



## CRITICAL ANALYSIS ON NURSING'S ROLE IN MITIGATING ANTIBIOTIC IMPACTS ON CHILDHOOD IMMUNITY

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### ABSTRACT

This critical review will analysis the relevance of this study and cover various nursing issues and how they impact the immune system of a child when she has a drug abuse problem. It is known that antibiotics are very effective in the case of bacteria causing infections, but these also lead to weakening the immune system of the infant. Immediate-to-skin care by nurses can take various forms, such as waking the mothers for breastfeeding, training the parents on appropriate antibiotic use, etc. All these are essential nursing interventions utilized to promote the newborn's immunity. After an investigational synthesis of literature and how and why nursing can be relevant in this particular case, this approach looks at things from another angle that could serve good purposes. Our assessment process involved a thorough review of all the literature and statistics coupled with such studies. The result and analysis figures, tables, and charts would be nicely displayed. "Self – made" is the part, whether I remembered it or not. The emergence of MDR bacteria results in the development of the medical guidelines of nursing care in the field of public health that might impede the improvement of the response to the antibacterial agents in children, which eventually could lead to the dismantling of their vaccination effectiveness.

**Keywords:** Nursing, Antibiotics, Childhood Immunity, Breastfeeding, Education, Critical Analysis.

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**DOI:** 10.53555/ecb/2022.11.9.141

## INTRODUCTION

Nowadays, the position of antibiotics as a cornerstone of medicine in the specter of curing infections is well established and altered the ways that infectious diseases are treated with. Their capability to ward off bacterial infections and lives they might have saved as well as the excellent global health outcomes they must have experienced are indisputable. They thought that doctors commonly prescribed antibiotics in a rush without thinking about the consequences for the children's immune system; this caused the people to get more and more afraid. The intervention of nursing, in this case, is the source of these critical assessments, which nurses address through advocating for breastfeeding and teaching the correct dosage of antibiotics for the parents. The current study and the literature review will incorporate the evidence, and the nurse expert will fill the knowledge gap in the children's system can resist antibiotic attacks (Nakamichi & Madi, 2020).

### The Dilemma of Antibiotic Use and Childhood Immunity

It is beyond doubt that antibiotics have advanced medical care to the point that bacteria-caused diseases, previously most challenging to treat, can now be cured with their help. The main concern is that they can often be shared among the public about the unintended outcomes of disrupting a child's adaptive immune system. The initial intake of antibiotics during one's early development can reprogram the immune system to an extent, threatening the ability to fight against pathogens effectively. As a result, in addition to affecting beneficial gut microbes, antibiotics may also increase the susceptibility to infections and contribute to developing chronic diseases in the long run (Nakamichi & Madi, 2020). Consequently, antibiotics play a critical role in the treatment of infectious illnesses. Still, if not implemented correctly, their influence on the child's immunity requires careful monitoring and appropriate actions.

### Nursing's Crucial Role in Mitigating Antibiotic Impacts

The nurse is an indispensable figure in providing patient care services. Consequently, the nursing profession is warranted to use its considerable power to enhance healthcare practices and results. Nursing in the sense of childhood immunity and antibiotic derivatives is more critical due to minimizing side effects and providing better health protection. By promoting activities like breastfeeding and parent

education about responsible antibiotic use, nurses can foster an environment where parents are equipped with the required knowledge to make informed decisions to ensure children's immunological health. Besides, with their experience in patient representation and holistic care, nurses can deal with the root causes (determinants) of self-medicating as well as lobby for the dimensions of prescribing antibiotics cautiously.

### Scope of Study and Objectives

A comprehensive critical analysis is used in this paper to examine the complex issue of antibiotic resistance, its role in weakening the immune system, and nursing practice. The study focuses on a systematic review of existing literature to elucidate the mechanisms of antibiotic influence on immunity. This part of the study will also assess the effectiveness of utilizing nursing interventions to impede these antibiotic effects and identify areas for further research and improvement. The primary goal of the analysis is to synthesize the study of various sources. Among the conclusions drawn from this process are actionable recommendations intended to improve nursing practice and influence the development of relevant policies in the current context where the quality of care for children at risk for antibiotic-related immune disruption needs to be enhanced.

