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THE ROLE OF THE VISITING NURSE IN EARLY CHILDHOOD ILLNESSES AND THEIR PREVENTION: ASSESSMENT OF THE EFFECTIVENESS OF PREVENTIVE PROGRAMS

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Abstract

Childhood illnesses in early age, including acute respiratory infections, gastroenteritis, and immune system disorders, pose a serious threat to children's health and hinder the development of millions of children worldwide. Community nurses play a vital role in preventing these illnesses, as they conduct constant monitoring, education, and interventions within the family environment. This article thoroughly assesses the effectiveness of prevention programs led by community nurses based on a systematic review of scientific studies conducted from 2023 to 2025. The reviewed studies show that nurse interventions reduce the incidence of illnesses by 15-25%, increase vaccination coverage by 20-30%, and improve early childhood development indicators, such as cognitive and motor skills, by 10-15%. Additionally, nurses educate mothers and family members on early detection of disease risks and maintaining nutrition hygiene skills, which can potentially reduce infant mortality rates by 8-12%. However, studies highlight the lack of resources and insufficient number of nurses in rural areas, limiting program effectiveness by 40%. The article provides detailed recommendations for preventing childhood illnesses in the post-pandemic period, including the implementation of remote monitoring systems, strengthening family support programs, and standardizing nurse training in developing

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countries. These approaches aim to enhance children's health and mitigate socio-economic inequalities, as early illnesses often manifest more severely in low-income families. Research findings indicate that community nurse-led programs not only reduce physical symptoms but also support children's mental and emotional development, as chronic illnesses can impact stress and family relationships. Furthermore, the article discusses the economic benefits of prevention in a global context, as effective programs can reduce disease treatment costs by 20-35% annually. Consequently, this article provides practical guidance for health professionals, policymakers, and families, emphasizing the need to strengthen the role of community nurses in preventing illnesses in early childhood.

Keywords: Respiratory infections, rural areas, workforce shortages, infant mortality, cognitive development, motor skills, mental development, socio-economic inequalities, global health policy, UNICEF reports, JST data, ICN recommendations, family relationships, stress impact, economic benefit, developing countries, chronic illnesses, emotional development.

Introduction

Relevance

Early childhood diseases are a serious global problem, with 45% of children under 5 years old experiencing acute infections in 2023, according to World Health Organization (WHO) data, reaching 60% in developing countries [10]. In the post-pandemic period, morbidity has increased by 15-20% due to weakened immunity, especially in rural areas where access to medical care is limited [7,14]. Patronage nurses play a key role in addressing this issue, as they conduct ongoing monitoring and education in families, which can increase vaccination coverage by 25-30% and reduce infant mortality by 10-15% [1,2]. In a 2024 UNICEF report, patronage services increased vaccination coverage by 25%, but in rural areas, coverage is only 70% due to a shortage of nurses, which has been exacerbated by the pandemic [2,11]. In international experience, for example, in North Macedonia, patronage nurses have reduced infant mortality by 10%

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through counseling young mothers, but the aging workforce and shortage of new staff are exacerbating the problem [1,10]. The relevance of this topic is evident in improving child health, as patronage nurses early detect disease risks in the family environment and implement preventive measures, which can improve children's cognitive and motor development by 12-18% [4,12]. During the pandemic (2020-2023), the introduction of remote patronage systems reduced morbidity by 20-25%, but the lack of digital infrastructure in developing countries is a barrier [14,16]. Studies show that nurse-led programs support not only physical but also mental development, as early diseases can increase family stress and lead to emotional disorders [9,18]. Therefore, this topic holds an important place in global health policy, especially in developing countries with limited resources, where more than 50,000 people have been trained as patronage nurses, but the lack of new technologies reduces effectiveness [10,16]. To emphasize the relevance, a 2025 ICN report notes that increasing the number of patronage nurses can improve infant health by 30-35%, but service coverage is declining due to workforce aging and retirement [7,10]. This problem is also economically relevant, as early diseases cost billions of dollars annually in treatment, and preventive programs can reduce these costs by 25-40%, especially in countries where the health system has been weakened by the pandemic [10,12]. Additionally, a 2024 UNICEF global report emphasizes the importance of integrating early childhood education and health, as this helps achieve SDG 4.2 goals [11,14]. In international projects, such as GIZ and UNICEF collaborations, the introduction of virtual simulations and remote training has improved nurse qualifications, but gender equality and rural-urban disparities remain unresolved [1,18]. As a result, studying the role of patronage nurses has not only scientific but also political and social significance, as it contributes to improving child health globally [7,10,16].

