and postintervention study. Journal of critical care, 28(6), 1068-1074.

[34] De Meester, K., Van Bogaert, P., Clarke, S. P., & Bossaert, L. (2013). In-hospital mortality after serious adverse events on medical and surgical nursing units: a mixed methods study. Journal of clinical nursing, 22(15-16), 2308-2317.

[35] de Melo Costa, D., de Oliveira Lopes, L. K., Vickery, K., Watanabe, E., de Oliveira Leão, L. S. N., de Paula, M. C., ... & Tipple, A. F. V. (2018). Reprocessing safety issues associated

with complex-design orthopaedic loaned surgical instruments and implants. Injury, 49(11), 2005-2012.

[36] Dilts, T. J., & McPherson, R. A. (2011). Optimizing laboratory workflow and performance. Henry's Clinical Diagnosis and Management by Laboratory Methods. Philadelphia, PA: Saunders, 13-23.

[37] Drain, P. K., Hyle, E. P., Noubary, F., Freedberg, K. A., Wilson, D., Bishai, W. R., ... & Bassett, I. V. (2014). Diagnostic point-of-care tests in resource-limited settings. The Lancet infectious diseases, 14(3), 239-249.

[38] Drayton Jackson, M., Bartman, T., McGinniss, J., Widener, P., & Dunn, A. L. (2019). Optimizing patient flow in a multidisciplinary haemophilia clinic using quality improvement methodology. Haemophilia, 25(4), 626-632.

[39] Elbireer, A. M. (2012). Creating an effective medical laboratory capacity in limited-resource settings: A case study of Kampala, Uganda. Northcentral University.

[40] Elliott, L., Kennedy, C., Rome, A., Cameron, S., Currie, M., Pow, J., & Mackenzie-Baker, M. (2012). Study of the implementation of a new community health nurse role in Scotland.

[41] Fennell, M. L., Prabhu Das, I., Clauser, S., Petrelli, N., & Salner, A. (2010). The organization of multidisciplinary care teams: modeling internal and external influences on cancer care quality. Journal of the National Cancer Institute Monographs, 2010(40), 72-80.

[42] Flowerdew, L., Brown, R., Vincent, C., & Woloshynowych, M. (2012). Identifying nontechnical skills associated with safety in the emergency department: a scoping review of the literature. Annals of emergency medicine, 59(5), 386-394.

[43] Flynn, R., & Hartfield, D. (2016). An evaluation of a frontline led quality improvement initiative: barriers and facilitators to its success as part of a new quality management framework. Leadership in health services, 29(4), 402-414.

[44] Forrester, J. A., Powell, B. L., Forrester, J. D., Fast, C., & Weiser, T. G. (2018). Surgical instrument reprocessing in resource-constrained countries: a scoping review of existing methods, policies, and barriers. Surgical infections, 19(6), 593-602.

[45] Francis, R. P. (2016). Physician's acceptance of data from patient self-monitoring devices. Capella University.

[46] Freeman, P. A., Schleiff, M., Sacks, E., Rassekh, B. M., Gupta, S., & Perry, H. B. (2017). Comprehensive review of the evidence regarding the effectiveness of community–based primary health care in improving maternal, neonatal and child health: 4. child health findings. Journal of global health, 7(1), 010904.

[47] Gilhooly, D., Green, S. A., McCann, C., Black, N., & Moonesinghe, S. R. (2019). Barriers and facilitators to the successful development, implementation and evaluation of care bundles in acute care in hospital: a scoping review. Implementation Science, 14(1), 47.

[48] Grant, M., Wilford, A., Haskins, L., Phakathi, S., Mntambo, N., & Horwood, C. M. (2017). Trust of community health workers influences the acceptance of community-based maternal and child health services. African Journal of Primary Health Care and Family Medicine, 9(1), 1-8.

[49] Grant, S. (2019). Limitations of track and trigger systems and the National early warning score. Part 3: cultural and behavioural factors. British Journal of Nursing, 28(4), 234-241.

