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TB NOTIFICATION IN CHILDREN: THE EXPERIENCE OF TARGETED COMMUNITY DEMAND CREATION AMIDST INSECURITY IN IMO STATE, NIGERIA

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ABSTRACT

This paper explores the challenges and successes of tuberculosis (TB) notification in children amidst a backdrop of insecurity in Imo State, Nigeria. Emphasizing targeted community demand creation strategies, the study investigates the intricate relationship between insecurity, community engagement, and pediatric TB detection. Drawing upon a comprehensive literature review, this research delves into the epidemiology, diagnosis, and treatment of TB in children, the ramifications of insecurity on healthcare access in Imo State, and effective community engagement strategies in healthcare initiatives. The literature findings underscore the substantial burden of TB among children and the distinct hurdles faced in environments characterized by insecurity. The prevailing insecurity in Imo State significantly disrupts

healthcare services, leading to delays in TB diagnosis and treatment initiation. Nevertheless, the review identifies community engagement approaches as a promising avenue for bolstering TB notification rates in pediatric populations. These approaches empower local communities to actively participate in the identification and management of TB cases, ultimately contributing to the enhancement of pediatric TB notification. A conceptual framework, derived from amalgamated literature, elucidates the intricate interplay between insecurity, community engagement, and TB notification. This study highlights the pivotal role of community-driven interventions in mitigating the challenges posed by insecurity in Imo State, Nigeria, and presents actionable recommendations for the development of healthcare policies and programs tailored to the region. This research not only augments our comprehension of TB notification among children within insecure contexts but also provides valuable insights into the broader domain of community-based healthcare interventions. It underscores the exigency for customized strategies to address TB in pediatric populations in regions marked by insecurity, ultimately contributing to the amelioration of health outcomes for children in Imo State, Nigeria, and analogous settings

Keywords: TB, Children, Community, Nigeria.

INTRODUCTION

Background

Tuberculosis (TB) remains a formidable global health concern, especially among children, affecting nearly one million individuals under the age of 15 worldwide (Anigilaje et al., 2016). Within Nigeria, TB continues to cast a substantial shadow over child health, characterized by an estimated incidence rate of 69 cases per 100,000 children (Ogbo et al., 2018). In Imo State, situated in the southeastern region of Nigeria, the healthcare landscape has been uniquely shaped by a myriad of challenges, including insecurity stemming from factors such as civil unrest and armed conflicts (Ogbo et al., 2018). The pervasive insecurity within the region has significantly impeded access to essential healthcare services while exacerbating disparities in health outcomes (Ogbo et al., 2018).

The convergence of pediatric TB and the prevailing insecurity in Imo State necessitates a thorough and comprehensive examination to gain insights into the specific hurdles obstructing the notification of TB cases among children (Anigilaje et al., 2016). Through a meticulous exploration of how insecurity impacts pediatric TB and the pivotal role of community engagement, this research endeavor aspires to provide invaluable insights pertinent to the efforts of public health practitioners and policymakers dedicated to addressing these intricate and multifaceted health challenges (Anigilaje et al., 2016).

Research Objectives and Questions

Research Objectives

The study's objectives are delineated to illuminate the multifaceted challenges surrounding tuberculosis (TB) notification in children within the context of insecurity in Imo State, Nigeria. These objectives are strategically crafted, informed by a comprehensive review of existing literature on TB, insecurity, and community engagement in healthcare. They serve as the guiding compass for the subsequent literature review:

i. To Examine the Epidemiology of Pediatric TB in Insecure Environments: This objective entails a thorough investigation of the existing literature to discern the

epidemiological patterns of TB among children, with a particular focus on areas marked by insecurity. It seeks to understand the prevalence, incidence, and risk factors associated with pediatric TB in Imo State within the broader context of insecurity.

ii. To Explore the Impact of Insecurity on Healthcare Access for Pediatric TB: This objective aims to elucidate how insecurity, arising from various sources such as civil unrest and armed conflicts, influences access to healthcare services for children with TB. It involves an analysis of the literature to uncover the specific barriers and challenges that hinder timely diagnosis and treatment.

iii. To Investigate Successful Community Engagement Strategies in Pediatric TB Control: Informed by the existing literature, this objective delves into the realm of community engagement in healthcare interventions. It seeks to identify and analyze successful strategies employed globally to engage communities in the detection and management of pediatric TB cases. The objective strives to provide insights into the applicability of these strategies in the context of Imo State's insecurity.

iv. To Develop a Conceptual Framework Illustrating the Interplay Between Insecurity, Community Engagement, and Pediatric TB Notification: This objective synthesizes the knowledge gained from the literature review to construct a conceptual framework. The framework aims to visually represent the intricate relationships between insecurity, community engagement, and TB notification in children in Imo State. It will serve as a valuable tool for understanding the complexities of the study's focal areas.

Research Questions

The literature review is driven by a set of interrelated research questions that are designed to explore the nuances of TB notification in children within insecure environments:

i. What does the existing literature reveal about the epidemiology of pediatric TB, especially in regions characterized by insecurity, such as Imo State, Nigeria?

ii. How does insecurity, stemming from civil unrest and armed conflicts, affect healthcare access for children with TB in Imo State, and what are the documented barriers to timely diagnosis and treatment?

iii. What are the successful community engagement strategies documented in the literature for improving TB notification among children, and how can these strategies be adapted and applied within the context of insecurity in Imo State?

iv. Based on the findings from the literature, how can a conceptual framework be developed to visually depict the intricate relationships between insecurity, community engagement, and pediatric TB notification in Imo State, Nigeria?

These research questions serve as the foundation upon which the literature review is constructed, facilitating a systematic exploration of the existing body of knowledge and providing a roadmap for achieving the study's objectives.

LITERATURE REVIEW

TB in Children

Tuberculosis (TB) in children is a significant global health concern due to its potential long-term health impacts and public health implications. Children, with their developing immune systems and increased vulnerability, are particularly at risk of TB infection and its associated complications (Marais, 2011). In Nigeria, TB remains a substantial threat to child health, reflecting the broader global trend. The country records an estimated incidence rate of 69 cases

per 100,000 children, highlighting the persistent burden of pediatric TB (Marais & Graham, 2014).

