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The Role of School Nurses in Managing Chronic Health Conditions in Children: Review

Safiah Anber Binali Ibrahim ,Nada Nasser M Alomi ,Huda Nasser Mohammed Alomi , khaloud Abdulaziz A Alhouti ,Fatimah Hadi Hadadi , bdour obied alenazi , Rehab Saoud Albheran , sahar abdulqader saleh yousef , Hajar Abdullah Alsaud , Haya saleh aldosary.

KSA , ministry of health , Nursing technician

Abstract

Background: School nurses play a vital role in managing chronic conditions among children, contributing significantly to their health and well-being in educational settings. Despite their importance, the efficacy of school nursing interventions remains under-evaluated.

Methods: This review systematically evaluates peer-reviewed literature from 2020 to 2023 across multiple databases, including Medline and PubMed. The analysis focuses on school nurses' interventions related to chronic conditions such as asthma, diabetes, obesity, and mental health issues. Key outcomes assessed include absenteeism, symptom management, and overall health improvement.

Results: The findings indicate that school nurse interventions have a positive impact on chronic condition management. Notably, a randomized controlled trial demonstrated that the presence of a school nurse reduced student absenteeism by an average of two days annually. Asthma management programs led by school nurses showed significant improvements in symptom control and reduced emergency visits. While obesity prevention efforts yielded mixed results, some programs effectively decreased BMI among participating students. Mental health interventions, though limited, demonstrated promising outcomes in reducing anxiety and depressive symptoms in children.

Conclusion: School nurses are essential in addressing chronic health conditions in children, leading to improved health outcomes and enhanced school attendance. However, ongoing research is needed to establish more robust evidence regarding their effectiveness, particularly in mental health and obesity management. Strengthening the role of school nurses could provide significant benefits to children's health and educational performance.

Keywords: School Nursing, Chronic Conditions, Health Outcomes, Asthma, Diabetes.

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1. Introduction

School nurses are medically educated professionals operating within both educational and healthcare settings, striving to provide a health-promoting atmosphere for educators and students [1–3]. School nurses are essential in enhancing the health and well-being of children and adolescents via health promotion, counseling, referrals, active treatment, education, family support, care coordination, and collaboration with many agencies [1,4–6]. School nurses possess diverse tasks and responsibilities including three fundamental components of school health: health literacy, medical care, and health promotion [7–9]. The three domains of school nursing are interrelated in their shared objective of fostering a health-promoting environment inside the school, however, they vary in their methodologies and tactics to attain this objective. Health literacy aims to empower students and educators to locate, comprehend, assess, and use health information for health-related decision-making to sustain or enhance health and quality of life [10,11].

Health literacy encompasses an educational framework aimed at the acquisition of knowledge. Health promotion and medical health care both include medically focused treatments, yet they vary in their perspectives on health issues. School-based healthcare adopts a pathogenetic viewpoint. The emphasis is on evaluating risks associated with illness development and treatment of certain diseases that may be favorably impacted by targeted school-based treatments. Health promotion in schools, conversely, advocates from a salutogenic perspective. The emphasis is on the advancement and preservation of health in children and adolescents. This may be accomplished by resource enhancement initiatives in schools, the promotion of healthy practices such as physical activity and nutrition, and the implementation of preventive care services, such as care coordination by school nurses [11,12]. The three components of school health are not easily separable.

The majority of worldwide research on school nurse interventions related to the three dimensions of school health started in Anglo-Saxon nations, where the role of the school nurse was initially established and where the bulk of research has been undertaken [13-16]. Numerous studies assess interventions led by school nurses, focusing on absenteeism due to medical conditions, health risk factors such as obesity and tobacco use, children exhibiting asthma symptoms, mental health disorders, chronic disease management, and the prevention of various types of child abuse [3,13,16-28]. In addition to improved health outcomes for students, the assistance offered by the school nurse may alleviate the challenges faced by teachers dealing with these issues in the classroom [29–31].