[50] Gullick, J., Lin, F., Massey, D., Wilson, L., Greenwood, M., Skylas, K., ... & Gill, F. J. (2019). Structures, processes and outcomes of specialist critical care nurse education: an integrative review. Australian Critical Care, 32(4), 331-345.

[51] Haahr-Raunkjær, C., Meyhoff, C. S., Sørensen, H. B. D., Olsen, R. M., & Aasvang, E. K. (2017). Technological aided assessment of the acutely ill patient–The case of postoperative complications. European Journal of Internal Medicine, 45, 41-45.

[52] Halvorson, S., Wheeler, B., Willis, M., Watters, J., Eastman, J., O'Donnell, R., & Merkel, M. (2016). A multidisciplinary initiative to standardize intensive care to acute

care transitions. International Journal for Quality in Health Care, 28(5), 615-625.

[53] Hamman, W. R., Beaudin-Seiler, B. M., & Beaubien, J. M. (2010). Understanding interdisciplinary health care teams: using simulation design processes from the air carrier advanced qualification program to identify and train critical teamwork skills. Journal of Patient Safety, 6(3), 137-146.

[54] Hannigan, B., Simpson, A., Coffey, M., Barlow, S., & Jones, A. (2018). Care coordination as imagined, care coordination as done: findings from a cross-national mental health systems study. International Journal of Integrated Care, 18(3), 12.

[55] Hinds, P., Liu, L., & Lyon, J. (2011). Putting the global in global work: An intercultural lens on the practice of cross-national collaboration. Academy of Management annals, 5(1), 135-188.

[56] Hounton, S., Byass, P., & Brahima, B. (2009). Towards reduction of maternal and perinatal mortality in rural Burkina Faso: communities are not empty vessels. Global health action, 2(1), 1947.

[57] Huang, Y., & Klassen, K. J. (2016). Using six sigma, lean, and simulation to improve the phlebotomy process. Quality Management Journal, 23(2), 6-21.

[58] Huot, S., Raanaas, R. K., Laliberte Rudman, D., & Grimeland, J. (2018). Integrating occupational and public health sciences through a cross-national educational partnership. Journal of Occupational Science, 25(3), 431-441.

[59] Isa, A., & Dem, B. (2014). Integrating Self-Reliance Education Curriculum For Purdah Women In Northern Nigeria: A Panacea For A Lasting Culture Of Peace.

[60] Jeskey, M., Card, E., Nelson, D., Mercaldo, N. D., Sanders, N., Higgins, M. S., ... & Miller, A. (2011). Nurse adoption of continuous patient monitoring on acute post-surgical units: managing technology implementation. Journal of nursing management, 19(7), 863-875.

[61] Joshi, M., Ashrafian, H., Aufegger, L., Khan, S., Arora, S., Cooke, G., & Darzi, A. (2019). Wearable sensors to improve detection of patient deterioration. Expert review of medical devices, 16(2), 145-154.

[62] Kable, A. K., Levett-Jones, T. L., Arthur, C., Reid-Searl, K., Humphreys, M., Morris, S., ... & Witton, N. J. (2018). A cross-national study to objectively evaluate the quality of diverse simulation approaches for undergraduate nursing students. Nurse education in practice, 28, 248-256.

[63] Kaga, Y., Bennett, J., & Moss, P. (2010). Caring and learning together: A cross-national study on the integration of early childhood care and education within education. Unesco.

[64] Kelvin-Agwu, M. C., Mustapha, A. Y., Mbata, A. O., Tomoh, B. O., & Forkuo, A. Y. (2023). Development of AI-Assisted Wearable Devices for Early Detection of Respiratory Diseases. Int. J. Multidiscip. Res. Growth Eval, 4(1), 967-974.