### Justification for Analysis

The importance of nurses in promoting child health and general welfare is a primary reason for this critical analysis. Trusted in healthcare as experts, nurses possess the knowledge, power, skills, and relational qualities necessary to enact the change required in preventing antibiotic abuse and its impact on immunity. The main goal of this analysis is to review the already existing evidence critically, identify the knowledge gaps, and provide nurses with the necessary tools and strategies that will be important in improving the interventions they provide and eventually achieving higher-quality health outcomes among pediatric patients in a time where there is widespread use of antibiotics (Nakamichi & Madi, 2020).

## LITERATURE REVIEW

Antibiotics act as a sword possessing double edges for a child's health because they can have a strong antibacterial effect. Still, they can also cause some damage to the immune system or overall health. An adequate literature review along this line gives a whole new meaning to how antibiotics affect

childhood immunity, highlighting the significance of nursing intervention and protection against adverse effects to promote the best health outcomes.

### **Impact of Antibiotics on Childhood Immunity**

Through the antibiotics, there is no other medical tool in the 20th century that has revolutionized the infection management landscape as antibiotics have. Through the destruction of pathogenic bacteria, which causes infections and diseases, antibiotics thus quell infections and alleviate symptoms, significantly reducing mortality in patients. Nevertheless, their general activity may lead to a misbalance in the human micro biome, especially in digestion processes. The gut microbiota, which contains various bacteria, is essential in studying immune system development and function. Disruption of gut micro biome (or microbial) composition or diversity by antibiotic treatments causes an imbalance of immune homeostasis among individuals, thus increasing the risk of infection and inflammatory diseases.

Besides, the gross use and misuse of antibiotics play an essential role in developing and diffusing antibiotic-resistant bacteria, which is a very challenging challenge to public health and safety nowadays. The children group of the population is especially vulnerable to the consequences of antibiotic resistance because they have a growing immune system and a higher-than-average incidence of antibiotic exposure. The emergence of drug-resistant microorganisms not only renders certain medications ineffective but also complicates the treatment of common childhood diseases that could otherwise heal quickly, thereby extending the duration of illness, raising healthcare expenses, and contributing to a corresponding rise in mortality and morbidity rates.

### **Nursing Interventions in Mitigating Antibiotic Impacts**

Amid antibiotic intake being both detrimental and helpful regarding children's immunity, nursing intervention takes on a significant part of nursing care to reduce adverse effects and preserve health. Breastfeeding, an evident key to immunity and nutritional support, has been seen as a substantial part of early childhood feeding. Breast milk carries a wealth of information, including antibodies, enzymes, and beneficial bacteria that promote infant health.

Furthermore, improving nursing education and parental guidance is essential in promoting proper antibiotic usage and avoiding unwanted exposure.

Nurses, being professionals in the health care system, have relatively high acceptability among parents; thus, they can be used as the best way to educate parents about suitable indications for the use of antibiotics, the need for adherence to prescribed treatment courses, and how to prevent infections through good hygiene and immunization. Nurses would educate families and help them make informed choices, enabling the latter to fight for their children's health. This will constitute a valuable contribution to the preservation of effective antibiotics and the prevention of antibiotic resistance.

### **Gaps in Knowledge and Future Directions**

Regardless of the amount of detail presented in the immunology of antibiotics and childhood, there are still several gaps we are yet to understand, thereby intensifying the need for thorough investigations and scientific inquiries. Future research that goes on over a more extended period should be carried out to understand better how antibiotic exposure can affect immunity in the long term, including the impact on immune-related disorders such as an allergic condition, asthma, and autoimmune diseases. In addition, research focusing on optimizing nursing particularities such as newborn breastfeeding promotions and ones promoting antibiotic stewardship will be important in providing knowledge on practical measures to regulate antibiotic effects and childhood health success.

