



Expenditure on Non-communicable Diseases in Rural Punjab

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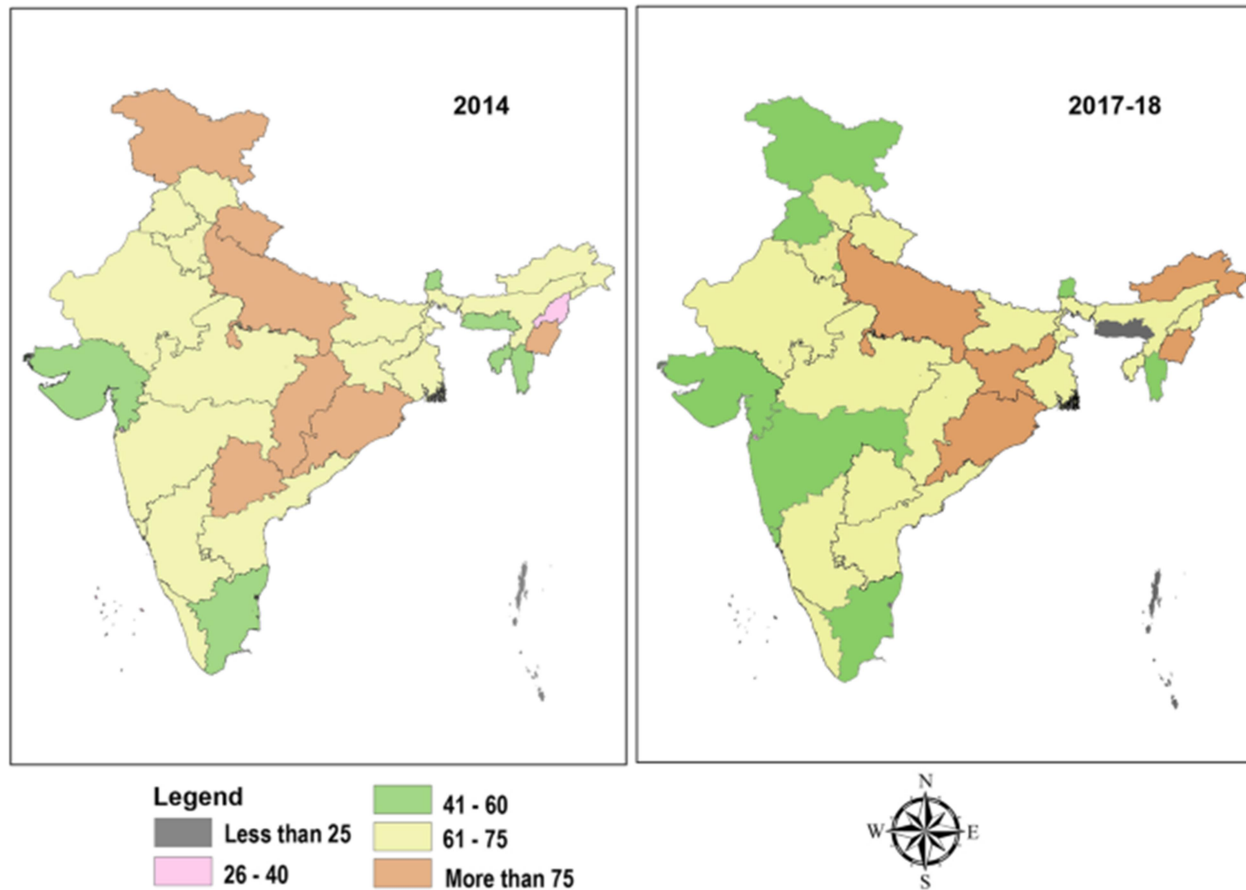
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Introduction

No communicable diseases (NCDs), which include diabetes, cancer, chronic respiratory conditions, and cardiovascular disease, cause 41 million deaths globally each year, or 71% of all fatalities. (WHO, 2021). These long-term illnesses have a substantial negative influence on people's health, productivity, and quality of life. As a result, they put a tremendous strain on healthcare systems and economies, particularly in low- and middle-income nations. Examining the spending on NCDs in rural Punjab is essential because of the particular difficulties that rural communities have, such as restricted access to healthcare, low health literacy, and limited financial resources. High NCD prevalence is a result of Punjab's agricultural economy and lifestyle choices (Engelgau et al., 2012). Gaining insight into these costs may aid in the creation of health policies that work and the efficient use of available resources, highlighting the financial strains on households and pointing out areas where healthcare is lacking. According to the WHO (2018),

"The rising burden of non-communicable diseases is a global challenge, but the greatest impact is felt in low- and middle-income countries where resources are limited".