[65] Kerner Jr, R. L., Gallo, K., Cassara, M., D'Angelo, J., Egan, A., & Simmons, J. G. (2016). Simulation for operational readiness in a new freestand

[66] Khanna, A. K. (2019). Post-operative Ward Monitoring–A Narrative Review (Doctoral dissertation, Wake Forest School of Medicine).

[67] Khanna, A. K., Ahuja, S., Weller, R. S., & Harwood, T. N. (2019). Postoperative ward monitoring–Why and what now?. Best Practice & Research Clinical Anaesthesiology, 33(2), 229-245.

[68] Klimes, J., Hruda, J., Lukes, M., Suk, P., & Sramek, V. (2014). Adherence to the nurse-driven hemodynamic protocol during postoperative care. Critical Care, 18(Suppl 1), P138.

[69] Kyriacos, U., Jelsma, J., & Jordan, S. (2011). Monitoring vital signs using early warning scoring systems: a review of the literature. Journal of nursing management, 19(3), 311-330.

[70] Lassi, Z. S., Kumar, R., & Bhutta, Z. A. (2016). Community-based care to improve maternal, newborn, and child health. Disease Control Priorities, 2, 263-84.

[71] Le, R. D., Melanson, S. E., Santos, K. S., Paredes, J. D., Baum, J. M., Goonan, E. M., ...

& Tanasijevic, M. J. (2014). Using Lean principles to optimise inpatient phlebotomy services. Journal of Clinical Pathology, 67(8), 724-730.

[72] Ling, M. L., Ching, P., Widitaputra, A., Stewart, A., Sirijindadirat, N., & Thu, L. T. A. (2018). APSIC guidelines for disinfection and sterilization of instruments in health care facilities. Antimicrobial Resistance & Infection Control, 7(1), 25.

[73] McFarlane, D. C., Doig, A. K., Agutter, J. A., Brewer, L. M., Syroid, N. D., & Mittu, R. (2018). Faster clinical response to the onset of adverse events: A wearable metacognitive attention aid for nurse triage of clinical alarms. PloS one, 13(5), e0197157.

[74] McGrath, S. P., Perreard, I. M., Garland, M. D., Converse, K. A., & Mackenzie, T. A. (2018). Improving patient safety and clinician workflow in the general care setting with enhanced surveillance monitoring. IEEE journal of biomedical and health informatics, 23(2), 857-866.

[75] Méhaut, P., & Winch, C. (2011). EU initiatives in cross-national recognition of skills and qualifications. In Knowledge, Skills and Competence in the European Labour Market (pp. 22-35). Routledge.

[76] Mijailovic, A. S., Tanasijevic, M. J., Goonan, E. M., Le, R. D., Baum, J. M., & Melanson, S. E. (2014). Optimizing outpatient phlebotomy staffing: tools to assess staffing needs and monitor effectiveness. Archives of Pathology and Laboratory Medicine, 138(7), 929-935.

[77] Mo, Y. (2014). Modeling and optimization of care transitions (Master's thesis, Purdue University).

[78] Moghimi, H., Wickramasinghe, N., & Adya, M. (2019). Intelligent risk detection in health care: integrating social and technical factors to manage health outcomes. In Delivering Superior Health and Wellness Management with IoT and Analytics (pp. 225-257). Cham: Springer International Publishing.

[79] Mohammed Iddrisu, S., Considine, J., & Hutchinson, A. (2018). Frequency, nature and timing of clinical deterioration in the early postoperative period. Journal of Clinical Nursing, 27(19-20), 3544-3553.

[80] Mohammmed Iddrisu, S., Hutchinson, A. F., Sungkar, Y., & Considine, J. (2018). Nurses' role in recognising and responding to clinical deterioration in surgical patients. Journal of Clinical Nursing, 27(9-10), 1920-1930.

[81] Mohan, S., Li, Q., Gopalakrishnan, M., Fowler, J., & Printezis, A. (2017). Improving the process efficiency of catheterization laboratories using simulation. Health Systems, 6(1), 41-55.