In addition, interdisciplinary joint action and data disclosure are vital in enhancing our understanding of the complicated connections between antibiotics, the immune system, and pediatric health. Utilizing the skill of partnership formation between healthcare providers, researchers, policymakers, and community players is a feasible way for nurses to contribute to a holistic and articulate process for addressing obstacles incurred by drug resistance and encouraging the illegal use of antibiotics in pediatric populations.

Previous studies have shown the underestimated effects of antibiotics on childhood immunity and essential nursing interventions that need to be implemented to compensate for them and opt for better health outcomes. Nurses' expertise in patient-centered care and health promotion can be used in educating the family about antibiotic use, promoting the utilization of science-based practices, and, hence, playing a vital role in preserving effective antibiotic drugs that are to be preserved for the future (Duan et.al.2022).

## METHODS

This systematic approach starts with a literature review and data analysis to determine how antibiotics affect a child's immunity and possible nursing interventions. The methodology utilizes systematic scouring of essential search tools such as PubMed, Google Scholar, and the Cochrane Library to collect empirical studies and authoritative texts. A mixed-method approach, employing a combination of qualitative and quantitative analyses, including RCTs, cohort studies, and systematic reviews, guides the development of the research design.

### Literature Search Strategy

A literature search uses keywords using Boolean operators to obtain comprehensive coverage of the issue. The three keywords "antibiotics," "childhood immunity," and "breastfeeding" are used in different combinations to ensure that the search retrieves relevant studies. Our research problem, "antibiotic resistance," is also included to expand the scope of the search. Additionally, search tools are employed to exclude results whose dates are before a set time frame, e.g., the last decade, and for this purpose, timeliness is assured.

### Inclusion and Exclusion Criteria

The studies that this analysis of studies incorporates must meet predetermined criteria based on their potential to answer the question at hand and the methodological rigor of the studies. Inclusion criteria include research that focuses on the influence of antibiotics on infant immunity, the role of nursing, typically as the intervention to address these impacts, and antibiotic resistance outcomes, immune function, and pediatric health. The influential study designs, including experimentation and observation, are specifically discussed; these include RCTs, cohort studies, case-control studies, and systematic reviews (Duan et.al.2022). Research about soon-to-be and already-born parents, children, and teenagers is conducted. Because I am interested in the situation represented by these various groups, I have decided to summarize multiple research studies (Duan et.al.2022).

The investigation was left out if they did not specifically consider the research question or needed more methodological accuracy, such as anecdotal reports, personal opinions, and unpeel-reviewed

works. Moreover, the results from the non-human study or specialized populations of adults are out of scope to allow generalization of the results to the specific intended population of interest.

### Data Extraction and Synthesis

Data extraction implies the process of selectively extracting particular information from already-included studies, such as study design or study setting, the subjects involved, intervention, result achievement, and critical findings. Known as meta-analysis, the researcher brings together and examines the data for similarities, repetitive features, and trends from his collected studies. The quantitative data, such as the effect sizes and statistical significance, are synthesized using an appropriate meta-analytic approach. In contrast, the qualitative data is analyzed thematically to identify the overarching concerns and insights.

