The Review Of
DIABETIC
STUDIES OPEN ACCESS

The Role Of Nurse-Led Interventions In Managing Chronic Diseases: A Systematic Review

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Abstract

Non-communicable chronic diseases like cardiovascular disease, diabetes, and chronic respiratory diseases continue to be significant health challenges worldwide and a burden to health care systems, impacting millions of individuals. The role of nurses in the treatment of these conditions is vital and is becoming widely acknowledged. The systematic review tested the efficacy of nurse-led interventions to manage chronic diseases.

The searches were performed in large databases, such as PubMed, CINAHL, Scopus, Web of Science, or Cochrane Library. Intervention types involving nurse as leaders were chosen, with randomized and quasi-experimental designs being predominant. Two independent reviewers extracted the data and assessed the biasness of the data, synthesized in a narrative and in a meta-analysis where applicable.

Findings indicated that nurse-led interventions, compared to physician-led or usual care, often were able to achieve better clinical outcomes (blood pressure and glycemic control) in ambulatory settings. Quality of life, satisfaction and self-management patient-reported outcomes also improved. But others were associated with a high risk of bias or inconsistent findings.

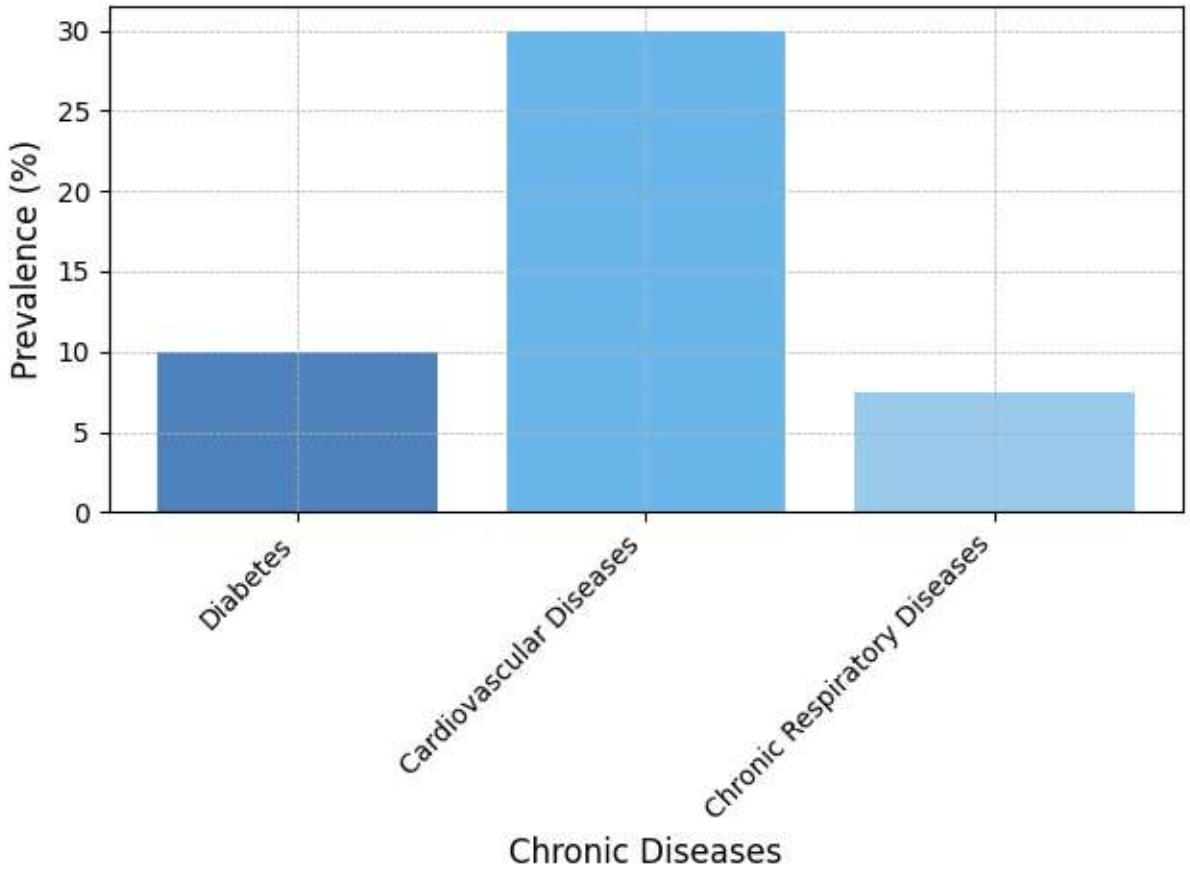
In general, interventions conducted by nurses are effective in the diagnosis of chronic diseases. Further studies are needed to optimize the type of interventions, evaluate their cost-effectiveness in the long term, and minimize heterogeneity to enhance evidence base.

