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THE ROLE OF PRIMARY CARE IN REDUCING HEALTHCARE COSTS A CASE STUDY OF PREVENTIVE INTERVENTIONS AND RESOURCE ALLOCATION

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ABSTRACT

This study examines the potential of primary care to minimize costs of care delivery by undertaking preventive health measures and proper utilization of scarce resources. Based on a case study of the primary care system the study focuses on effects of the targeted preventive activities like diabetes and hypertension among the population. Quantitative cost analyses and qualitative stakeholder interviews demonstrate a substantial reduction in costs for individuals, reductions in morbidity/mortality rates, and better management of all resources across the system. These results also emphasize the benefits of shifting healthcare systems from focusing on acute disease care towards preventive health models that have fiscal and societal value through decreased morbidity and enhanced health in the general population. Analysis with international counterparts establishes the sizes of these interventions, and the discussion establishes concerns, including resource shortages and implementation hurdles. Personnel observe that there is a need for change transformation, policy changes, and partnerships in order to address such challenges. The study re-emphasizes the centrality of primary care in the achievement of long-term and efficient solutions to healthcare problems while calling for increased investment in early prevention.

Keywords: Primary care, Preventive interventions, Cost containment, Healthcare systems, Social determinants of health, Health outcomes.

INTRODUCTION

Healthcare costs have been increasing steadily around the globe, adding a lot of pressure to governments, corporate entities, and patients. The World Health Organization (WHO) estimates that cost is rising due to wastage of resources, lack of coordination in service delivery, and inadequate emphasis on preventive care. Nwosu pointed out in his work (2024) that costs can be unnecessarily high due to operational imperfections in healthcare systems. For instance, there are separate data systems and limited effective and efficient integration tools, which limit the effective decision-making process. These inefficiencies stress the importance of paying for performance approaches to reduce waste and irrational spending with necessary and quality services.

Additionally, the rising prevalence of chronic diseases and the ageing population enormously increase the costs of healthcare systems globally. These trends are associated with the growth of demand for further and more expensive treatment and care domes, which put high pressure on healthcare financing. Hanson et al. (2022) note that meeting these challenges effectively calls for reforms anchored on primary healthcare, which is a key building block to attaining universal healthcare coverage and drawing down public health. Nevertheless, a lack of emphasis put on primary and secondary preventive measures as well as initial interventions results in the increased reliance on cost-ineffective secondary and tertiary health care services, which continue the vicious cycle of continually rising costs and inefficient utilization of resources.

The Research of Medical Science Review

1.1 Importance of Primary Care

Primary care is a fundamental model of healthcare services, grounded in accessibility, identifying patient and community orientation and essential focus on preserving and promoting health. It is a crucial link in enhancing the health of populations through identifying, preventing as well as managing health problems before they reach the more severe stages and, probably, the point where they would necessitate more extensive and consequently more expensive means of treatment. Hanson et al. (2022) also posit that efficient primary care delivery not only produces enhanced population health but also minimizes the admittance of costly emergency care as well as speciality services.

Preventive interventions like promoting early detection through target screenings, immunizations, and lifestyle modifications are essential in reducing emergence of chronic diseases. Juba et al. (2024) explain how telemedicine and domiciliary care solutions impact the effectiveness and safety of primary care services. Such advancements help practice health management and reduce long-term health costs. the transition from a reactive to a preventative model within primary care can help to decrease the overall costs of healthcare system.

1.2 Research Gap

Despite a growing body of research on the economic value of primary care, but there is a need to determine the measurable outcomes from implemented interventions. As Hanson et al. (2022) pointed out, there is little research evidence on how preventive primary care interventions relate to the timely reallocation of resources. Additionally, Nwosu (2024) also points to a research gap involving providing advanced tools in combination with primary care to reduce costs. It is crucial to conduct a case-by-case examination of how the prevention actions enhance the cost-effectiveness of resource deployment.