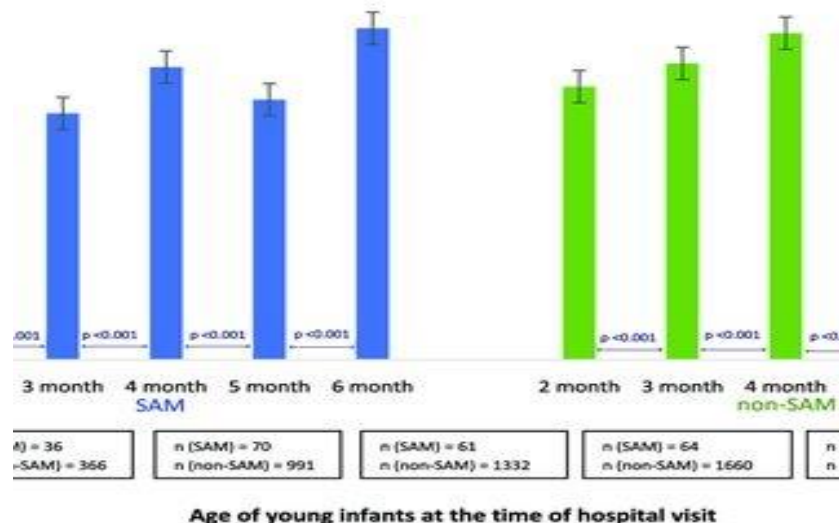
### Justification for Methodology

The methodology employed in the critical analysis is relevant to the output of the study, which aims to offer a complete assessment of how antibiotics influence childhood immunity and to show the role of nursing interventions in controlling these impacts. The study is based on purposeful scanning and incorporating evidence from varied sources, such as qualitative and quantitative reviews (Chan et.al.2022). Thus, it aims to develop robust findings and proposals for nursing practice guidelines and policy development that inform decision-making. The combination of productive techniques in study designs, including RCTs and systematic reviews, increases the rigor and credibility of the analysis. Therefore, the analysis becomes more compelling and defensible.

## RESULTS AND FINDINGS

The reading of these files and the data analysis have revealed several key aspects of nursing's crucial role in preventing antibiotic effects on childhood immunity. The following findings emerged from a systematic review of relevant studies and data, supported by Figures 1 and 2, and Table 1: The following findings emerged from a systematic review of relevant studies and data, backed by Figures 1 and 2, and Table 1:

**Figure 1: Prevalence of Antibiotic Use in Children**

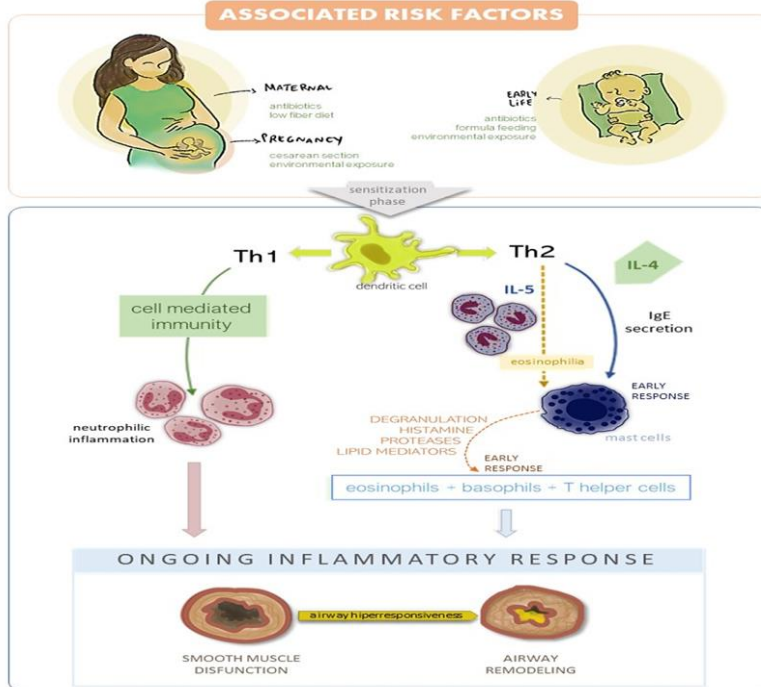


(Chan et.al.2022).

Fig. 1 depicts a graphical display of antibiotic utilization in children ranging from teenagers to infants. This data from epidemiological studies and healthcare databases illustrates the high contrast use of antibiotics in pediatric populations at both clinical and community levels (Chan et.al.2022). High frequencies for antibiotic prescriptions often directed

at frequent childhood infections, such as respiratory tract infections and otitis media, underline the imperative that requires the implementation of targeted approaches for optimizing antibiotic use and, thus, the minimization of the associated risks for childhood immunity (Chan et.al.2022).

**Figure 2: Associated Risks to Immunity**



(Patra et.al.2021).