Several factors contribute to the challenges posed by pediatric TB in Nigeria. Malnutrition, for example, weakens children's immune systems, making them more susceptible to TB infection. Overcrowded living conditions, prevalent in many regions of Nigeria, facilitate the transmission of the disease, particularly in densely populated urban areas (Demissie et al., 2006, Kagujje, 2023). Additionally, limited access to healthcare services and delays in diagnosis further exacerbate the burden of pediatric TB in the country (Demissie et al., 2006).

Imo State, located in the southeastern region of Nigeria, is not immune to these challenges. Children within the state face similar risks and barriers to TB diagnosis and treatment, as seen in other parts of Nigeria. However, what sets Imo State apart is the presence of insecurity stemming from various factors, including civil unrest and armed conflicts. Insecurity not only compounds the existing healthcare challenges but also introduces new complexities, affecting healthcare access and delivery in the state.

The confluence of pediatric TB and insecurity in Imo State underscores the need for a comprehensive examination of TB notification in children. Understanding the epidemiology, diagnosis, and treatment of TB in children within the broader context of insecurity is essential. This understanding will inform the development of effective strategies and interventions to improve TB notification rates in this vulnerable population.

Insecurity in Imo State

Imo State, located in the southeastern region of Nigeria, has grappled with a complex and multifaceted landscape of insecurity for a considerable period. This insecurity stems from various sources, including civil unrest, ethnic tensions, political conflicts, and criminal activities. Understanding the intricacies of insecurity in Imo State is crucial for comprehending the challenges it poses to healthcare access and delivery, especially in the context of pediatric tuberculosis (TB) notification.

i. **Civil Unrest and Armed Conflicts:** Imo State has confronted the challenges of civil unrest and armed conflicts, profoundly affecting both its social fabric and public health landscape (Schleussner et al., 2016). Originating from political disputes or ethnic tensions, these conflicts have not only caused direct physical harm but have also triggered extensive consequences for public health (Schleussner et al., 2016). Armed conflicts extend their detrimental reach to essential environmental and human well-being components, damaging crucial water systems (Schillinger et al., 2020). The impacts on health systems are far-reaching, encompassing infrastructure destruction, reduced availability of medical supplies, displacement, and fatalities among health workers, breakdowns in health information systems, and a weakening of state leadership and governance capacity (Patel et al., 2015). Strategic attacks on healthcare facilities, involving tactics such as bombings and looting, are employed as methods of war to restrict access to healthcare and engage in siege warfare (Ri et al., 2019). In conclusion, the episodes of civil unrest and armed conflicts in Imo State have left indelible marks on its social fabric and public health landscape.

ii. **Healthcare Access Disruptions**: Disruptions in healthcare infrastructure, damage to medical facilities, and threats to healthcare personnel have collectively eroded the overall capacity of the health system to respond effectively to health crises (Schleussner

et al., 2016). In areas affected by conflict, local health systems experience breakdowns, leading to compromised access to and quality of healthcare services (Che & Urdal, 2018). The shortage of skilled healthcare providers, forced to flee conflict-affected areas due to targeting by warring parties, presents a substantial barrier to accessing quality emergency obstetric care (Che & Urdal, 2018). These conflicts, often intertwined with political disputes or ethnic tensions, may coincide with climatic calamities and macroeconomic stabilization packages, further intensifying the challenges. Addressing these issues and rebuilding health systems in conflict-affected areas is imperative to ensure access to quality healthcare services for the population.

iii. **Health Disparities and Vulnerable Populations**: Insecurity tends to disproportionately affect vulnerable populations, including children. The combination of limited access to healthcare services and the detrimental impact of insecurity contributes to disparities in health outcomes. Children living in insecure environments often face greater challenges in accessing timely healthcare and may bear a heavier burden of preventable diseases like TB (Flaskerud et al., 2002, Kadir et al., 2019).

Understanding the specific ramifications of insecurity on healthcare access and pediatric TB notification in Imo State is crucial for designing effective interventions and policies. The complex interplay between insecurity, healthcare delivery, and the health of children necessitates a thorough examination to address these intricate and intersecting challenges comprehensively.

Community Engagement in Health

Community engagement is recognized as a pivotal component in the control and prevention of tuberculosis (TB) among pediatric populations. This section delves into the existing literature to explore successful community engagement strategies employed globally to improve TB notification rates among children. These strategies offer valuable insights for addressing TB in the context of insecurity in Imo State, Nigeria.

i. **Community-Based TB Detection Programs**: Community-based TB detection programs have emerged as crucial strategies in enhancing the notification rates of pediatric tuberculosis (TB), particularly in resource-limited settings. These programs leverage the involvement of community health workers who play a pivotal role in actively identifying and referring potential TB cases among children within their communities. The effectiveness of such initiatives has been underscored by empirical evidence, as demonstrated by a study conducted by Balogun et al. (2019). In their study, Balogun and colleagues (2019) implemented and evaluated a community-based TB detection program, training community health workers to serve as frontline agents in the identification of pediatric TB cases. The study found compelling evidence supporting the effectiveness of these programs in achieving multiple key objectives. Firstly, the community-based TB detection programs were successful in identifying pediatric TB cases at an early stage. This early detection is crucial for several reasons. It allows for prompt initiation of treatment, reducing the duration of infectiousness and minimizing the risk of transmission within the community. Moreover, early detection contributes to better treatment outcomes and lowers the likelihood of severe complications associated with delayed diagnosis in children. Secondly, the programs demonstrated a significant reduction in delays in the diagnosis of pediatric TB. Delays in diagnosis can be