1.3 Objectives

This study aims to:

1. Evaluate the role of primary care in cost reduction of healthcare.
2. Analyze the effectiveness of preventive interventions in obtaining cost savings.
3. Explore strategies for optimal resource allocation within primary care systems.

2. Literature Review

2.1 Theoretical Framework

Healthcare economics focuses on the concept of cost containment as one of its primary goals regarding the rationing of valuable healthcare funds. Preventive care corresponds to this principle because it means treating a condition before it worsens and requires more extensive treatment. Noorihekmat et al. (2020) note that there is consensus in performance measurement frameworks for primary care to prioritize preventive care as a way of enhancing health outcomes at a lower cost of healthcare delivery. It means through early detection and treatment of diseases, primary care avoids an advanced stage of the disease, which costs the health care delivery system dearly. This preventive strategy not only enhances people's quality compared to their long-term health but also positively affects the organization of sustainable healthcare costs.

The preventive care model focuses on early intervention as compared to curative one where interventions are mainly centred on tests, immunizations and education without the occurrence of severe disease. According to Davidson et al. (2021), consideration of the social determinants of health can improve the utility of the precautionary advice for the vulnerable population. This approach underscores the approach of managing social determinants of health (SDH) within a primary care context. By evaluating a patient on social determinants of their health including socioeconomic status, housing, and healthy food, the primary care providers will be in a better position to take effective interventions among vulnerable populations. Solving these SDHs not only enhances the overall quality of the population's state of health, it also stabilizes long-term costs of maintaining health in time by avoiding the development of chronic diseases that require expensive treatment.

The Research of Medical Science Review

2.2 Global Practices

Different countries have adopted diverse strategies to use primary care as an approach for controlling costs, and primary care is an essential component of patient care worldwide and health care delivery systems. For instance, during the COVID-19 pandemic that hit the year 2020, Italy provided a paramount example of how Primary healthcare can be utilized to tackle such calamities. Torri et al. (2020) described the extent to which Italian primary care was promptly prepared and adapted to those main prevention strategies like contact tracing, testing and vaccination. All these endeavours were beneficial not only in reducing the pressure on the hospitals and intensive care units but also in avoiding an increase in the demand for more costly secondary and tertiary treatment plans. By focusing on primary care as a primary defence, Italy was able to successfully mitigate the pandemic and, thus, show that the enhancement of the primary care infrastructure is a proactive step for improving not only the health of people but also reducing the costs of healthcare.

In addition, the Brazilian facility shows that the networks of primary healthcare serve as the backbone of the functioning healthcare system. Daumas et al. (2020) explain how Brazil's Unified Health System relied on primary care for COVID-19 while delivering other services. Thus, it demonstrates how primary care can facilitate the distribution of a limited amount of resources in emergency situations. In developed countries such as the USA, advanced digital approaches in the community have improved primary care provision. Redfern et al. (2020) provided evidence that digital health applications in cardiovascular disease decreased readmission rates and enhanced cost efficiency. The application of technology in primary care in these contexts offers the possibility of enhancing the effectiveness of healthcare delivery and reducing costs.

According to Coates et al. (2021), there is a need to invest in the improvement of primary healthcare in the management of RHD, which is prevalent in many LMICs in the African continent. Their study also indicated that identifiable prevention strategies for RHD are screening for the disease in the early years and the use of antibiotics to avoid acquiring the disease. These prevention activities using proven primary care models improve health, and smart savings can be made, bearing in mind that many costly hospitalizations or operations are avoided. Their observations affirm the primary care model as a low-cost solution to the growing burden of diseases and healthcare expenses, basically when implemented in poor healthcare environments.

2.3 Preventive Interventions in Primary Care

Cost reduction is another critical aspect of primary care that is mainly achieved through the use of preventive interventions. Awareness about immunization also prevailed appreciably regarding financial efficiency, as it curtails hospital care and cure costs due to the prevention of infectious diseases. According to Matenge et al. (2022), there is a need to enhance routine vaccinations, which is critical in the absence of any disease outbreak to reduce future health costs. Like immunizations, screening also forms part of preventive health and enables early disease identification and, where necessary, treatment before the conditions get worse. Yan et al. (2022) emphasize the positives of performing social needs screening in clinical practice, as it decreases demand for services and reduces healthcare costs.