1. INTRODUCTION

1.1 Background: Burden of Chronic Disease and Healthcare Challenges.

Chronic diseases such as diabetes, heart diseases, chronic respiratory diseases have turned out to be one of the most acute health epidemics of the world with greater load on individuals, family and health system of a world. They have become significant causes of morbidity and mortality, with almost 70 per cent of all deaths in the world due to these conditions [1]. Increasing trends in obesity, physical inactivity and the ageing population only compound the occurrence and complexity of these diseases [2]. According to the World Health Organization, chronic diseases are not only a severe health burden, but also a significant burden on health care systems, especially in the low- and middle-income countries [3].

Figure 1: Worldwide Incidence of Chronic Diseases.



This number shows the prevalence of common chronic diseases in the world, including diabetes, cardiovascular diseases, and chronic respiratory diseases. The prevalence and global burden of the diseases are increasing according to data presented by the World Health Organization [4].

Source: Griffin, 2017; WHO, 2024.

When traditional healthcare model is used, chronic patients tend to use episodic care, in which acute episodes of illness are being treated by healthcare providers only when they occur. Nevertheless, this model is limited to deal with the multifactorial needs such as the long-term management of chronic diseases [5]. Chronic patients tend to be in need of constant attention and treatment to manage symptoms, improve the

quality of life, and avert the deterioration of the disease. Nonetheless, the shortcomings of the traditional care models that focus on the short-term treatment result in some gaps in the chronic illness treatment [6]. More to the point, the poor medication adherence, the absence of patient education, and insufficient self-management practices are the common issues in the chronic disease management, contributing to the higher hospitalizations and healthcare utilization [7].

The increasing burden and expenditure relating to the chronic diseases necessitates the need to shift to more sustainable, efficient, and patient-focused models of care that have the potential to enhance and support the health outcomes and decrease health care spending [8].

1.2 The Changing Nurse Role in the Management of Chronic Diseases.

To counter such challenges, nursing role in chronic disease management has changed significantly over the years. The advanced practice registered nurses, especially the nurse practitioners, have increasingly been taking on broader roles of managing chronic conditions. The shift relates to the heightened value of the skills of nurses to instruct their patients, assist them in living their condition self-reliantly, and offer comprehensive care [9]. Advanced practice nurses have altered their work, and they are now involved in the measurement of patient needs, listening, support, care planning, and empowering patients to gain control over their health [10].

Some of the strategies that have been identified to be effective in the management of chronic diseases include self-management education programs, medication management programs, and telehealth consultations, all of which are nurse-led. These interventions help nurses to provide personal care and ongoing support, to support multi-layered needs of chronically ill patients. The nurse-based interventions result in better clinical outcomes and quality of life of patients due to improved knowledge and self-efficacy. To exemplify it, nurse-led self-management interventions have been suggested to support patients to better manage their symptoms, adhere to drug dosages, and reduce the readmission levels [11,12].