The purpose of this study is to examine how this worldwide issue manifests itself in rural Punjab and offer evidence-based suggestions to policymakers and healthcare professionals.

Households with Catastrophic Health Expenditures Across States in India (in %)**1.1.The importance of studying NCD expenditure in rural Punjab**

Examining the costs associated with non-communicable diseases (NCDs) in rural Punjab is essential to have a thorough grasp of the health and economic issues this community faces. NCDs have a significant financial cost, especially in rural regions where resources are limited. Indirect expenses like missed income from illness or caregiving obligations can exacerbate the direct costs of controlling noncommunicable diseases (NCDs), which include doctor visits, prescription drugs, and hospital stays. In Punjab's rural areas, where agriculture is the main industry, NCDs can have a catastrophic economic impact. High out-of-pocket costs frequently lead to unmanageable healthcare costs, which forces families into poverty (Ladusingh et al., 2018). Research in this field can draw attention to the financial burden that households face and guide the creation of financial safety nets like insurance schemes.



Punjab's rural areas have major obstacles to the availability and standard of healthcare. These places frequently have weak healthcare infrastructures, with few diagnostic centers and specialist healthcare practitioners available. This may worsen health outcomes and raise expenses by causing delayed diagnosis and insufficient care of NCDs (Kumar et al., 2024). Researchers can find significant gaps in healthcare delivery and push for greater budget allocation to enhance healthcare access and quality in rural regions by looking at NCD expenditure. In rural Punjab, cultural norms and socioeconomic circumstances also have a significant impact on health-related behaviors. The high incidence and inadequate management of non-communicable diseases (NCDs) are caused by traditional eating practices, inactivity, and low health literacy (Nethan et al., 2017). To effectively create health promotion and disease prevention programs that are suited to the rural environment, it is important to comprehend these sociocultural elements. Furthermore, comparing NCD spending across rural and urban populations might highlight differences in healthcare outcomes and access. discrepancies in healthcare infrastructure, economic circumstances, and social determinants of health are frequently the cause of these discrepancies. Reducing these differences is essential to attaining fair health outcomes and enhancing rural communities' general health. The knowledge gathered from this study can help policymakers understand the need for focused interventions and the distribution of resources to meet the particular difficulties in controlling NCDs that rural populations confront.

1.2. Objectives and scope of the review

The main goal of this analysis is to evaluate the direct and indirect costs of non-communicable diseases (NCDs), such as lost income and medical bills, on rural families in Punjab. The objective is to ascertain trends in healthcare spending related to non-communicable diseases (NCDs), encompassing chronic respiratory conditions, diabetes, cancer, and cardiovascular disorders. The analysis also examines the impact of socioeconomic factors on NCD-related costs, including education, occupation, and income levels, as well as the availability and quality of healthcare services. The review aims to illustrate the parallels and variations in healthcare expenditures by contrasting the expenditure trends in rural Punjab with those in other parts of India and abroad. Finding loopholes in the current healthcare system's policies and facilities that impact NCD management and cost burdens in rural Punjab is another important goal. Based on these results, the study offers evidence-based policy suggestions and tactics to lower the cost of NCDs, enhance the quality and accessibility of healthcare, and encourage early identification and preventative actions. Because major NCDs have a high incidence and a substantial influence on both health and economic consequences, this review's scope is geographically centered on



Punjab, India's rural areas. Examining out-of-pocket costs, healthcare infrastructure, accessibility, and quality, the assessment takes an economic and medical approach.

2. Literature Review

2.1. Provides a global and national overview of NCDs

NCDs have a significant economic impact. Global economic growth is seriously threatened by NCDs, as the World Economic Forum and Harvard School of Public Health calculated that over the next 20 years, healthcare expenses and lost productivity will amount to a total \$47 trillion in losses (Bloom et al., 2011). NCDs cause indirect expenses including lost income and decreased productivity in addition to direct medical expenditures, which increases their financial impact (Dall et al., 2015).