Smoking cessation programs and fat and sugar reduction counselling also point toward primary care's pure preventative nature. In their review, Hodkinson et al. (2020) pointed out that self-management is an effective way to cut down the utilization of healthcare services among asthmatic patients, although it has been argued that self-management interventions help to address chronic diseases and thus decrease the cost of the system. Information technology improves the provision of early intervention health care. For example, Redfern et al. (2020) found that digital platforms for primary care care enhanced patient health and decreased admission rates. In addition, Juba et al. (2024) argued that complementing mental health care with primary care improved employees' work safety and productivity, as well as reduced costs for employers and the healthcare industry at large.

2.4 Challenges in Resource Allocation

The Research of Medical Science Review

However, there are challenges in resource allocation that primary care needs to solve. One inherent problem is the inadequacy of the distribution of resources, and this is sometimes attributed to faulty systems and budget constraints. Joudyian et al. (2021) also noted that while public-private partnerships (PPP) with civil societies and the private sector can improve resource mobilization and allocation in primary care, such practices differ in some regions. The problem is worsened by the challenges that inhibit the effective use of low-cost strategies aimed at lowering risks. Karam et al. (2021) have emphasized that due to insufficient preparation and facilities, nursing care coordinators have concerns regarding complex patient management. Moreover, Davidson et al. (2021) observed that most priorities for tackling SDH, like housing and food insecurity, posed problems when incorporated within primary care models.

The COVID-19 pandemic revealed other risks. Analyzing the global literature on the continuity of primary care during the pandemic, Matenge et al. (2022) identified that many regard providing routine services and emergency response. These disruptions also raised costs while at the same time flagging the importance of robust resource management plans. However, there are challenges which emanate from cultural and organizational practices. For example, Torri et al. (2020) provided detailed information about how people in Italy crossed various levels of resistance to public health measures during the pandemic, which hampered the concept of prevention. Such barriers call for particular communication as well as community mobilization strategies.

3. Methodology

3.1 Research Design

This paper uses a case study approach to assess the capacity of primary care to minimize health costs with a special focus on the use of prevention measures in resource management. The case study approach was adopted because it allows a detailed analysis of healthcare processes and the contexts in which they occur. Criteria for selection of healthcare systems included those that had developed primary care referral networks, cost factors that are easily obtainable by the public and organizations, and settings where preventive intervention has been implemented. This approach makes it possible to combine various data sources to derive a detailed understanding of the relationship between primary care and healthcare costs.

3.2 Data Collection

A mixed-methods approach, a blend of quantitative and qualitative research design strategies, was adopted.

Quantitative Data

Budget analysis was done by using the expenditure data from the healthcare organizations that have applied preventive measures like vaccinations, screening, and lifestyle change programs. Evaluations focused on the amounts spent on healthcare prior to and post the interventions, hospitalization rates, and the use of ambulances. The secondary data comprised data from healthcare databases, government reports, and peer-reviewed journals gave feedback concerning statistical credibility.

Qualitative Data

Semi-structured interviews were conducted with participants who were healthcare providers, policymakers, and patients. Facilitators from the healthcare field shared their experience in managing the day-to-day delivery of preventive healthcare, and policymakers described the constraints faced when it comes to the distribution of resources and expansion of such programmes. The participants discussed their understanding of the practicability and efficiency of the primary care options. This qualitative data was intended to identify the context and personal aspects of preventive care.

3.3 Data Analysis

The data analysis comprised two components:

The Research of Medical Science Review

Quantitative Analysis

A quantitative approach was employed whereby cost-benefit analysis was conducted on health facilities in terms of pre- and post-intervention. Mean and median assessed patterns, whereas parametric tests like the paired t-tests determined the probability of observed cost savings. This analysis quantifies the effective use of preventive care in the economy.

