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Contents

The Primary Health Care Approach: Rhetoric or Policy? - A Review of National Health Policies in 8 Countries in Southern Africa	1
<i>Gamuchirai P. Gwaza, Marcy McCall MacBain, Annette Annette Plüddemann & Carl Heneghan</i>	
Mapping Evidence on the Determinants of Postnatal Care Knowledge among Postpartum Women in sub-Saharan Africa: A Literature Review	16
<i>Enos Moyo, Perseverance Moyo, Tafadzwa Dzinamarira, Grant Murewanhema & Andrew Ross</i>	
Incidence of Recurrent Low Back Pain as a Side Effect of Decompressive Surgery for Lumbar Spinal Stenosis in Obese Versus Non-Obese Patients	29
<i>Abdullah Ali Alzahrani & Mohammad Abdullah Alhasani</i>	
Socio-Demographic Determinants of Quality of Life Among Aging Population in Thailand	37
<i>Yodfah Ratmanee & Phattrawan Tongkumchum</i>	
Stress and Coping Strategies Among Nursing Students	46
<i>Kholoud Alharbi</i>	
Telehealth in Saudi Arabia: Its Evolution, Present Infrastructure, and Forward-Looking Implications	53
<i>Abdullah Ghthaith Almutairi, Salman Abdulrahman Almutairi, Ashwaq Awadh Almutairi, Najla Nishaa H. Althobaiti, Khlood Awadh T. Alrashedi & Muaddi Faris Alotaibi</i>	
Reviewer Acknowledgements for Global Journal of Health Science, Vol. 15, No. 12	58
<i>Erica Grey</i>	

The Primary Health Care Approach: Rhetoric or Policy? - A Review of National Health Policies in 8 Countries in Southern Africa

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Abstract

Introduction: The Primary Health Care approach (PHC) can contribute towards universal health coverage (UHC). However, implementing the PHC approach in Africa remains suboptimal. One way to ascertain political commitment to the PHC approach is its reflection in the national health policies (NHP). Several PHC initiatives have helped define and guide the PHC definition, implementation, and evaluation. These include the Alma Ata PHC conference, the Ouagadougou Declaration on PHC in Africa, and the Astana conference. The aim of this paper is to explore to what extent the guidance and characteristics of the PHC approach have been reflected and integrated into the National Health Policies (NHPs) in countries in the Southern African Development Community (SADC).

Methods: The READ approach was undertaken to analyze eight publicly available NHPs. A 12-point checklist was developed to extract relevant data from the policy documents. The WHO Health Systems building blocks are used as the analytical framework to understand the key features of the PHC approach mentioned in the policies.

Results: All the NHPs were developed after the Alma Ata conference in 1978. Six of the eight NHPs reviewed were updated after the Ouagadougou declaration on PHC in Africa in 2008. None of the NHPs were updated after the 2018 Astana PHC conference. Based on the checklist, Lesotho had the most integrated PHC elements (n = 12), while Eswatini had the least (n = 4). Based on the policy review, there seems to be commitment and priority placed on leadership, governance, and access to essential medicines. However, more still needs to be done to improve service delivery in terms of integrated patient centered care (only included in 3 out of the 8), health financing for primary care, integrated health information systems and the community health workers as part of the health workforce.

Conclusion: In conclusion, NHPs should guide implementation, and the NHP is a reference document for many organizations wishing to partner with the government in improving health care services. As such, it should be updated in line with the new evidence and learning and reflect the country's priorities to help align development actors.

Keywords: Primary health care, National Health policy, Southern Africa

1. Introduction

Governments carry responsibility for developing and implementing health policy and plans. Evaluating a national health policy document from a process and content perspective can determine its value, worth, feasibility, and likelihood of success (Funk, Drew, Faydi, Freeman, & Ndyabangi, 2011). Whether it is possible to conduct an objective assessment of a policy is a moot point; however, subjecting the document to a systematic evaluation process can lead to improvements or even major changes and considerable resource savings. Policy evaluation can ensure that a "poor" policy is not implemented, for instance, as it is unreal.

By the late 1960s, several events internationally influenced the development of the Primary Health Care (PHC) approach globally. Doubts about the vertical programs began to surface with the failure of the malaria eradication programs by US agencies and the World Health Organization (WHO) in the late 1950s (Cueto, 2004). New studies on community health showed that despite medical advances, there were still persistent health problems, and there was a relationship between the overall health of the population and the standards of living and nutrition (Cueto,

2004). The political landscape was also changing with the Cold War, and many African countries were beginning to gain their independence. In 1974, the UN passed a resolution on the need for a “new international economic order” to improve social conditions in underdeveloped countries. The WHO and UNICEF were instrumental in convening the first international conference on PHC in 1978, the Alma Ata conference, where the PHC approach was adopted as a key strategy for attaining Health for All (Cueto, 2004). PHC was also endorsed at the 1981 World Health Conference. Many African countries developed or updated their National Health Policies (NHPs) and national development plans in line with the PHC approach (WHO, 2008a).

Thirty years later, in 2008, the International Conference on Primary Health Care and Health Systems in Africa was held in Ouagadougou, Burkina Faso. The meeting reaffirmed the principles of the Declaration of Alma-Ata and expressed the need for accelerated action by African governments to improve health and revitalize primary health care as the key approach for achieving improved health outcomes. Many countries updated their NHPs and developed PHC revitalization plans (WHO, 2010).

A second international PHC conference, the Astana conference, was held in 2018 to review and check progress (WHO, 2018a). PHC was redefined as a “*whole-of-society approach to health that aims equitably to maximize the level and distribution of health and well-being by focusing on people’s needs and preferences (both as individuals and communities) as early as possible along the continuum from health promotion and disease prevention to treatment, rehabilitation and palliative care, and as close as feasible to people’s everyday environment.*” (WHO, 2018a). The conference identified three core elements of PHC, which are (1) meeting people’s health needs, (2) systematically addressing the broader determinants of health, and (3) empowering individuals, families, and communities to optimize their health. Furthermore, PHC would be accessible, equitable, safe, high quality, comprehensive, efficient, acceptable, available, and affordable, and deliver continuous, integrated, people-centred, and gender-sensitive health care (WHO & UNICEF, 2018).

The PHC approach is both a philosophy and an approach to health service delivery (CNA, 2000; Langlois, McKenzie, Schneider, & Mecaskey, 2020). PHC is often seen as the most inclusive, effective, and efficient approach to addressing people’s health and strengthening health systems, particularly in developing countries (WHO, 2018a). The PHC approach also provides the foundation for achieving Universal Health Coverage (UHC), helping advance country-focused, integrated, people-centred health services (WHO & UNICEF, 2018). Governments are committed to implementing the PHC vision as an integral part of the national health strategy.

However, decades later, many African countries need help to implement PHC models due to economic, human, and institutional capacity challenges (Chatora & Tumusime, 2004; WHO, 2008b). Some countries, such as Malawi, have begun to focus more on the Essential Health Package (EHP) following the realization that PHC as a strategy for achieving health for all was unclear, unfocused, and too general to be attained (Makaula et al., 2012). Most of those initial NHPs have since been updated; for example, the Botswana 1995 NHP was revised in 2011, the Eswatini 1983 Policy was updated in 2007, Lesotho 2004 NHP was revised in 2011, Tanzania 1990 NHP revised in 2003 and 2007, and the Zambia 1991 NHP revised in 2012 (NHP Botswana, 2011; NHP Eswatini, 2007; Lesotho NHP, 2011; NHP Tanzania, 2003; NHP Zambia, 2011). It is unclear whether these revised policies have continued to uphold PHC as the main strategy for health for all. Besides, the revised policies predate the Astana Conference in 2018 and may need to incorporate the new understanding of PHC. The main question answered in this paper is how the PHC approach has been integrated into revised NHPs of eight countries in the SADC.

The rationale for the policy review was the need to understand the level of continued political commitment to PHC particularly on elements such as integration and how the Astana declaration of 2018 is reflected in current NHPs. An abundance of guidance manuals and scholarly output on how to develop policy and evaluate the implementation of policy are available. (Collins, 2005; Gilso, Orgill, Shroff, & World Health Organization, 2018; Langlois, Daniel, Akl, & World Health Organization., 2018; Terwindt & Rajan, 2016; Weiner, 2005) However, once a policy has been developed, there is minimal guidance available on how to assess the processes and content issues that are likely to lead to the policy’s success (Funk et al., 2011). This paper provides a checklist to help evaluate the content of the health policy document in line with the PHC approach.

2. Methods

2.1 Study Design

A document analysis was performed using the READ approach (Read your materials, Extract data, Analyse data and Distil your findings (DalGLISH, Khalid, & McMahan, 2021)). Data were extracted guided by a checklist adapted from the WHO checklist for evaluating a mental health policy (Funk et al., 2011). The mental health policy checklist allows for analyzing content and processes needed in developing a mental health policy. Some countries

have already started to use the checklist to assess the content of their policy documents and plans for mental health. Even though the WHO formulated the checklist to assess the content and processes of mental health policies, the approach can be widely applied to other health policies and plans generally (Funk et al., 2011).

The WHO checklist is divided into two sections on Process and Content Issues with twenty-eight questions rated on a four-point scale (1 = yes/to a great degree, 2 = to some degree, 3 = no/not at all, 4 = unknown). Seven questions, with 12 items, were included in the extraction tool as these were deemed directly relevant to PHC and could be rephrased to fit the PHC elements described in the definition above from the Astana declaration. None of the process questions were included, as this review focused only on the content of the policy documents. The rating scale used in the analysis had three points on the WHO scale and excluded the fourth item, 4 = unknown. Anything unknown from the policy or not included was rated a 3, meaning it was not mentioned.

2.2 Inclusion and Exclusion Criteria

Countries with a publicly available national health policy document and located within the Southern Africa Development Community (SADC), a regional economic community with a common plan for its future (SADC, 2021), were included. Only policies written in the English language were included for pragmatic reasons.

The WHO definition of a health policy is used in this paper, which defines a health policy as an overarching formal statement of intent on health covering vision, goals and broad policy directions and priorities (WHO, 2010). On the other hand, the strategic health plan or other frameworks usually focus on measures and instruments for implementing or operationalizing the policy. Only the National Health Policy (NHP) was included in the review. The health strategies and disease-specific policies, such as HIV policy and strategy, were excluded to ensure a comparison of similar documents.

2.3 Document Search and Selection

The published NHPs for included SADC countries were identified through an internet-based search, initially using Google to locate the official websites of the relevant country's Ministry of Health. If the NHP was unavailable on the official government site, the WHO global file repository website was used to retrieve the NHPs (WHO Country Planning Cycle database, 2022). Only policy documents that matched the WHO definition of a policy and were labelled as an NHP were included. As such, the National health strategies from South Africa and Zimbabwe were excluded. The search was done in October 2022.

Another search for relevant publications on policy analysis and the PHC approach in Africa was conducted on the WHO Africa region website (WHO Regional Office for Africa, 2022) and Google scholar. Articles were screened using the titles for papers that referred to overall national policies of countries in the SADC region and not, for example, disease or age-specific policies. These articles were stored and managed using the Endnote referencing software.

2.4 Data Analysis

As part of the READ approach to document analysis, the relevant data was extracted from the checklist in an excel document as described in the study design and summarised. Based on the WHO checklist, the rating scale was used in the following way:

1 = yes/to a great degree, given if a concept or issue was mentioned and described, for example, if the essential health package is mentioned and its components described.

2 = to some degree, given if a concept or issue was mentioned but not described. For example, the policy can say an integrated health plan with no clear description.

3 = no/not at all refer to a concept that is not mentioned at all or is unclear.

A comparison was made across each of the questions for the countries and summarised with some comments to explain the rating. A word count to check the frequency of using certain words and phrases was also done. The terms and phrases analyzed all relate to part of the elements of PHC as provided in the Astana declaration quoted in the introduction, such as “integrated”, “community”, “multisectoral”, “intersectoral”, “people-centred care”, “gender” and “community health workers”.

These key elements of the PHC are presented using the six WHO Health Systems building blocks as the analytical framework (WHO, 2010). i.e., 1) Service Delivery related to people centred care, integrated care and Universal Health Care (UHC) 2) Health workforce related to multisectoral collaboration and community health workers 3) Leadership and Governance related to community involvement or participation, decentralisation and PHC coordination 4). Health financing related to affordability as part of UHC 5) Access to essential medicines related

to comprehensive care and essential health packages 6) Health information systems. There are many overlaps and linkages within these relationships but the WHO building blocks serve as a useful guide for countries when strengthening their health systems to achieve UHC and improve overall health outcomes. The PHC approach is a strategy to achieving similar outcomes i.e., UHC and improved overall health outcomes.

Table 1. 12-point checklist for evaluating an NHP for alignment with the PHC approach. Results from the table are mapped in Figure 3

#	Question
1	Is the primary health care approach mentioned as a general approach to health care in the country?
2	Do the values, principles and objectives in the policy promote key PHC elements such as:
	-Integrated care
3	-Community participation
4	-Multisectoral collaboration
5	-People-centred care
6	-Comprehensive care
7	Is Universal Health Coverage mentioned addressing?
	-Access
8	-Affordability, including PHC financing
9	Is an Essential Health Package (EHP) clearly described?
10	Does the policy establish a coordinating body to oversee major decisions in PHC?
11	Does the policy address an integrated national health information system from the primary level?
12	Does the policy address advocacy for community health workers and other health workforce at the primary level?

3. Results

There are sixteen countries in the SADC region, which are: Angola, Botswana, Comoros, Democratic Republic of Congo (DRC), Eswatini (formerly known as Swaziland), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe (SADC, 2021). Five of these countries, Angola, Comoros, DRC, Madagascar, and Mozambique, were excluded because their policies were not in English. No NHPs could be located for Zimbabwe, South Africa, and Mauritius at the time of the review, and only their national health sector strategies were available and therefore excluded from the review. There were eight NHPs found as PDFs finally selected from Botswana, Eswatini, Lesotho, Malawi, Namibia, Seychelles, Tanzania, and Zambia (Table 2). Eswatini was formerly known as Swaziland, the name used in the NHP, and it changed its name to Eswatini in 2018; as such, Eswatini has been used in this paper.

Table 2. List of countries and National Health Policies reviewed.

Country	First NHP published	NHP reviewed	Link to the source (accessed 28 April 2022)
Botswana	1995	National Health Policy 2011 (revised)	https://www.moh.gov.bw/Publications/policies/revised_National_Health_Policy.pdf
Eswatini	1983	National Health Policy 2007	https://extranet.who.int/countryplanningcycles/sites/default/files/planning_cycle_repository/swaziland/ministry_of_health_-_national_policy.pdf
Lesotho	2004	National Health Policy 2011	https://extranet.who.int/countryplanningcycles/sites/default/files/planning_cycle_repository/lesotho/health_sector_policy_2011-22_2_3.pdf
Malawi	2017	National Health Policy 2017	https://www.health.gov.mw/index.php/policies-strategies
Namibia	1998	National Health Policy Framework 2010-2020	https://extranet.who.int/countryplanningcycles/sites/default/files/planning_cycle_repository/namibia/namibia_policy_framework_2010-2020.pdf
Seychelles	Undetermined	National Health Policy 2016	http://www.health.gov.sc/wp-content/uploads/National-Health-Policy_final-26062015.pdf
Tanzania	1990	National Health Policy 2003 (also 2007 in Swahili)	https://www.healthresearchweb.org/files/Tanzania%20National%20Health%20Policy%202003.pdf
Zambia	1991	National Health Policy 2011	https://extranet.who.int/countryplanningcycles/sites/default/files/planning_cycle_repository/zambia/nhp_prepared_23_january_2012.pdf

The World Health Assemblies in 1977 and 1981 and the Alma Ata declaration in 1978 stimulated health policy formulation in Africa (WHO, 2008a). Six of the NHPs reviewed in the paper were the second revised versions following these events (Botswana NHP, Eswatini NHP, Lesotho NHP, Namibia NHP, Tanzania NHP and Zambia NHP). Except for Namibia, Seychelles and Eswatini, five countries selected had separate standalone policies and strategies specific to PHC. Tanzania had another more recent NHP revised in 2007, but it was only available in Swahili, so the English 2003 NHP was used in this paper. It was not clear from the literature search whether this was Seychelles' first NHP or whether they had been another before this.

The results are presented first, showing the situation assessment, which describes the economic and socio-political overview of the countries as explained in the NHPs. Secondly, the key elements of the PHC approach, as defined in the Astana declaration, quoted in the introduction, are presented using the WHO Health Systems building blocks as the analytical framework.

3.1 Overview of the Countries

Optimal PHC implementation assumes a conducive economic and socio-political environment, which is lacking in much of Africa and affecting its implementation (Chatora & Tumusime, 2004). Three countries under review are low-income, four middle-income, and one high-income (Figure 1). They have relatively small populations, with Seychelles, Botswana, Lesotho, Eswatini and Namibia with under three million people (World Bank, 2020). Tanzania is the biggest, with an estimated 59 million people, while Malawi and Zambia have 19 and 18 million people. All eight countries have a relatively young population, with 50% (4/8) of them having more than 40% of the population below 15 years. Malawi has the highest dependency rate, with 64% of the population under 15 years, and Seychelles has the lowest, with 22% under 15 years (World Bank data, 2021).