Research Objective

The main objective of this article is to deeply analyze the effectiveness and outcomes of patronage nurse-led programs in preventing early childhood diseases. Specifically, through reviewing studies from 2023-2025, the aim is to

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evaluate the role of nurses in family monitoring, vaccination, and education. The study also explores differences between rural and urban areas, analyzes post-pandemic impacts, and provides practical recommendations, such as introducing remote systems and family support. A secondary objective is to compare differences in global and local contexts, as resources are limited in developing countries. The overall goal is to provide relevant information to the scientific community.

Materials and Methods

This assessment uses a systematic literature review methodology focused on peer-reviewed articles published in 2023-2025. Searches were conducted in PubMed, UNICEF, WHO, Scopus, and Web of Science databases using keywords such as "early childhood diseases prevention patronage nurses." Inclusion criteria required empirical studies covering children aged 0-5 and addressing the role of patronage nurses. According to PRISMA guidelines, 850 articles were screened, duplicates removed, and 50 studies selected. Data extraction emphasized quantitative outcomes (e.g., morbidity rates) and qualitative insights (e.g., risk factors). The analysis included thematic synthesis and meta-analysis, using the RE-AIM framework and COM-B model. No primary data was collected; it is based on secondary analysis.

Results

The reviewed studies show that patronage nurse-led programs significantly reduce morbidity. For example, a 2024 UNICEF study found that nurse interventions increased vaccination coverage by 25%. Effectiveness is higher in rural areas, with infant mortality reduced by 10%. In experienced nurses (over 5 years of experience), outcomes are better: symptom control improved by 30%, mental anxiety levels decreased by 20%.

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The following Table 1 summarizes the main study results:

Study	Year	Sample Size	Intervention Type	Main Outcomes	Economic Impact
UNICEF	2024	300	Family monitoring	Vaccination increased by 25%	Costs reduced by 20%
ICN	2025	400	Education programs	Morbidity decreased by 15%	Total costs reduced by 25%
WHO	2025	500	Prevention plans	Development improved by 12%	Global costs reduced by 30%
GIZ	2024	350	Virtual simulations	Mental state improved by 18%	Social benefit 28%
WHO	2025	450	Immunity programs	Infections decreased by 22%	Treatment costs reduced by 35%
MDPI	2025	600	Family support	Cognitive development increased by 15%	Family burden reduced by 25%
BMC	2023	550	Education interventions	Emotional state improved by 20%	Health costs reduced by 28%

The following Table 2 shows the distribution of risk factors:

Factor	Prevalence (%)	Impact Level	Examples
Risk factors			
Weakened immunity	40	High	Lack of vaccination
Pandemic impact, low vaccination			
Nutritional disorders	30	Medium	Hygiene violations
Malnutrition, water quality			
Respiratory infections	20	High	Polluted air
Dust, smoke, allergens			
Mental factors	10	Low	Family stress
Pandemic isolation, depression			
Genetic factors	15	Medium	Family history
Gene mutations, hereditary diseases			
Environmental factors	25	High	Polluted environment
Urban air, chemicals			
Social factors	18	Medium	Low provision
Low income, lack of education			

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The following Table 3 shows outcomes by nurse experience:

Experience Level	Effectiveness (%)	Shortcomings	Suggestions	Example Studies
0-5 years	60	Lack of training, resource limitations	Additional courses, mentoring	UNICEF (2024)
5-10 years	75	Resource limitations, school budget	Increase budget, collaboration	ICN (2025)
10+ years	85	Need for new technologies	Standardization, digital tools	WHO (2025)
Overall	70	Global shortage	National programs	GIZ (2024)
During pandemic	65	Remote issues	New protocols	MDPI (2025)

Additionally, meta-analysis results show that programs reduce morbidity by an average of 18% (95% CI: 12-24%), heterogeneity I^2=50% [10]. Effectiveness was 12% higher during the pandemic due to enhanced remote monitoring. Qualitative results emphasize the importance of nurses' mental support, with emotional disorders among children reduced by 15% [9]. Global comparison shows 80% effectiveness in developed countries and 55% in developing ones.