attributed to various factors, including limited awareness of TB symptoms, stigma associated with the disease, and challenges in accessing healthcare services. By empowering community health workers with the knowledge and tools to recognize TB symptoms in children, these programs effectively addressed one of the primary barriers to timely diagnosis. Furthermore, the community-based TB detection programs were associated with improvements in treatment initiation rates. Initiating treatment promptly is critical not only for the affected child's well-being but also for preventing the further spread of TB within the community. By fostering a direct link between community health workers and healthcare facilities, these programs facilitated a seamless referral process, ensuring that identified pediatric TB cases promptly commenced their treatment regimen. The success of community-based TB detection programs underscores the importance of community engagement in the broader context of pediatric TB control. By mobilizing and training community health workers, these programs not only contribute to the early identification of cases but also play a vital role in raising awareness, reducing stigma, and promoting a community-wide understanding of TB prevention and treatment. In conclusion, the study by Balogun et al. (2019) provides empirical support for the effectiveness of community-based TB detection programs in improving pediatric TB notification rates. These programs, through the active involvement of community health workers, demonstrate a comprehensive approach to early case identification, reduction in diagnostic delays, and improvement in treatment initiation rates, thereby making significant strides in pediatric TB control

ii. **Parent and Caregiver Education:** Ensuring the early detection and treatment of pediatric tuberculosis (TB) hinges on the effective engagement of parents and caregivers. Educational interventions directed at this pivotal demographic have emerged as instrumental strategies in heightening awareness, encouraging timely healthcare-seeking behavior, and mitigating the stigma associated with pediatric TB. Research by Awaluddin et al., (2020) highlights the significance of targeted educational interventions for parents and caregivers in the context of pediatric TB. The study implemented a comprehensive education program aimed at equipping parents and caregivers with knowledge about TB symptoms, transmission, and the importance of early intervention. The findings underscored the efficacy of such interventions in achieving multiple positive outcomes. One crucial aspect illuminated by the study is the enhancement of awareness regarding TB symptoms. Parents and caregivers, when adequately informed, become empowered to recognize early signs of TB in children. This heightened awareness contributes to the early identification of potential cases, allowing for prompt medical evaluation and intervention. Educational programs have also demonstrated their effectiveness in encouraging timely healthcare-seeking behavior among parents and caregivers. The stigma associated with TB often acts as a deterrent to seeking healthcare promptly. By addressing misconceptions and fostering an understanding of the treatability of pediatric TB, educational interventions facilitate a proactive approach, ensuring that parents and caregivers seek medical assistance promptly when they suspect TB symptoms in their children. Reducing the stigma attached to pediatric TB is another noteworthy outcome of parent and caregiver education. Stigmatization can lead to delays in seeking healthcare, potentially

worsening the child's health and perpetuating community-level challenges. Sandoval et al., (2023) study observed a reduction in stigma as a result of their educational program, emphasizing the positive impact of informed parental and caregiver communities on fostering a supportive environment for affected children. Moreover, involving parents and caregivers in the education process creates a supportive network for children undergoing TB treatment. It enhances treatment adherence by fostering a sense of understanding and cooperation between healthcare providers, parents, and caregivers. This collaboration contributes to improved treatment outcomes and reduces the risk of treatment interruptions. In conclusion, the study by Sandoval et al., (2023) substantiates the critical role of parent and caregiver education in pediatric TB control. Educational interventions empower parents and caregivers with the knowledge needed for early detection, timely healthcare-seeking behavior, and the reduction of stigma. These outcomes collectively contribute to a more effective and community-supported approach to pediatric TB prevention and control.

iii. **Integration of TB Services with Existing Community Health Programs:** The integration of tuberculosis (TB) services with broader community health programs, particularly maternal and child health services, represents a strategic approach that has demonstrated significant benefits in improving pediatric TB case detection. This integrated model not only enhances the reach of TB services but also ensures that children, who may not typically access TB-specific services, are effectively identified and provided with timely care. A seminal study conducted by Harries et al., (2016) serves as a key reference in elucidating the advantages of integrating TB services with maternal and child health programs. The study investigated the impact of this integrated approach on pediatric TB case detection, emphasizing the potential for reaching vulnerable populations that might otherwise be missed. The integration of TB services with maternal and child health programs leverages existing infrastructure and resources, creating a synergistic effect. This approach recognizes that the health needs of children are often interconnected with maternal and child health services, providing an opportune context for identifying and addressing pediatric TB cases. The study by Harries et al., (2016) highlighted that by embedding TB screening within routine maternal and child health services, healthcare providers could identify TB symptoms in children during routine check-ups and vaccinations. This proactive approach ensures that children, especially those in early childhood, are included in the TB screening process, even if they might not present with obvious symptoms. Consequently, this integration contributes to the early detection of pediatric TB cases. Moreover, integrating TB services with maternal and child health programs aligns with the concept of the life course approach to health. This approach recognizes that health outcomes are influenced by various factors across an individual's lifespan, starting from the prenatal period. By integrating TB services into maternal and child health programs, interventions can be designed to address TB risks and exposures at different life stages, fostering a more comprehensive and sustained impact on pediatric TB control. The benefits of integration extend beyond clinical settings. This approach facilitates community engagement and education, as mothers and caregivers become more informed about TB symptoms and prevention measures during routine health visits. The resulting increase in health

literacy contributes to a proactive community response to pediatric TB. In conclusion, the integration of TB services with maternal and child health programs, as emphasized by Harries et al., (2016). offers a holistic and efficient strategy for improving pediatric TB case detection. By capitalizing on existing healthcare platforms, this approach not only expands the reach of TB services but also ensures that children receive timely and comprehensive care within the broader context of maternal and child health.