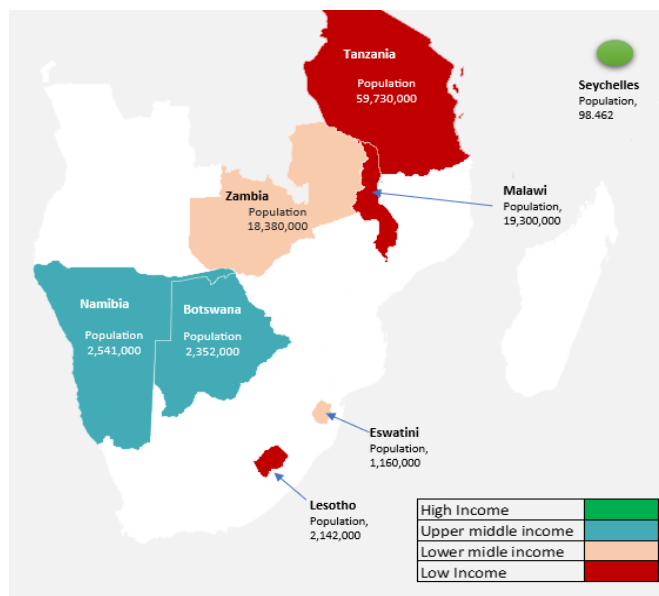


Figure 1. Overview of the countries with NHPs reviewed in the paper. Map generated in Excel and Population figures are for 2020 based on www.worldometers.info/world-population extracted 28 April 2022

All eight countries share a colonial history, which shaped the adoption of the PHC approach even before it was formalized in 1978 (Chatora & Tumusime, 2004; Kasonde, Martin, & World Health Organization, 1994; Makwero, 2018). Colonial health systems were typically fragmented, discriminatory, and urban-focused curative health services (Kasonde, 1994). Post-independence governments were committed to ensuring universal access, equity, and social justice, which are the fundamental principles of PHC (Maluka et al., 2018). For example, Botswana, which obtained its independence in 1966, incorporated community participation, intersectoral collaboration, and preventive healthcare as central to its healthcare system during the late 1960s and early 1970s (Molutsi, 1998). In Tanzania, the 1967 Arusha Declaration sought to make basic health services available closer to the population (NDP, 2016). Similarly, countries that became independent later, such as Namibia in 1990, a decade after the Alma Ata declaration, only adopted the PHC approach in 1990 (Chatora & Tumusime, 2004).

3.2 Primary Health Care Approach

There are two ways of looking at primary health care. The first, primary care as the first level of health service delivery, is clearly explained in all the eight NHPs. The second, a focus of this paper is primary health care as a philosophy and strategy for service delivery where communities are involved, participate, and are empowered in their health development. The interrelationships among health determinants are also addressed (WHO, 2008). Table 3 shows how each country defines and describes PHC within the NHP. PHC is mostly understood as essential health care provided as close to the community as possible and integrates prevention, treatment, rehabilitation, and care. However, PHC as a general approach or strategy to health service delivery is mentioned in five NHPs. The Tanzania NHP explicitly mentions PHC as the cornerstone of their health care system; Namibia has PHC as a policy goal. Lesotho, Malawi, and Zambia NHPs mention PHC as a key principle. Botswana, Eswatini and Seychelles did not mention the PHC approach. However, the Botswana and Eswatini NHPs, explained in the introduction that they had evolved from a PHC focus to the current strategy. In Eswatini, there was an evolution from the initial 1983 NHP, which was founded on the principles of PHC, to the updated 2007 NHP, based on the principles of health promotion. Similarly, Botswana transitioned from the first 1995 NHP, which had gone through various reforms to align with the PHC approach. There is no explanation why the current Botswana NHP does not mention the PHC approach as the key strategy.

Table 3. Definition of primary health Care based/used in the national health policies

Botswana	A main health care delivery model at the 2nd and 3rd levels of the five-tier system comprising individual/family, primary health clinics/centres, primary hospitals, district/secondary hospitals, and referral hospitals. Primary care is provided through a network of clinics, health posts and mobile stops, and community-based preventive and promotive services.
Eswatini	The first level of care, which provides health education, promotes food supply and proper nutrition, improves access to clean water and basic sanitation, promotes maternal and child health (including family planning, immunization, prevention, and control of endemic diseases), improves treatment of common illnesses and injuries, and provide essential drugs.
Lesotho	Basic health care services available nearest to the population at the community level.
Malawi	Essential basic health care based on practical, scientifically sound, and socially acceptable methods and technology; universally accessible to all in the community through their full participation; at an affordable cost; and geared toward self-reliance and self-determination (adopted from WHO 1978).
Namibia	Care that embodies these key principles: people-centred care, health equity, solidarity and social inclusion, health authorities that can be relied on and communities where health is promoted and protected. Orientation of social services from curative and remedial social work to a developmental approach emphasizing the prevention of social ills and empowerment of individuals, groups, and communities.
Seychelles	Care delivered through a network of community-based facilities offering a well-defined, cost-effective health intervention package centred on disease prevention, health promotion, multisectoral collaboration and each individual, family and community taking responsibility for its health. Essential health care model to achieve universal health coverage.
Tanzania	Essential health care that emphasizes community involvement and ownership, multisectoral collaboration, equity and accessibility to health care, empowerment through decentralization of health services and providing promotive, preventive, curative, and rehabilitative interventions.
Zambia	Essential health care based on practical, scientifically sound, and socially acceptable methods and technology made universally accessible to individuals, families, and communities at a cost that the community and the country can afford to maintain (adopted from WHO 1978)

3.3 Elements of PHC Presented Using the WHO Framework for Health Systems

The Astana declaration (2018) provides key elements of the PHC approach to build a strong and sustainable health care system. The key features of the PHC approach reviewed below include people centred care, integrated care, community involvement/participation, multisectoral collaboration, comprehensive care, and universal health coverage. The WHO Six Building Blocks Framework (WHO, 2010) serves as a valuable guide for countries and healthcare systems aiming to strengthen their healthcare infrastructure. By prioritizing service delivery, health workforce, health information systems, access to essential medicines, health financing, and leadership and governance, healthcare systems can work toward providing equitable, affordable, and high-quality care for all, which is aligned with the vision of the primary healthcare approach. These building blocks are fundamental to achieving the goal of universal health coverage and improving the overall health and well-being of populations around the world. The building blocks are not fully aligned to the PHC approach but are used as a general framework to describe the whole health system. These criteria are not provided in any hierarchy of importance.

3.3.1 Service Delivery

Good health service delivery considers how the health care services are provided including the quality and access to the services. Based on the PHC approach, services should be delivered in a manner that is people centred and integrated.

People-centred care: This refers to people having access to health services that are provided in a way that responds to their life course needs and preferences, are coordinated across the continuum of care and are safe, effective, timely, efficient, and of acceptable quality (WHO, 2015:8). People-centred care is a key component of the PHC approach that overlaps and cuts across all the other features and strategic areas. It focuses on health interventions that address people's legitimate needs and expectations. Reaching the underserved, marginalized, and vulnerable is also part of meeting people's health needs. Addressing equity concerns and gender sensitivity is one of the key principles of the PHC approach.

Botswana, Tanzania, and Zambia NHPs mentioned adopting a client or patient charter and were rated a 1, which means this criterion was met. The charter will display the patient’s rights and responsibilities to safe, timely, quality care. It is intended to ensure accountability of the health facilities and health workers to the patients. Seychelles, Lesotho, and Malawi were also rated 1, as they had indicators and outcomes on client satisfaction in their monitoring framework. Patient-centred care is part of the values of the Seychelles NHP. These six countries also mention gender sensitivity as one of their key guiding principles. From the word frequency analysis, Malawi and Zambia have the most gender mentions, 19 and 14 times, respectively, both as a principle and mainstreamed across the different policy initiatives and strategies.

Namibia NHP does not mention people-centred care but has gender as one of the guiding principles and was rated 2, which means the criteria are met to some extent. Eswatini NHP did not mention people-centred care or gender and was rated a 3, which means it is not mentioned. Women’s health situation is mentioned in the context section of the NHP. Still, as there is nothing else within the body of the policy on gender, that is, in the vision, mission, objectives, scope, principles and policy direction, they were rated as not having met this criterion.

Integrated care: PHC seeks to avoid fragmentation of services and ensure a functional linkage or referral system between primary and other levels of care (WHO, 2018). Referral systems are not always well-defined or available and can have limited influence on the level at which users access services (NHSSP, 2014; PESS, 2014). The first two health system levels, primary and secondary, are typically the first referral points and offer integrated services. Strengthening the referral system across all levels and services is a critical policy action. The health system’s strength depends on patients being seen at appropriate levels of care without burdening the system.

The NHPs mentioned integrated care at differing levels and across different health conditions. Table 4 shows how each country defined and described integrated care within their NHPs.

Table 4. Definition of Integrated Care based on the national health policies.

Botswana	Attainment of universal coverage of a high-quality package of essential health services (EHSP) (as stated in the Integrated Health Services Plan (2010) referenced in the NHP
Eswatini	Undetermined from the NHP as it is not mentioned
Lesotho	The health service provision which approaches health issues holistically such that treatment of diseases will be coupled with aspects of nutrition, hygiene, and promotion of healthy lifestyles
Malawi	Essential health services package
Namibia	Not clearly defined. Examples are provided of Integrated Management of Newborn and Childhood Illness (IMNCI) PMTCT integrated into maternal and newborn PHC services.
Seychelles	A strong health system capable of responding adequately to present and future health challenges. Through an optimal national primary health care, quality three-tier national referral system, collaboration with the private sector and support of effective complementary health care services.
Tanzania	Essential health services package
Zambia	Service that is coordinated and streamlined to take advantage of similar functions, skills, resources and targeted populations. This is particularly related to the Integrated Disease Surveillance and Response Strategy (IDSR) that Zambia adopted from WHO-AFRO to monitor, prevent, and control priority notifiable infectious diseases in the country. Other examples given are the Integrated Reproductive Health (IRH)

Zambia, Lesotho, Namibia, and Tanzania were rated a 1, which means they met this criterion, as they mentioned integrated care and provided examples of services to be integrated. The Zambia NHP had the most examples of integrated care, focusing on integrating reproductive health services, mental health, and preventive chemotherapy for neglected tropical diseases and mass immunization. In Lesotho, integrated care is holistic treatment focusing on integrating the management of acute nutrition, hygiene, and healthy lifestyles at the primary level. In Namibia, integrated care focuses on preventing mother-to-child transmission of HIV, maternal and neonatal health, and integrated management of newborn and childhood illnesses (IMNCI). Tanzania mentions the essential health package (EHP) as integrated care.

Malawi, Seychelles, and Botswana were rated 2, which means the criteria were met to some extent, as they mentioned integrated care but with fewer details of what it meant in their context. Seychelles has integrated health

care as a policy objective though no detail is provided. Botswana NHP mentions an integrated national health services plan with no details and integrating health services such as substance abuse into the school curriculum. Health promotion is the cornerstone of the Botswana NHP, which integrates several diseases though this is not explained. Swaziland NHP does not mention integrated care.

Universal Health Coverage (UHC): Access and coverage of services is an essential part of service delivery. UHC addresses access and affordability of health services (Seidman, 2017). PHC is a strategy to address UHC (WHO, 2019). In restructuring their health systems, most countries have focused on ensuring health facilities are available within a certain geographical reach for everyone structured into a two-, three- or four-tier health system (Chatora & Tumusime, 2004). UHC has been divided into access and affordability for the analysis, even though some countries like Zambia may not have used the exact term UHC. Affordability is addressed under the health pillar on financing.

All the NHPs have access to health services as a key principle. Access to health services is also mainstreamed across all the policy focus areas. All were rated a 1, which means they met the criterion. In Seychelles, 86% of the people take less than thirty minutes, mostly via public transportation or walking, to get to a health facility, while in Lesotho, 79.5% of people are within less than two hours walking distance from a fixed health facility. In Malawi, one of the key outcomes is increasing the percentage of the population with access to a health facility offering 24-hour quality EHP within a 5 km radius. One of the policy measures in Zambia is to ensure a health post is established within a 5 km radius of sparsely populated areas. Botswana, Namibia, Eswatini, Botswana, and Tanzania do not mention distances to health facilities.

3.3.2 Health Workforce

A well performing workforce consists of adequate human resources with the necessary knowledge and skills to delivery services. More importantly, based on the primary health care approach, there is a need for multisectoral collaboration across departments and organizations for health care needs to be comprehensively met.

Multisectoral collaboration: The Ministry of Health is the sole custodian of the people's health within the countries, with the legal mandate and responsibility to formulate policies, regulations, norms, standards and guidelines for health services in the country but not the sole provider of responses and interventions (WHO, 2018b). Beyond the health sector, many other sectors, such as education, agriculture, housing, and water, significantly contribute to health. Since PHC encompasses preventive activities, these other sectors become more important. In Africa, healthcare delivery is highly pluralistic and dependent on many international and national civil society organizations. The church is a key health stakeholder in some countries such as Lesotho, Malawi, and Zambia.

The PHC approach recognizes the need for multisectoral collaboration to achieve positive health outcomes and implement a Health in All Policies approach espoused by the World Health Assemblies in 1978. Intersectoral collaboration is the only component of the PHC approach explicitly acknowledged and reflected in all the NHPs, especially related to prevention, promotion, and addressing the social determinants of health. All the NHPs were rated with 1, which means they fully met this criterion. Seychelles mentions the health in all approach, and in Malawi and Namibia, an intersectoral approach with a health sector working group is provided. Botswana formed a national health council with various ministries, and it is a key objective in Zambia and a key strategy for achieving the NHP objectives in Tanzania. In Lesotho and Eswatini, the participation of other sectors in health planning, funding, implementation, and M&E is one of the guiding principles.

Community Health Workers (CHWs): An integral part of the PHC approach is the involvement of the community (see next section), and as part of that, the presence of CHWs is a key part of the health workforce. CHWs health workers are part of the frontline health care workers at the community level, especially in rural and remote areas, conducting different health-related tasks (WHO, 2017). Only the Lesotho NHP mentions advocacy for community health workers and is rated 1, which means they met this criterion. The Tanzania NHP has a brief mention of community health workers with no details on advocacy, so it is rated 2, which means the criteria were met to some extent. The other six NHPs do not mention community health workers and are rated 3, which means they did not meet this criterion.

3.3.3 Leadership and Governance

Effective leadership and governance ensure the existence of policy frameworks, effective oversight, collaboration across sectors, provision of appropriate incentives, attention to system design and accountability; as such, it cuts across all the different elements. However, a key distinguishing factor of the PHC approach is the involvement and participation of the community as an integral part of its leadership and governance strategy.

Community involvement: This refers to health services that empower individuals, families, and communities to

participate and optimize their health outcomes (WHO, 2018). The structure of the health system has the community as the first level of health service delivery. All the NHPs mentioned community involvement and participation and were rated a 1, which means they met this criterion. Lesotho, Tanzania, Zambia, Malawi, Namibia, and Botswana mentioned it the most. They described community involvement as a key principle and value guiding the NHP and mainstreamed it across the different policy measures and initiatives. In Eswatini, strengthening community action and involving service beneficiaries is one of the guiding principles. In the Seychelles NHP, community participation is mentioned as part of the organization and structure of their service delivery. Tanzania had the most frequent word references to community involvement ((n = 7), including communities contributing to the overall PHC budget through in-kind labour or resource contributions (Maluka & Chitama, 2017).

Decentralization: In addition, the decentralization process, a key public reform policy in Africa, a core strategy to place decision-making authority at the lower levels, is part of community involvement (Langlois et al., 2020). Malawi, Zambia and Eswatini mentioned adopting a decentralization policy, while Lesotho developed a decentralization plan. In lesser detail, Namibia, Botswana, Tanzania, and Seychelles also mentioned decentralization. In Seychelles and Namibia, power has been devolved to the regional level. In Tanzania, Zambia, Botswana, Lesotho and Malawi, power has been devolved to the district level, which oversees the lower community level of care. The Lesotho NHP provides the most details on their decentralization action plan with district health management teams established to oversee PHC services. Power has been devolved to Swaziland's chiefdoms, urban government, and regional levels.

PHC Coordinating body: Lesotho and Malawi were the only countries that mentioned establishing a coordinating body to oversee major decisions in PHC, one of the questions on the checklist. In contrast, the remaining six countries do not mention any PHC coordinating body.

3.3.4 Health Financing

A good health financing system raises adequate funds for health, protects people from financial catastrophe, allocates resources and purchases goods and services in ways that improve quality, equity, and efficiency.

Affordability: One of the barriers to accessing health care is the cost of the services. Affordability is a critical element in the PHC approach and a key part of the UHC mission. PHC financing is not explicitly mentioned in the policies. However, affordability is mentioned in all NHPs as part of the mission, objectives or principles and values and rated a 1 for all, which means they met the criterion. Seychelles and Zambia offer free public health care with user fees removed in Zambia. The Essential health package will be free or highly subsidized in Botswana and Lesotho. Public health is free for specific vulnerable groups in Eswatini. The Tanzania MoH will set up a community health fund to help with user fees. Namibia will consider universal health insurance if out-of-pocket expenses increase. There is no mention of a national health insurance scheme or free services in Malawi.

3.3.5 Access to Essential Medicines

Procurement and supply programs need to ensure equitable access to quality-assured and cost-effective medical products. In addition, the availability of adequate medical products helps to ensure comprehensive care can be provided, a key part of the primary health care approach or at least a prioritized set of essential services.

Comprehensive Care: Five NHPs mention comprehensive health care in detail and describe the different health services. These were rated with a 1, which means they met this criterion. For Namibia, comprehensive care is mentioned concerning prevention and emergency obstetric care, Zambia, mental health, medical rehabilitation services and palliative care. Lesotho offers comprehensive services for victims/survivors of gender-based violence and occupational health and hazard management. In Botswana, one of the policy initiatives is for the MoH to define a comprehensive essential health package with a special emphasis on health promotion and preventive health care. The Seychelles NHP has comprehensive care as part of the objectives and principles. The Tanzania NHP was rated a 2, which means they met this criterion to some extent. There is a mention of dispensaries providing comprehensive PHC services though this is not explained. Eswatini and Malawi NHPs were rated a 3, which means they did not meet the criteria on the checklist. They do not mention comprehensive care but refer to a comprehensive NHP and human resources plan.