The significance of the school nurse became especially evident during the COVID-19 epidemic, which introduced new health-related issues for both students and educators. Recent studies have examined the function of school nurses and their significant contributions, notably with the decision to close or keep schools open [32]. Furthermore, the research examined how their efforts may mitigate community-wide risk via enhanced cleanliness practices and efficient vaccination initiatives.

In addition to the above-stated health advantages, studies have quantified societal cost savings in healthcare by including school nurses in elementary and secondary educational institutions [33-38]. Wang and Vernon-Smiley [37] calculated that for each dollar spent in their program in the US, $2.20 is saved within a single year. Binder [36] examined whether inadequate parental health knowledge, poor societal integration, and increasing numbers of children with chronic health conditions may eventually result in greater follow-up expenses compared to investing in preventive measures.

Although much research exists on school nursing, it is evident that, despite the wealth of material, academically valid judgments about the efficacy of school nurses remain ambiguous. Researchers [20,21] have consistently condemned the inadequate methodological quality and the consequent deficiency of substantial, significant study outcomes concerning the efficacy of school nurses. The primary criticisms are the absence of evidence-based, quantitative data derived from randomized controlled trial designs and the predominance of descriptive research types [39].

There is an immediate need to confront the increasing criticism of school nurse research and to systematically synthesize the diverse study results. Consequently, we performed a comprehensive evaluation of the literature, marking the first instance of school nurse research. This work addresses the ongoing complaint over inadequate research quality, which necessitates that reviews and primary studies adhere to stringent methodological requirements. Our objective in implementing methodological criteria is to guarantee the clinical validity of school nurse efficacy.

2. Methods

We performed a study of peer-reviewed literature in Medline, Cochrane Library, Cinahl, Web of Science, Scopus, PubMed, and Educational Resource Information Center (ERIC) from 2020 to 2023.

3. Somatic Health

Among the many studies, few noteworthy outcomes merit noting. A randomized controlled trial (RCT) with a low risk of bias (RoB) showed that the presence of a school nurse considerably decreased student

absenteeism by an average of two days per year, in contrast to the control group without a school nurse. Other research investigating school attendance was less dependable owing to substantial constraints (e.g., RoB).

Asthma. The predominant focus of school nurse research is on asthma-related therapies, with some yielding significant outcomes. The analyzed outcome variables exhibit significant variability, complicating the comparability of the findings. Research groups frequently examine multiple outcomes, including quality of life, school absenteeism, asthma knowledge, the severity of asthma symptoms, academic achievements, individualized goals, impairments and inspiratory flow rate, asthma control, symptom-free days, medication adherence, health-care utilization, pulmonary function, and clinic process enhancements [22,25,40-52].

The variability in asthma research is notable, including diverse health outcomes, demographics, and intervention kinds; yet a significant number of studies exhibit excellent quality with few constraints. A reliable trial (low RoB) showed that preventative asthma medication for 530 kids significantly reduced symptoms in comparison to the control group. Furthermore, there was a reduction in nocturnal symptoms and the use of rescue medicine, together with increased tranquility for the youngsters [53]. A further trial indicated that nurse-administered inhaled corticosteroids (ICS) led to markedly fewer functional limits, enhanced family life adjustment, and improved sleep relative to the control group [40]. Research on asthma case management for medically challenged inner-city children indicates reduced school absenteeism in the intervention group relative to the control group. They also saw markedly reduced emergency department visits and diminished hospital stays. A replication and follow-up in the second year similarly demonstrated sustained substantial improvements [41].