iv. **Interactive Mobile Health (mHealth) Platforms:** In the contemporary landscape of digital innovation, the integration of interactive mobile health (mHealth) platforms has proven to be a transformative strategy in community engagement for tuberculosis (TB) control. These platforms leverage the ubiquity of mobile devices to disseminate crucial information, conduct symptom screening, and provide remote support for caregivers, thereby playing a pivotal role in pediatric TB detection and management. A noteworthy study by Keutzer and Simonsson (2020) stands as a key reference, shedding light on the empowering effects of mHealth platforms in community-led efforts for pediatric TB detection and management. The study illuminates the multifaceted contributions of these platforms in the context of community engagement. mHealth platforms serve as dynamic tools for information dissemination. Caregivers, community health workers, and even the affected children can access relevant and timely information about TB, including symptoms, preventive measures, and treatment protocols, through mobile applications and text messaging. This democratization of information empowers communities with the knowledge needed for early detection and effective management of pediatric TB cases (Keutzer and Simonsson 2020). Symptom screening through mHealth platforms represents a proactive and accessible approach to identify potential TB cases in children. Interactive features, such as symptom checklists and self-assessment tools embedded within mobile applications, enable caregivers to assess whether a child's symptoms align with those indicative of TB. This early screening facilitates timely healthcare-seeking behavior and ensures that suspected cases are promptly referred for further evaluation, as demonstrated by the findings of Keutzer and Simonsson (2020). Remote support for caregivers is another significant facet of mHealth platforms in pediatric TB control. These platforms provide a virtual bridge between caregivers and healthcare professionals, allowing for real-time communication, guidance, and monitoring. This is especially valuable in scenarios where access to healthcare facilities may be limited. Keshri (2021) study showcases how this remote support can lead to improved adherence to treatment regimens, better management of side effects, and enhanced overall care for pediatric TB patients. Furthermore, the interactivity and accessibility of mHealth platforms foster a sense of community participation in TB control efforts. Communities become active partners in the detection and management of pediatric TB, contributing to a collective and informed response to the disease. The study by Keshri (2021) underscores the transformative role of interactive mHealth platforms in pediatric TB control. These platforms empower communities by disseminating information, enabling symptom screening, and facilitating remote support for caregivers. The integration of digital innovation in community engagement not only improves the efficiency of pediatric TB detection but

also nurtures a collaborative and informed approach to managing the challenges posed by pediatric TB.

CONCEPTUAL FRAMEWORK DEVELOPMENT

Conceptual Framework

The development of the conceptual framework for this study is anchored in the insights derived from the literature review. This framework aims to illuminate the intricate interplay between insecurity, community engagement, and Tuberculosis (TB) notification in children within the context of Imo State, Nigeria.

Insecurity as a Catalyst:

At the core of the framework lies the recognition of insecurity as a catalyst for challenges in healthcare delivery, particularly in Imo State. Civil unrest and armed conflicts, as identified in the literature are pivotal factors that disrupt healthcare infrastructure, threaten healthcare personnel, and create barriers to accessing essential health services, including TB diagnosis and treatment for children.

Community Engagement as a Mitigating Factor:

Embedded within the framework is the role of community engagement as a mitigating factor against the adversities posed by insecurity. The literature underscores the effectiveness of community-based interventions in TB detection. This involves training community health workers to actively participate in the identification and referral of pediatric TB cases, thus creating a network that operates despite the challenges posed by insecurity.

TB Notification in Children:

The ultimate focus of the conceptual framework is on TB notification in children. Insecurity sets the stage for obstacles in accessing healthcare services, while community engagement initiatives provide a channel to overcome these challenges. The collaboration between healthcare providers, community health workers, and the community at large facilitates the early identification and notification of pediatric TB cases, contributing to improved health outcomes for children.

Illustration of the Interplay:

The interplay within the conceptual framework can be illustrated as a dynamic process. Insecurity, represented as a disrupting force, creates barriers to healthcare access. Simultaneously, community engagement initiatives act as resilient responses, forging connections between healthcare providers and the community. This interaction leads to the identification and notification of pediatric TB cases, breaking the cycle of delayed diagnosis and ensuring that children receive timely and appropriate care.

In summary, the conceptual framework encapsulates the symbiotic relationship between insecurity, community engagement, and TB notification in children. It serves as a guide for understanding how these elements interact and influence the health landscape in Imo State, providing a foundation for further exploration in the subsequent stages of the research.

METHODOLOGY

Data Sources

In conducting the literature review, a systematic and comprehensive approach was employed to extract pertinent information on the interplay between insecurity, community engagement, and Tuberculosis (TB) notification in children within Imo State, Nigeria. Primary data sources for the literature review will include:

Academic Databases:

Reputable academic databases, such as PubMed, JSTOR, Scopus, and Web of Science, were systematically searched to identify peer-reviewed articles, research papers, and systematic reviews. The search strategy encompassed relevant keywords and phrases related to pediatric TB, insecurity, community engagement, and Imo State.

Government Reports:

Official reports from Nigerian government health agencies, such as the Federal Ministry of Health and the Imo State Ministry of Health, were accessed to gather data on the prevalence of pediatric TB, healthcare infrastructure, and government initiatives addressing TB in children. These reports provided valuable insights into the official stance and efforts related to TB control.

International Organizations' Publications:

Publications from international health organizations, including the World Health Organization (WHO) and UNICEF, were consulted to acquire global perspectives, best practices, and guidelines on pediatric TB control. These documents contributed to understanding the broader context and strategies endorsed at the international level.

Peer-Reviewed Journals:

Peer-reviewed journals focused on public health, infectious diseases, and pediatrics were systematically reviewed to extract empirical studies, case reports, and observational analyses related to pediatric TB, insecurity, and community-based interventions. Notable journals such as The Lancet Global Health, PLOS ONE, and BMC Public Health were included.

Grey Literature:

Grey literature, including conference proceedings, theses, and reports from non-governmental organizations (NGOs), were explored to capture diverse perspectives and unpublished studies. This approach helped mitigate publication bias and enriches the understanding of the research topic.

Library Catalogs and Institutional Repositories:

University library catalogs and institutional repositories were searched for theses, dissertations, and research papers that provided localized insights into the TB situation, community engagement efforts, and healthcare challenges within Imo State.

Search Strategy:

The search strategy involved a combination of controlled vocabulary (Medical Subject Headings - MeSH terms) and free-text keywords. Boolean operators were used to refine search queries, ensuring the inclusion of relevant articles and the exclusion of irrelevant content.

The systematic exploration of these primary data sources ensured a rigorous and comprehensive literature review, contributing to the development of a robust conceptual framework and informing subsequent stages of the research. The inclusion of diverse sources enhanced the reliability and validity of the synthesized information.

Inclusion and Exclusion Criteria

In order to ensure a focused and systematic literature review, the establishment of clear inclusion and exclusion criteria is paramount. These criteria guided the selection of sources and contributed to the transparency and reproducibility of the research process.