Essential Health Package: The EHP is a prioritized, limited package of basic and cost-effective health services determined based on experience and ability to significantly impact most people's health status (WHO, 2020). The Essential Health Package (EHP) is mentioned in detail in 3 countries. Tanzania, Botswana, and Malawi, where EHP is the service delivery model. Eswatini, Lesotho, and Zambia were rated a 2, which means they met the criteria to some extent, as there is a brief mention but no detail of what the EHP included. Namibia and Seychelles were rated a 3, which means they do not mention the EHP.

3.3.6 Health Information Systems

A well performing system ensures the production, analysis, dissemination, and use of timely and reliable information. As part of the PHC approach, having integrated health information systems will ensure all the necessary information is collected and utilized for decision making. Integrated health information systems or disease surveillance are mentioned in Seychelles, Tanzania, Lesotho, Namibia, and Botswana NHPs, rated a 1, which means they met this criterion. In Namibia, the focus is on integrating parallel resource programs into the mainstream health information system. The other four countries mention it in general across all levels. Zambia was rated a 2, which means they met the criteria to some degree, as there is mention of an integrated financial management information system, which may contain disease surveillance. Eswatini and Malawi were rated a 3, which means they do not mention integrated health information systems.

Rating Scale															
1	Yes/ to a great degree														Botswana
2	To some extent														Eswatini
3	No/not at all														Lesotho
															Malawi
															Namibia
															Seychelles
															Tanzania
															Zambia
		PHC approach in general	Integrated Care	Community Participation	Multisectoral Collaboration	People-centered care	Comprehensive Care	Universal Health Coverage	Essential health package	PHC Coordinating body	Integrated Health Information System from	CHWs advocacy			

Figure 2. Checklist for evaluating an NHP for alignment with the PHC approach. The heat map provides information on how each country ranked according to the PHC elements identified using the 3-point rating scale

Six of the eight countries' NHPs reviewed have integrated more than 60% of the PHC elements on the 12-point checklist (Figure 2). Lesotho NHP included all 12 features of the PHC approach. Overall, the frequency of NHPs being rated one on the 12-point checklist were Lesotho (n = 12) and Tanzania (n = 9), Botswana (n = 8), Malawi (n = 8), Namibia (n = 8), Zambia (n = 8), Seychelles (n = 7) and Eswatini (n = 4). The Eswatini NHP has the least elements of PHC mentioned. The NHPs fully addressed community participation, multisectoral collaboration and universal health coverage.

4. Discussion

For any health systems to be strong, all the six building blocks need to be addressed in the context of primary health care. Based on the policy review, there seems to be commitment and priority placed on leadership, governance, and access to essential medicines. However, more still needs to be done to improve service delivery in terms of integrated patient centered care, health financing for primary care, integrated health information systems and the community health workers as part of the health workforce.

There are variations in how the PHC approach is defined and understood across the countries. There seems to be some agreement that PHC should offer essential or basic services, whether at the first level (clinics or community) or second level (hospitals), like in Botswana, where they have primary hospitals. Malawi and Zambia have adopted the WHO 1978 definition in their policy. Five countries explicitly include the PHC approach as a cornerstone or underlying principle of the health care system. Seychelles, Eswatini and Botswana do not mention it. This can somewhat correlate with country income. The PHC approach is the most logical way of organizing the health system in low-income countries where access and affordability are critical issues. It can also ensure that stronger health systems are built at the primary care level as it addresses the six WHO building blocks for health systems.

In both high and upper-middle-income countries, such as Seychelles and Botswana, the PHC approach is not mentioned. The countries that were explicit about the PHC approach as a guiding principle and philosophy in the NHP were also low-income and lower-middle-income countries, such as Tanzania, Malawi, Lesotho, and Zambia. The two exceptions were Namibia, an upper-middle-income country with the PHC approach as a policy goal, and Eswatini, a lower-middle-income country that does not mention the PHC approach. Various contextual issues could also explain these discrepancies related to the economy, politics, population size, and structure. For example, Eswatini is a small country of just over one million people, health access may present differently, and the PHC approach may be understood differently. This paper does not delve into these contextual issues but only focuses on self-reported NHPs. However, the NHPs show that despite differences in income status and population density, most countries have made primary health services geographically accessible to all.

Integrated care is also understood and described differently in the NHPs. The most common way presented by Botswana, Malawi, and Tanzania is equating integrated care with the essential health package (EHP) offered at primary and secondary care levels. The EHP does not necessarily mean that these services are provided in an integrated way. Priorities in the EHP differ across countries. For example, maternal health is mentioned in Botswana, acute malnutrition in Lesotho and IMCI guidelines in Tanzania. Although some of these services are integrated, they constitute separate service bundles sometimes within one health facility and can be disjointed from each other. These bundles of health services are typically selected around donor priorities in low-income countries (Sherr K et al., 2013). As such, bundles of vertically integrated programs can run parallel, focusing on different components of PHC with weak coordination. This parallel program integration can result in missed opportunities for quality comprehensive PHC. Though it advances the PHC approach, the EHP intervention risks perpetuating the vertical projects and fragmentation of PHC programs in Africa. Integrating or coordinating these different vertical programs into one primary care model is necessary to achieve UHC. Equitable financing for and access to a range of services should not just be for a handful of privileged programs (Chaitkin M et al., 2019). The upper-middle-income countries are now prepared to take on more financial responsibility for their health and focus on more comprehensive services (Burkot et al., 2019).

Seychelles views integrated care as part of building a strong health system and referral networks across all levels of care. Lesotho also considers integrated care a holistic approach encompassing all primary care services. Zambia uses integrated care to coordinate different services and use different skills and functions to address the target population. While the EHP mentioned above can be considered integrated care, mention of the term integrated care or other types is relatively few within the NHPs, only 4 out of 8 (50%). Yet, it is a key element of the PHC approach and strategy for achieving UHC. A systematic review of integrated models in LMICs shows that 'adding on' services (or linkages) may improve the utilization and outputs of healthcare delivery even though there is no evidence that a fuller form of integration improves healthcare delivery or health status (Dudley & Garner, 2011). A later systematic review on integrated care in the UK and internationally suggested that integrated care models may enhance patient satisfaction, increase the perceived quality of care, and enable access to services (Baxter et al., 2018). However, this review only considered studies carried out in developed countries or members of the Organisation for Economic Collaboration and Development (OECD). There is a need for an updated review of the utility of integrated care at PHC level in LMICs and Africa to inform policy direction.

Integrated health information systems are still generally not prioritised within the policies. Furthermore, data utilization for decision-making is still lacking, even though policymakers may develop many monitoring plans and health indicators to measure health outcomes (Burkot et al., 2019). Whilst other health workforce are mentioned and prioritised in the policies, there is still limited advocacy and support for community health workers, who are the frontline for community health services, especially in countries with a vast rural population. However, it could well be that this is not represented in the national policy but is covered in other specific policy documents.

4.1 Limitations of the Research

The review only focused on NHPs in English, which can bias the results as there are many contextual differences across the countries. A more comprehensive study including all countries may be necessary. The unit of analysis in this study is the national health policy. There is a risk of overinterpreting the results. Much richer information could have come from a combination of secondary and primary data sources. However, for this study, a pragmatic choice was made to use documentary evidence: the national policy documents exclusively. Thus, the convergence of information from multiple sources is limited, and construct validity is undermined. The countries and areas where primary care elements were missing may be addressed in other specific policy documents outside this research's scope.

4.2 Implications for Policy

There are important implications for primary health care based on how it is understood and integrated within the NHPs. The NHPs guide national health priorities and can affect national health investment decisions. As such, the moderate alignment between the NHPs and some of the PHC elements envisioned in the WHO Astana declaration should be a pressing concern for policymakers and international health players. NHPs need to be updated to reflect this revised understanding of PHC.

The variations in definitions of primary health care and integrated care affect how it is implemented or success is measured, which can result in a disconnect between policy and practice. This review adds value to the body of literature as it compares policies across countries in southern Africa and can inform efforts to standardize and measure PHC efforts in the region. Clarity of concept and approach around integrated people-centred health care is necessary to avoid implementation gaps and a lack of understanding of what works. Integration may improve the service uptake and coverage of health services. Still, there is limited evidence that integration results in improved patient experiences or health outcomes compared to other service delivery models. This lack of rigorous evidence on integrated care is reflected in its sparse mention within the NHPs. More research is needed to understand integrated healthcare delivery models and how we can optimize them to inform policy direction.

The PHC approach is still considered the most effective vehicle for achieving health goals in LMICs. Achieving acceptable health outcomes and patient experiences in healthcare will require sustained optimal implementation of the PHC approach and continued commitment, prioritization, and incorporation in the NHPs even as they get revised and updated. There are still many policy questions around defining and operationalizing specific PHC elements, such as the best models for integrated, patient-centred, and comprehensive care. More funds for qualitative and quantitative research on primary care are necessary to expand the knowledge and evidence base for the policy and practice for primary care.

5. Conclusion

In conclusion, what gets prioritized in national policy in any given country needs to be interpreted within the contextual differences. Improving health outcomes in Africa will require political commitment and the implementation of evidence-informed health care approaches. The PHC approach is still considered the most effective vehicle for achieving health goals in LMICs. Achieving acceptable health outcomes and patient experiences in healthcare will require sustained optimal implementation of the PHC approach and continued commitment, prioritization, and incorporation in the NHPs even as they get revised and updated. There are still many policy questions around defining and operationalizing specific PHC elements, such as optimal health care delivery models for integrated, patient-centred, and comprehensive care. More funds for qualitative and quantitative research on integrated patient-centred care in primary care in Africa are necessary to expand the knowledge and evidence base for the policy and practice.

Data Availability

The authors confirm that the data supporting the findings of this study are available within the article and the corresponding tables and graphs. Additional information is available upon reasonable request from the corresponding author.

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Mapping Evidence on the Determinants of Postnatal Care Knowledge among Postpartum Women in sub-Saharan Africa: A Literature Review

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Abstract

Maternal and neonatal deaths continue to pose significant public health challenges globally. In 2020, low-to-middle-income countries accounted for over 95% of all maternal deaths. Sub-Saharan Africa (SSA) is the region most severely impacted, accounting for 70% of global maternal deaths in 2020. Most of the maternal deaths and about a third of child deaths occur in the postnatal period. These unnecessary deaths can be avoided if postpartum women have adequate knowledge about postnatal care (PNC). This literature review's aim was to determine the factors that influence PNC knowledge among postpartum women in SSA. The methodology of this literature review was loosely guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P) statement. Peer-reviewed articles describing determinants of PNC knowledge among postpartum women in SSA published in English between 2013 and 2023 were searched using several search engines. All the twenty-five articles used in this literature review reported on quantitative cross-sectional studies. Some of the individual-level determinants of PNC knowledge identified in this review include place of residence, age of the mother, marital status, educational status of the mother, and the socio-economic status of the woman while the health system-level determinants include distance to a healthcare facility, source of PNC information, place of delivery, and previous maternal healthcare service experience. To improve PNC knowledge of postpartum women, we recommend developing rural areas through improving transport networks, improving the socio-economic status of women, and devising strategies to increase maternal and child health services utilization.

Keywords: Postnatal care knowledge, determinants, sub-Saharan Africa, postpartum women, factors

1. Introduction

Maternal and neonatal deaths are two problems that continue to cause challenges globally. Globally, over 287,000 women died either during or shortly after giving birth in 2020. This figure equates to about 800 maternal deaths daily throughout the world. Nearly 95% of these maternal deaths took place in low-to-middle-income countries (LMICs), and the majority of them could have been avoided (World Health Organization [WHO], United Nations Children's Emergency Fund [UNICEF], United Nations Population Fund [UNFPA], World Bank Group, and United Nations Department of Economic and Social Affairs [UNDESA]/Population Division, 2023). The worst affected region is sub-Saharan Africa (SSA), which accounted for 70% of maternal deaths. Three countries that had extremely high maternal mortality ratio (MMR), that is MMR above 1000 deaths per 100,000 live births, were in SSA, and these are South Sudan, Chad, and Nigeria. With over 82,000 deaths, Nigeria had the greatest estimated number of maternal deaths in 2020, making up almost 25% of all estimated maternal deaths worldwide. However, despite its very high MMR of 545 deaths per 100,000 live births in 2020, SSA managed to significantly reduce MMR by 33% between 2000 and 2020. Almost 60% of maternal deaths in the world occur in the postpartum period. According to UNICEF (2021), the newborn mortality rate (NMR) fell from 37 deaths in 1990 to 17 deaths per

1,000 live births in 2020. Nevertheless, despite this global drop in NMR, there are considerable variations between regions and nations. In 2020, SSA reported 27 neonatal deaths per 1,000 live births, compared to fewer than 5 in Europe. About one-third of all child deaths worldwide occur within the first four weeks of life, also known as the neonatal period. It is estimated that 75% of neonatal deaths take place in the first week after birth (Beraki et al., 2020).

Postnatal care (PNC) is described as the care provided to the woman and her newborn child within 42 days of the placenta's birth. In the postnatal period, there should be at least four PNC visits. PNC offers a chance to promote and put other public health components into action (McCauley et al., 2022). Promoting exclusive breastfeeding is one of the elements of maternal PNC, along with depression screening and counseling, family planning, disseminating information on danger signs in mothers, and detecting, preventing, and treating anemia and cervical cancer. Additionally, other components of maternal PNC include testing for gestational diabetes mellitus and managing it, checking for pre-eclampsia, and identifying victims of intimate partner violence so that counseling can be offered to them (McCauley et al., 2022). The components of newborn PNC include kangaroo mother care, skin-to-skin care at birth, prevention of mother-to-child transmission of HIV, the clinical assessment of the baby, including congenital anomalies, and guidance and education on danger signs in the baby. In addition, the other components of newborn PNC include screening for, preventing, and treatment of malaria in the baby, immunizations for the baby, Vitamin K supplementation, the monitoring of the newborn baby's growth, hygienic cord care, and the care of the pre-term baby.

Despite being of utmost importance to both the mother and the baby, PNC utilization is very low globally. According to global estimates, fewer women and newborn babies receive PNC compared to antenatal care (ANC), with less than 50% of women receiving a PNC visit within 48 hours of giving birth (Langlois et al., 2015). The mother or the newborn baby may occasionally die or become disabled because of inadequate PNC (Beraki et al., 2020). According to estimates, 10-27% of all neonatal deaths might be prevented if PNC utilization rates reached 90% (McCauley et al., 2022). These unnecessary deaths and disabilities can be avoided if postpartum women have adequate knowledge about PNC. Some studies conducted in SSA have revealed insufficient PNC knowledge among postpartum women (Berhan & Gulema, 2018; Kiragu et al., 2021). Additionally, several studies have shown that women were more likely to use PNC services if they were aware of them (Amsalu et al., 2022; Golla et al., 2018; Alemu et al., 2021). This literature review, therefore, aimed to determine the factors that have an effect on postpartum women's level of PNC knowledge in SSA from previous studies. This information may be used to formulate strategies that can be used to improve PNC knowledge among the target population, possibly leading to an increase in PNC utilization.

2. Methodology

2.1 Study Design

The Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P) statement served as a loose guide for this literature review.

2.2 Research Question and Study Eligibility

The research question that we sought to answer in this literature review was: What are the determinants of PNC knowledge among postpartum women in SSA? The studies' eligibility was determined using the problem-interest-context (PICO) framework. The problem was defined as PNC knowledge, interest as postpartum women, and the context as SSA.

2.3 Inclusion Criteria

This review included original quantitative studies published in English that reported on the determinants of PNC knowledge among postpartum women in SSA. Studies that were excluded from this review were meta-synthesis, literature reviews, qualitative studies, systematic reviews, and meta-analyses.

2.4 Literature Sources and Search Strategy

We searched Google Scholar, ScienceDirect, MEDLINE, Africa Journals Online (AJOL), SCOPUS, and PubMed databases for peer-reviewed articles published between 2013 and 2023. All the databases were searched on 26 July 2023. Supplementary File 1 shows more details of the PubMed search strategy. The terms we used in searching for the relevant articles include 'PNC knowledge', 'determinants', 'sub-Saharan Africa', 'factors', 'postpartum women', 'postpartum family planning', 'postpartum contraception', 'neonatal complications', 'immunization', 'vaccination', 'postpartum danger signs', 'neonatal danger signs', 'postpartum complications', and all countries in SSA. Boolean operators were used to combine search terms. To widen search terms to encompass all variations of

the root words, wildcards, and truncation symbols were utilized. All the full-text retrieved articles were exported to ENDNOTE, which was used to find duplicates. After eliminating the duplicates, the remaining articles were assessed to see if they matched the requirements for inclusion. To determine whether an article met the inclusion criteria, two reviewers (EM and PM), assessed the titles and the abstracts of the remaining articles independently. In order to potentially find publications that might have been overlooked during the initial search, the lead author then looked through the reference lists of the remaining articles. Where the two reviewers disagreed on their assessment results, a third reviewer (GM), was requested to adjudicate.

2.5 Data Extraction

A data extraction form prepared by the authors was used to capture information retrieved from the articles. The information that was captured includes the name of the first author, the publication year of the article, the country in which the study was conducted, the aspect of PNC that was studied, the research method, the study design used, and the determinants of PNC knowledge revealed in each study. The findings were presented in a narrative form and in the form of tables.

3. Results

We retrieved 210 articles from all the databases searched. One hundred and twenty duplicate records were removed before the screening. Among the 90 articles that were screened, 50 were excluded because they were published before 2013, were qualitative studies, or were systematic reviews and meta-analyses. Only forty articles were assessed for eligibility. Fifteen articles were excluded at this stage, and we remained with 25 articles for this literature review, as illustrated in Figure 1.