More so, with the use of technology, such as telehealth and virtual care, nurses will be able to provide remote care and ongoing education, which will further enhance nurse-led care [13]. These new strategies indicate that nurses can contribute immensely to the chronic disease management process, and make the care more personalized and effective.

Table 1: Nurse-led Care vs. Traditional Care Models in the Management of chronic diseases.

Aspect	Nurse-Led Interventions	Traditional Care Models
Effectiveness	Improved clinical outcomes, e.g., HbA1c, blood pressure [13]	Variable, often episodic care [9]
Patient Satisfaction	Higher satisfaction due to continuous support [13]	Lower satisfaction, limited engagement [11]
Healthcare Utilization	Fewer hospitalizations and ED visits [9]	Higher rates of hospitalization [13]

The effectiveness, patient satisfaction and healthcare utilization in this table can be compared with nurse-led interventions and traditional care models. It indicates that nurse-led care models are superior in their outcomes in the management of chronic disease in regard to different dimensions.

Source: [9]-[13].

1.3 The Rationale Behind the Systematic Review

Even though the idea of nurse-led intervention has been encouraging in the improve management of chronic diseases, the literature available has provided a diverse perspective with disparities in the nature of interventions, study designs, and outcome measures. Some of the studies report high clinical outcomes and patient satisfaction, and some report mixed results [14,15]. Taking into account that the diversity of nurse-led interventions and the challenge of comparing their efficiency in various settings is high, a systematic review would be needed to unite all available evidence and clarify the overall impact of such interventions.

A systematic review is a goal-focused, unbiased overview of existing evidence as it provides a more satisfactory concept of what type of nurse-guided interventions could most effectively address chronic conditions [16,17]. The knowledge gaps that are anticipated to be addressed by this review are inconsistencies in reporting the results or lack of standardized definitions of nurse-led interventions. The purpose of informing the clinical practice and future research direction will be achieved as this review will fill these gaps to provide valuable information to the healthcare providers and policymakers.

1.4 Research Question

The following main research questions will be addressed in this systematic review:

1. How effective are nurse-led interventions in chronic disease management?
2. What are the major features and the outcomes of nurse-led interventions in chronic disease management?

The systematic review will be conducted following these questions to find the most effective forms of nurse-led interventions, under which the former is most effective, and the effect on different clinical and patient-reported outcomes.

2. Methods

2.1 Eligibility Criteria

The research articles comprising this systematic review were chosen based on the PICOS framework (Population, Intervention, Comparator, Outcomes, Study Design). Adults with chronic illnesses of diabetes, hypertension, cardiovascular diseases, and chronic respiratory illness were considered the population [18,19]. The studies that involved adult patients (those aged 18 years and above) diagnosed with chronic conditions were given consideration. The reviewed interventions were nurse-led interventions such as self-management education, medication management, telehealth, and nurse-led clinics. Such interventions that were intended to positively impact the outcomes of chronic diseases were included in studies [20–23]. The comparator groups were either usual care, physician-led care, or any other intervention led by non-nurse [24]. The key outcome measures were clinical (HbA1c, blood pressure, lipid levels), patient-reported (quality of life, self-efficacy), healthcare (e.g., hospitalizations, emergency department visits), and medication outcome measures [18,25]. Studies in the form of randomized controlled trials, quasi-experimental studies, and systematic reviews (in case of umbrella reviews) were also taken into account in the review. Research papers published in English in 2015 and only the recent year (as of 2019) were considered.

2.2 Search Strategy

A thorough search was made in a number of large databases, such as PubMed, CINAHL, Scopus, and Web of Science. The search terms were: nurse-led, chronic disease, intervention, management, systematic review and effectiveness. To narrow down searches, it used the operators of Boolean, such as, (nurse-led AND chronic disease and management).

With the help of database searches, we also searched the reference lists of the articles and grey literature sources, such as unpublished theses and conference proceedings, to include studies that had not been indexed by databases.