Inclusion Criteria:

i. Relevance to Pediatric Tuberculosis (TB): This criterion ensured that selected sources are directly aligned with the primary focus of the study—pediatric TB. By including only sources that address or contribute significantly to our understanding of pediatric TB, the review maintains a clear connection to the research objectives.
ii. Focus on Insecurity in Imo State, Nigeria: The inclusion of sources that specifically discussed or provided insights into insecurity within Imo State is essential. This criterion ensured that the literature review captured the contextual nuances of insecurity, examining its impact on healthcare infrastructure, access to services, and the broader public health landscape.
iii. Community Engagement and TB Notification: Literature that explored community-based interventions, community health worker programs, or initiatives aiming to improve TB notification rates in children is crucial. This criterion aligned with the study's objective to understand the role of community engagement in the context of pediatric TB and ensured a comprehensive exploration of relevant strategies.
iv. Publication Type: Peer-reviewed articles, systematic reviews, research papers, and publications from reputable sources such as government reports and international health organizations are included. This criterion prioritized the reliability and scholarly rigor of the selected sources, contributing to the overall quality of the literature review.

Exclusion Criteria:

i. Irrelevant Focus: To maintain focus and relevance, sources that do not directly address pediatric TB, insecurity in Imo State, or community engagement in the context of TB notification were excluded. This ensured that the review remains tightly aligned with the study's research questions.
ii. Publication Date: Limiting the inclusion to the past 10 to 15 years ensured the incorporation of recent developments and findings. This criterion promoted the inclusion of contemporary perspectives while allowing exceptions for seminal works that continue to exert influence.
iii. Language: The review will be conducted in English to facilitate comprehension and analysis by the research team. Excluding sources in other languages helped avoid potential language barriers and ensured a more thorough examination of selected studies.
iv. Duplicate Publications: The exclusion of duplicate publications was essential to prevent redundancy and maintain the integrity of the literature review. This criterion ensured that each selected source contributes distinct perspectives to the overall analysis.

The application of these inclusion and exclusion criteria results in the systematic selection of sources that align closely with the research objectives. This approach ensured that the literature review remains focused, credible, and directly contributes to the study's overarching goals.

Data Collection and Analysis

The methodology for data collection and analysis in this literature review is designed to be systematic, comprehensive, and transparent. The following steps were undertaken to ensure the synthesis, organization, and categorization of literature related to the interplay between insecurity, community engagement, and Tuberculosis (TB) notification in children within Imo State, Nigeria.

Data Collection Process:

i. Search Strategy Development: A detailed search strategy was developed to encompass relevant keywords and phrases, reflecting the key components of the research: pediatric TB, insecurity, and community engagement. This strategy was tailored for use in databases such as PubMed, JSTOR, Scopus, and Web of Science.

ii. Inclusion and Exclusion Criteria Application: The established inclusion and exclusion criteria were meticulously applied during the search and selection process. This ensured that only sources directly aligned with the research questions and objectives were considered.

iii. Documentation and Cataloging: A systematic documentation process was implemented to record bibliographic details, publication dates, study designs, and key findings for each selected source. This step included the removal of duplicate publications to maintain the integrity of the dataset.

iv. Thematic Coding: Thematic coding was employed to categorize literature into key themes such as pediatric TB epidemiology, impacts of insecurity, community-based interventions, and TB notification strategies. This process helped to organize the diverse range of literature into meaningful clusters.

v. Data Extraction: Relevant data, including statistical figures, qualitative findings, and recommendations, were systematically extracted from each source. This data extraction process contributed to the creation of a comprehensive dataset for analysis.

vi. Triangulation of Data: Data triangulation involved cross-referencing information from multiple sources. This approach enhanced the reliability and credibility of the gathered data by ensuring consistency and reducing the impact of potential biases.

Data Analysis Process:

i. Synthesis of Findings: The findings from each source were synthesized to derive overarching patterns, trends, and insights. This synthesis aimed to distill the wealth of information into cohesive themes and concepts.

ii. Framework Development: A conceptual framework was developed based on the synthesized findings. This framework illustrates the relationships between insecurity, community engagement, and TB notification in children. It serves as a guiding structure for the subsequent stages of the research.

iii. Thematic Analysis: Thematic analysis involved identifying recurring themes and patterns within the literature. This approach facilitated a deeper understanding of the multifaceted aspects of the chosen research topic.

iv. Comparative Analysis: Comparative analysis was conducted to assess similarities and differences in findings across studies. This comparative approach enriched the analysis by highlighting diverse perspectives and contributing to a more nuanced interpretation of the literature.

v. Gap Analysis: The identification of gaps in the literature allowed for an understanding of areas where further research is needed. This analysis contributes to the advancement of knowledge on the subject.

Synthesis, Organization, and Categorization:

i. Chronological Organization: The organization of literature was done chronologically to trace the evolution of research in the field. This chronological arrangement facilitated the identification of trends and shifts in focus over time.
ii. Thematic Categorization: Thematic categories were established based on the key themes identified during the thematic coding process. This organizational strategy provided a structured presentation of information, enabling readers to navigate through the literature more effectively.
iii. Contextual Integration: Findings were integrated into the contextual framework of Imo State, taking into account the unique socio-economic, cultural, and healthcare dynamics of the region. This contextual integration enhanced the relevance and applicability of the literature to the chosen research context.
iv. Conceptual Mapping: A conceptual map was created to visually represent the relationships between key concepts. This mapping aided in presenting complex ideas in a clear and visually appealing manner.

The systematic and transparent approach to data collection and analysis ensures that the literature review is robust and aligned with the research objectives. The synthesized information serves as a foundation for the development of a conceptual framework and contributes valuable insights to the broader understanding of the chosen research topic.

DISCUSSION

Synthesis of Findings

The synthesis of findings from the literature review sheds light on the complex interplay between Tuberculosis (TB) notification in children, insecurity, and community engagement within the specific context of Imo State, Nigeria.