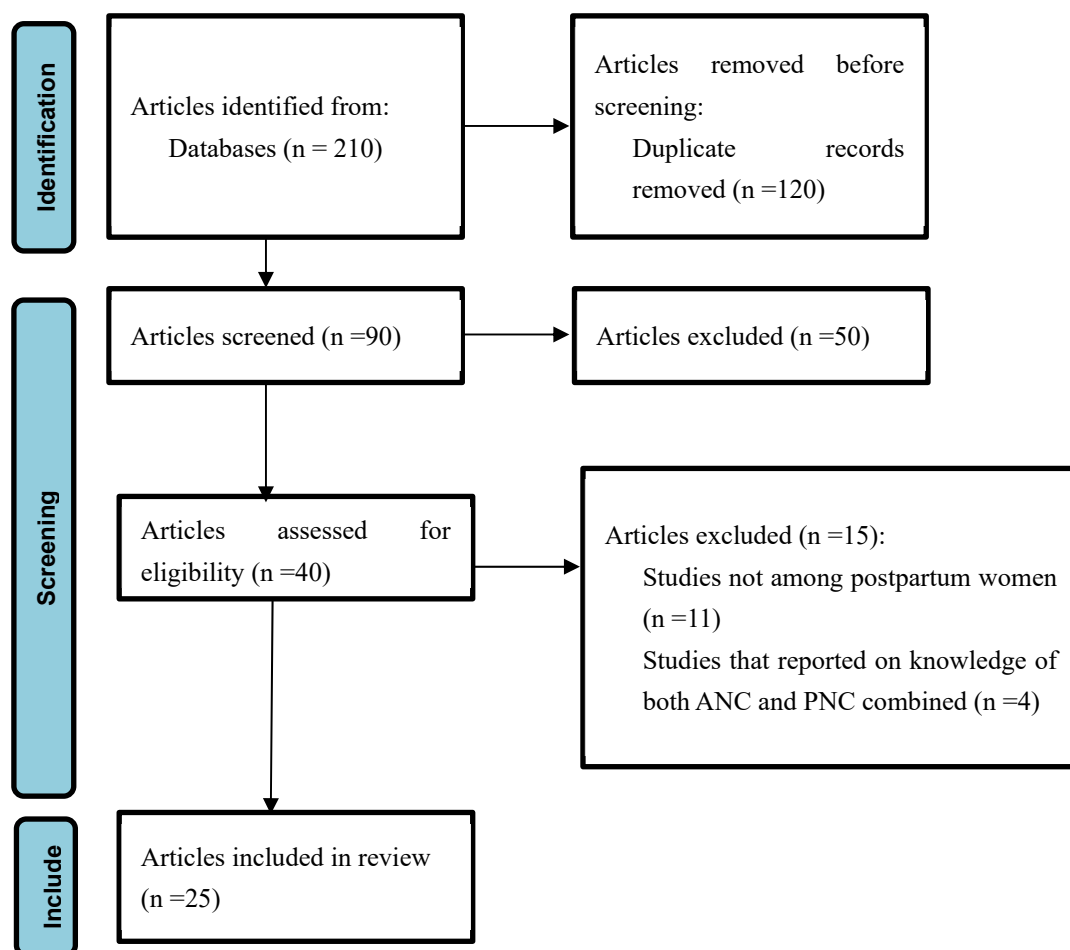


Figure 1. PRISMA Flowchart

Table 1. Characteristics of included studies

Authors, publication year	Reference	Country where study was conducted	Aspect of Postnatal care (PNC) studied	Research method	Study design
Beraki GG, Tesfamariam EH, Gebremichael A, Yohannes B, Haile K, Tewelde S, et al., 2020.		Ethiopia	PNC	Quantitative	Cross-sectional study
Yaya Tessema G, Ayele G, Fikadu Tessema K, Gendisha Ukke G, Godana Boynito W., 2023.		Ethiopia	Postpartum complications	Quantitative	Cross-sectional study
Leta M., 2022.		Ethiopia	Essential Newborn Care (ENC)	Quantitative	Cross-sectional study
Berhan D, Gulema H., 2018.		Ethiopia	ENC	Quantitative	Cross-sectional study
Getachew T, Dheresa M, Eyeberu A, Balis B, Yadeta TA., 2022.		Ethiopia	ENC	Quantitative	Cross-sectional study
Berhea TA, Belachew AB, Abreha GF., 2018.		Ethiopia	ENC	Quantitative	Cross-sectional study
Mose A, Abebe H, Shitu S, Shimels H., 2021.		Ethiopia	Neonatal danger signs (NDS)	Quantitative	Cross-sectional study
Hassen SS, Lelisho ME.,2022.		Ethiopia	Maternal healthcare	Quantitative	Cross-sectional study
Mekonnen BD, Gelagay AA, Lakew AM., 2021.		Ethiopia	Family planning	Quantitative	Cross-sectional study
Seifu B, Yilma D, Daba W., 2020.		Ethiopia	Family Planning	Quantitative	Cross-sectional study
Guta A, Sema A, Amsalu B, Sintayehu Y., 2020.		Ethiopia	NDS	Quantitative	Cross-sectional study
Kebede AA, Cherkos EA, Taye EB., 2020.		Ethiopia	NDS	Quantitative	Cross-sectional study
Tesfaye DG, Koboto DD, Gezahegn H., 2022.		Ethiopia	NDS	Quantitative	Cross-sectional study

Yitayew DG, Tadele AS, Yalew ZM, Mamuye SA, Jember DA., 2021.	Ethiopia	NDS	Quantitative	Cross-sectional study
Bulto GA, Fekene DB, Moti BE, Demissie GA, Daka KB., 2019.	Ethiopia	NDS	Quantitative	Cross-sectional study
Degefa N, Diriba K, Girma T, Kebede A, Senbeto A, Eshetu E, et al., 2019.	Ethiopia	NDS	Quantitative	Cross-sectional study
Kiragu C, Osero JS, Wanyoro AK., 2021.	Kenya	PNC	Quantitative	Cross-sectional study
Roney E, Morgan C, Gatungu D, Mwaura P, Mwamboo H, Natecho A, et al., 2021.	Kenya	NDS	Quantitative	Cross-sectional study
Msiba GH, Assenga EN, Ndossa A, Mchomvu F, Zuechner A., 2022.	Tanzania	ENC	Quantitative	Cross-sectional study
Nchimbi DB, Joho AA., 2022.	Tanzania	Puerperal sepsis	Quantitative	Cross-sectional study
Batamuriza M, Uwingabire E, Oluyinka A., 2020.	Rwanda	ENC	Quantitative	Cross-sectional study
Deynu M, Nutor JJ., 2023.	Rwanda	Mother to child transmission of HIV	Quantitative	Cross-sectional study
Kanu JS, Tang Y, Liu Y., 2014.	Sierra Leone	PNC	Quantitative	Cross-sectional study
Chembe BC, Siziya S., 2017.	Zambia	PNC	Quantitative	Cross-sectional study
Meseka LA, Mungai LW, Musoke R., 2017.	South Sudan	ENC	Quantitative	Cross-sectional study

3.2.1 Individual-Level Determinants of PNC Knowledge

All the articles included in this review reported on the individual-level determinants of PNC knowledge among postpartum women. The individual-level determinants of PNC knowledge include place of residence (Beraki et al., 2020; Mose et al., 2021; Mekonnen et al., 2021; Yitayew, et al., 2021; Deynu & Nutor, 2023), age of the mother (Beraki et al., 2020; Batamuriza & Uwingabire, 2020), age at first pregnancy, marital status (Beraki et al., 2020; Deynu & Nutor, 2023), educational level of the mother (Beraki et al., 2020; Yaya Tessema et al., 2023; Leta, 2022; Getachew et al., 2022; Berhea et al., 2018; Hassen & Lelisho, 2022; Seifu et al., 2020; Yitayew et al., 2021; Bulto et al., 2019; Degefa et al., 2019; Roney et al., 2021; Nchimbi & Joho, 2022; Kanu et al., 2014; Chembe & Siziya, 2017), educational level of the father (Hassen & Lelisho, 2022; Yitayew et al., 2021), and religion of the mother (Getachew et al., 2022). All articles that reported on place of residence as a determinant of PNC knowledge (Beraki et al., 2020; Mose et al., 2021; Mekonnen et al., 2021; Yitayew et al., 2021; Deynu & Nutor, 2023) revealed that those who stayed in urban areas were more likely to have good PNC knowledge compared to those who stayed in rural areas. Two articles (Beraki et al., 2020; Batamuriza & Uwingabire, 2020) revealed that an increase in maternal age was associated with an improvement in PNC knowledge among them. One study revealed that women who were older than 19 years at first pregnancy were more likely to have good PNC knowledge compared to those who were 19 years old and younger. Two studies that reported on marital status (Beraki et al., 2020; Deynu & Nutor, 2023) revealed that women who were married were more likely to have good PNC knowledge compared to those who were not married. All the studies that reported on the educational level of the mother (Beraki et al., 2020; Yaya Tessema et al., 2023; Leta, 2022; Getachew et al., 2022; Berhea et al., 2018; Hassen & Lelisho, 2022; Seifu et al., 2020; Yitayew et al., 2021; Bulto et al., 2019; Degefa et al., 2019; Roney et al., 2021; Nchimbi & Joho, 2022; Kanu et al., 2014; Chembe & Siziya, 2017) revealed that mothers who had a higher educational level were more likely to have good PNC knowledge compared to those who had a lower educational level. The two studies that reported on the association between the educational level of the father and the mother's PNC knowledge (Hassen & Lelisho, 2022; Yitayew et al., 2021), revealed that mothers who had partners with a higher educational level were more likely to have good PNC knowledge compared to those whose partners had a lower educational level. Only one study (Getachew et al., 2022) that reported on religion as a determinant of PNC knowledge among postpartum women revealed that Muslims were more likely to have good PNC knowledge compared to Christians.

The other determinants of PNC knowledge reported in this review include the number of previous pregnancies (Beraki et al., 2020; Yaya Tessema, et al., 2023; Leta, 2022; Berhan & Gulema, 2018; Mose et al., 2021; Kebede et al., 2020; Yitayew et al., 2021; Roney et al., 2021; Kanu et al., 2014; Meseka et al., 2017), whether the pregnancy was planned or not (Hassen & Lelisho, 2022; Kebede et al., 2020), family size (Tesfaye et al., 2022), whether the woman stayed with the father of the baby (Tesfaye et al., 2022; Nchimbi & Joho, 2022), involvement of the father of the baby in PNC activities (Kebede et al., 2020; Roney, et al., 2021), and whether the woman had self-decision making power to seek care for herself and her baby (Yaya Tessema et al., 2023). All the studies that reported on the number of pregnancies as a determinant of PNC knowledge (Beraki et al., 2020; Yaya Tessema et al., 2023; Leta, 2022; Berhan & Gulema, 2018; Mose et al., 2021; Kebede et al., 2020; Yitayew et al., 2021; Roney et al., 2021; Kanu et al., 2014) revealed that women who had more children were more likely to have PNC knowledge compared to those who had fewer, except for one (Meseka et al., 2017) that revealed that primiparous women were more likely to have good PNC knowledge compared to multiparous women. The two studies that reported on the influence of pregnancy planning on PNC knowledge (Hassen & Lelisho, 2022; Kebede et al., 2020) revealed that women who had planned their pregnancies were more likely to have good PNC knowledge compared to those whose pregnancies were not planned. One study (Tesfaye et al., 2022) that reported on the effect of family size on PNC knowledge revealed that women who were from smaller families were more likely to have good PNC knowledge compared to those who were from larger families. Two studies that reported on the influence of staying with the father of the child on the woman's PNC knowledge (Tesfaye et al., 2022; Nchimbi & Joho, 2022) revealed that women who stayed with their partners were more likely to have good PNC knowledge compared to those who did not stay with their partners. In addition, two studies (Kebede et al., 2020; Roney, et al., 2021) reported that women whose partners were involved in PNC activities were more likely to have good PNC knowledge compared to those whose partners were not involved. One study (Yaya Tessema et al., 2023) reported that women who had self-decision-making power to seek care for themselves and their babies were more likely to have good PNC knowledge compared to those who did not.

The woman's employment status (Guta et al., 2020; Kiragu, et al., 2021), the employment status of the father (Yitayew et al., 2021), the woman's income (Leta, 2022; Hassen & Lelisho, 2022; Yitayew et al., 2021; Kiragu et al., 2021; Roney et al., 2021; Deynu & Nutor, 2023), the woman's easy access to transport (Hassen & Lelisho, 2022; Kiragu et al., 2021), and the woman's access to media (Hassen & Lelisho, 2022; Kebede et al., 2020; Yitayew,

et al., 2021; Deynu & Nutor, 2023) were also identified as individual-level determinants of PNC knowledge among postpartum women. Two studies (Guta et al., 2020; Kiragu et al., 2021) reported that women who were employed were more likely to have good PNC knowledge compared to those who were unemployed while one study (Yitayew et al., 2021) also reported that women whose partners were employed were more likely to have good PNC knowledge compared to those whose partners were not employed. Several studies (Leta, 2022; Hassen & Lelisho, 2022; Yitayew et al., 2021; Kiragu et al., 2021; Roney et al., 2021) that reported on the association between a woman's income and her PNC knowledge revealed that women who had a higher income were more likely to have good PNC knowledge compared to those who had a lower income, except for one that reported that women who had a lower income were more likely to have good PNC knowledge. Additionally, two studies (Hassen & Lelisho, 2022; Kiragu et al., 2021) reported that women who had easy access to transport were more likely to have good PNC knowledge compared to those who did not have easy access to transport. Finally, women who had access to media were more likely to have good PNC knowledge compared to those who did not have access (Hassen & Lelisho, 2022; Kebede et al., 2020; Yitayew et al., 2021; Deynu & Nutor, 2023).

3.2.2 Health System-Level Determinants of PNC Knowledge

Three studies (Beraki et al., 2020; Kanu et al., 2014; Chembe & Siziya, 2017) in this review did not report on the health system-level determinants of PNC knowledge among postpartum women. The health system-level determinants of PNC knowledge reported include distance to a healthcare facility (Berhea et al., 2018; Kiragu et al., 2021), source of PNC information (Nchimbi & Joho, 2022; Meseka et al., 2017), place of delivery (Getachew et al., 2022; Mekonnen et al., 2021; Yitayew et al., 2021; Roney et al., 2021), and previous PNC experience (Mekonnen et al., 2021; Seifu et al., 2020; Guta et al., 2020; Kebede et al., 2020; Yitayew et al., 2021; Bulto et al., 2019). In addition, the other determinants include ANC attendance (Yaya Tessema et al., 2023; Getachew et al., 2022; Mose et al., 2021; Hassen & Lelisho, 2022; Seifu et al., 2020; Guta et al., 2020; Tesfaye et al., 2022; Roney et al., 2021; Leta, 2022; Berhan & Gulema, 2018), whether the women attended PNC (Tesfaye et al., 2022; Yitayew et al., 2021; Bulto et al., 2019; Degefa et al., 2019), whether women received education and counseling about PNC services during ANC or PNC attendance (Getachew et al., 2022; Berhea et al., 2018; Mose et al., 2021; Mekonnen et al., 2021; Guta et al., 2020; Yitayew et al., 2021; Bulto et al., 2019; Msiba et al., 2022; Batamuriza & Uwingabire, 2020; Deynu & Nutor, 2023; Meseka et al., 2017), and whether the women had obstetric complications (Yitayew et al., 2021). The two studies (Berhea et al., 2018; Kiragu et al., 2021) that reported on the association between distance to a healthcare facility and women's PNC knowledge revealed that women who stayed closer to a healthcare facility were more likely to have good PNC knowledge compared to those who stay far away. Two studies (Nchimbi & Joho, 2022; Meseka et al., 2017), revealed that women who received PNC information from healthcare workers were more likely to have good PNC knowledge compared to those who received the information from mass media. Four studies (Getachew et al., 2022; Mekonnen et al., 2021; Yitayew et al., 2021; Roney et al., 2021) that reported on the association between place of delivery and women's PNC knowledge revealed that those who delivered at a healthcare facility were more likely to have good PNC knowledge compared to those who delivered at home. All the studies that reported on the association between previous PNC experience and PNC knowledge (Mekonnen et al., 2021; Seifu et al., 2020; Guta et al., 2020; Kebede et al., 2020; Yitayew et al., 2021; Bulto et al., 2019) revealed that women who had previous PNC experience were more likely to have good PNC knowledge compared to those who did not have experience. While most studies (Yaya Tessema et al., 2023; Getachew et al., 2022; Mose et al., 2021; Hassen & Lelisho, 2022; Seifu et al., 2020; Guta et al., 2020; Tesfaye et al., 2022; Roney et al., 2021) that reported on the association between ANC attendance and PNC knowledge revealed that women who attended four or more ANC visits were more likely to have good PNC knowledge compared to those who attended less, two studies (Leta, 2022; Berhan & Gulema, 2018) revealed that those who attended fewer visits were more likely to have good PNC knowledge compared to those who received more. All the studies (Tesfaye et al., 2022; Yitayew et al., 2021; Bulto et al., 2019; Degefa et al., 2019) that reported on the association between PNC attendance and PNC knowledge revealed that women who attended PNC were more likely to have good PNC knowledge compared to those who did not. Additionally, all the studies (Getachew et al., 2022; Berhea et al., 2018; Mose et al., 2021; Mekonnen et al., 2021; Guta et al., 2020; Yitayew et al., 2021; Bulto et al., 2019; Msiba et al., 2022; Batamuriza & Uwingabire, 2020; Deynu & Nutor, 2023; Meseka et al., 2017) that reported on the association between PNC education and counseling and PNC knowledge revealed that women who received PNC education and counseling were more likely to have good PNC knowledge compared to those who did not. Finally, women who experienced obstetric complications were more likely to have good PNC knowledge compared to those who did not experience obstetric complications (Yitayew et al., 2021).