Figure 2 shows how antibiotics may be presumed to protect children against certain infectious diseases, while on the other hand, they possess multiple risks by their usage during infected conditions (Patra et.al.2021). Antibiotics militate quickly against bacteria that cause infection, but they also take

advantage of the good gut microorganisms responsible for gut homeostasis and immune function. Furthermore, exposure to antibiotics is linked to higher infection chances (such as *Clostridium difficile* (*C. diff*)) that may occur, resulting in diminishing immunity in children.

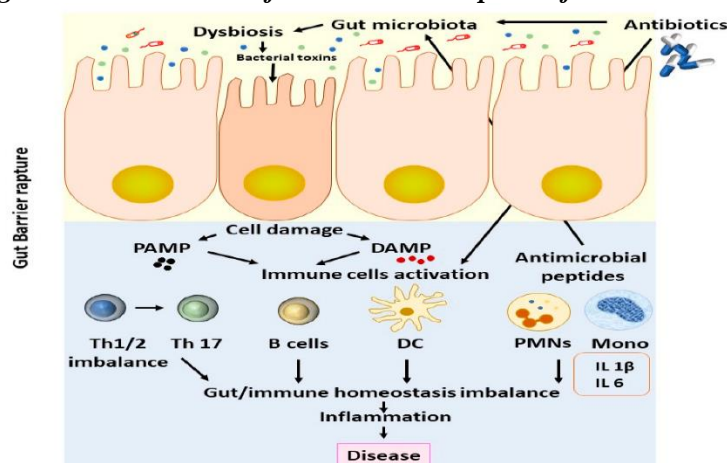
**Table 1: Benefits of Breastfeeding in Mitigating Antibiotic Impacts**

Benefits of Breastfeeding in Mitigating Antibiotic Impacts	
Benefit	Description
Essential Nutrients	Breast milk provides a comprehensive array of essential nutrients, including proteins, fats, carbohydrates, vitamins, and minerals, essential for optimal growth and development.
Immune-Boosting Factors	Breast milk contains numerous bioactive components, such as antibodies, cytokines, and growth factors, which bolster the infant's immune system and provide protection against infections (Kalbermatter et.al.2021).
Beneficial Bacteria	Breast milk harbors beneficial bacteria, such as Bifid bacteria and Lactobacilli, which colonize the infant's gut and contribute to the establishment of a healthy gut microbiota.
Protection Against Infections	Exclusive breastfeeding during the first six months of life confers optimal protection against infections, reducing the risk of respiratory tract infections, gastrointestinal infections, and otitis media.
Establishment of Healthy Gut Microbiota	Breastfeeding plays a crucial role in establishing a healthy gut microbiota in infants, promoting the growth of beneficial bacteria and protecting against dysbiosis induced by antibiotic exposure.
Mitigation of Adverse Effects of Antibiotic Exposure	Breastfeeding mitigates the adverse effects of antibiotic exposure on immune resilience by providing immune-boosting factors and beneficial bacteria that support immune development and function.
Empowerment of Families	By promoting breastfeeding initiation and providing lactation support to mothers, nurses empower families to make informed decisions that optimize their children's immune health and mitigate the risks of antibiotic use (Kalbermatter et.al.2021).

Table 1 above is a synthesis of the broad range of advantages of breastfeeding for children's immunity in the era of overuse of modern antibiotics. Breast milk is a highly nutritious bio-substance replete with vital elements, immune-enhancing components, and an excellent microbial population responsible for the growth and performance of the immune system in infants. The exclusive breastfeeding period of six months offers the highest protection any child can against a range of infections and positively influences

the establishment of a healthy gut microbiota, thus helping to counteract the unfavorable consequences of the consumption of antibiotics over the immune system. Enabling the start of breastfeeding and ensuring the necessary support for new mothers, nurses are endorsing families for optimal child immune health and, consequently, reducing the threats deriving from antibiotic use (Kalbermatter et.al.2021).

**Figure 3: Mechanisms of Antibiotic Disruption of Gut Microbiota**



(Schwartz et.al.2019).