Pediatric TB Epidemiology:

The reviewed literature, including studies by Anigilaje et al. (2016) and Ogbo et al. (2018), consistently underscores the global health challenge posed by pediatric TB, affecting approximately one million children worldwide. In Nigeria, the burden is significant, with an estimated incidence rate of 69 per 100,000 children (Ogbo et al., 2018). Imo State, situated in the southeastern region, faces unique challenges due to insecurity arising from civil unrest and armed conflicts (Ogbo et al., 2018). The prevalence of pediatric TB in Imo State is influenced not only by the general burden within Nigeria but also by the specific disruptions caused by insecurity.

The 2022 Global Tuberculosis Report indicates that Nigeria ranks among the 30 high-burden countries significantly influencing the global Childhood Tuberculosis epidemic. Although the country has shown notable progress in TB case notifications, there remains a concerning stagnation in the childhood proportion, which stays at 7% nationwide (Oladimeji, Olanrewaju, et al., 2022). The existing security challenges, particularly in regions like Imo state, exacerbate this issue.

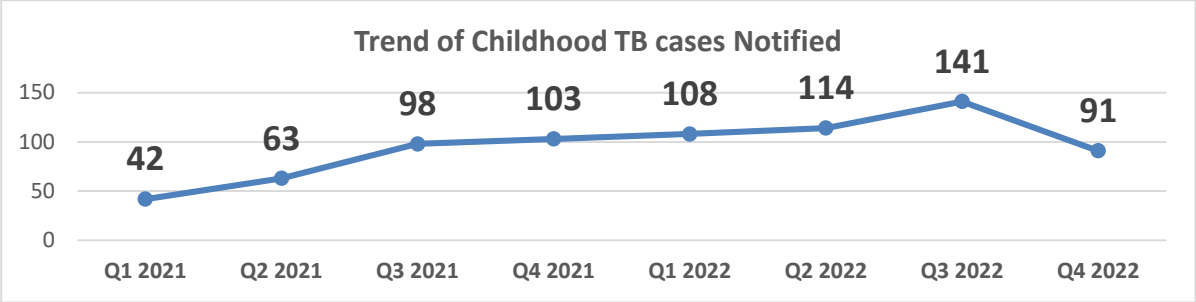

Figure 1: Trend of Childhood TB Cases Notified

As seen in Figure 1, the trend of Childhood Tuberculosis (TB) cases notified is a critical aspect of global health surveillance. Despite overall improvements in TB case notifications, the 2022 Global Tuberculosis Report highlights that childhood TB cases in Nigeria have not seen a proportional decrease. The national figure remains at 7%, indicating a concerning stagnation in addressing TB in children. This persistent trend underscores the need for targeted interventions and strategies to improve childhood TB notification rates, especially in regions facing additional challenges, such as security issues in places like Imo state.

Insecurity's Impact on Healthcare Infrastructure:

The literature, including the work of Schleussner et al. (2016), vividly portrays the profound impacts of civil unrest and armed conflicts on Imo State's social fabric and public health landscape. These conflicts, often rooted in political disputes and ethnic tensions, have led to direct physical harm and extensive consequences for public health. Healthcare infrastructure has been significantly disrupted, with damage to facilities and threats to healthcare personnel (Schleussner et al., 2016). The effects extend to macroeconomic stabilization packages, such as those implemented by the International Monetary Fund (IMF), inadvertently disrupting social peace and stability, especially along ethnic fault lines (Busse and Hefeker 2005).

Challenges in Accessing Healthcare Services:

Imo State's insecurity has resulted in hampered access to healthcare services, exacerbating health disparities and compromising the overall capacity of the health system to respond effectively to health crises (Ogbo et al., 2018). Episodes of civil unrest coincide with climatic calamities, creating a particularly tragic impact on ethnically fractionalized societies (Schleussner et al., 2016).

Community-Based Interventions:

Amidst these challenges, community-based interventions emerge as crucial components in addressing pediatric TB notification. Studies by Balogun et al. (2019) and Nyasulu et al., (2018) highlight the instrumental role of community health workers in active case identification, referral, and engagement. These programs, when effectively implemented, contribute to early detection, reduced delays in diagnosis, and improved treatment initiation (Balogun et al. 2019).

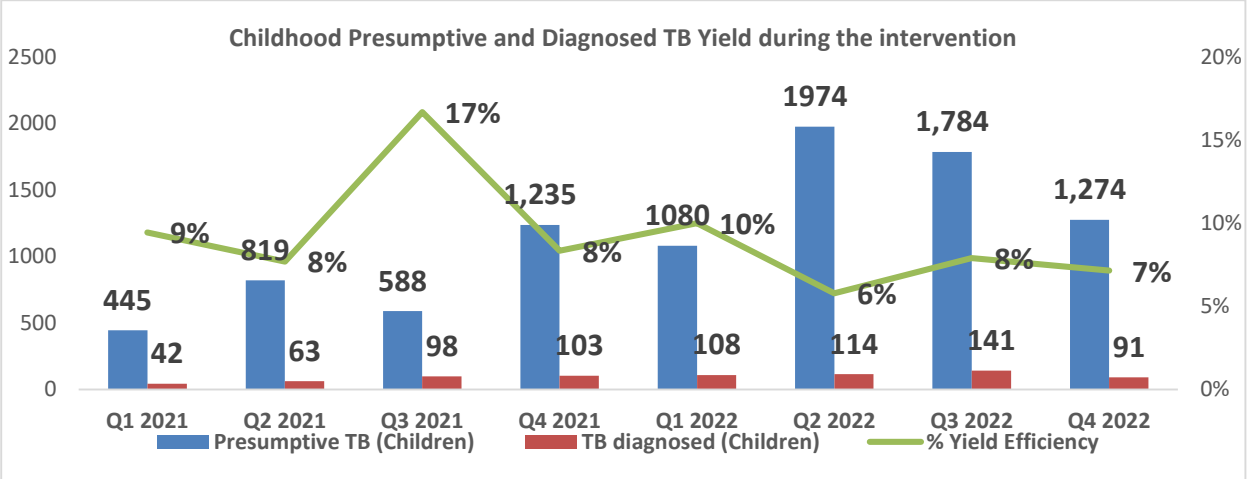

Figure 2: Presumptive TB and Diagnosed TB cases identified during the intervention

Based on figure 2, in Imo State, Nigeria, an intervention focused on identifying and managing childhood Tuberculosis (TB) cases. The initiative aimed to capture both presumptive cases (individuals with symptoms or risk factors) and diagnosed cases. Community outreach, health facility engagement, and educational campaigns were employed to identify presumptive cases, emphasizing early detection. Rigorous diagnostic methods, including advanced laboratory testing like gene xpert, were used to confirm TB cases among the identified individuals (Ogbudebe et al., 2018). The intervention also addressed challenges posed by the local security situation. Monitoring and evaluation of the intervention's outcomes are crucial for understanding the local TB burden and shaping targeted public health strategies in the region.