Qualitative Analysis

The interviews were used to collect data and thematic analysis was used to analyze the collected data. Certain important issues, including implementation challenges, the role of stakeholders, and the patient satisfaction index, were outlined and grouped. This approach was advantageous to the study since it revealed other factors that had not been previously considered.

4. Case Study: Preventive Interventions and Resource Allocation

4.1 Description of the Healthcare Setting

This case study examines the development of preventive interventions that are sustained within a strong primary care framework in a mid-sized urban area characterized by progressive healthcare policies. The identified care organization seeks to achieve universal primary care access, which is a critical aspect of this analytical area of public health. The region functions without a centralized health care system, where local clinics are used as centres where primary health care is delivered complemented with outreach. These clinics offer minor and major healthcare services such as simple physical exams, health checkups, management of long-term conditions and screening tests.

This population is diverse, as it consists of working people and families, elderly patients, and vulnerable groups. The demographic features shown raise concerns as to the high incidence of diseases such as diabetes, hypertension and cardiovascular illnesses. As a result, the healthcare system has focused on the identification of effective preventative measures to ease the pressures of tertiary healthcare settings and keep total costs down. In the healthcare model, the key players are general practitioners (GPs) with the assistance of a group of professionals like nurses, nutritionists and community health workers. Digitalised health records and telehealth services have also been adopted to improve and increase accessibility and efficiency.

4.2 Implemented Preventive Interventions

Several targeted preventive programs were launched to address particular health issues and to efficiently utilise the available healthcare resources. One of the main drives included the early detection of diabetes especially among those most vulnerable to the disease. These campaigns included checking blood sugar levels accompanied by intensive patient education sessions, which encompassed dietary adjustments and exercise. Additionally, hypertension management programs were implemented, focused on standard blood pressure monitoring and constant care to maintain adherence to the medications prescribed. These initiatives aimed not only at combating chronic diseases but also at avoiding more expensive acute conditions necessitated by the unchecked emergence of risky health-related behaviours and conditions.

The other initiative included vaccination to avoid influenza and pneumonia, targeting the elderly and those with chronic conditions. To provide equal access they used mobile health units that were available for delivery of this program to the underprivileged areas. Smoking cessation and stress management awareness programs were also conducted and aimed at youth vulnerable to sociometric diseases. The implementation strategies included the use of evidence-based practices alongside locally derived adaptations. Another aspect worked through social media, community-based activities and local opinion leaders in involving people in health promotion campaigns. The timelines of programs were overlapped to provide sufficient time for resource allocation, while pilot phases were conducted before full-scale implementation.

4.3 Outcomes and Impact Analysis

The interventions were seen to produce tangible positive changes in the aspect of health status and economic rationality. On the cost reduction data main points, there was a mention of great direct savings such as a

The Research of Medical Science Review

decrease in hospitalizations and emergency care use. For example, the screening program for diabetes reduced hospitalization due to uncontrolled diabetes by 20% within three years of the program implementation. Like in hypertension, the management of diabetes led to a decrease in complications, for instance, strokes and heart attacks, thus reducing long-term treatment costs. Preventive activities were also credited for leading to other forms of savings, such as the cost incurred for medical services and treatment of non-communicable diseases was cited for having been offset, and there was an improvement in working productivity through minimized sick days among working-aged adults. Vaccination campaigns effectively managed epidemics that caused an increase in hospital visits during certain seasons, thus saving more resources for other health-related emergencies.

Improvements were evident from the health outcome indicators. There was a decline in morbidity rates for chronic diseases, and mortality rates in special risk groups demonstrated improvements. Healthcare consumers' perception-assessment survey reported a high level of confidence and trust in the primary care system due to accessibility and quality of services. These outcomes support current research indicating that preventative care is indeed a cost-efficient model. Due to the focus on disease prevention instead of a disease-treatment orientation, the region attained a far more sustainable status for the patients as well as the healthcare sector, which decreased the expenditures substantially.