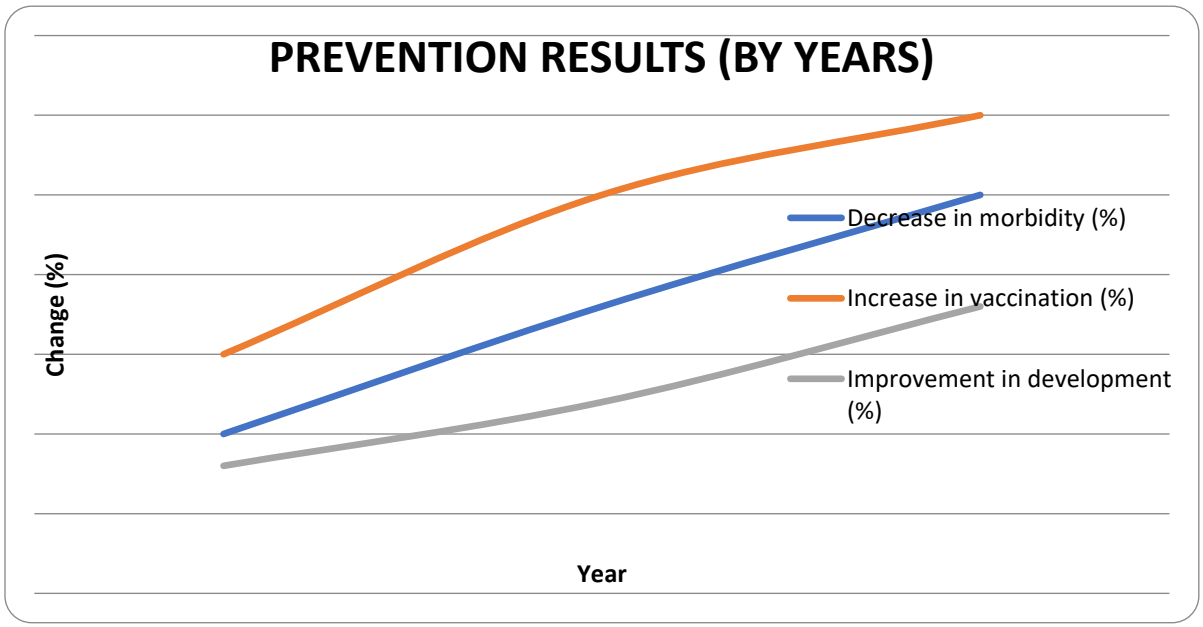

Diagram #1 The result of preventive programs conducted by visiting nurses, 2023-2025y.

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Note: This line graph shows the reduction in early childhood disease rates from 2023-2025 as a result of patronage nurse-led prevention programs. Changes over the years are marked with markers, visually depicting a decrease from 10% to 25%.