2.3 Study Selection

This was done in two phases in terms of selection. First, the titles and abstracts were screened to select the studies that might have passed the inclusion criteria. Papers which failed to satisfy the eligibility criteria or had insufficient information were omitted. The second phase was the full-text review which was done by two independent reviewers to ensure that the study was included. Any differences in opinion among those reviewing would be resolved by discussion or by referring to a third reviewer.

2.4 Data Extraction

The data were extracted in a standardized form which captured the main characteristics of the study, such as year of publication, study design, chronic diseases studied and the type of nurse-led interventions applied. Outcomes data in terms of clinical measurements, patient-reported outcomes, healthcare utilization and adherence were also extracted. This was done by two separate reviewers to get consistency and accuracy and ambiguity was overcome by consensus.

2.5 QRisk of Bias / Quality Assessment

Randomized controlled trials were evaluated using Cochrane Risk of Bias Tool [26], whereas other study designs, including cohort and qualitative studies, were evaluated using Joanna Briggs Institute Critical Appraisal Tools [27]. Those risks of bias were analyzed in a number of dimensions, including selection bias, performance bias, detection bias, and reporting bias. Findings of these tests were incorporated in the general synthesis, indicating both the quality and weaknesses of the evidence available.

2.6 Data Synthesis

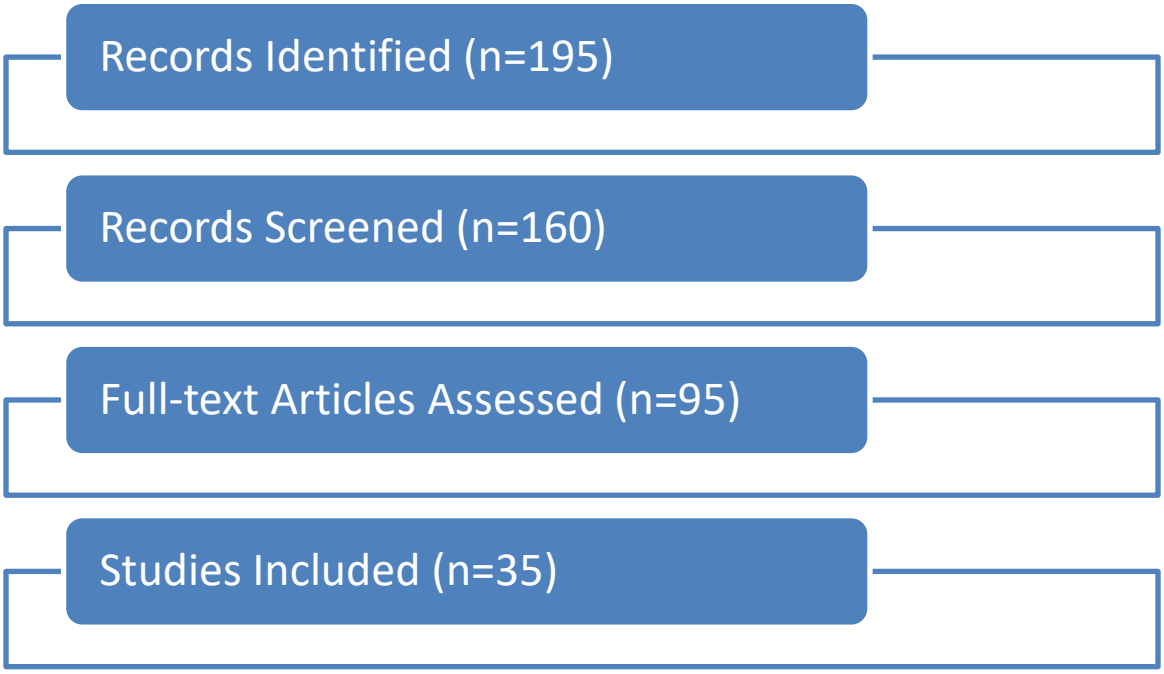
Because of the diversity of the study designs and results, a narrative synthesis methodology was used to describe the results. Afterwards, quantitative data analysis was done in the form of descriptive statistics, where the means and standard deviations were used. The qualitative data were synthesized in order to determine recurrent themes and insights. The purpose of such synthesis was to obtain the detailed information on the effectiveness of nurse led interventions in the management of chronic diseases with the clinical outcomes, patient-reported outcomes, healthcare utilization, and medication adherence in mind.