4. Discussion

This review revealed that individual-level determinants of PNC knowledge among postpartum women include the

place of residence, the mother's age, and the mother's education level. These findings are consistent with a Pakistani study, which revealed that there was a statistically significant association between newborn care knowledge and place of residence, the mother's age, and the mother's education level (Memon et al., 2019). The study revealed that women who stayed in urban areas had a higher likelihood of having good knowledge than those who stayed in rural areas. It also revealed that women who had a higher level of education had a higher likelihood of having good knowledge than those who had a lower educational level. In addition, the study revealed that women who were older than 19 years were more likely to have good knowledge compared to those who were younger (Memon et al., 2019). Women who stay in urban areas are more likely to have good knowledge of PNC because of their proximity to healthcare facilities. Due to this close proximity, urban residents are more likely to visit healthcare facilities in search of medical care, where they are more likely to learn about PNC. Additionally, urban residents have easier access to the mass media, which is usually utilized to inform women about PNC (Samuel et al., 2021). We would also expect women who are better educated to be more likely to have good PNC knowledge compared to those who are less educated because they might have learned about PNC at school or tertiary institutions.

The other individual-level determinants of PNC knowledge reported in this review include the number of previous pregnancies, whether the pregnancy was planned or not, whether the woman stayed with the father of the baby, involvement of the baby's father in PNC activities, and whether the woman had the autonomy to seek care for herself and her baby. The findings of this review concur with those of a study conducted in Ethiopia, which revealed that women's autonomy was positively associated with maternal healthcare utilization (Tiruneh et al., 2017). It is more likely that women who have had prior pregnancies have heard about PNC during ANC and/or PNC attendance. In addition, it is plausible that women who have planned pregnancies are more likely to seek PNC information compared to those who would not have planned their pregnancies. Women who are autonomous have a higher likelihood of utilizing maternal healthcare services, which in turn may lead to increased knowledge of PNC through education and counseling by healthcare workers. The involvement of partners in PNC activities may improve PNC knowledge since they may share PNC knowledge with their partners. In this study, women who stayed with the baby's father had a higher likelihood of having good PNC knowledge than those who did not. This may be explained by the fact that these partners may help the women with resources to access healthcare services, and it is through these interactions with the healthcare system that they obtain PNC information.

The woman's employment status, the employment status of the father, the woman's income, the woman's easy access to transport, and the woman's access to media, were also identified as individual-level determinants of PNC knowledge among postpartum women. The results of this review are consistent with those of studies carried out in Bangladesh, which revealed that the employment status of the woman and her income were significantly associated with PNC knowledge (Majumder et al., 2018; Timilsina & Dhakal, 2015). The studies revealed that employed women had a higher likelihood of having good PNC knowledge than the unemployed. Additionally, women who had a higher income had a higher likelihood of having good PNC knowledge than those who had a lower income (Majumder et al., 2018; Timilsina & Dhakal, 2015). These results make sense because women who are employed, women whose partners are employed, and women who have a higher income are more likely to attend ANC and PNC visits where they can receive information about PNC since they can afford to pay for the transport and the services.

The health system-level determinants of PNC knowledge reported include distance to the healthcare facility, source of PNC information, place of delivery, previous interaction with the healthcare system, and whether the women had obstetric complications. The findings of this review can be explained by the findings of a Malawian study, which revealed that a short distance to a healthcare facility was associated with an increase in the utilization of PNC services (Kim et al., 2019). During the utilization of maternal healthcare services such as ANC, delivery, and PNC, women are likely to receive education about PNC, which will improve their PNC knowledge. The finding of this review which revealed that women who received PNC information from healthcare workers had a higher likelihood of having good PNC knowledge than those who received it through mass media may be a result of less accurate PNC information being provided through mass media compared to that from healthcare workers. Misinformation in mass media is not only a challenge in maternal and child health, but it is also observed in other areas of health. COVID-19 misinformation was a common challenge experienced during the initial stages of the COVID-19 pandemic (Anwar et al., 2020).

After considering the findings of this review, we came up with several recommendations. One of the recommendations is to develop transport networks in rural areas in the region so that there is easy accessibility to healthcare facilities (Varela et al., 2019). Countries should also make use of community health workers to educate women about PNC, after adequate training, especially in hard-to-reach areas (Wilford et al., 2018). There should

be an improvement in the socio-economic status of women by keeping them in school by providing affordable education up to secondary education. Women should also be empowered through vocational training and providing them with financial assistance to start income-generating projects. Such training and projects will ensure that they have adequate income that will allow them to utilize healthcare services where they can learn more about PNC. Empowered women may be able to have autonomy over healthcare-seeking behavior and better access to media. Strategies to increase ANC attendance and healthcare facility delivery such as providing the services free of charge or at an affordable cost should be promoted, as the women are more likely to receive PNC information during these interactions with healthcare workers (Dzakpasu et al., 2014). In addition, health information provided through mass media should be assessed for accuracy before it is disseminated to ensure that women receive accurate PNC information. There is also a need for countries in the region to conduct research on how the provision of PNC knowledge will influence PNC utilization among women in the region.

This review had several strengths. One strength is that several databases were used to find articles on the subjects. The other strength is that a search criterion was agreed upon before the commencement of the study, which makes the study reproducible. Additionally, two reviewers assessed the articles for eligibility, which improved the accuracy of the search results. However, there might have been a language bias because only English articles were retrieved.

5. Conclusion

Maternal and neonatal deaths remain unacceptably high globally. Maternal and neonatal mortality are highest in countries in SSA. Most of the maternal deaths occur in the postpartum period while about a third of the child mortality occurs in the neonatal period. These deaths can be avoided if women have good PNC knowledge, as this may improve PNC utilization. Several individual-level and health system-level factors influence PNC knowledge among postpartum women in SSA. To improve PNC knowledge of postpartum women, we recommend developing rural areas, improving the socio-economic status of women, devising strategies to increase maternal and child health services utilization, and assessing the accuracy of PNC information that has to be disseminated through mass media.

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Authors' Contributions

Enos Moyo – Conceptualization; Data extraction and synthesis; Writing original draft

Perseverance Moyo –Data extraction and synthesis; Writing review and editing

Tafadzwa Dzinamarira –Writing review and editing

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Andrew Ross – Supervision; Writing review and editing

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Not applicable.

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There is no dataset for this study.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Incidence of Recurrent Low Back Pain as a Side Effect of Decompressive Surgery for Lumbar Spinal Stenosis in Obese Versus Non-Obese Patients

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Abstract

Studies have reported an increased incidence of recurrent post-decompression-associated lower back pain (LBP) among obese patients after Lumbar spinal stenosis (LSS) surgery. Higher prevalence of lower back pain (LBP) associated with post-decompression surgical treatment among obese or overweight female patients compared to male patients. The current study has aimed to examine the relationship between body composition and long-duration consequences of post-spinal decompression among the Saudi population. This retrospective, longitudinal study was conducted at Taif Hospital, Kingdom of Saudi Arabia (KSA), throughout 2010-till 2015. Chronic pain grade questionnaire for assessing lower back pain and any disability among post-decompression participants. The chi-square test was used to analyze independent variables, and an independent t-test was employed to detect variances between mobility, age, education, body composition, and emotional disorders. The adjustment of age, education, mobility, emotional disorder, and BMI was examined through multivariate analysis. Highly a statistically substantial difference between obese and non-obese with regard to age, emotional distress, low mobility, Body mass index (BMI), mean estimated flow of blood (p-value <0.000), and hospitalization (p-value <0.002). The results showed a statistically substantial relationship between the degree of pain and disability with patient weight (p-value: 0.05), body mass index (p-value: 0.03), and Fat mass/fat-free mass ratio (p-value: 0.05). Clinical improvement is observed in obese patients post decompression surgical intervention, but the percentage of improvement was significantly higher among the male gender compared to female obese patients.

Keywords: body mass index, decompression, obesity, spinal surgery

1. Introduction

Decompression is a well-established spinal surgery intervention for Lumbar spinal stenosis (LSS) among geriatrics (Giannadakis et al., 2015). Studies have reported an increased incidence of recurrent post-decompression-associated lower back pain (LBP) among obese patients after LSS surgery, in addition to its equivalent clinical outcomes (Onyekwelu et al., 2017; Licht et al., 2015). LBP is an extensive public health issue, with approximately 80% population exposed to one episode of lower back pain in a lifetime (Christe et al., 2021). The prevalence of LBP in underdeveloped countries is 60-70% (Awwad et al., 2020). The global incidence of spinal trauma ranges between “16 and 64 out of 100000” population (Choi et al., 2017). In Saudi Arabia, the prevalence of lumbar spinal injury was 30%, and 22.6% of life loss was due to traumatic injuries (Bakhsh et al., 2020). In some cases, the structural cause of LBP and its transition to chronicity are not known adequately due to a weak connection between neurological, structural abnormalities, and degenerative symptoms (Goubert et al., 2017).

The potential risk factors for LSS include the elderly population with degenerative alterations, inflammatory spine disease, traumatic injuries, vertebral osteoporotic compression fracture, herniated disk, and tumors (Wang et al., 2018). One of the predominant risk factors for lumbar deterioration in obesity due to excessive mechanical loading in the thoracolumbar spine (Patel et al., 2020). Obesity causes progressive spinal weakening due to chronic inflammation, biochemical alterations, and excessive mass accumulation that influence clinical improvement after lumbar decompression (Basques et al., 2019). Recent literature reported use of a minimally invasive spine

decompression approach to perform posterior lumbar surgery among obese patients resulted in poorer outcomes concerning postoperative complications and reduced estimated flow of blood in comparison to conservative approaches and non-obese patients (Carrol et al., 2021). Worst scores for backache postoperative lumbar decompression surgery were reported after two years in obese patients without fusion (Onyekwelu et al., 2017). The comparison of obese and non-obese patients' post-decompression surgical intervention for LSS showed more pain for three to twelve months for obese patients (Elsayed et al., 2017). Hareni et al. (2022) evaluated the occurrence of obesity on a national level after central lumbar spinal stenosis (CLSS). The data was collected from the National Swedish Quality Registry. The inclusion criteria were limited to patients with age above 50 undergone laminectomy surgery during the years 2005-2018. The records included patient satisfaction 1 year after surgery, leg pain rated on the Numerical Rating Scale [NRS], any incapability experienced in limbs after surgery rated on Oswestry Disability Index [ODI], and any complications faced during that period. The outcome displayed satisfaction among obese patients after surgery as compared to patients with normal weight (Hareni et al., 2022).

Globally based on body mass index (BMI), one-third adult population is estimated to be overweight (Rambod et al., 2020). However, BMI to assess obesity gives only a primary measure of adiposity due to failure to disseminate fat-free mass from the fatty mass (Chooi et al., 2019). Additionally, men and women markedly differ in body composition, with more fat accumulation among women (Ameze et al., 2019). This provided a ground for meta-analysis concluding a higher prevalence of LBP associated with post-decompression surgical treatment among obese or overweight female patients compared to male patients (Goyal et al., 2019). Gender differentiation also relates to the perception of pain and hormonal effects in obesity-based LBP after the decompression procedure, as different fatty compositions are influenced differently (Lee et al., 2020). The fat mass intensifies backache and leads to debility among female adolescents, requiring further evaluation among the male population (Wu et al., 2020).

Previously, studies showed the impact of post-decompression surgery complications on reducing BMI in the Saudi population (Aleissa et al., 2022; Ullah et al., 2019). Not many studies have studied the occurrence of this complication particularly in Saudi Arabia. Especially with the aim to only find out about lower back pain after decompressive surgery for lumbar spinal stenosis. Only scarce data is available in the Kingdom of Saudi Arabia (KSA) to examine post-decompression surgery incidence of lower back pain among the obese population based on gender (Alnaami et al., 2021). To address this neurological injury concern, the current research has aimed to examine the effect of overweightness on decompression-associated LBP among male and female non-obese patients compared to obese patients on long-term follow-up. Several studies have been cited throughout the research to provide depth in the literature; however, the identified gap remains. For this reason, this research aims to explore the relationship between body composition and long-term consequences in post-spinal decompression among the Saudi population.

2. Method

2.1 Ethical Approval

The study was directed after approval from the Institutional Review Board (IRB), University of (Taif), KSA, and by following the guidelines declared by Helsinki, under the approval number _____.

2.2 Participant (Subject) Characteristics

The information about patient demographic characteristics, comorbidities, level of education, and lifestyle patterns was collected through a questionnaire. Participants' level of mobility was also assessed. Participants' age, body mass index, diabetic status, sex, smoking status, employment, the estimated flow of blood, hospitalization length, lumbar surgery history, and nationality were noted. In our study, obesity was classified as $\geq 30\text{kg/m}^2$ BMI, and non-obese were classified as $<30\text{kg/m}^2$ BMI. The variables of obese and non-obese were compared against demographic characteristics.

2.3 Sampling Procedures

This retrospective, longitudinal study was carried out at the Department of Orthopedics, Taif Hospital, Kingdom of Saudi Arabia (KSA), from 2010 till 2015. The study was conducted with the approval of the Institutional Review Board, University of (Taif), KSA, and following the guidelines of the declaration of Helsinki.

2.3.1 Sample Size, Power, and Precision

The study included an age-stratified sample of 100 participants. The sample size was calculated based on the baseline study [rule of obesity in outcome result for lumbar spine stenosis surgery conducted between 2010 and 2015]. A stratified sample of 100 men with regard to their age was employed from the clinic at Alamin Hospital.

This study assessed adult male members ($n = 100$) aged ≥ 50 years who joined in the 5-year record at the Alman clinic.

2.3.2 Inclusion and Exclusion Criteria

Thus, the 100 participants (84%) of the study population accessed from a clinical assessment. The variables included measures of body composition and completed questionnaires planned to extract demographics, back pain, and health status. The rest of the 14% of participants were in drop out due to follow-up.

The study included participants with stenosis due to disk herniation and degenerative change, both genders, aged between 50 and 70, willing to provide informed consent, with post-decompression surgery. The study excluded female patients. The detailed study objective was elaborated to enrolled participants, and informed agreement to attain consent to contribute was arranged. The baseline characteristics and follow-up at six and twelve months were maintained using questionnaires.

2.3.3 Assessment of LBP Post Decompression

The study used a "Chronic pain grade questionnaire" to assess lower back pain and any disability among post-decompression participants. The Chronic pain grade questionnaire is an authenticated tool used in population-based studies to record chronic pain severity and disability (Smith et al., 1997). The scale includes seven questions to compute the disability score (0 to 6) and pain intensity total (0 to 100). As per the scale classification, participants were divided into five groups (i) no disability and pain (disability points = 0 and pain points = 0), (ii) low disability and low-intensity pains (disability points <3 and pain points <50), (iii) low disability and high-intensity pain (disability points <3 and pain points ≥ 50), (iv) moderately limiting high disability (disability score 3 or 4, irrespective of pain), (v) severely limiting high disability (disability score 5 or 6, irrespective of pain). Study members were further divided into none or moderately low back pain intensity and high back pain intensity.

2.3.4 Body Mass Index

A stadiometer was used to assess height nearest to 0.001m² and weight nearest to 0.1kg after removing shoes and heavy clothing to calculate BMI. Dual-energy X-ray absorptiometry measured body composition (DXA; WI, Madison, GE Lunar Corp, GE Lunar Prodigy). Lean tissue mass as fat-free mass (FFM) and body fat whole measurement as fat mass was calculated. The study also calculated fat mass index as fat mass divided by height² and fat-free mass index as fat-free mass divided by height², where FFM included content that has bone mineral and FFM. The ratio between fat mass and FFM was calculated.

2.3.5 Experimental Manipulations or Interventions

Data were analyzed using SPSS version 22.0 (SPSS Institute, Chicago, IL). We examined the interaction between post-decompression recurrent lower back pain risk factors and evaluation of the rate of obesity, which includes body composition assessment. The standard p-value which must be less than 0.05 was considered and achieved statistically significant. A chi-square test was employed for independent variables, and an independent t-test was adopted to detect variances between mobility, age, education, body composition, and emotional disorders. The adjustment of age, education, mobility, emotional disorder, and BMI was examined through multivariate analysis.

3. Results

The study participants' demographic characteristics and clinical information are demonstrated in Table 1. The results showed a highly significant difference between non-obese and obese in terms of age (p-value <0.000), emotional distress (p-value <0.000), low mobility (p-value <0.000), Body mass index (p-value <0.000), mean estimated flow of blood (p-value <0.000), and hospitalization (p-value <0.002). The results also showed a statistically significant difference in weight (kg) among obese males and females compared to non-obese. The results showed that in the obese group, the fat-free mass, fat mass, fat-free mass index, and fat mass index were recorded more among female participants than male participants.

Table 1. Participants' demographic characteristics

Variables	Obese		Non-Obese		P value
	Male	Female	Male	Female	
No. of patients, n (%)	21 (42)	29 (58)	24 (48)	26 (52)	0.064
Age (years)	69.23	66.11	68.71	64.32	<0.000
Weight (kg)	88.3	81.02	82.65	78.4	0.021
Emotional distress	4 (19)	8 (28)	2 (8)	3 (11.5)	<0.000
Low Mobility, n (%)					<0.001
Yes	18 (86)	24 (83)	7 (29)	8 (31)	
No	3 (14)	5 (17)	17 (71)	18 (69)	
BMI (kg/m ²)	35.2	36.41	26.31	25.64	<0.000
Diabetes n (%)	5 (23.8)	9 (31)	2 (8.3)	5 (19.2)	0.118
Smoking status					0.1647
Active Smokers	8 (38)	4 (14)	11 (46)	8 (31)	
Non-Smokers	13 (62)	25 (86)	13 (54)	18 (69)	
Employment Status					<0.041
Working	12 (57)	14 (48)	16 (67)	15 (58)	
Non-Working	9 (43)	15 (52)	8 (33)	11 (42)	
Mean EBL (mls)	298.65	145.86	97.55	120.1	<0.000
Hospitalization	2.12	1.9	1.66	1.32	<0.002
Fat-free mass (kg)	38 (12)	36 (18)	31 (22)	32 (25)	0.542
Fat mass (kg)	29 (14)	32 (23)	26 (21)	22 (20)	0.016
Fat mass index (kg/m ²)	9.1	9.4	8.1	7.7	0.0034
Fat-free mass index	22.3	23.1	20.1	19.12	0.414

We also examined the response of the obese patient group using multivariate analysis on a chronic pain grade scale to identify the sternness of pain and disability among the obese group. The results exhibited a statistically significant relationship between the degree of pain and disability with patient weight (p-value: 0.05), body mass index (p-value: 0.03), and Fat mass/fat-free mass ratio (p-value: 0.05) (Table 2).