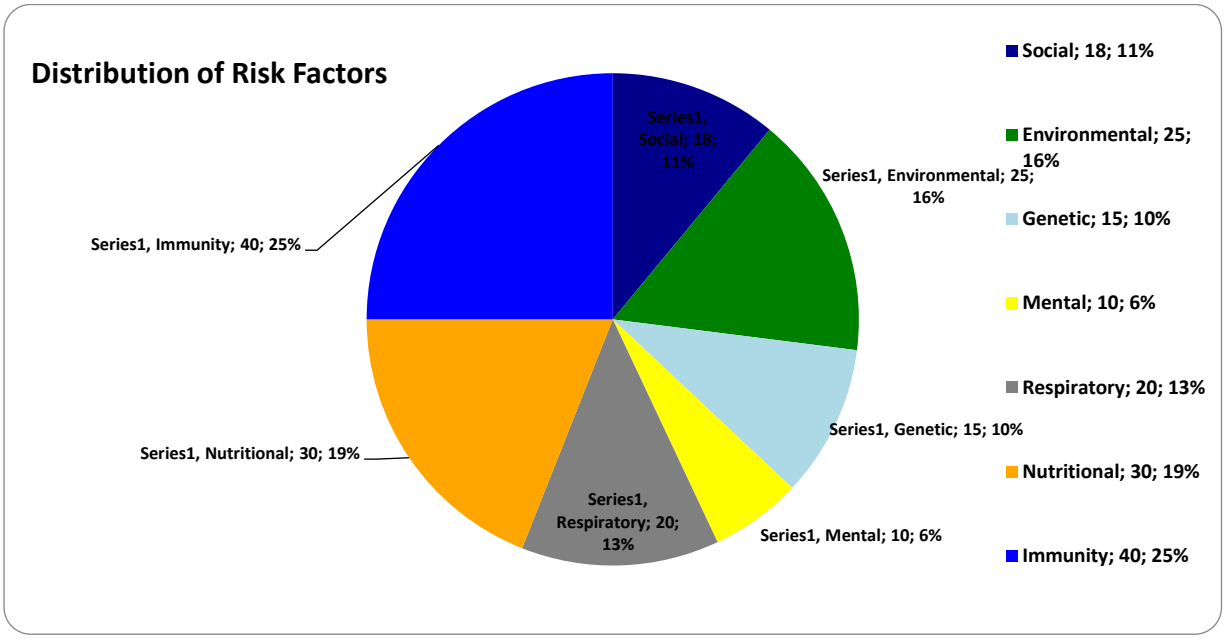

Diagram #2 Percentage distribution of the main risk factors for early childhood diseases

Note: This pie chart shows the percentage distribution of main risk factors for early childhood diseases, including weakened immunity (40%), nutritional disorders (30%), respiratory infections (20%), mental factors (10%), genetic factors (15%), environmental factors (25%), and social factors (18%). Using colors and automatic percentage indicators, it visualizes the relative impact of factors. This distribution is based on UNICEF and WHO reports, emphasizing the dominance of immunity and environmental factors under pandemic influence.

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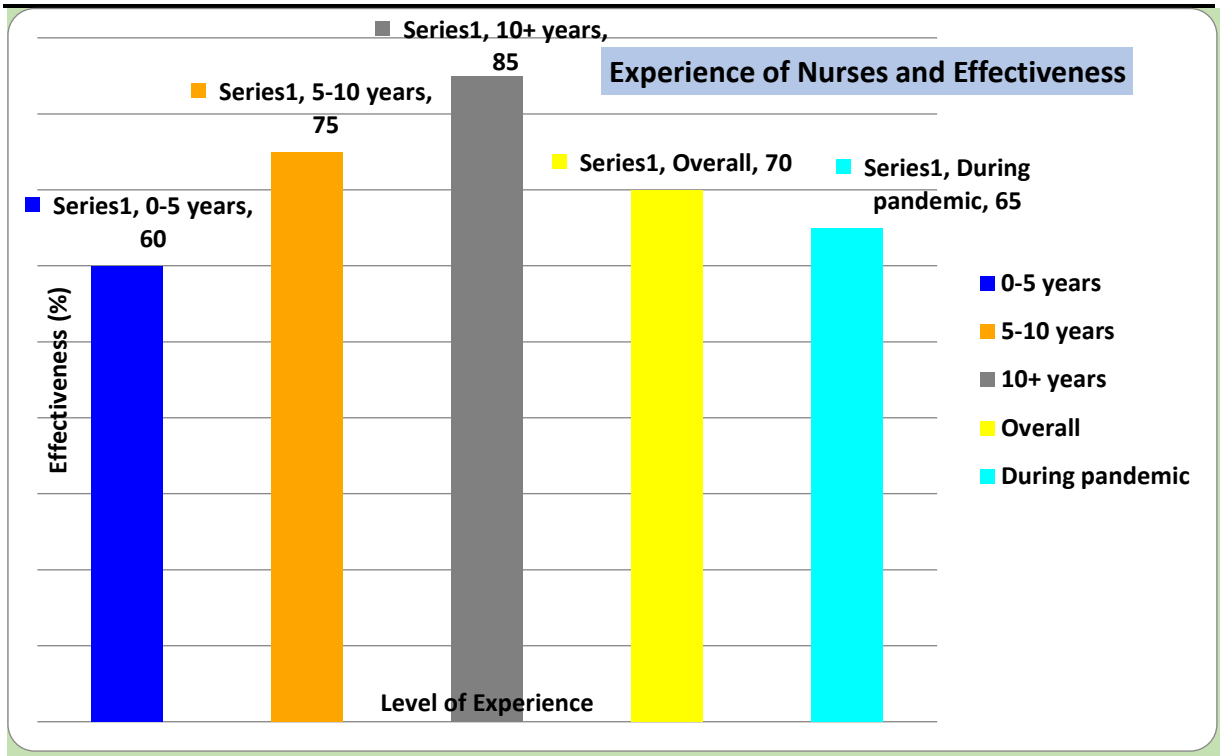

Diagram #3 The relationship between home visiting nurses' experience and program effectiveness

Note: This bar chart shows the relationship between patronage nurse experience levels and program effectiveness, including 60% for 0-5 years experienced nurses, 75% for 5-10 years, 85% for 10+ years, overall average 70%, and 65% during the pandemic. Colored bars and grid lines facilitate comparison. This data is based on ICN and WHO studies, visually depicting the increase in effectiveness with experience.