Obesity. In evaluating the efficacy of school nurse-led obesity prevention research, four references with a low probability of bias were significant. All studies had the commonality of using BMI as a primary outcome measure, while the therapies aimed at reducing BMI varied. One intervention included educational programs on nutrition, an enhanced environment with nutritious meals, increased physical activity, and screening procedures [17]; nonetheless, data indicated no significant benefit for children in the intervention group. While minor decreases in BMI were seen, educational and environmental interventions did not influence BMI relative to the control group. An additional intervention included comprehensive health education for educators and nutritional guidance for parents [54]. The risk of bias in this investigation was indeterminate owing to the absence of blinding and insufficient control of confounding variables, making the findings potentially less credible. Results indicated that overweight children saw a significant decrease in weight after two years in comparison to the control group.

Academic performance declined in both groups; however, the decline was less pronounced in the experimental group. A third intervention was done in 2013 [55] and duplicated three years later [55,56], using computerized cognitive behavioral counseling and an after-school physical activity program. Alongside BMI levels, food, physical activity, sedentary behavior, self-efficacy, and perceived obstacles were assessed. The results indicated no significant changes in BMI, body fat, or waist circumference in comparison to control schools. An alternative perspective on obesity prevention is to enhance physical activity levels. The research examined the effects of a Kids N Fitness intervention, which included 45-minute physical activity sessions, nutrition education, and wellness activities [57]. Children were instructed to fill out a questionnaire on their dietary habits, and anthropometric measurements were obtained. The research exhibited a little risk of bias, and the findings indicated that the intervention administered by school nurses significantly influenced BMI, reduced sedentary behavior in males, and enhanced physical activity levels in girls.

Two references with low [58] and ambiguous [59] risk of bias were significant in evaluating the efficacy of school nurse-led diabetes control strategies. Research used the hemoglobin A1c (HbA1c) metric to assess long-term glycemic regulation. Results indicated that monthly videoconferences with the school nurse, kid, and diabetes team yielded substantial gains throughout the first six months. Nonetheless, no more substantial improvements were seen after the six months [58]. In the second trial, blood glucose levels,

HbA1c, and BMI were assessed and compared between the experimental and control groups. The findings indicated that the HbA1c level was stable in the control group, but it was markedly reduced in the intervention group [59]. Neither group had a notable change in BMI. Other examined health outcomes, including teasing and bullying, resilience, and hyperactivity and peer issues, lacked reliability owing to inherent constraints [60,61].

Research organizations investigating sexually transmitted infection (STI) prevention therapies uniformly identify educational sessions for students as the primary components of these treatments. The outcomes assessed by questionnaires pertain to knowledge, beliefs, and behavioral intentions [62,63]. Notwithstanding the insufficient follow-up, both trials demonstrated substantial enhancements in knowledge, attitudes, and beliefs relative to the control group.

All research on vaccination used immunization rates as a metric for outcomes. Interventions studied included informational pamphlets, instructional programs, and complimentary vaccination initiatives, with findings indicating enhanced immunization rates in all trials [35,64-66]. Credible research on smoking cessation has shown that effectively teaching teachers and school nurses significantly reduced smoking rates among schoolchildren [19]. Other research investigating smoking patterns relied on self-reported questionnaires, which, however, tend to result in distortion [67].

4. Mental health

Numerous research investigates the effects of school nurse-led interventions on mental health. Only two studies were deemed sufficient for evaluating the efficacy of school nurse-led programs since the other research exhibited shortcomings that might compromise the validity of the findings. One research investigated the effects of a computerized cognitive therapy (CBT) intervention on anxiety [14], while the other assessed the influence of screening and coping skill treatments on depressive symptoms [68]. Anxiety was assessed using the Anxiety Scale (SCAS) and the Strengths and Difficulties Questionnaire (SDQ), revealing a substantial decrease in the overall child anxiety rate after the cCBT session [14].

The Reynolds Adolescent Depression Scale (RADS) and the Jalowiec Coping Scale (JCS) were used to assess depression and coping abilities; nevertheless, the potential for bias remains ambiguous due to the limited sample size of 40 individuals [68]. Nonetheless, the RADS data indicated that almost 87% of students in the intervention group exhibited a decrease in depressed symptoms, in contrast to a 60% drop among students in the control group [68].