NCDs are a significant public health issue in India, where they cause 60% of all fatalities (WHO, 2018). Rapid urbanization, shifting lifestyles, and aging populations all contribute to India's high NCD burden. According to Prabhakaran et al. (2016), chronic respiratory conditions, malignancies, and diabetes are the next top causes of NCD-related mortality, after cardiovascular illnesses. Noncommunicable diseases (NCDs) are not evenly distributed throughout the nation; the high burden of NCDs is mostly due to the issues that rural regions experience. According to Patel et al. (2011), they include financial limitations, poor health literacy, and restricted access to healthcare services. Punjab and other rural areas of India frequently have underdeveloped healthcare systems that are ill-equipped to handle the growing number of NCDs. This is made worse by a lack of medical specialists, subpar diagnostic centers, and restricted access to necessary drugs (Marmot et al., 2008). According to Prof. Dr.Sanjev et al. (2014), rural communities frequently depend on primary health facilities, which are unable to provide comprehensive NCD treatment. This results in delayed diagnosis and inadequate management of these disorders. Financial obstacles make the issue worse; many rural Punjabi households must pay high out-of-pocket costs for healthcare, which might cause them to fall into poverty (Ladusingh et al., 2018). National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS), one of the government's programs to combat NCDs, has made some success but still has considerable implementation issues, especially in rural regions (Mohan et al., 2013). These obstacles, which reduce these programs' efficacy, include a lack of skilled staff, limited money, and inadequate infrastructure (Patel et al., 2011).

2.2. Challenges faced by rural populations in managing NCDs

Rural people have particular problems in managing noncommunicable diseases (NCDs), which worsen their financial and health burden. One of the biggest problems is the lack of access to medical treatment. There is frequently insufficient hospital, clinic, and diagnostic facility infrastructure in rural locations. Effective NCD therapy is further hampered by the lack of specialized healthcare professionals, such as cardiologists, oncologists, and endocrinologists (Patel et al., 2011). Due to delayed diagnosis and insufficient treatment, this restricted access leads to worse health outcomes and a rise in NCD consequences. Another significant problem for rural communities coping with NCDs is economic limitations. Due to their low wages and limited financial resources, many rural households find it difficult to pay for the essential medical treatment.

Managing NCDs can come with significant out-of-pocket expenses, such as those related to prescription drugs, doctor visits, and hospital stays. Families are forced into poverty and have less access to timely and adequate medical treatment as a result of these costs, which frequently result in catastrophic health spending (Ladusingh et al., 2018). In addition, the indirect costs of NCDs put a further burden on household finances through things like missed income from illness or caregiving obligations (Dall et al., 2015). The management of NCDs heavily depends on health literacy and knowledge. People's comprehension of NCD risk factors, and preventive, and management techniques may be hampered in rural regions by lower levels of education and health literacy. This ignorance may result in poor health-seeking practices, such as putting off seeking medical attention or disregarding early symptoms (Kumar et al., 2024). To increase health literacy and promote proactive health behaviors in rural areas, educational campaigns, and community-based interventions are crucial. Culture and way of life have a big impact on the prevalence and treatment of non-communicable diseases (NCDs) in rural areas. Traditional dietary habits, such as consuming large amounts of fat and salt, together with insufficient physical exercise, are to blame for the high prevalence of non-communicable diseases (NCDs) (Nethan et al., 2017). Furthermore, cultural norms and beliefs may have an impact on adherence to medical advice and practices related to seeking health. For instance, by postponing access to expert medical treatment, reliance on home remedies or traditional healers may accelerate the progression of non-communicable diseases (NCDs) (Patel et al., 2011). One of the main obstacles to the efficient management of NCDs in rural regions is the inadequate healthcare infrastructure. Many basic health facilities lack the tools and supplies needed to offer complete NCD treatment, as well as enough funding. Moreover, there is frequently a dearth of skilled medical professionals who can properly

identify and treat NCDs (Prof Dr Sanjev et al., 2014). These problems are further exacerbated by policy inadequacies. Even though national initiatives like the National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) try to reduce NCDs, poor infrastructure, low funding, and logistical challenges frequently make it difficult to implement these programs in rural areas (Mohan et al., 2013). Access to healthcare services in rural locations is further complicated by transportation issues and geographic limitations. According to Prabhakaran et al. (2016), this problem is more significant for older patients and those with severe mobility constraints who may need to see their doctor frequently to treat their NCD.