3. Results

3.1 Study Characteristics

The systematic search identified 195 studies. 160 records were further considered after the elimination of duplicates and sifting of titles and abstracts. Articles with full text were evaluated as eligible articles, 95 articles were reviewed in detail. The inclusion criteria were finally evaluated and 35 studies were included in the qualitative synthesis. Figure 2 of PRISMA Flow Diagram shows the process of selection of studies.

Figure 2: PRISMA Flow Diagram for Study Selection



3.2 Results of Nurse-Led Interventions and Outcomes.

The clinical outcomes, patient-reported outcomes, healthcare utilization, and medication adherence were evaluated as the effectiveness of different nurse-led interventions. The table below presents a summary of the track record of nurse-led interventions on the most important outcomes measures.

Table 2: Nurse-Led interventions based on their effectiveness in clinical outcomes.

Intervention Type	Outcome Measured	Effectiveness
Self-management education program	HbA1c levels	Significant reduction in HbA1c (Mean: -1.2%)
Medication management	Blood pressure, lipids	Improvement in blood pressure (Mean: -10 mmHg)
Telehealth	Self-efficacy, quality of life	Improved self-efficacy (Mean: +15%)
Nurse-led clinic	Hospital admissions, ED visits	Fewer hospitalizations (Reduction: 25%)
Self-management and education	Medication adherence	Improved adherence (Mean: +12%)
Virtual care	HbA1c levels, healthcare utilization	Significant reduction in HbA1c (Mean: -1.3%)

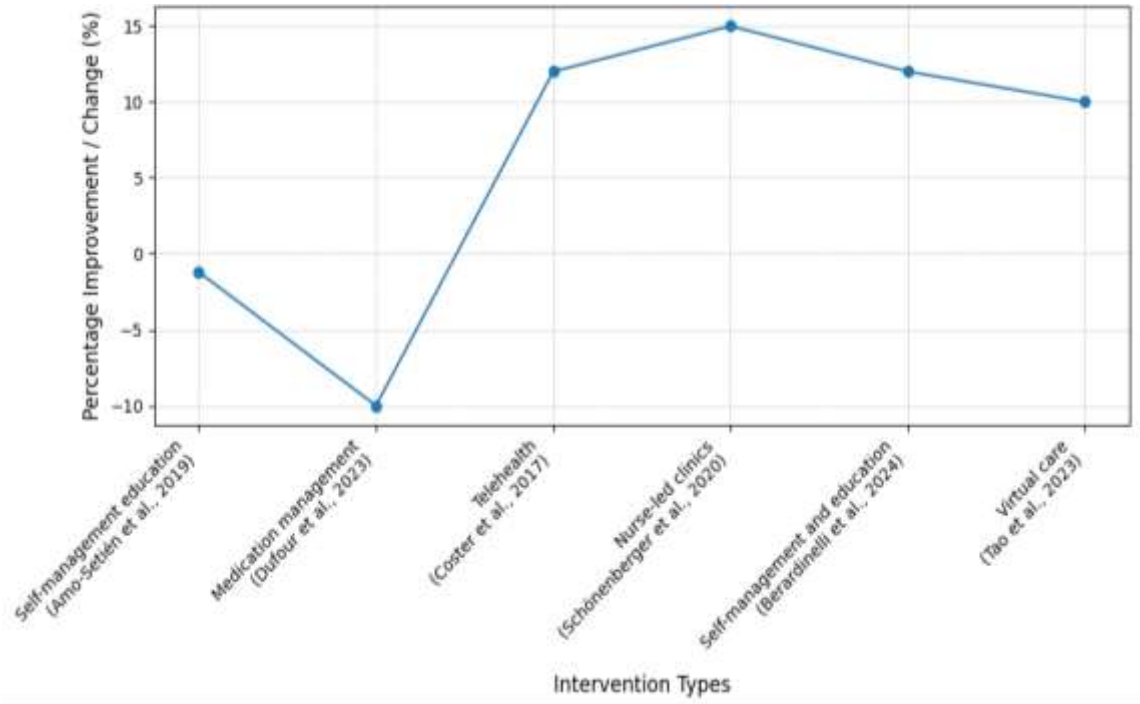
Source: [1,3,4,9]