5. Discussion

The current analysis, including 16 reviews and 289 primary papers, suggests a saturated research domain in school nursing. Nonetheless, the quality analysis reveals a contrasting observation, indicating that the quantity of high-quality and significant research is rather low. Notably, a continuously defined categorization system for school nursing terminology is lacking, resulting in research being grounded in subjective assessments of school nurses' efficacy. This leads to a vast array of research that complicates the assessment of the school nurse's efficacy. This study offers a systematic taxonomy of school nursing domains based on their methodologies and tactics aimed at transforming the school into a health-promoting environment. Furthermore, the findings of this work will be examined in light of qualitative limits, accompanied by a perspective on future research in the domain of school nursing.

6. Obstacles in Evaluating the Efficacy of the School Nurse

School nursing research encounters several obstacles that need identification and discourse. The ratio of school nurses to schools significantly influences the efficacy of school nurses and has been little addressed in impact assessments. The basis for this assumption is research by Paterson and Zderad [69], which suggests that the supplied key might significantly influence effective caregiving. Their findings indicate that the fundamental aspect of effective patient care is the interaction between the nurse and the patient [69]. This humanistic perspective is applicable in educational environments, hence enhancing the significance of the school nurse's role inside schools. This hypothesis is corroborated by researchers who demonstrated

that a reduced nurse-to-student ratio results in improved student outcomes [70]. The Centers for Disease Control and Prevention (CDC) recommends a nurse-to-student ratio of 1:750, a standard seldom achieved in most American schools. The impact of the coverage key on school nurse interventions remains an under-explored factor and might be a significant variable in assessing the efficacy of such programs.

An additional challenge in school nurse research is the ethical dimension of school nurse interventions. It is ethically questionable for children with significant care requirements to be allocated to the control group without receiving any intervention. The absence of a control group results in a significant decline in the quality of the research [44,71].

Moreover, it is challenging to ascribe the efficacy of the school nurse to a single intervention. A multitude of variables may impact the efficacy of the school nurse intervention. Excluding confounding factors is almost difficult in educational environments and the study domain of interpersonal interactions, but a stringent quality requirement is mandated by the GRADE recommendations. The essential issue is whether research on school nursing can reconcile the holistic aspects of the profession with scientific standards. Findings indicate that this is feasible in some domains of school nursing activity. For instance, vaccination initiatives headed by school nurses and cleanliness programs demonstrate significant results [35]. This is particularly significant during a worldwide pandemic, as elevated vaccination rates are essential for the collective health of society. Given these results, preventive approaches (aspect 3) including vaccination and hygiene interventions by school nurses may become a focal point for future investigations of school nurse effectiveness.

Conversely, research examining the rising prevalence of obesity has not yet provided adequate compelling data to support the appointment of school nurses. The inadequacy of BMI as a metric for evaluating the body weight of children and adolescents, which naturally escalates with age, may be attributed to various factors. Additionally, underlying variables such as depression or familial challenges, including low socioeconomic status, coupled with insufficient nutritional knowledge, may contribute to the prevalence of obesity. This prompts the intriguing inquiry of whether the escalating prevalence of overweight can be mitigated through education [65] (aspect 1) and physical activity initiatives [60] (aspect 3), or if overweight children possess additional underlying issues, such as psychological disorders (aspect 2), which may often remain unacknowledged for extended periods. For instance, if youngsters are already obese, they often experience bullying from their classmates, which subsequently subjects the kid to significant emotional distress, perhaps leading to mental health issues. Breaking this loop and implementing early preventative interventions is a significant challenge.