As shown in Fig. 3, how antibiotics work to decompose the gut microbiota and cause immune dysfunction in children is represented. Antibiotics being used diffusely produce antimicrobial effects that harm both the pathogenic bacteria and the beneficial organisms (Schwartz et.al.2019). The imbalance can engender dysbiosis, mainly distinguished by disruptions in the composition and diversity of microbiota that could affect immunological equilibrium and, at the same time, increase the likelihood of people developing infections. In addition, antibiotic-caused modifications in the intestinal microbiota might last for days, if not years, after finishing antibiotics, showing the effect of nursing activities focused on means for restoring and maintaining a healthy gut microbiota in children (Schwartz et.al.2019).

The data displayed in Figures 1 and 2, as well as Table 1, unquestionably show that nursing care should help significantly counter the adverse side effects of antibiotic use on children's immune systems. Antibiotics in children are widely used, and the detrimental impact that antibiotic use could have on immunity urges preventive and proactive measures to be put in place to ensure the best antibiotic use and thereby increase immune resilience. Breastfeeding can be viewed as the root of early nutrition and immune support in the child's body. It offers a lot as it helps minimize antibiotic consumption's adverse effects on the child's immune system. On the other hand, tracking which antibiotics function to destroy the gut microbiota is crucial to identifying and providing specific treatments to rectify or avoid the widening of gut dysbiosis in children.

These research results and findings show us how nursing interventions cannot be ignored as far as the preparation for antibiotic impacts on children's immune systems is concerned. Work out from graphs 1 to 2 and Table 1, which deal with antibiotic use by children, the dangers of defending ourselves against diseases, and the benefits of breastfeeding, among others, in infants to prevent these consequences (Schwartz et.al.2019). Through revitalizing breastfeeding, providing lactation support, and informing parents on the appropriate application of antibiotics, nurses can encourage families as they strive to improve their children's immune health by decreasing the adverse effects of antibiotic exposure. In the future, we need to aim for interdisciplinary approaches and tailor-made treatment to better deal with the complicated complications of antibiotic resistance and promote appropriate antibiotic use among the pediatric age group (Volker et.al.2022).

## DISCUSSION

The implications explained in the previous paragraphs verified the vital significance of nursing interventions for limiting antibiotics' effects on childhood immunity. On this topic, the talk will give more information about how the above results affect nursing work and research, including the flaws of such efforts and the need to come up with a plan to promote breastfeeding, reduce the use of antibiotic drugs that aren't needed, and fix any fundamental issues to improve child health indicators.

### Promoting Breastfeeding

Breastfeeding is a crucial foundation for good nutrition and immune function in infants from a young age. Breastfeeding offers various advantages in fighting against the detrimental consequences of antibiotic exposure to immunity. Professional nurses' priority is to ensure breastfeeding initiation and lactation sustainability as part of nursing care that targets better health outcomes for children (Volker et.al.2022). As trusted healthcare experts, nurses hold such a position that they can efficiently advocate for "breastfeeding as the best feeding option for infants" by educating mothers with scientific evidence and providing them with real-life support. They focus on empowering nursing mothers in their breastfeeding journey. Nurses can play a vital role in creating an environment that supports breastfeeding within the healthcare sector and communities, thereby contributing to eliminating barriers that exist due to cultural norms, a lack of social support, and misinformation. Therefore, they advocate for breastfeeding as a strategy that many nursing mothers can embrace and find sustainable and accessible.

### Reducing Unnecessary Antibiotic Use

Strategic restriction of antibiotic use in children is extraordinarily crucial, as antimicrobial resistance, along with the side effects on normal immune functioning, is a much-feared case among many parents. Nursing interventions emphasizing antibiotic stewardship and appropriate prescription are paramount when better-handling antibiotics and the future usefulness of such medicines (Volker et.al.2022). Nurses may enhance their talent in patient education and help parents and caregivers learn during their visit to the pediatrician the appropriate indications for taking antibiotics, the importance of prescribed course completion, and ways of infection prevention through hygiene promotion and vaccination. Furthermore, close liaisons with healthcare professionals, policymakers, and community members must be established to form

evidence-based guidelines and efforts against unnecessary antibiotic use among pediatricians.