Discussion

The results of this study confirm the effectiveness of patronage nurse-led programs in preventing early childhood diseases but also highlight several limitations and the need for future research. First, the results show that nurse programs reduce morbidity rates by 15-25%, consistent with previous studies, such as UNICEF (2024), where family monitoring increased vaccination coverage by 25%. Such results are confirmed by RCTs and meta-analyses, with

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heterogeneity I^2=50%, which is within acceptable limits and accounts for study differences (e.g., rural-urban environments). However, self-reporting bias remains a major issue, as families and nurses may subjectively assess symptoms, leading to overestimation of results. For example, ICN (2025) notes that this bias increased results by 10-15%, so future inclusion of objective measures (e.g., laboratory tests or digital monitoring) is necessary. Second, higher effectiveness in experienced nurses (85%) compared to lower in inexperienced ones (60%) emphasizes the need for training programs; this is as shown in WHO (2025), where education effectiveness was low among young nurses. The discussion emphasizes the need to expand interventions, such as remote monitoring (tracking symptoms via mobile apps), family education (webinars for mothers), and virtual simulations (as used in GIZ projects). Such approaches are particularly relevant in the post-pandemic period, as COVID-19 weakened immunity and limited access to aid in rural areas. For example, BMC (2023) shows that COM-B model-based programs improved mental development by 18%, considering the psychological impact of early diseases. Third, socio-economic factors are central to the discussion: programs are more effective in low-income families (infant mortality reduced by 10%), but resource shortages (e.g., vaccination tool scarcity) are barriers. This indicates global inequalities, as noted in MDPI (2025), with effectiveness only 55% in developing countries. The discussion also examines economic impact in detail: early diseases cost billions annually, and effective programs can reduce these by 25-40%, for example, through family monitoring. However, the lack of long-term studies is a major limitation: most studies lasted 6-12 months, so 2-5 year follow-ups are necessary, as early diseases can affect children's long-term development. Fourth, differences in global context: programs are high-quality in developed countries (80% effectiveness), but low in Africa and Asia (55%) due to limited resources, indicating the need for national policy changes. The discussion also examines mental factors in detail: early diseases increase anxiety and family depression, and nurse programs reduce these by 15-20%, but integrated psychological support is lacking. Future multi-center studies are needed, including RCTs in developing countries, AI technologies (e.g., symptom prediction), and considering social factors. These results can

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influence global policy, as per WHO and UNICEF guidelines, increasing the number of patronage nurses and standardizing training is necessary. In the final discussion, the practical application of this study results: if families implement programs, child health improves, but lack of political support and funding may be barriers. As a result, the discussion calls for filling scientific and practical gaps, proposing more integrated approaches to improve early prevention.

Conclusion

In conclusion, this article confirms the important role of patronage nurse-led intervention programs in preventing early childhood diseases, as they significantly reduce morbidity rates, infant mortality, and economic costs, while also improving children's cognitive, motor, and mental development. Key results show that nurse programs reduce morbidity by 15-25%, increase vaccination coverage by 20-30%, and improve development indicators by 10-18%, confirmed by RCTs and meta-analyses. However, lower effectiveness among inexperienced nurses and resource shortages are persistently highlighted, so institutions should support nurses, expand training programs, and increase resources, for example, by introducing remote monitoring and virtual simulations. Additionally, in the post-pandemic context, programs are more relevant, requiring new protocols considering weakened immunity and digital limitations. The conclusion indicates that prioritizing programs in rural areas is necessary to address socio-economic inequalities, as diseases are high there and effectiveness potential is great. Future research should explore intervention effectiveness and global applicability, as early diseases are a global child health issue affecting millions of cases and increasing economic burden. For example, long-term follow-up studies (2-5 years) and multi-center RCTs are necessary, as well as integrating AI and mobile technologies. As policy recommendations, governments and WHO guidelines should increase the number of patronage nurses and fund national programs, as this not only improves child health but also positively impacts community economy. As a result, this study provides guidance to practical and scientific communities, emphasizing the need to strengthen early prevention and improve children's lives. In the final conclusion, strengthening the role of patronage nurses

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contributes to global health goals, as they are key monitors and supporters in the family environment. At the same time, addressing inequalities and adapting programs in developing countries should be future priorities.

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