Table 2. Measurement of risk factors for obese patients using chronic pain grade scale after one year

Variables for obese patients' scores	No disability and pain (inability points = 0 and pain points = 0)	Low disability and low-intensity pains (inability points <3 and pain points <50)	Low disability and high-intensity pain (inability points <3 and pain points ≥50)	Moderately limiting incapacity (disability score 3 or	Severely high limiting incapacity (disability score 4, 5 or 6, or	p-value
				irrespective of pain)	irrespective of pain)	
No. of patients, n (%)	3 (6)	17 (34)	21 (42)	8 (16)	1 (2)	0.05
Weight (kg)	80.67	81.9	84.2	86.7	88.1	0.05
BMI (kg/m ²)	27	31	34	34.4	35	0.03
Fat-free mass (kg)	34.1	34.8	35.2	35.4	35.5	0.65
Fat mass (kg)	23.6	24.5	24.8	25.6	25.9	0.21
Fat mass index (kg/m ²)	7.9	8.1	8.6	9.3	9.9	0.068
Fat-free mass index	20.1	21.6	21.9	23.1	24.1	0.32
Fat mass/fat-free mass ratio	0.71	0.77	0.79	0.85	0.89	0.05

4. Discussion

Lower back pain involves complex etiologies and impacts the quality of life (Zhou et al., 2022). Our study examined the effect of overweightness on decompression-associated LBP among male and female non-obese patients compared to obese patients on long-term follow-up. We also examined the association between body composition and long-term outcomes post-spinal decompression among the Saudi population. The results showed statistically significant differences among female and male obese patients in terms of age, emotional distress, mobility, and BMI (p-value <0.000). A meta-analysis reported a high frequency of complications [Odds Ratio (OR): 1.34, CI=1.13-1.58] (p-value 0.01) and elevated operation rates [Odds Ratio (OR): 1.40, CI=1.19-1.64] (p-value 0.001) among obese patients (Goyal et al., 2019). Another study reported a high incidence of lower back pain development among overweight and obese patients [obesity logged odds: 0.395, p<0.001], suggesting the addition of lower back pain burden associated with obesity (Sheng et al., 2017). Our study observed a substantial difference in the length of hospitalization (p-value <0.002) among obese and non-obese patients. Patients with obesity experience prolonged stays in hospitals postoperatively and minimal achievement in disability scores compared to non-obese patients (Patel et al., 2022). The results of our study established obesity as a substantial risk for postoperative LBP. Obesity is a potential risk factor for postoperative spinal epidural hematoma (Snopko et al., 2021).

Some complications associated with spinal decompression surgery include delayed pseudimeningocele formation and dural tears (Weiss et al., 2019). The obese population is a challenge to spine surgeons due to the risk of triggered complications post-surgery (Weiss et al., 2019). Our study showed a non-significant association between diabetes and post-decompression obese and non-obese groups. However, another study reported a statistically significant association of obesity with diabetes mellitus (p value<0.001) and lower operative scores among obese patients (p<0.001) (Katsevman et al., 2020). Our study used a Chronic pain grade questionnaire to assess lower back pain and any disability among post-depression participants. Other studies also used this scale to assess increased fat mass association with raised back pain among post-decompression surgery patients (Khan et al., 2020; Hawker et al., 2011). Goyal et al. (2019) investigated the influence of obesity on lumbar spine surgery. In this regard the study argued on the conclusions of many studies giving mixed results, either supporting the influence of obesity on lumbar spine surgery or supporting otherwise. The study performed a systematic review and a meta-analysis by adopting the godliness address by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). The existence of bias in the results was investigated using the Newcastle-Ottawa Scale along with strength assessment by employing Grades of Recommendation, Assessment, Development, and Evaluation (GRADE). Visual Analog Scale-Back Pain and Oswestry Disability Index was used for comparison between the two groups obese ds non-obese. The study analyzed 32 studies that hold a total of 23,415 patients. The results displayed a slightly higher rate of blood loss due to surgery, longer duration to complete surgery, complications, and reoperation in obese patients; however, the difference was not highly significant (Goyal et al., 2019). Molina et al. (2021) asserted that the matter of early complications and difference in surgery has been experienced by the two groups morbidly obese patients and non-obese patients. Records were extracted from the years 2013 and 2016 of patients undergoing posterior lumbar surgery. Factors influencing pre- and post-surgical terms had been examined such as blood loss, duration of stay, complications faced in hospitals, dispositions, etc. the study displayed a higher rate of obese patients with regard to long-duration surgery and in-hospital complications (Molina et al., 2021). Klimov et al. (2020) analyzed degenerative lumbar spinal stenosis in elderly patients influenced by somatic comorbidity. The methods follow a retrospective non-randomized sampling technique by adopting level tree evidence (OCEBM Levels of Evidence Working Group). Among many other results, the study showed significant results of body mass or obesity on lower back pain along with other complications that occur during surgery due to obesity (Klimov et al., 2020).

The response to the decompression surgical intervention among obese patients depends on the level of education and the patient's understanding of the disease to improve decision-making (Awwad et al., 2020). Our study had the limitation of an increased dropout number and a comparatively small sample size due to the limited inclusion criteria. The record extracted was for one year which could also be adjusted in future randomized control trials. Future studies on larger sample sizes must further explore decompression for LSS treatment choice.

The primary objective of the current study was to examine the association between body composition and long-term outcomes following spinal decompression among the Saudi population. Our research provides crucial baseline data, with a particular focus on gender, regarding the incidence of recurrent low back pain among the obese population in Taif City, KSA. In addition to providing this baseline information, our study has important implications for the development of local guidelines for post-decompression management and recovery of patients, particularly those who are obese. We found that clinical improvement was observed in obese patients after

decompression surgery, although the degree of improvement varied based on gender. Specifically, male obese patients experienced a significantly higher percentage of improvement compared to female obese patients. Overall, our study contributes valuable insights into the association between body composition and long-term outcomes following spinal decompression in the Saudi population.

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The data that support the findings of this study are available on request.

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The authors declare that there are no competing or potential conflicts of interest.

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Socio-Demographic Determinants of Quality of Life Among Aging Population in Thailand

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Abstract

Thailand is becoming an aged society. It is very important to investigate the effect of Thailand becoming an aged society. It is crucial to examine the impact of socio-demographic factors on quality of life (QoL) for population aging. This study aimed to understand the QoL of older adults aged 60 years or older based on their socio-demographic status. Using the data of 13 Regional Health (RH) of Thailand from 2012-2018. QoL was measured with the Thai version of the WHOQOL-BREF. A total of 400 older adults were selected from each region each year. To analyze the factors affecting the QoL between 2012 and 2018, the linear regression model was used. The results showed that the QoL significantly increases with age for both sexes. The QoL was significantly higher than the overall mean in the married and secured income groups. According to time, the QoL in 2015 was significantly lower than the overall mean. In addition, the groups of adults in Bangkok, lower northeast, southwest, and south of the country showed a significantly lower QoL.

Keywords: Quality of Life, aging, socio-demographic factors, WHOQOL-BREF (THAI)

1. Introduction

Population aging is a global challenge. This is due to an increase in life expectancy and a decrease in fertility rate. In 2022, there were 771 million people worldwide who were 65 years of age or older, accounting for approximately 10% of the global population. The aging population has been growing rapidly and it will reach 16% in 2050 and 24% by 2100 (United Nations World Population Prospects, 2023). It has significant and multifaceted effects on society, economies, healthcare systems, and more. For example, with aging comes a higher demand for healthcare services and treatments for age-related conditions, leading to increased healthcare costs. Healthcare systems face an increased demand for services tailored to the elderly, including specialized care for age-related conditions. This can result in increased demand for mental health services. Governments may need to implement policies and reforms that address the unique needs of an aging population, including healthcare financing, elder care services, and retirement age adjustments.

The aging population in Asia is also expected to increase. The average life expectancy is higher than the world average. While it is true that some Asian countries have relatively high birth rates, it's important to note that this varies significantly across the continent. Countries with higher birth rates may experience continued population growth, while those with lower birth rates will have a more pronounced aging population. As demographic trends can change over time, governments and organizations must have policies in place to address the challenges and opportunities associated with aging populations and birth rates in their respective countries (Długosz & Razniak, 2014).

In Thailand, the aging population is increasing at a rapid rate. The proportion of the population aged 60 years or older is projected to increase from 13% in 2010 to 33% in 2040 (Economic Research Institute for ASEAN and East Asia, 2021). Addressing the impact of a rapidly increasing aging population in Thailand requires careful planning, interdisciplinary collaboration, and a commitment to policies and services that support the well-being and dignity of older individuals while maintaining economic and social stability. This demographic change is a long-term process that requires ongoing attention and adaptation in various sectors of society.

Developing and maintaining the functional ability that enables well-being among the aging population is important for national policy plans. As the elderly population increases, so does the social burden of caring for them. QoL in older age has become a research issue in many disciplines (Ismail et al., 2021). The aging population and their QoL is a complex phenomenon that requires increasing numbers of multidisciplinary studies.

QoL is defined by the World Health Organization as an individual's perception of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards, and concerns. It mainly covers health issues, material comforts, personal safety, relationships, opportunities to help and encourage others, socializing, emotions, life satisfaction, and economics (World Health Organization, 2023). QoL and its determinants in an aging society is a primary relevant information for policy-makers.

Studies addressing determinants of QoL have been documented. For example, a study in India found that older age, male, no schooling, without a spouse, lower economic status, and chronic disorder were determinants associated with low QoL scores (Singh et al., 2022). Another study reported that females show a higher QoL than males, QoL depends more on the relationship with family members rather than the type of family alone, financial independence was found to afford better QoL in the elderly, and the elderly living in joint families had better QoL than in nuclear families (Bansal, 2019). A study in Poland found that age determined worse QoL. Drinking alcohol was associated with better QoL and depression determined lower QoL, both were reported as determinants from a study in Spain. Self-reported unhappiness was also related to worse QoL as reported by a study in Finland and Poland. Smoking status determined worse QoL, low levels of physical exercise have been associated with lower QoL, being emotionally affected by health issues, a strong social network, and a comfortable environment were other factors that were associated with higher QoL (Raggi et al., 2016). Therefore, understanding QoL and its determinants in older age is becoming an important issue.

Studies addressing determinants of QoL generally focus on measuring determinants of QoL under particular morbidity conditions, and mental health problems, a few focusing on QoL in the general population. In addition to this, socio-economic factors have been shown to affect QoL. Some factors are commonly associated with QoL but some predictors were specifically associated with QoL in single countries (Raggi et al., 2016). Studies of determinants of QoL in Thailand are almost lacking.

The present study aims to investigate factors affecting QoL and compare the differences in QoL among the elderly who live in each Regional Health (RH) in Thailand. The results of this study can be used as guidelines to promote and improve the QoL of aging in Thailand. As well as being used for the benefit of policy formulation to properly care for the QoL of the aging with further directions.

2. Method

2.1 Setting and Participants

The data used in this study were obtained from RH, Ministry of Public Health, Thailand. There are 77 administrative provinces in 13 RH in Thailand. Generally, each RH included 4-8 provinces (3-6 million people). In 2012-2015 there were 12 RH and in 2016 Bangkok was separated into its own RH (National Health Commission Office, 2015). Participants were adults aged 60 years or older who were resident members in Thailand's provinces from 2012 to 2018.

2.2 Procedure

A sample of 34,800 adults aged 60 years or older were selected based on a quota sampling technique. Four hundred adults per RH were selected from senior club members in each province each year.

2.3 Measures

2.3.1 Outcome Variable

The outcome variable for this study was QoL assessed using the World Health Organization Quality of Life Assessment-Brief Instrument (WHOQOL-BREF). The WHOQOL-BREF is a trustworthy screening tool that has been used extensively and is accepted in all cultures. There are 26 items in this instrument. The 24 items are grouped into four domains that focus on physical, psychological, social, and environmental, and 2 items evaluate overall QoL and health satisfaction. On a Likert scale, each item is rated from 1 to 5, with higher numbers meaning higher QoL. Consequently, the QoL's overall score ranges from 26 to 130. They can be compared to the standards that Thai people have already accepted as appropriate. Scores between 26 and 60 indicate poor QoL, 61 to 95 indicate moderate QoL and 96 to 130 indicate good QoL. (Department of Mental Health Thailand, 2023). In this study, the WHOQOL-BREF-THAI was used to evaluate QoL.

2.3.2 Explanatory Variables

Sociodemographic characteristics included gender, age, marital status, source of income, caregiver, and medical treatment place. Gender and age were grouped into 6 levels (with three levels of age in years: 60–69, 70–79, and 80+). Marital status was categorized as single, married, widowed, and separated or divorced. The source of income was categorized as an elderly allowance, business, and pension or employment. The caregiver was categorized as self-care, spouse, children, and relatives. Treatment place was categorized as sub-district province hospital, government hospitals, and private hospital or clinic. RH and year were also explanatory variables.

2.4 Data Analysis

The total score of QoL is a continuous outcome. Socio-demographic characteristics are categorical determinants. Year and RH are also categorical determinants. Descriptive statistics including the mean of total QoL classified by levels of determinants are presented. Preliminary analysis comprises two sample t-tests or one-way analysis of variance as appropriate were used to compare means for levels of each determinant. Multiple regression was used to model the relationship between determinants and the total score of QoL. Data analysis was performed using R. This study was approved by the research ethics committee for science, technology, and health science (psu.pn.1-003/62), Prince of Songkla University, Pattani Campus.

3. Results

Table 1 shows the socio-demographic characteristics and differences in means of QoL between the groups. There were slightly more women than men who participated in the study; 97% had married status, 88% had spouses being caregivers, 45% had income from an elderly allowance, 40% had income from the business, and 96% used government hospitals for their medical treatment. The means of QoL were significantly different between groups of socio-demographic factors, year, and RH.

Table 1. Means of QoL classified by socio-demographic characteristics, year, and RH.

Determinant	Number	Percent	Mean	SD	p-value
Gender-age group					<0.001
Male					
60-69	7,059	20.3	81.5	14.6	
70-79	6,822	19.6	76.8	12.9	
80+	2,630	7.6	78.1	10.3	
Female					
60-69	7,862	22.6	75.8	11.0	
70-79	7,450	21.4	73.6	10.0	
80+	2,977	8.6	74.5	8.1	
Marital Status					0.018
Single	425	1.2	78.4	11.4	
Married	33,865	97.3	76.7	12.1	
Widow	266	0.8	77.4	10.8	
Divorce	244	0.7	75.8	11.0	
Source of income					<0.001
Elderly allowance	15,507	44.6	68.7	10.3	
Business	13,816	39.7	79.7	7.3	
Pension	5,457	15.7	92.1	6.8	
Other	20	0.1	66.6	6.9	
Caregiver					<0.001
Alone	48	0.1	77.5	12.0	

Table 2. (Continued)

Determinant	Number	Percent	Mean	SD	p-value
Spouse	30,580	87.9	76.8	12.3	
Children	3,803	10.9	76.2	9.7	
Relatives	369	1.1	78.8	11.0	
Treatment place					<0.001
Sub-district province Hos.	226	0.6	68.2	9.9	
Government Hos.	33,260	95.6	76.6	12.1	
Private Hos. or clinic	1,314	3.8	82.4	8.1	
Year					<0.001
2012	4,800	13.8	77.2	10.9	
2013	4,800	13.8	77.6	12.0	
2014	4,800	13.8	78.6	11.3	
2015	4,800	13.8	76.3	11.6	
2016	5,200	14.9	76.1	12.5	
2017	5,200	14.9	75.9	12.5	
2018	5,200	14.9	75.7	13.0	
Regional health (RH)					<0.001
1	2,800	8.0	81.8	11.0	
2	2,800	8.0	81.5	11.8	
3	2,800	8.0	81.4	11.9	
4	2,800	8.0	70.0	11.4	
5	2,800	8.0	71.9	14.0	
6	2,800	8.0	81.0	7.8	
7	2,800	8.0	79.4	9.4	
8	2,800	8.0	80.8	8.1	
9	2,800	8.0	80.7	8.2	
10	2,800	8.0	79.9	7.4	
11	2,800	8.0	70.9	12.1	
12	2,800	8.0	69.7	12.4	
13	1,200	3.4	58.2	3.3	

A multiple regression model was used to identify socio-demographic factors, year, and RH affecting QoL. The model gave an r-squared of 59.4% indicating the proportion of variance of QoL explained by socio-demographic factors, year, and RH. The quantile-quantile (Q-Q) plot of studentized residuals in Figure 1 shows that the model fits well as the residuals in the quantile-quantile (Q-Q) plot of studentized residuals tended to follow a red line.