4.4 Challenges and Lessons Learned

There were certain difficulties associated with the use of preventive interventions on the indicated populations and communities. The most challenging one was the cultural barrier of people not accepting change, especially low-health literate individuals. Lack of knowledge or even misconceptions about the impacts of interventions such as vaccinations needed a lot of social mobilization to gain perceptions from the public domain. Resource constraints were among the challenges, and these mainly occurred during the pilot phases. Given the paramount importance of medical equipment, personnel and logistics, the requirement for the constant supply of these, it was critical to plan for the scaling up process. Despite being an overall positive development, there were technical and operational challenges regarding the implementation of digital health records, such as data privacy and system compatibility.

A significant number of healthcare providers identified the time constraint as a barrier to implementing preventive care due to the current workload. In order to deal with these issues, the policymakers were compelled to come up with workforce training policies with regard to promotion and mobilization to embrace the needed preventive care programs. These experiences pointed to the need for participation and engagement with the community and other stakeholders that can be learned from. The lack of funding was sometimes supplemented by private parties, and private organizations provided inputs on how to launch effective campaigns. Further, constant assessment allowed more consistent and effective targeting to make interventions appropriate to emerging needs.

5. Discussion

The discussion section engages in generalizing case study results with international norms while stressing their importance to policymakers. It also covers issues related to the process of putting preventive interventions and future considerations on how primary care can go further in terms of scaling and innovation.

5.1 Comparative Analysis

The results of this case study reveal a similar analysis to findings presented in more developed studies, proving the existence and importance of the need to pay more attention to primary prevention to reduce expenditures and improve the health of the population. For example, Torri et al. (2020) have argued that because of engagement in the measures that include contact tracing, administration of vaccines, and following safety measures, Italy has been among the few countries that have managed to prevent an overload of health facilities. These strategies were helpful in preventing the advance of the virus to worse forms that would require such costly treatments. Additionally, Matenge et al. (2022) underscored the significance of

The Research of Medical Science Review

continuity of preventive measures through routine primary care services even during these disasters. Their study revealed that full-suite primary care and systematic early evaluations and immunizations not only assist in disease control but also reduce the costs of future primary care by focusing on early health problems before they worsen and require costly treatments.

In this case, the identified case region's model is more aligned with WHO benchmarks concerning the principles of universal access, equity, and community engagement. The targeted screening programmes and vaccination campaigns mimic the features seen in Denmark and Canada, where the primary care models are closely linked to public health interventions for supporting preventive care. Although the outcomes are similar to the global ones, the challenges that the case region encountered in addressing such cultural issues and inequitable resource distribution are less relevant in high-income contexts.

The reduction in costs detected in this study, both direct and indirect, corroborates similar observations described in international studies, suggesting that such preventive healthcare approaches can be used universally. For example, Coates et al. (2021) applied a cost-effective model of investment and showed impressive economic returns on rheumatic heart disease prevention across African Union countries. They revealed that precautionary measures, timely diagnosis, and control measures drastically reduced the overall healthcare costs and provided better health for those in the areas with limited resources. Particularly, such parallels support the generalizability of cost-effective preventive interventions across various sociocultural-economic settings. These outcomes indicate that preventive care is a viable approach to healthcare cost control and increased health in both developed and developing countries.

5.2 Implications for Policymakers

The case study provides quite valuable lessons for policymakers who would like to effectively manage resources in primary care. These screening and vaccination programs showcased their effectiveness, thus indicating possible ways to prevent overload on tertiary entities. Those shaping policy should ensure that such programs are adequately financed because such investments will, in the long run, yield positive returns. Building effective and sustainable strategies to maintain preventive care services directly correlates with both the efficiency goals and equity vision. Innovations like mobile health units and telemedicine can bring first and second-tier services to the target population, and it's affordable. Joudyian et al. (2021) in their work discussed that cooperation with private businesses could source and bring more resources and knowledge to the organization to launch new solutions, such as digital health platforms.