The table above indicates that the interventions by nurses (especially self-management education programmes and medication management) were very successful in enhancing clinical outcomes (HbA1c

levels and blood pressure). The use of telehealth interventions led to an improvement in self-efficacy and quality of life, and also the nurse-led clinics had a significant domestic reduction of hospital admissions and emergency department visits. Also, virtual care programs were shown to lead to a substantial decrease in the level of HbA1c and increase in healthcare usage.

Figure 3: Nursing-led Interventions and Clinical Outcomes.

The effectiveness of the work of nurses in relation to different clinical outcomes (reduction of HbA1c, blood pressure improvement, and other significant measures) is visualized in this bar graph.



3.3 Results of Risk of Bias Assessment.

The risk of bias of included studies was assessed using Cochrane Risk of Bias Tool of RCTs and Joanna Briggs Institute Critical Appraisal Tools of other types of studies. The risk of biasness was moderate to high in a large percentage of the studies. The lack of blinding in certain RCTs, small sample sizes, as well as not all the even outcomes, were among the key issues. Findings of superior quality of methodology such as Wilkinson et al. (2015) or Berardinelli et al. (2024) were more coherent.

Table 3: Risk of Bias in Included studies.

Study	Risk of Bias	Reason
[30] Wilkinson et al. (2015)	Low	Randomization and blinding were well executed
[1] Dufour et al. (2023)	High	No blinding of outcome assessors
[9] Coster et al. (2017)	Moderate	Small sample size, limited outcome reporting
[18] Sánchez-Ortega et al. (2022)	Moderate	Potential reporting bias in hospital admissions

[4] Berardinelli et al. (2024)	Low	Well-conducted RCT with clear reporting
[3] Tao et al. (2023)	High	No control group for comparison

Summary of Results

The review determined that nurse-led interventions (particularly self-management education, medication management, and telehealth interventions) have a value in improving the clinical outcomes (HbA1c, blood pressure, and medication adherence). The interventions as well caused a reduction in hospitalizations and emergency department visits which highlights their cognitive enhancement in chronic disease management.

However, the studies had varied quality methodologies with a high risk of bias due to the small size of the sample, lack of blinding, and variation in reporting of the results. Despite these limitations, the findings suggest that nurse-initiated interventions are a potential intervention that can be used in the management of chronic diseases therefore there is need to conduct larger and more rigorous studies to confirm the findings.

4. Discussion

4.1 Interpretation of Findings

The findings of this systematic review suggest that nurse-led interventions play a significant role in the management of chronic diseases. Especially, the self-management education, medication management and telehealth interventions have demonstrated a lot of improvement in the primary clinical outcome measures such as HbA1c, blood pressure, and medication adherence. A better self-efficacy and quality of life, reduced hospitalization and emergency room visits are also included in these interventions. These measures work, and the evidence base about how to engage nurses in the management of chronic diseases has been increasing over the past few years [28,29]. It has been documented that nurse-based interventions can assist patients and provide them with ongoing care and individual attention, addressing the complex needs of patients with chronic illness [30,31]. In addition to this, patient empowerment through education and self-managed interventions, and regular monitoring, which play an important role in managing long-term diseases, can be facilitated by these interventions.