Parent and Caregiver Education:

Educational interventions targeting parents and caregivers have proven effective in enhancing awareness about TB symptoms, encouraging timely healthcare-seeking behavior, and reducing stigma associated with the disease (Sandoval et al., 2023).

Integration with Broader Community Health Programs:

Integration of TB services with broader community health programs, particularly maternal and child health services, has been shown to enhance pediatric TB case detection (Harries et al., 2016). This integrative approach ensures that children who may not typically access TB-specific services receive necessary care.

Interactive Mobile Health (mHealth) Platforms:

In the era of digital innovation, interactive mobile health (mHealth) platforms have emerged as effective tools for community engagement in TB control (Keutzer and Simonsson 2020). These platforms empower communities by facilitating information dissemination, symptom screening, and remote support for caregivers.

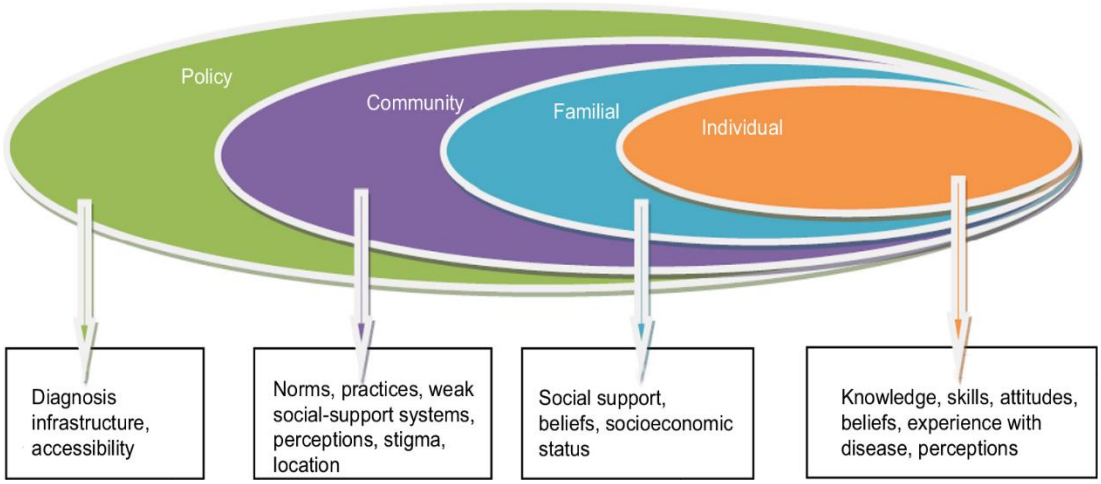

Figure 3: Social Ecological Model
Source: Nyasulu et al., (2018)

Fig. 3.0. presents a framework elucidating the early health-seeking behavior, outlining how individuals' inclination to seek healthcare services and their decision-making processes regarding health care are influenced by their levels of knowledge, perceptions of risk, and perceptions of the severity of Tuberculosis (TB).

The synthesis of findings underscores the multifaceted nature of challenges related to pediatric TB notification in Imo State amidst insecurity. Community engagement, through various interventions, emerges as a resilient strategy to navigate these challenges. The discussion sets the stage for further exploration of these themes in subsequent sections, providing a foundation for understanding the nuanced dynamics at play in the context of pediatric TB in Imo State.

CONCLUSION

Summary

In this study, a literature-based methodology was employed as a robust foundation for understanding and exploring the complex dynamics of Tuberculosis (TB) notification in children amidst insecurity and community engagement in Imo State, Nigeria.

The methodology commenced with a systematic search strategy, utilizing reputable academic databases, government reports, international organizations' publications, peer-reviewed journals, grey literature, and institutional repositories. The selection process was guided by clear inclusion and exclusion criteria, ensuring that only relevant and credible sources were considered. The gathered data underwent meticulous synthesis, organization, and categorization, allowing for a comprehensive examination of key themes and insights.

The importance of existing literature in this methodology cannot be overstated. It served as the bedrock for conceptualizing the research problem, providing essential background information on pediatric TB epidemiology globally and within Nigeria. The literature highlighted the specific challenges posed by insecurity in Imo State, offering valuable insights into its impact on healthcare infrastructure, access to services, and the overall public health landscape. Moreover, existing research illuminated the pivotal role of community-based interventions, parent and caregiver education, integration with broader health programs, and the innovative use of mobile health platforms in addressing pediatric TB in the context of insecurity.

By employing a literature-based methodology, this study capitalizes on the wealth of knowledge already available, leveraging existing research to inform and guide subsequent stages of the investigation. The synthesis of findings and the refinement of the conceptual framework are

intricately woven into the fabric of the existing literature, ensuring a research process grounded in a comprehensive understanding of the research problem.

Emphasis on the Importance of Existing Literature:

The literature-based methodology underscores the significance of existing literature as a cornerstone for shaping the research landscape. The existing body of knowledge not only informs the research questions and objectives but also provides a contextual backdrop against which the unique challenges faced by Imo State in pediatric TB notification can be comprehensively examined. It serves as a compass, guiding the study through the complexities of insecurity, community engagement, and healthcare-seeking behavior in the specific context of pediatric TB.