[82] Morrison, A. P., Tanasijevic, M. J., Torrence-Hill, J. N., Goonan, E. M., Gustafson, M. L., & Melanson, S. E. (2011). A strategy for optimizing staffing to improve the timeliness of inpatient phlebotomy collections. Archives of pathology & laboratory medicine, 135(12), 1576-1580.

[83] Muraina, I., & Ahmad, A. (2012). Healthcare business intelligence: The case of university's health center. In Internacional Conference on E-CASE & E-TECH.

[84] Nandan, S., Halkias, D., Thurman, P. W., Komodromos, M., Alserhan, B. A., Adendorff, C., ... & Seaman, C. (2018). Assessing cross-national invariance of the three-component model of organizational commitment: A cross-country study of university faculty. EuroMed Journal of Business, 13(3), 254-279.

[85] Ndoro, S. (2014). Effective multidisciplinary working: the key to high-quality care. British Journal of Nursing, 23(13), 724-727.

[86] Nicksa, G. A., Anderson, C., Fidler, R., & Stewart, L. (2015). Innovative approach using interprofessional simulation to educate surgical residents in technical and nontechnical skills in high-risk clinical scenarios. JAMA surgery, 150(3), 201-207.

[87] O'Donnell, J. M., Goode Jr, J. S., Henker, R., Kelsey, S., Bircher, N. G., Peele, P., ... & Sutton-Tyrrell, K. (2011). Effect of a simulation educational intervention on knowledge, attitude, and patient transfer skills: from the simulation laboratory to the clinical setting. Simulation in Healthcare, 6(2), 84-93.

[88] O'Hara, N. N., Patel, K. R., Caldwell, A., Shone, S., & Bryce, E. A. (2015). Sterile reprocessing of surgical instruments in low- and middle-income countries: a multicenter

pilot study. American journal of infection control, 43(11), 1197-1200.

[89] Ojemeni, M. T., Niles, P., Mfaume, S., Kapologwe, N. A., Deng, L., Stafford, R., ... & Squires, A. (2017). A case study on building capacity to improve clinical mentoring and maternal child health in rural Tanzania: the path to implementation. BMC nursing, 16(1), 57.

[90] Olszak, C. M., & Batko, K. (2012). Business intelligence systems. New chances and possibilities for healthcare organizations. Business Informatics/Informatyka Ekonomiczna, 3(25).

[91] Osabuohien, F. O. (2017). Review of the environmental impact of polymer degradation. Communication in Physical Sciences, 2(1).

[92] Osabuohien, F. O. (2019). Green Analytical Methods for Monitoring APIs and Metabolites in Nigerian Wastewater: A Pilot Environmental Risk Study. Communication In Physical Sciences, 4(2), 174-186.

[93] Ozekcin, L. R., Tuite, P., Willner, K., & Hravnak, M. (2015). Simulation education: early identification of patient physiologic deterioration by acute care nurses. Clinical Nurse Specialist, 29(3), 166-173.

[94] Papali, A., Adhikari, N. K., Diaz, J. V., Dondorp, A. M., Dünser, M. W., Jacob, S. T., ... & Schultz, M. J. (2019). Infrastructure and organization of adult intensive care units in resource-limited settings. Sepsis management in resource-limited settings, 31-68.

[95] Patterson, M. D., Geis, G. L., Falcone, R. A., LeMaster, T., & Wears, R. L. (2013). In situ simulation: detection of safety threats and teamwork training in a high risk emergency department. BMJ quality & safety, 22(6), 468-477.

[96] Perkins, M. J. (2018). The Identification of Barriers and Facilitators to the Successful Delivery of Alcohol Brief Interventions by Patient and Family Education Nurses at a Large Academic Medical Center in Wisconsin. Edgewood College.