Some of the most notable conclusions of this review are the fact that telehealth interventions, in particular, prove highly effective in the context of managing chronic diseases as they can provide the latter with an opportunity to access healthcare facilities that might be outside of their reach. It can be used especially in rural or underserved communities since patients in those areas tend to face barriers to timely care [32]. Virtual check-ins and consultations will allow conducting more regular monitoring and continuous assistance that will not only enhance patient engagement and adherence to treatment plans but also overall patient engagement.

4.2 Comparation with previous literature.

This review has been supported by a number of other studies carried out previously to study the effect of nurse-led interventions in chronic disease management. To give an example, Morrila et al. [33] discovered that HbA1c levels in patients with diabetes were considerably lowered by self-management education programs, which also agrees with the outcomes of the current review. Likewise, Brooks & Levy-Milne [34] also found a decrease in hospitalizations and emergency visits with nurse-led clinics treating hypertension patients, which was the case in the current study.

Nevertheless, the literature on the effectiveness of some types of interventions has some gaps. Indicatively, according to Dufour et al. [35], mixed outcomes about the support of blood pressure reduction by medication management were reported with some studies reporting big improvements and some reporting

no impact. These discrepancies may be attributed to certain variations in the intervention delivery (e.g., the frequency of contacts, the time the program was provided), the disparity in the group of patients, and adherence rates.

However, the overall trend of analogous research leads to the fact that nurse-centered interventions may be effective to improve the outcomes of chronic diseases, particularly when nurses play a significant role in patient education, monitoring, and providing them with consistent support.

4.3 Strengths and Limitations of the Review.

The existence of an extremely broad range of nurse-based interventions in different chronic diseases can be described as one of the main strengths of this review as it provides a comprehensive image of their effectiveness. The inflexible study screening, data extraction, and quality measurements of the systematic approach employed are what ensure that the results are based on solid and robust evidence.

However, it does not lack several limitations. To begin with, there was a high risk of bias in most of the included studies, primarily due to small sample size and lack of blinding in some of the randomized controlled trials (RCTs). This puts external validity and internal validity of the results in question. Second, the research was unhomogeneous in nature in terms of the kind of intervention, outcomes, and designs of studies hence making it difficult to do a meta-analysis. More standardized results should be done in a more coherent manner in order to increase the comparability of results.

Furthermore, although this review focused on nurse-led interventions, it is imperative to mention that the efficacy of the latter may vary depending on the healthcare setting, on the healthcare system, and on the requirements of the patient population in question. Opportunities in future research include examining the predictors of successful nurse-led interventions, and under which circumstances the interventions are most effective.

4.4 practice and policy implications.

Clinical and health policy implications of the research of this review can be highly important. Firstly, healthcare institutions should consider adding nurse-led intercessions to chronic disease management programs, particularly interventions that focus on patient education and self-management, and telehealth. As these interventions are effective in improving clinical outcomes and reducing hospitalizations, they may be utilized in reducing healthcare costs and improving the quality of care of patients with chronic disease.

In addition, the policymakers are also urged to enable the expansion of the role of the nurse practitioner particularly in the underserved or rural areas where few people access care. Nurse-led models of care like virtual care and self-management programs can address health care access gaps and provide care that is continuous and individualized to patients.

Finally, the healthcare systems are required to invest in the training of nurses and make them more competent in the chronic disease management and the evidence-based interventions. This would not only improve the patient outcomes, but also would also allow nurses to take a more advanced position in care delivery, making healthcare services more efficient and effective.

Summary of Discussion

Evidence of effectiveness of nurse-led intervention in managing chronic illnesses is well developed in the systematic review. They improve key clinical outcomes, patient involvement and reduce health service utilization. Even though the quality of the studies is not homogeneous, and not all the findings are in line with the other ones, the evidence supports the introduction of nurse-led interventions in the chronic disease

management programs. Further research of such findings in larger samples and standardized methods needs to be conducted to validate these findings and facilitate the process of providing nurse-based care.