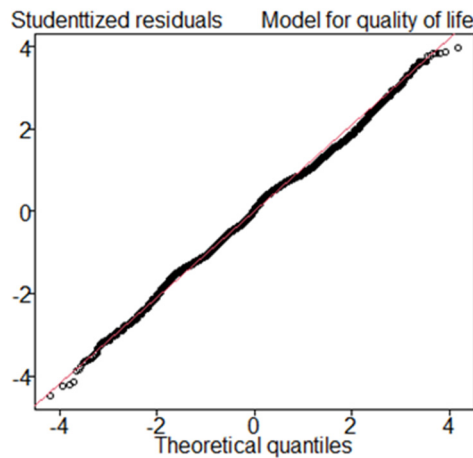


Figure 1. Quantile-quantile (Q-Q) plot of residuals from multiple regression model

Figure 2 shows the confidence interval plots of mean QoL for each factor adjusted for other factors in the model. It should be noted that most of the confidence intervals are very short due to the large sample size in each category resulting in smaller standard error. The overall QoL was 76.8. The QoL significantly increases with age for both sexes and is slightly higher for women than men. The QoL was highest among women aged 80 years or older.

The QoL was significantly higher than the overall mean in the married group. The groups of those who had marital status as divorced had the lowest QoL. The QoL was significantly higher than the overall mean for the groups of those who had the source of income from pension and business.

The groups of those who had used private hospitals or clinics for their medical service had the highest QoL whereas those who had used local sub-district hospitals had the lowest QoL.

According to time, the QoL in 2015 was significantly lower than the overall mean. In addition, the groups of adults in Bangkok, lower northeast, southwest, and south of the country showed a significantly lower QoL.

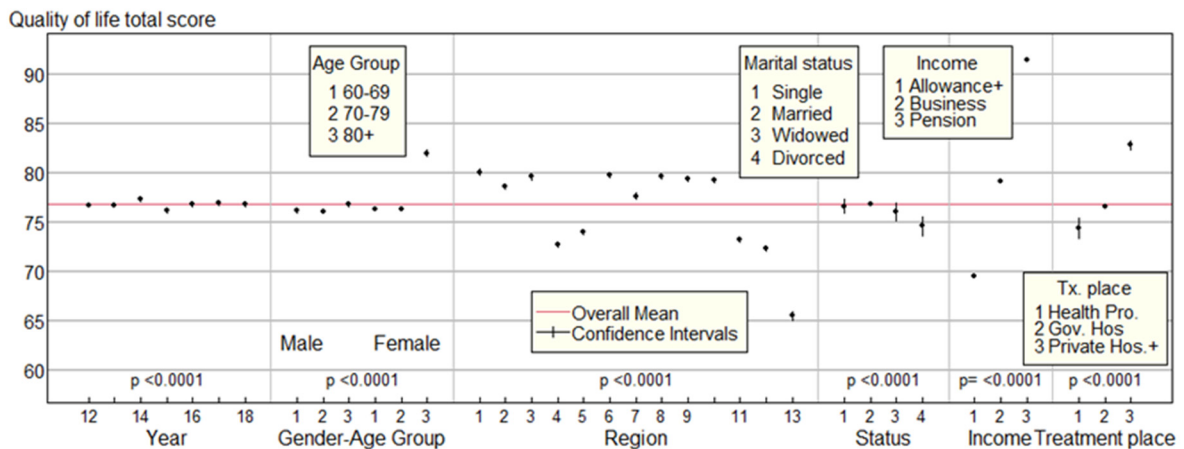


Figure 2. Confidence interval plots of QoL classified by socio-demographic factor levels

4. Discussion

The purpose of this study was to investigate the effects of socio-demographic factors on the QoL of older adults in Thailand from 2012 to 2018. Our results show that the most important factors were gender-age group, marital

status, and income. A slight difference in QoL from 2012-2018 was observed. Differences in QoL among RH were also presented.

Our results show that age determined increases QoL for both sexes, especially among women aged 80 years and over. One reason for this might be that the aging in this period were born in an age without technological development and had a simple lifestyle. Particularly in rural areas, chemicals are not utilized and most occupations are still in agriculture. They continued to coexist primarily with nature at that time. Additionally, compared to other age groups, the population aged 80 years and over in Thailand receives the highest subsistence allowance from the government (Saksunan, 2017) and has the most caregivers (Plodpluang et al., 2017).

The relation between individual QoL and age is controversial. In some studies, age was found among the predictors of decreased QoL (Brett et al., 2019; Qadire et al., 2023; Samadarshi et al., 2021; Gobbens & Remmen, 2019), most likely as a result of the effect of chronic conditions in older individuals, while such a relationship was not confirmed in other studies (Elisi et al., 2017). The characteristics of the elderly women aged 80+ in this study were that they had less employment experience and had lived for their families rather than for themselves. Therefore, it is necessary to study in more detail, the relationship between age and the QoL of elderly women in Thailand using large samples.

Income has been sometimes used as a way to address socioeconomic status inequalities connected to QoL. Our findings show that being pensioners who have regular income and owning business are related to increased QoL compared to those who have senior allowance (at most 25 USD/month) from the government (Micali et al., 2019), (Santhalingam et al., 2022) (Panita et al., 2021). Similar results were found among participants in the study of QoL of pensioners in India (Charles & Kulandai, 2020), as well as the study of QoL among older adults covered by various pension funds in Iran (Sadighiyan et al., 2021). The finding of many previous studies is that QoL is higher among the elderly who are employed (Samadarshi et al., 2021; Akhtari-Zavare et al., 2018; Sala et al., 2022).

Marital status was found that related to QoL same as the study of impacts of age and marital status on the elderly's QoL in an elderly social institution in Indonesia (Daely et al., 2022) and compared the QoL between single and remarried elderly in Iran (Moudi et al., 2020). In contrast to the study of QoL among patients with colorectal cancer in East Azarbijaban, it was found that it was not related to QoL (Laghousi et al., 2019).

Year and RH, both factors were found to be related to QoL. It was shown that there was a tendency for a decline in the QoL scores from 2012 to 2018. For many reasons, a survey of the economic and social conditions of households claims that the financial crisis caused family spending to rise between 2011 and 2017. However, income will improve in 2021 because of a variety of government-subsidized support projects (National Statistical Office [NSO], 2023). A report from the Pollution Control Department found that the amount of solid waste generated tended to increase from 2012-2019 (Pollution Control Department, 2023) and a report from the prevalence of surveillance diseases tends to rise from 2012 to 2019 and then dramatically decline from 2020 to 2021 (Department of Disease Control, 2022).

When considering each RH, there was only one in the poor QoL group (score 26-60) (Sirisuwan et al., 2021) because people in that area are stressed brought on by the high cost of living and other expenses associated with residing in a large city compared to other area. A study of household spending patterns was carried out. The average monthly household expenditure of people living in Bangkok was determined to be 870 USD, in contrast to the national average household expenditure of 592 USD (NSO, 2023).

Taken as a whole, our results pointed out similarities and differences of determinants with other research. However, it serves as a guide to improve elderly people's QoL in a variety of ways. This leads to elderly people having an excellent QoL, being happy, satisfied, and having the ability to live in society.

5. Conclusions

To summarize, this study found that age income, and married status are important factors affecting the QoL. To improve the QoL of older adults, it is necessary to understand the characteristics of the elderly and to create a suitable environment for them. This study has some limitations. Health-related information, illnesses, and diseases are not included. Therefore, future research should collect and analyze these data as well.

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Obtained.

Provenance and Peer Review

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Data Availability Statement

The data that support the findings of this study are available on request.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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Stress and Coping Strategies Among Nursing Students

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Abstract

Background: Nursing students experience stress as they progress through their programs of study because they must fulfill numerous theoretical and clinical requirements. Stress describes a dynamic relationship between a person and their surroundings. It is a widespread phenomena of contemporary life styles; it has been discovered to have negative health effects and to adversely impair students' learning, and it is recognized as one of the most significant problems in the contemporary world.

Aim/Objective: The goal of the current study was to identify the sources of stress among undergraduate nursing students and to explore their coping methods.

Design: a qualitative descriptive methodology.

Method: 20 semi-structured interviews were conducted individually in the English language by the principal researcher at female nursing college. The initial section of the interview consisted of a document listing the participants' age and level. Questions derived from theoretical model were used in the interview's second section to identify the sources of stress among undergraduate nursing students and to explore their coping methods. The qualitative data was analyzed using thematic analysis based on the Braun and Clarke framework.

Results: four global themes were emerged as the following: stressors, stress symptoms, coping strategies, and educational environment. The first 3 themes were derived deductively from the study theoretical model; whereas, the last theme was derived inductively from the data itself.

Conclusion: management of the stress becomes critical. Coping strategies have been found to be effective in lowering the stress among nursing students.

Keywords: nursing students, stress, coping, education

1. Introduction

One of the world's most demanding and stressful jobs is nursing (Ching et al., 2020). It has been discovered that sources of stress are similar for nursing students and staff nurses (Pulido-Martos et al., 2012). Nursing students experience stress as they progress through their programs of study because they must fulfill numerous theoretical and clinical requirements. By studying nursing theory and principles in the classroom, students acquire the necessary information to care for their patients. Students apply theoretical principles gained in the classroom in a clinical setting (Lavoie-Tremblay et al., 2022). Clinical practice is considered the highest source of stress for undergraduate nursing students. Other stressors can be personal or academic which effect on the physical and mental health (Ching et al., 2020). Using coping strategies is very essential for stress management (Labrague et al., 2017).

2. Background/Literature

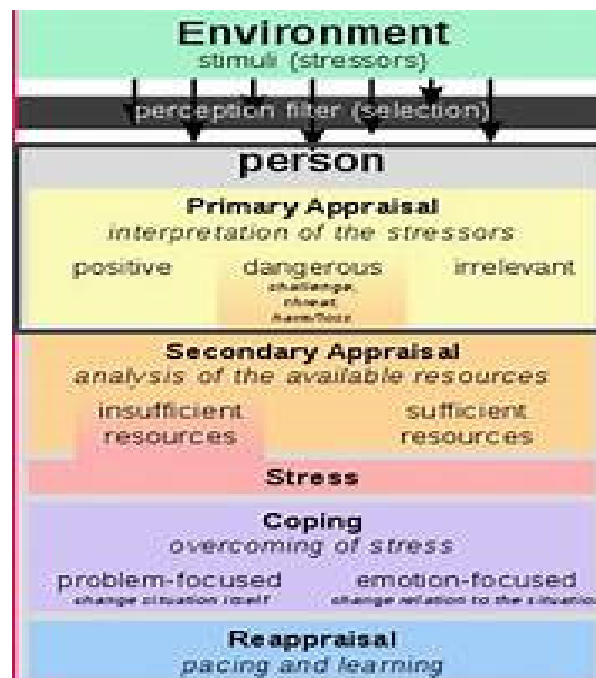
Stress describes a dynamic relationship between a person and their surroundings. It is a widespread phenomena of contemporary life styles; it has been discovered to have negative health effects and to adversely impair students' learning, and it is recognized as one of the most significant problems in the contemporary world (Madian et al., 2019). Nursing students experience stress frequently during their education (Hamadi et al., 2021). "The definition of stress as a response was discovered by Selye (1976), who defines stress as the non-specific response of the body to any kind of demand" (Hamadi et al., 2021, p. 2). Madian et al. (2019) reported in their study that students have a moderate level of academic stress: 42.5%.

Chan et al. (2009) conducted a study on 205 nursing students and the study revealed a moderate level of stress among nursing students ($M = 2.10$, $SD = 0.44$). The source of stress was lack of knowledge and skills. Moreover, a cross-sectional study was done by Manti et al. (2022) on 424 nursing students to determine the causes of the stress experienced by Greek nursing students as well as their coping mechanisms. The study revealed that the majority of students (81.7%) claimed that their present financial situation contributed to their feeling of stress. McCarthy et al. (2018) reported that stress is common in all aspects of nursing students during their nursing education. Nursing educators should be aware of this influence and provide the proper support to students in nursing school and during their clinical practice.

Students who use coping skills can overcome the difficulties brought on by stress (Shdaifat et al., 2018). In order to manage stress, an individual must make cognitive and behavioral adjustments to lessen the internal and external demands placed on them. Seeking social support was a common coping method among students from all program years. Social support functions as a stress-protective element because it can either reduce stress or help people respond to the circumstance in a healthy way (Lavoie-Tremblay et al., 2022). More studies are required to understand the sources of stress among undergraduate nursing students and their coping strategies. The aims of this study were: (1) to identify the sources of stress among undergraduate nursing students and (2) to explore coping methods used by nursing student through education.

3. Theoretical Model

There are various ways that stress can be felt. These include emotions, thoughts, sensations, and behaviors. These are typically brought on by stressors from outside. Depending on how the issue is viewed, a person's feeling of stress will vary. The transactional theory of stress and coping, created by Lazarus and Folkman in 1966, has played a significant role in the development of the field's understanding of stress and coping during the past five decades (Biggs et al., 2017). Their theory demonstrates how significant experiences in life impact people's emotions. The approach places a strong emphasis on coping with stress and cognitive appraisal. Three levels of assessment are used: primary, secondary, and tertiary (reassessment). The theory states that rather than an event, stress is caused by interactions between people and their environment. According to the theory, before feeling and reacting to stress, we go through two stages of situational appraisal. Stress is then experienced as an appraisal of the situation we find ourselves in. Certain stressors can be such as divorce, loss of loved ones, loss of job, etc. Coping or adjustment is required. The term "coping" refers to the cognitive and behavioral strategies people use to deal with stress (Kivak, 2020).



(Griese, 2017, p.3).

4. Methodology

4.1 Study Design and Setting

The study utilized a qualitative descriptive methodology to deliver in-depth data and a comprehensive grasp of the students' stress and their coping strategies. The researcher's understanding of the participants' perspectives was aided by this design. The setting was King Saud University in Riyadh, Saudi Arabia. More specifically in the female nursing college.

4.2 Sampling Process

Participants in the study were gathered using a purposeful sampling method. The sample size for the current study was established by the data saturation level, which was attained with 20 participants. The inclusion criteria were: 1) being enrolled in the undergraduate nursing program. Students in any level can participate in the study. 2) being presented to contribute in the semi-structured interview. Participants who expressed a lack of interest in participating in the study were not included.

4.3 Rigor and Trustworthiness

The current qualitative study's rigor/trustworthiness was attained by conforming to Lincoln and Guba's (1985) four criteria: credibility, confirmability, dependability, and transferability (Polit & Beck, 2016). Participants gave extensive explanations during the semi-structured interviews, which helped to establish the credibility. Additionally, member checking by participants was done to confirm the study findings in order to meet the criteria of credibility and confirmability. Moreover, the study's results were verified by an external reviewer. The study methodology was well described, which meet the requirements of transferability and dependability. Additionally, dependability was attained by going over the transcripts, looking at the themes, and assessing the findings.

4.4 Data Collection Procedure

Six nursing students participated in a pilot study to determine the feasibility of the study and the probes. The main study did not include any of the pilot research's participants. The duration of data collection of the main study was five weeks. Students were interviewed for 20 to 30 minutes. About 20 semi-structured interviews were planned. They were conducted individually in a quiet class. Interviews were conducted in the English language as they studied their nursing program in the English language too. The principal researcher conducted all the semi-structured interviews. The initial section of the interview consisted of a document listing the participants' age and level. Questions derived from theoretical model were used in the interview's second section to identify the sources of stress among undergraduate nursing students and to explore their coping methods. The questions were as the following: 1) What do you think about the educational environment at this nursing school? 2) What are the things or difficulties that stress you out this academic year? 3) Please tell me about the feelings you experience when you are stressed? 4) What coping strategies did you use to deal with your stressors or challenges? 5) What could the university do to lower your stress?. Descript' software was used to record and transcript each interview. It is one of the top transcribing programs (Mansoor, 2022).

4.5 Ethical Consideration

The King Saud University Institutional Review Board approved this study. Before taking part in the study, nursing students were informed about its purpose. They were asked whether they had any queries or needed more information. All participants provided informed consent. They were aware that their participation was entirely voluntary and that they had the option to withdraw from the study at any time. They also agreed that the interviews would be audio-recorded. Individual interviews were conducted to ensure privacy. Confidentiality was maintained by assigning a number to each participant, such as 'participant 1' when the study findings were reported. All participant data was saved on a password-protected computer. Participants were provided with the phone number of the researcher in case they had any questions or concerns. Participants' information will be destroyed once the study is completed.

4.6 Data Analysis

The qualitative data was analyzed using thematic analysis based on the Braun and Clarke framework. It composed of six steps: reading transcripts, creating codes, producing themes, reviewing themes, defining themes, and writing the report (Maguire & Delahunt, 2017). As a result, in this study, the researcher listens to recordings numerous times. Microsoft Word was used to organize the data. The thematic analysis produced 24 priori codes. These codes were rearranged into 11 organizing themes. Those 11 organizing themes were grouped together to form 4 global themes which were: stressors, stress symptoms, coping strategies, and educational environment. The first 3 themes were derived deductively from the study theoretical model; whereas, the last theme was derived inductively from

the data itself.

5. Results

5.1 Demographic

The current study enlisted the participation of 20 undergraduate nursing students. Two participants were 19 years old, eight of the participants were 20 years old, seven were 21 years old, and three were 22 years old. In terms of level, three participants were from level one, one participant was from level two, two participant was from level three, three participants were from level four, two participants were from level five, four participants were from level six, two participants were from level seven, and three participants were from level eight.

5.2 Stressors

Nursing students revealed that they are experiencing different kinds of stressors. Stressors theme includes the following categories: academic stressors, clinical stressors, personal stressors, and emotional stressors.

"I have many stressors, like heavy workload, high expectation, deadlines of assignments, and academic competition" (Participant 1)

"For me, the most stressor is exam, I always have anxiety and fears from exams" (Participant 6)

"Some courses are complex and they give me a lot of stress" (Participant 10)

"I have family problems that make me difficult to concentrate on my learning goals and this stress me" (Participant 16)

"I think my stress is coming from the huge number of assignments and my responsibility also at home" (Participant 19)

5.3 Stress Symptoms

Participants reported some of the signs and symptoms of stress and they expressed their feelings toward stressors. Stress symptoms theme include: physical symptoms and psychological symptoms.