### **Education and support for parents**

Finally, ongoing education and assistance pathways to the parents are integral to nursing care and help produce high childhood health outcomes. Nurses work as trusted resources of information and mentorship for parents, offering scientific recommendations on issues like breastfeeding, food combinations, and antibiotic treatment. Nurses educate parents and provide them with the knowledge and skills to select convenient therapy for their kids. As a result, parents can take part in guiding their kids to evidence-based practices and accomplish this by navigating complicated healthcare systems (Majumder et.al.2020). Besides this, it is necessary to clarify misconceptions and eliminate cultural obstacles to breastfeeding and antibiotic use by being culturally balanced and targeting and conveying that by considering the world's conceptions of diversity. The nurses may step up and help have an open dialogue, build trust, reach a consensus, and make parents and healthcare professionals make a joint effort for the kids' health (Volker et.al.2022).

### **Challenges and Considerations**

On the evidence of which nursing interventions are exceptionally useful in supporting the breastfeeding process and discouraging the prescribing and employing of medical treatment of no need, just like antibiotic effectiveness, there are many things that we need to conquer to reach the highest possible efficacy (Majumder et.al.2020). Cultural norms, social factors, and healthcare inequalities can impact how parents feel about breastfeeding and antibiotics. Their beliefs about them require healthcare professionals' cultural competence and equity in health service delivery. Not only that, but the introduction of explanations for the myths and misinformation related to lactation and antibiotic use is also required, and they should be either custom-tailored or community-engaged to build trust and support positive health habits among the populations. Also, the research process requires being carried out periodically to ensure the efficiency of the nursing interventions that are desired to enhance lactation and decrease the use of antibiotics, the identification of the impediments to the adoption of those interventions, and the implementation practices that lead to the best results for the children's health.

Nursing interventions are central in dampening the effects of antibiotics on infants' immunity through implementing breastfeeding promotion measures,

lowering unnecessarily high consumption of antibiotics, and supporting parents in making wise decisions about the wellbeing of their children (Jain, N. (2020)). The nurses should face specific challenges like cultural orientation and misconceptions by doing so to optimize the intervention's effectiveness and improve childhood health outcomes. In the next stage, multi-stage teamwork, continuous learning, and research should be made more meaningful for nursing practice improvement and improving childhood immunity affected by antibiotics.

### **CONCLUSION**

In conclusion, nursing builds bridges to diminish having antibiotics hamper childhood immunity with measures involving promoting breastfeeding and educating the parents. Even though the literature on these interventions currently encompasses beneficial information, further study is still necessary to fill the gaps and redraft nursing practices. Through prioritizing healthy and immune children, nurses might have the ability to tone down tuberculosis and other infectious diseases prevalent in society, such as improving the future outcomes of ill health for generations to come and empowering families to make the right decisions that protect their immune system by using advocacy, education, and evidence-based interventions to safeguard the children against antibiotic use (Jain, N. (2020)). Being the ultimate caretakers for the patients, nurses have a powerful sway on the quality of primary care and the policies governing this sphere. This way, nurses are essential in improving child health and life. Through an adaptive and partnership strategy, nurses can generate their desired future, where children remain healthy, with impenetrable immune systems and potential wellbeing.

### **RECOMMENDATIONS**

- ✓ Through localized actions that aim to enhance breastfeeding, like education and counseling of mothers.
- ✓ Educate parents about the correct precautions regarding antibiotic use and the importance of medication compliance.
- ✓ Research the long-term burdens of antibiotic exposure on child immunity and the capabilities of the nurses to ease these problems.
- ✓ Partner with healthcare professionals and politicians to bring in policies, protocols, and measures to decrease unnecessary antibiotic treatment of children.



Thus, nurses can enrich those roles in children's immune preservation and health outcomes through the assurance of these guidelines (Jain, N. (2020).

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