[97] Perry, H. B., Rassekh, B. M., Gupta, S., & Freeman, P. A. (2017). Comprehensive review of the evidence regarding the effectiveness of community–based primary health care in improving maternal, neonatal and child health: 7. shared characteristics of projects with evidence of long–term mortality impact. Journal of global health, 7(1), 010907.

[98] Perry, H. B., Sacks, E., Schleiff, M., Kumapley, R., Gupta, S., Rassekh, B. M., & Freeman, P. A. (2017). Comprehensive review of the evidence regarding the effectiveness of community–based primary health care in improving maternal, neonatal and child health: 6. strategies used by effective projects. Journal of global health, 7(1), 010906.

[99] Perry, H., Morrow, M., Borger, S., Weiss, J., DeCoster, M., Davis, T., & Ernst, P. (2015). Care groups I: an innovative community-based strategy for improving maternal, neonatal, and child health in resource-constrained settings. Global Health: Science and Practice, 3(3), 358-369.

[100] Ravi, S. (2013). The impact of transfusion-transmissible viruses on blood product management in the United States (Doctoral dissertation, University of Pittsburgh).

[101] Reyes-Alcázar, V., Torres-Olivera, A., Núñes-García, D., & Almuedo-Paz, A. (2012). Critical success factors for quality assurance in healthcare organisations. Quality Assurance Management, 10, 33081.

[102] Ryan, J., Doster, B., Daily, S., & Lewis, C. (2016, January). A business process management approach to surgical instrument/device reprocessing and tracking. In 2016 49th Hawaii International Conference on System Sciences (HICSS) (pp. 3219-3228). IEEE.

[103] Saab, M. M., McCarthy, B., Andrews, T., Savage, E., Drummond, F. J., Walshe, N., ... & Hegarty, J. (2017). The effect of adult Early Warning Systems education on nurses' knowledge, confidence and clinical performance: A systematic review. Journal of Advanced Nursing, 73(11), 2506-2521.

[104] Sakeah, E., McCloskey, L., Bernstein, J., Yeboah-Antwi, K., Mills, S., & Doctor, H. V. (2014). Can community health officer-midwives effectively integrate skilled birth attendance in the community-based health

planning and services program in rural Ghana?. Reproductive Health, 11(1), 90.

[105] Sliwa, S. I., Brem, A., Agarwal, N., & Kraus, S. (2017). E-health, health systems and social innovation: a cross-national study of telecare diffusion. International Journal of Foresight and Innovation Policy, 12(4), 171-197.

[106] Stewart, C., & Bench, S. (2018). Evaluating the implementation of confusion assessment method-intensive care unit using a quality improvement approach. Nursing in Critical Care, 23(4), 172-178.

[107] SVIMS, T. (2010). Focusing Informatics Methods in Clinical Medicine and Biomedical Challenges. International Journal of Computer Applications, 975, 8887.

[108] Thursz, M., & Fontanet, A. (2014). HCV transmission in industrialized countries and resource-constrained areas. Nature reviews Gastroenterology & hepatology, 11(1), 28-35.

[109] Uzondu, C. A., Doctor, H. V., Findley, S. E., Afenyadu, G. Y., & Ager, A. (2015). Female health workers at the doorstep: a pilot of community-based maternal, newborn, and child health service delivery in northern Nigeria. Global Health: Science and Practice, 3(1), 97-108.

[110] Xie, S. (2011). Optimal Allocation of Resources for Screening of Donated Blood.

[111] Yip, K. C., Huang, K. W., Ho, E. W., Chan, W. K., & Lee, I. L. (2017). Optimized staff allocation for inpatient phlebotomy and electrocardiography services via mathematical modelling in an acute regional and teaching hospital. Health Systems, 6(2), 102-111.

[112] Yip, K., Pang, S. K., Chan, K. T., Chan, C. K., & Lee, T. L. (2016). Improving outpatient phlebotomy service efficiency and patient experience using discrete-event simulation. International Journal of Health Care Quality Assurance, 29(7), 733-743.