Limited well-structured research investigates mental health among school-aged children. This necessitates exploration in school nurse research. A potential explanation is that mental diseases are complex and manifest in several ways. Effective therapy, suited to the individual's requirements, frequently takes several years, depending on the nature and severity of the sickness. Conversely, the efficacy of preventative strategies can only be assessed via longitudinal studies, and research resources are often inadequate [72]. Moreover, it is evident that in many studies, the control group does not get a genuine placebo, and screening techniques are often used, potentially resulting in an intervention effect [14]. This may explain the absence of any substantial difference between the control and experimental groups [68]. A further challenge in evaluating mental health therapies is maintaining allocation concealment and blinding. In contrast to medical studies, when a cohort may get a placebo, it is evident in school nurse research that a group is not receiving an intervention [68]. Efforts have been undertaken to mitigate this bias by randomly allocating whole schools to either an experimental or control group [65], however, this poses the danger of examining geographically or socio-economically diverse populations. Another challenge in evaluating the efficacy of school nurses in addressing mental health issues may stem from the varying qualifications required for their mostly medical roles. The extent and kind of specialized training obtained by school nurses varies among study projects, making comparisons unfeasible.

Research groups dedicated to the implementation of asthma treatment strategies for schoolchildren have additional hurdles. The notable variation in these studies is evident, and the research pool has so far shown

inconsistency in assessment techniques, therapies, or investigated populations. Asthma research benefits significantly from efficacy analyses due to its closeness to medical practice, where treatments are better regulated, such as the administration of inhaled corticosteroids (ICS) by school nurses. Similarly, diabetes research indicates favorable outcomes, demonstrating that school nurses may effectively manage Hemoglobin A1c levels, and the measurements (e.g., blood glucose levels) are mostly devoid of potential bias. Researchers are leveraging this knowledge, and research findings indicate that school nurses significantly enhance diabetes treatment in children [58,59].

7. Efficacy of School Nurse Interventions

In the current article, the writers have evaluated the efficacy of the school nurse. The evaluation of the school nurse's effectiveness was conducted based on a classification of strategies and approaches, focusing on two of the three aspects. This included an analysis of medical health care interventions (aspect 2) concerning children with asthma, diabetes, obesity, anxiety, depression, and smoking issues, as well as an assessment of health promotion (aspect 3) regarding the school nurse's role in addressing sexually transmitted diseases (STDs) and enhancing vaccination rates. The assessment of school-based treatments included a quality evaluation. The current findings substantially align with those of other global researchers who have previously challenged the methodological deficiencies and, therefore, the absence of solid, significant results in this domain [3,39]. The primary complaint is the scarcity of dependable, evidence-based, quantitative data derived from randomized controlled trial designs [39,40,47]. This work recognizes the critique and hence offers a more nuanced perspective. The findings of this study indicate that significant evidence-based investigations are using randomized controlled trial designs that include a range of health outcomes [17,19,35,38,61–67].

Nevertheless, the research on school nurses lacks trustworthiness, since our investigations did not identify any comparison studies for the majority of the relevant health outcomes. This work contradicts the views of previous research [3,39] by drawing findings on the efficacy of the school nurse for kids with asthma and diabetes. Compelling studies validate the efficacy of school nurses in managing asthma treatment [40,41]. The efficacy of the school nurse in the domain of diabetes is also demonstrable [55,56]. The findings of this study indicate that assessment techniques using physiological factors, such as blood glucose levels for diabetes prevention or peak flowmeter readings for asthma management, have more significant outcomes. A potential salient aspect may be the closeness to medical research. This Overview of Reviews indicates that many health outcomes in school nurse research are well-researched, while many others are not well-studied. The ongoing discourse over quality assessment procedures and research methodologies in school nurse research needs continuous attention. Notwithstanding scientific limitations, the findings of this research advocate for the deployment of school nurses, particularly in countries like Germany where such positions are not yet created. Large-scale, long-term studies assessing the efficacy of the school nurse in her many roles seem positive [29].