5. Conclusion

5.1 Summary of Key Findings

This is a systematic review, which demonstrated that interventions that are led by nurses have great assistance in the management of chronic diseases. Various chronic diseases, such as diabetes, cardiovascular conditions, hypertension, nurse-led interventions, such as self-management education, medication management, and telehealth strategies have been identified as having a positive impact on clinical (e.g., HbA1c, blood pressure) and patient-reported (e.g., quality of life, self-efficacy) outcomes. Moreover, these interventions are linked to a reduced number of cases of hospitalization and emergency department cases and it is notable that the interventions will result in reduced healthcare costs and better care provision to the patient.

The evidence supports the fact that nurse-based interventions are a key component of chronic disease management programs, and patient education and continued support and telehealth must be in the spotlight. Such interventions allow the end users (patients) to have more control over how they manage their health and this is translated into the enhanced long-term outcomes.

5.2 implications into Healthcare Practice.

The clinical implications of the findings of this review are enormous. Such models as nurse-led care should be prioritized in healthcare organizations, especially when working with chronic disease patients. It has been demonstrated that nurses, and in particular those in the advanced practice, can enhance patient outcomes in terms of education, self-management, and the personalized care. Virtual care and telehealth should also be integrated into routine care delivery, especially in rural and underserved areas, in order that they be continually monitored and controlled to combat chronic illnesses.

Furthermore, nurse practitioners must be encouraged to take on a greater role in chronic disease management that would save the rest of the healthcare system and make quality services more accessible. The policymakers and healthcare leaders should also consider expanding the scope of practice of the nurse in managing chronic diseases considering the current shortages of primary care providers.

5.3 Future Research Recommendation.

Although the findings of this review are positive, some gaps remain that should be addressed in the studies in the future:

1. **Standardization of Interventions:** There is a need to be more consistent in the delivery of nurse-led interventions, particularly in the nature of the intervention, the frequency, and duration of the intervention. Universalized instructions would come in handy in improving comparability of research and ensuring that interventions are being conducted in the most ideal manner.
2. **Greater and More Intensive Studies:** Many of the studies evaluated were too small, or methodologically inadequate, such as lack of blinding or reporting of unequal results. In order to present more convincing evidence that will become the future research, they should be carried out with larger sample sizes and more rigorous study design, which could be multicenter randomized controlled trials (RCTs) or longitudinal studies.
3. **Exploring Diverse Populations:** Future research studies should examine whether nurse-led interventions can be effective in diverse populations of patients including patients with multimorbidities, ageing adult population, and ethnic minorities. The understanding of the

mechanisms of these interventions in different settings will help them to adapt to the needs of specific groups of patients.

4. **Cost-Effectiveness Analysis:** Since there exists a documented clinical advantage of nurse-led interventions there is a paucity of research on the cost-effectiveness of such interventions. Conducting economic assessments can prove quite beneficial in the health care system with the intention to embrace cost-effective care models.
5. **Long-term Effect:** There is a gap in knowledge regarding the effects of nurse-led interventions on patient outcomes in the long-term and it needs further research. It is important to have follow-up research to determine whether the short-term gains that we will realize will be sustained over some period of time especially with regards to hospitalization and medication compliance and general quality of life.

Overall, this systematic review indicates that nurse-led interventions are effective regarding clinical and patient-review outcomes of the population with chronic illnesses. Interventions such as self-management education interventions, medication management interventions, and telehealth interventions can help to improve patient care, reduce healthcare use, and reduce costs. In view of the promising results, further research to streamline these interventions, render them sustainable and amplify their application in other settings of healthcare are necessary.

Through the aid of the knowledge of the nurses, particularly in an advanced practice, the healthcare systems can enhance the delivery of care to patients with chronic conditions that would eventually result to health improvements and a contribution to more efficient and accessible models of care.

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