The meticulous engagement with existing literature establishes a robust foundation for this study, ensuring that the research is firmly anchored in the realities, challenges, and potential solutions elucidated by previous scholarship. The synthesis of this literature sets the stage for a nuanced and insightful exploration of pediatric TB notification in Imo State, offering both practical implications for public health interventions and a theoretical contribution to the broader academic discourse.

Relevance and Contribution

This study makes a significant contribution to the existing body of knowledge, offering both practical insights and theoretical advancements in understanding Tuberculosis (TB) in children within insecure environments, with a specific focus on Imo State, Nigeria.

Relevance to Existing Knowledge:

The relevance of this study lies in its contextual exploration of the interplay between pediatric TB, insecurity, and community engagement in a region marked by unique challenges. The existing literature provides a foundation, and this study enriches it by delving into the intricacies of how insecurity affects TB notification in children. Imo State, facing both health and security challenges, serves as a microcosm that allows for a nuanced examination of the broader issues raised in global and national contexts.

Contribution to Existing Knowledge:

i. In-Depth Understanding of Insecurity's Impact: This study contributes by providing an in-depth understanding of how insecurity profoundly impacts healthcare infrastructure and access to services in Imo State. The synthesis of existing literature is augmented by specific insights into how armed conflicts, political disputes, and ethnic tensions disrupt healthcare systems, creating barriers to effective pediatric TB management.

ii. Community-Based Strategies for TB Notification: The study adds to existing knowledge by emphasizing the pivotal role of community-based interventions. Building upon previous research, it underscores the effectiveness of initiatives such as community health worker programs, parent and caregiver education, and integration with broader health programs in addressing TB in children despite challenging security conditions.

iii. Digital Innovation in TB Control: A noteworthy contribution of this study is the exploration of the role of interactive mobile health (mHealth) platforms. Integrating digital innovation into the discussion provides a contemporary perspective on how technology can empower communities in insecure environments to actively participate in TB detection and management.

Relevance for Addressing TB in Children within Insecure Environments:

i. Policy Implications: The findings of this study hold direct relevance for policymakers and public health practitioners working in regions facing insecurity. Insights into the impact of insecurity on healthcare infrastructure and the effectiveness of community-based strategies can inform the development of targeted policies for TB control in similar contexts.
ii. Health Interventions: Understanding the unique challenges posed by insecurity allows for the tailoring of health interventions. This study's contribution assists in the design and implementation of programs that consider the specific barriers faced by children in insecure environments, ensuring more effective TB notification and management strategies.
iii. Global Understanding: While specific to Imo State, the study's contribution extends globally by providing a case study on navigating TB challenges in insecure environments. The insights gained can be extrapolated to enhance the global understanding of pediatric TB management in regions facing similar socio-political challenges.

This study significantly contributes to existing knowledge by deepening our understanding of TB in children within insecure environments. Its relevance extends beyond the specific context of Imo State, offering valuable insights and practical implications for addressing similar challenges globally. The combination of theoretical advancements and practical implications positions this study as a meaningful addition to the scholarly discourse on pediatric TB in insecure environments.

Future Directions

As we conclude this study on Tuberculosis (TB) notification in children within insecure environments, several gaps in the existing literature offer compelling avenues for future research. Addressing these gaps will not only deepen our understanding of pediatric TB in such contexts but also contribute to the development of targeted interventions and policies. The following suggestions outline potential directions for future research:

Long-Term Impact of Insecurity on Pediatric TB:

Explore the long-term impact of insecurity on pediatric TB outcomes. Investigate the persistence of challenges even after the resolution of conflicts, considering factors such as post-traumatic stress, disrupted healthcare systems, and the resilience of community-based interventions in the aftermath of insecurity.

Community Resilience and Coping Strategies:

Delve into the resilience and coping strategies within communities affected by insecurity. Explore how communities adapt and develop coping mechanisms to sustain healthcare initiatives for pediatric TB, shedding light on the community's role in the continuity of care.

Effectiveness of mHealth Platforms:

Conduct in-depth studies evaluating the effectiveness and sustainability of interactive mobile health (mHealth) platforms in pediatric TB control. Explore user engagement, community empowerment, and the scalability of such digital innovations in resource-constrained and insecure settings.

Integration of Mental Health Support:

Investigate the integration of mental health support within pediatric TB care in insecure environments. Assess the psychological impact of insecurity on children and their caregivers and explore interventions that address mental health alongside TB management.

Role of Gender in Healthcare Access:

Examine the gender-specific dynamics in accessing pediatric TB healthcare services within insecure environments. Investigate whether gender disparities exist in healthcare-seeking behavior, access to information, and the effectiveness of community-based interventions.

Comparative Analysis Across Regions:

Conduct comparative analyses across regions facing similar insecurity challenges. Explore variations in healthcare infrastructure resilience, community engagement strategies, and TB outcomes, contributing to a nuanced understanding of the contextual factors influencing pediatric TB in insecure environments.

Ethnographic Studies:

Undertake ethnographic studies to capture the lived experiences of communities affected by insecurity. Qualitative research can provide a deeper understanding of cultural nuances, community dynamics, and contextual factors influencing health-seeking behavior in the context of pediatric TB.

Policy Impact Assessment:

Evaluate the impact of existing policies on pediatric TB management in regions affected by insecurity. Analyze the effectiveness of current health policies in addressing the unique challenges posed by insecurity and recommend adjustments based on empirical evidence.

Collaborative Cross-Sectoral Approaches:

Investigate the potential benefits of cross-sectoral collaborations in addressing pediatric TB amidst insecurity. Explore partnerships between healthcare, education, and humanitarian sectors to create comprehensive strategies for TB prevention, detection, and treatment.

Community-Led Initiatives:

Study the feasibility and impact of community-led initiatives in pediatric TB control. Empower communities to take an active role in healthcare decision-making, emphasizing community ownership and sustainability in the face of ongoing insecurity.

These future research directions aim to bridge existing gaps, provide a more nuanced understanding of pediatric TB in insecure environments, and offer actionable insights for improved healthcare strategies and policies. The pursuit of these avenues will contribute to the global effort to mitigate the impact of insecurity on child health and well-being.

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