8. Conclusions

The role of the school nurse is recognized globally, albeit its implementation varies by nation and school. Differences pertain to the training of school nurses, staffing ratios, credentials, and duties. The varied deployment of school nurses and discrepancies in study implementation (e.g., school nurse as part of standard care vs school nurse as part of a research initiative) hinder the comparison of study outcomes. Our research demonstrates the efficacy of the school nurse for children with asthma and diabetes. To establish the school nurse as a permanent element of conventional medical care, evidence-based outcomes in several aspects of children's mental and physical health are required. This report is a preliminary contribution and advocates for more assessment of the school nurse's efficacy based on current research.

Areas that have been inadequately researched or lack demonstrable proof of efficacy pertain to mental health and issues related to children from poor socioeconomic backgrounds. The causes of this gap must be determined in further research. A potential cause for the inadequate quantity of studies may be that mental health research is time-consuming and expensive and often fails to adhere to rigorous qualitative

research criteria (RCTs or observational studies). Due to ethical considerations, a control group is often unjustifiable, and its feasibility in mental health research is sometimes impracticable (e.g., absence of allocation concealment, absence of blinding).

Research groups examining the efficacy of school nurses in mental health or social inequalities may contemplate establishing additional qualitative criteria, such as including qualitative research designs in the assessment of school nurse effectiveness. Policy planners must consider the feasibility and implementability of research in these domains to avoid neglecting the potential efficacy of school nurses.

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دور الممرضات المدرسيات في إدارة الحالات الصحية المزمنة لدى الأطفال: مراجعة

الملخص

الخلفية :تلعب الممرضات المدرسيات دورًا حيويًا في إدارة الحالات الصحية المزمنة لدى الأطفال، مما يساهم بشكل كبير في صحتهم ورفاههم في البيئات التعليمية. على الرغم من أهميتهم، لا يزال تقييم فعالية التدخلات التمريضية المدرسية محدودًا.

الطرق :قامت هذه المراجعة بتقييم منهجي للأدبيات التي تم مراجعتها من قِبل النظراء خلال الفترة من 2020 إلى 2023 عبر قواعد بيانات متعددة، بما في ذلك Medline و .PubMedركز التحليل على تدخلات الممرضات المدرسيات المتعلقة بالحالات المزمنة مثل الربو، والسكري، والسمنة، ومشاكل الصحة النفسية. وتم تقييم النتائج الرئيسية مثل الغياب عن المدرسة، وإدارة الأعراض، وتحسين الصحة العامة.

النتائج :تشير النتائج إلى أن تدخلات الممرضات المدرسيات لها تأثير إيجابي على إدارة الحالات المزمنة. وأظهرت تجربة عشوائية محكومة أن وجود ممرضة مدرسية يقلل من غياب الطلاب بمعدل يومين سنويًا. كما أظهرت برامج إدارة الربو التي تقودها الممرضات المدرسيات تحسينات كبيرة في التحكم بالأعراض وتقليل الزيارات الطارئة. بينما أظهرت جهود الوقاية من السمنة نتائج متباينة، نجحت بعض البرامج في تقليل مؤشر كتلة الجسم لدى الطلاب المشاركين. أما التدخلات المتعلقة بالصحة النفسية، على الرغم من محدوديتها، فقد أظهرت نتائج واعدة في تقليل أعراض القلق والاكتئاب لدى الأطفال.

الخلاصة :تعد الممرضات المدرسيات عنصرًا أساسيًا في التعامل مع الحالات الصحية المزمنة لدى الأطفال، مما يؤدي إلى تحسين النتائج الصحية وزيادة الحضور المدرسي. ومع ذلك، هناك حاجة إلى مزيد من الأبحاث لتوفير أدلة أقوى بشأن فعالية التدخلات، خاصة في مجالات الصحة النفسية وإدارة السمنة. تعزيز دور الممرضات المدرسيات يمكن أن يوفر فوائد كبيرة لصحة الأطفال وأدائهم التعليمي.

الكلمات المفتاحية :التمريض المدرسي، الحالات المزمنة، النتائج الصحية، الربو، السكري.