"When I have stress, I feel I can't focus anymore and also I feel tired both physically and mentally" (Participant 3)

"Stress cause me headache" (Participant 5)

"My stomach hurt me when I got stress. I always go to doctor and he say you don't have physical problem and I have to work on lowering my stress" (Participant 8)

"I have trouble with sleeping. I stay the whole night trying sleep" (Participant 13)

"It effect my feelings and I feel I am overwhelmed and I cannot work" (Participant 17)

5.4 Coping Strategies

Participants shared their own personal experiences in using the coping strategies, as well as they discussed the coping strategies that they could utilize in the future. Coping strategies theme include: prior coping strategies and future coping strategies.

"I used to do physical activity when I feel stressed" (Participant 2)

"Relaxation techniques like mediation helped me a lot" (Participant 7)

"I Can tell that time management is important step for me to decrease my stress level" (Participant 11)

"I usually use social support like my family or friends for lowering stress but I maybe use exercise in the future to help me also with that" (Participant 15)

"I am planning to use healthy lifestyles, for example to start diet and exercise because this will affect on my mood and heath" (Participant 18)

5.5 Educational Environment

Participants shared their experiences about the educational environment in the school of nursing and they provided some suggestions. Educational environment theme include: classroom and setting, organization, and support.

"Educational environment is very supportive" (Participant 4)

"I find environment is positive because there is good communication between faculty and students" (Participant 9)

"We have good academic advising in our school. My adviser always help me when I have any difficult things" (Participant 12)

"I hope our school will open any program for exercise, Hmmm, like wellness program or fitness program, I think this, mmm, will help all students who have stress" (Participant 14)

"Uh, I see workshops is important to help us in managing coursework and academic responsibility effectively" (Participant 20)

6. Discussion

The aim of the current study was to identify the sources of stress among undergraduate nursing students and to explore their coping methods. The stressors theme was a construct in the conceptual framework of the current study. This study revealed that nursing students are having many sources of stressors. The results of the current study were consistent with the study of Majrashi et al. (2021) who found nursing students very stressed due to assignments, clinical training, and educational workloads. In addition, Temiz's (2020) study reported that 40.5% of nursing students had a moderate anxiety; and there was a positive correlation between students' stress levels and their family, educational, and financial issues.

The stress symptoms theme was also a construct in the current study's conceptual framework. The current study findings were consistent with the results of Gomathi et al.'s (2017) study who stated that the impacts of stress transcend beyond physical, emotional, and behavioral problems, as students may struggle to achieve their academic goals. Prolonged stress among nursing students may cause memory problems, inability to concentrate, depression, headache, abdominal cramps, and trouble with sleeping. Also, it can cause burnout. Furthermore, Alvarez et al. (2019) reported that more lifetime stressors were linked to an increased risk of several health disorders such as hypertension, diabetes, and depression.

Coping strategies theme was another construct in the current study's conceptual framework. The study showed that nursing students were using coping strategies such as physical activity, healthy lifestyles, social support, time management, and relaxation techniques. According to Shdaifat et al. (2018), coping techniques assist students in dealing with stress-related issues. The current study findings were consistent with results of Rafati et al.'s (2017) study who revealed that nursing students were using social support from others such as mentors or peers to reduce their stress level. However, the results were different from a study that conducted by Kumar and Nancy (2011) on 180 nursing students. The study revealed that "Seeking diversion" is the most coping strategy that was identified in nursing students, while "seeking professional support" is the least common coping strategy.

Educational environment was a theme that emerged from qualitative data through the inductive approach. The results of the current study were similar to those of Onieva-Zafra et al. (2020) who highlighted on the importance of that nursing teachers and clinical preceptors/mentors should be encouraged to establish programs to help nursing students prepare for the obstacles they will face during their education or clinical placements; that might help in reducing the students' stress. Del Prato et al. (2011) stated that academic, social, and behavioral support systems at nursing school can help in lowering the distress and prevent unhealthy levels of stress. In addition, students' stress levels can be reduced by using caring and supportive learning environment.

7. Study Implications, Limitations, and Recommendations

The study's findings can be used to help students in managing their stress and to motivate them in using the coping strategies. Social support functions as a stress-reduction method because it can either prevent stress or allow a good response to the situation. Nursing schools should create regulations that extend nurse educators' role in assisting students with stress management. Creating a caring and supportive environment in nursing schools not only improves the relationship but also has a favorable impact on the students' academic performance. In addition, it is important to make the students understand that psychological problems are same as physical problems and they need support and help when they have any of them. The current study included some limitations. Purposive sampling was used in the study, which limits the generalizability of the results. Another limitation is that the study was conducted in only one setting and geographical location, limiting the generalizability of the study's findings. Therefore, future research studies are recommended to address those limitations.

8. Conclusion

Nursing students experience stress during education. Academic stress has become a widespread issue in many countries. It is a serious problem that affect the student's mental and physical health. Thus, management of the condition becomes critical. Coping strategies have been found to be effective in lowering the stress among nursing students. Educator should provide social support for students which will help in improving the holistic health of the student. This would ultimately affect positively on the academic performance of students; and it would increase the overall productivity of the academic institution.

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Telehealth in Saudi Arabia: Its Evolution, Present Infrastructure, and Forward-Looking Implications

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Abstract

Telehealth, the utilization of digital technologies for remote healthcare, has seen significant growth in Saudi Arabia. Historically used to bridge the healthcare gap between urban and rural regions due to the vast desert terrains of the country, its adoption has been bolstered by initiatives like the ‘Telemedicine Project’ and Saudi Vision 2030. Despite challenges including connectivity issues, hesitations among healthcare professionals, and patient skepticism, the COVID-19 pandemic accentuated its importance. With technological advances, a shift in societal needs, and strategic policies, telehealth’s prospects in Saudi Arabia appear promising, but vigilance against potential pitfalls remains essential.

Keywords: telehealth, healthcare, Saudi Arabia, challenges, opportunities

1. Introduction

Telehealth, defined as the use of digital information and communication technologies to access health care services remotely and manage one’s health care, has experienced substantial growth in various parts of the world, including Saudi Arabia (Al Baalharith et al., 2022). The Saudi healthcare system, known for its continuous evolution and adaptation to technological advancements, recognized the potential of telehealth early on and has been working diligently to integrate it into the healthcare framework.

Historically, Saudi Arabia, with its vast desert terrains and scattered populations, faced challenges in providing equitable healthcare services to all its residents, especially those in remote areas. However, the introduction and subsequent embracement of telehealth have enabled the Saudi government to extend quality healthcare services to even the most distant parts of the country. According to (Alaboudi et al., 2016), telehealth initiatives in Saudi Arabia began in the early 2000s, with the primary objective of bridging the healthcare gap between urban and rural regions¹.

The Ministry of Health (MoH) in Saudi Arabia launched several initiatives to encourage the use of telehealth. Among them was the ‘Telemedicine Project,’ started in 2011, aimed at using technology to diagnose, treat, and monitor patients from a distance (Albarrak et al., 2021). This not only reduced the load on tertiary hospitals in major cities but also ensured that patients received timely and appropriate care without having to travel extensively. Furthermore, Saudi Vision 2030, a strategic framework aimed at reducing the Kingdom’s dependence on oil, diversifying its economy, and developing various sectors, including health, accentuates the importance of telehealth. One of its objectives is to enhance the quality of healthcare services and promote preventive practices, with telehealth being a significant player in achieving this goal (Vision 2030, 2016).

However, the adoption of telehealth in Saudi Arabia was not without challenges. Concerns related to patient

privacy, technology infrastructure, and resistance from some healthcare professionals due to lack of familiarity with digital tools posed obstacles (Albarrak et al., 2021). Yet, consistent government initiatives and robust regulatory frameworks have worked towards addressing these challenges and facilitating smoother telehealth integration.

COVID-19 further amplified the significance of telehealth. With social distancing measures in place and an increased emphasis on remote care, telehealth platforms in Saudi Arabia witnessed a surge in usage. Hospitals and clinics, with the support of the government, transitioned to teleconsultations, ensuring that non-emergency medical needs were addressed without compromising patient or healthcare provider safety. This paper delves into the development, current status, challenges, and potential future of telehealth within the Saudi healthcare system.

2. The Historical Context of Telehealth in Saudi Arabia

The history of telehealth in Saudi Arabia offers a unique insight into how technological advancements and strategic governance can effectively address public health needs in a vast and geographically diverse nation. Saudi Arabia, a country marked by its sprawling deserts and significant distances between urban centers and remote villages, has always faced the arduous task of ensuring consistent, quality healthcare delivery to every corner of the Kingdom.

In the early 2000s, as digital technology began to mature globally, Saudi Arabia saw an opportunity to overcome its geographic barriers. The onset of telehealth in the country is often attributed to initial efforts by the Ministry of Health (MoH) to bridge the medical service gap between populous cities and isolated rural areas. These efforts found support in the literature as well, with Alghamdi et al. (2020) highlighting the early telehealth projects aimed at providing specialty consultations to patients in remote regions.

Subsequent years witnessed an organic growth in telehealth services. The Saudi government, recognizing the potential of this technology, began to invest more heavily in infrastructure and training. The King Faisal Specialist Hospital and Research Centre (KFSH&RC) in Riyadh, for instance, emerged as a pioneer in these efforts, establishing a telemedicine unit that connected primary healthcare centers across the nation to specialist services in the hospital (KFSH&RC, 2015).

The formal acknowledgment and strategic direction for telehealth were further cemented with the introduction of Saudi Vision 2030. This ambitious national plan, aimed at diversifying the economy and enhancing public service sectors, underscored the role of telehealth in healthcare transformation (Vision 2030, 2016). Telehealth was viewed not just as a mode of service delivery but as a cornerstone for healthcare innovation, focusing on preventive care and patient empowerment.

The turn of the decade marked a crucial period for telehealth in Saudi Arabia, as the onset of the COVID-19 pandemic propelled the urgency and adoption of remote medical consultations. As (Adly et al., 2020); Sheerah et al. (2023) notes, the pandemic acted as a catalyst, pushing many healthcare providers to adopt telehealth platforms almost overnight, making them an integral part of the healthcare ecosystem (Althbiti et al., 2017; Moussa et al., 2023).

Reflecting on this historical trajectory, it becomes evident that Saudi Arabia's telehealth journey, although driven by geographical needs initially, matured into a well-articulated strategy, leveraging technology for comprehensive healthcare advancement.

3. Current Telehealth Infrastructure and Adoption

Saudi Arabia, a nation with a vision of becoming a global epicenter for various industries by 2030, has notably propelled its healthcare sector into the digital age (Chowdhury et al., 2021). Telehealth, once perceived merely as a tool to combat geographical barriers, has now evolved into an integral component of the Kingdom's medical landscape. The present state of telehealth infrastructure and its adoption in Saudi Arabia is characterized by expansive technological deployments, proactive government initiatives, and a considerable shift in patient and provider perspectives.

Central to this transformation is the investment in digital infrastructure. As outlined in the National Transformation Program (NTP) under Saudi Vision 2030, there has been an explicit emphasis on harnessing Information and Communication Technologies (ICT) to revolutionize healthcare (National Transformation Program, 2016). This investment can be seen in the widespread establishment of telecommunication networks, data centers, and digital platforms that facilitate teleconsultations, remote patient monitoring, and digital health records. The Ministry of Health (MoH) and other healthcare bodies have been instrumental in implementing these systems, ensuring they adhere to global best practices and standards.

Additionally, a myriad of telehealth platforms has sprouted across the Kingdom, some spearheaded by government hospitals and others by private entities. For instance, Sehha is a government-backed telemedicine app that offers medical consultations around the clock, reflecting the state's commitment to making healthcare accessible at any time (Ministry of Health-Saudi Arabia, 2020). On the other hand, private platforms like Cura have garnered widespread attention, providing specialized consultations from a roster of renowned physicians (Cura Healthcare, 2021).

The adoption of telehealth, however, extends beyond infrastructure and platforms. The human element, consisting of healthcare professionals and patients, has been central to this shift. Albarrak et al. (2021) emphasized that the training programs and workshops focusing on telehealth competencies for medical professionals have witnessed a surge, fostering a generation of digital-savvy healthcare providers (Albarrak et al., 2021). From the patient's perspective, the convenience, reduced need for travel, and quicker access to specialists have driven a more positive attitude towards telehealth services.

Nonetheless, it's essential to acknowledge that while Saudi Arabia has made monumental strides in telehealth adoption, challenges persist. These include concerns about data privacy, the need for more extensive interoperability between different digital systems, and ensuring the quality of care delivered via telehealth matches that of in-person consultations.

4. Challenges Encountered

The introduction and growth of telehealth within Saudi Arabia's healthcare ecosystem, while promising, has not been devoid of challenges. Several hurdles have arisen over the years, pertaining to technological, organizational, socio-cultural, and regulatory facets, underscoring the complexity of transitioning to a digital-centric healthcare model.

Technologically speaking, Saudi Arabia, despite its expansive efforts, still grapples with disparities in infrastructure. While urban centers such as Riyadh and Jeddah boast advanced telecommunication networks, some remote regions experience connectivity issues, hampering the seamless delivery of telehealth services (Alaboudi et al., 2016). Moreover, the interoperability of different telehealth systems is still a work in progress. There's an overarching need for a unified digital health platform that can integrate data from various sources, ensuring clinicians have access to comprehensive patient information during remote consultations.

From an organizational standpoint, healthcare institutions have faced challenges related to staff training and the integration of telehealth into existing workflows. Alghamdi et al. (2020) highlighted the reluctance among some healthcare professionals to adopt telemedicine, stemming from a lack of familiarity and concerns about the quality of care delivery. Such hesitations necessitate continuous training programs and demonstrations of telehealth's efficacy to gain professionals' confidence (Alghamdi et al., 2020).

Culturally and socially, patient acceptance is crucial for the success of any telehealth program. While many have embraced the convenience offered by digital consultations, others, especially older generations, display skepticism. Concerns about the impersonal nature of virtual consultations, apprehensions about technology use, and fears concerning data privacy have been prevalent among certain demographics (Alajlani & Clarke, 2013).

Lastly, the regulatory landscape for telehealth in Saudi Arabia is still evolving. Addressing issues of patient privacy, data security, licensing for practitioners offering cross-border consultations, and ensuring quality standards are consistently met in a virtual space require robust regulatory frameworks. The Saudi Health Council and other regulatory bodies have been proactive, but striking a balance between innovation and regulation remains a daunting task (Saudi Health Council, 2019).

5. Prospects and Forward-Looking Considerations

The expansive embrace of telehealth in the healthcare landscape of Saudi Arabia stands as testament to the country's commitment towards integrating advanced technological solutions in critical sectors (Al Baalharith et al., 2022). This journey, while undoubtedly marked by challenges, holds great promise for the future. The prospects and forward-looking considerations for telehealth in Saudi Arabia are shaped by a combination of technological advancements, evolving societal needs, and strategic policy directions.

Firstly, the technological underpinning of telehealth is expected to witness substantial advancements. The rise of artificial intelligence (AI) and machine learning offers exciting prospects for predictive analytics, personalized treatment plans, and enhanced diagnostic accuracy (Renu, 2021). It is conceivable that in the near future, telehealth platforms in Saudi Arabia might incorporate AI-driven chatbots for initial patient screenings or employ algorithms that analyze patient data to predict potential health issues before they become acute.

Secondly, the growing acceptance of wearable technology and Internet of Things (IoT) devices among the Saudi population offers a new dimension to telehealth. These devices, which can monitor vital signs, track physical activity, and even administer medications, will further empower remote patient monitoring (Lu et al., 2020). For patients, especially those in remote areas or with chronic conditions, this continuous health monitoring could prove transformative.

From a societal standpoint, as the younger, tech-savvy generation becomes the primary demographic seeking healthcare services, the demand for telehealth services is likely to amplify. The convenience, flexibility, and real-time feedback offered by digital health platforms resonate with their lifestyles and expectations.

Policy-wise, Saudi Arabia's Vision 2030 has already laid down the foundation for digital transformation in various sectors, including healthcare (Vision 2030, 2016). It's anticipated that as telehealth matures, the country will introduce more comprehensive regulations, focused on ensuring patient safety, data security, and the overall quality of virtual care. These policies will likely also address aspects like cross-border telehealth services, further expanding the reach and potential of telehealth platforms.

However, as the country marches forward, it's imperative to remain attentive to potential pitfalls. Ensuring that the digital divide doesn't widen, maintaining the human touch in medicine, and continually assessing the efficacy and efficiency of telehealth interventions will be vital.

The manuscript offers a comprehensive insight into the evolution, challenges, and prospects of telehealth in Saudi Arabia, effectively contextualizing its significance within the broader Saudi healthcare system. Its strengths lie in the meticulous historical tracing, detailed examination of the current infrastructure, and a forward-looking analysis. The paper employs a structured approach, seamlessly integrating factual data with analytical reasoning. The use of varied sources, including Alaboudi et al. (2016) and Sheerah et al. (2023), enhances the manuscript's credibility and depth. However, there are limitations. The manuscript could benefit from a more detailed exploration of patient experiences and feedback. The challenges section might have gained from more direct quotes or primary data from healthcare professionals. While the prospects section captures broad trends, it could delve deeper into specific case studies to illustrate potential telehealth implementations.

6. Conclusion

Telehealth in Saudi Arabia stands as a beacon of innovation, embodying the fusion of healthcare with digital technology. Born out of necessity to bridge geographic divides, its evolution has been marked by strategic government initiatives, infrastructural advancements, and societal acceptance. The era of COVID-19 further underscored its pivotal role in the healthcare landscape. As Saudi Arabia moves towards its Vision 2030 goals, the telehealth sector is poised for further growth, powered by advancements in AI, IoT, and the evolving needs of a tech-savvy generation. However, as with any rapidly advancing field, vigilance is required. Balancing the advantages of digital healthcare with the challenges it presents will be key to ensuring that telehealth remains an effective, equitable, and sustainable solution for the Kingdom's healthcare needs.

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