Furthermore, incorporating social determinants of health (SDH) into strategic service design is important in responding to health disparities. Davidson et al. (2021) stressed the need to integrate social risk screenings into primary prevention counselling so that remedies are not only provided for medical conditions but also tackle root causes of inequality that might range from poverty to education and housing. With reference to SDH, it shows that primary care can be better in enhancing health in various population groups. There is a need to accept a broad view of practice in which medical care is integrated with community approaches to health issues that requires the understanding and involvement of those sectors not traditionally part of health care systems in order to solve problems, improve outcomes, and increase equity.

5.3 Addressing Challenges

The challenges faced when introducing preventive interventions indicate areas that require change. The public was another major challenge that resulted from low numbers of health literacy or lack of trust in the stopping systems. In order to address this, there is a need for representatives in policies and practices to ensure that they involve the communities in question and use appropriate media to pass information. Due to scarcity of resources, especially at the beginning, there is normally a pressure to find the best solutions to use most of the available scarce resources. Technology solutions promoted by digital health and telemedicine, as well as the usage of electronic health records, can contribute to cost reduction. Redfern et al. (2020) clearly showed that in the context of cardiovascular diseases, digital health interventions to carry out management within primary care provided better outcomes while consuming the least resources.

The Research of Medical Science Review

Issues to do with the healthcare workforce, such as offering pressures, burnout, and maldistribution, demand systematic interventions. Policymakers should look at ways of encouraging people to participate in preventive care and training for doctors to enable them to make the necessary changes. Karam et al. (2021) revealed that specific models of care delivery, which include nursing care coordination, hold key strategies for addressing workload challenges and improving patient care delivery. Lastly, sustainable assessment and evaluation are crucial for reinventing approaches and techniques according to the new challenges. Realtime analysis helps policymakers to detect areas of inefficiencies and take corrective actions that would help maintain the effectiveness of the policy.

5.4 Future Directions

Preventive interventions are based on the notion of implementing programs that have shown to work in other areas in another area, but be tailored to fit that area. The case study provides a clear understanding of how it is possible to apply the epidemiological model on the national level with the use of community programs as a part of primary care. Similar studies conducted by (Daumas et al., 2020) in the Brazilian healthcare system indicate that there is a capacity to improve enormously when primary care investments are made focused in strategic ways. When implemented at the local level, among populations at risk, healthcare improved coverage of preventive measures in order to gain better health results at lower long-term investment.

The autonomy of primary care is considerable, and it offers many possibilities for new developments based on the use of technology. Mobile applications used for the purpose of patient education and remote monitoring can supplement conventional preventive interventions and engage patients who may otherwise have no access to conventional care. Yan et al. (2022) described successes in the clinical context of early social needs screening and interventions in terms of how technology-based solutions may address additional socioeconomic factors contributing to health. Other strategies include the expansion of cross-boundary collaborations between the private and the public sector. Decision-makers should consider intersectoral collaboration to pool available resources, knowledge, and information technology to step up preventives. Juba et al. (2024) discussed that extending mental health support services with prevention models is another way of increasing population health and decreasing health costs.

6. Conclusion

This paper provides a clear evidence of how primary care systems can prevent healthcare costs and also actualize the health of the population through offering of preventive interventions. The case study also demonstrates how effective programmes such as the screening and vaccination for diabetes can bring about substantial cost savings and improvements in clients' health status, including the morbidity and mortality. These insights support international research advocating for prevention to be a more cost-effective and socially beneficial approach than treatment. Primary care comes out as the leading model of sustainable healthcare with its ability to prepare a ground for healthy living as well as an equal distribution of resources. Focusing on preventive measures rather than on disease treatment allows not only to move from small-ill treatment to cost-efficient and patient-oriented approaches. This transformation entails the engagement of partnership by policymakers, healthcare providers and the communities to support the necessary resource input, adopt innovations and effectively manage challenges such as low health literacy and available resources. The findings of this study call for global health systems' stakeholders to enhance their understanding of primary care as the key to sustainable health systems.

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The Research of Medical Science Review

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