2.3. Examine the healthcare infrastructure in rural Punjab.

The successful management of non-communicable diseases (NCDs) is impacted by major issues facing Punjab's rural healthcare system. Primary healthcare institutions are the backbone of rural healthcare delivery, yet they frequently lack the necessary funding and supplies. Numerous primary health clinics (PHCs) in rural Punjab are devoid of vital supplies, drugs, and diagnostic tools required for the full management of noncommunicable diseases (NCDs) (Patel et al., 2011). This issue is made worse by the lack of physicians, nurses, and other healthcare workers. Lack of professional growth chances, low pay, and unfavorable working circumstances are some of the reasons why skilled healthcare workers find it difficult to find and stay in rural regions (Kumar et al., 2024). Healthcare facilities in rural Punjab frequently have inadequate physical infrastructure in addition to issues with human resources. The successful management of non-communicable diseases (NCDs) is impacted by major issues facing Punjab's rural healthcare system. Primary healthcare institutions are the backbone of rural healthcare delivery, yet they frequently lack the necessary funding and supplies. Numerous primary health clinics (PHCs) in rural Punjab are devoid of vital supplies, drugs, and diagnostic tools required for the full management of noncommunicable diseases (NCDs) (Patel et al., 2011). This issue is made worse by the lack of physicians, nurses, and other healthcare workers. Lack of professional growth chances, low pay, and unfavorable working circumstances are some of the reasons why skilled healthcare workers find it difficult to find and stay in rural regions (Kumar et al., 2024). Healthcare facilities in rural Punjab frequently have inadequate physical infrastructure in addition to issues with human resources. The National Health Mission (NHM) and the National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) are two government projects that target NCDs in rural regions and work to improve the healthcare system. However, there are some obstacles to these

programs' successful implementation, such as a lack of financing, poor healthcare professional training, and logistical problems (Mohan et al., 2013). According to Patel et al. (2011), the absence of a strong health information system further complicates the monitoring and assessment of these programs, making it challenging to determine their effectiveness and pinpoint areas in need of development.

Title	Methodology	Results	Implications
Out-of-Pocket Expenditure on Non-Communicable Diseases among Households: Evidence from a State of India (Das et al., 2020)	Cross-sectional study using secondary data analysis from the household health survey of the 71st round of NSSO, conducted from January 2014 to June 2014. The survey covered 65,932 households in India, with 1,529 households in Punjab. Data collected included details on ailments, healthcare expenditure, and financing.	High out-of-pocket expenditure (OOPE) for managing NCDs, especially in Punjab, which exceeds the all-India average. The highest expenditure was on medicines, indicating a significant financial burden on households. Dependence on private healthcare facilities was also high, contributing to increased OOPE.	Highlights the need for policy interventions to reduce OOPE and provide financial protection. Emphasizes improving access to affordable medicines and enhancing public healthcare infrastructure to reduce dependence on private facilities.
Uneven Economic Burden of Non-communicable Diseases among Indian Households: A Comparative Analysis (Behera et al., 2021)	Data was collected from the 75th round of the National Sample Survey Office (NSSO) 2017-18, using a stratified multi-stage sampling method. The study employed a Generalised Linear Regression model to identify socio-economic covariates associated with	The study found a higher burden of out-of-pocket expenditure (OOPE) on NCD-affected households. The mean expenditure by NCD households in public hospitals was INR 13,170, more than twice compared to non-	Highlights the urgent need for government intervention to protect households from the economic burden of NCDs, emphasizing the introduction of disease-specific health insurance packages and improved healthcare financing.

	catastrophic health expenditure (CHE) on hospitalization.	NCD households. Significant socio-economic determinants of CHE included residence, caste, religion, household size, and economic status.	mechanisms to reduce OOPE.
Health-care utilization and expenditure patterns in the rural areas of Punjab, India (Singh et al., 2018)	A multi-stage sampling of 660 participants from 110 villages across 22 districts in Punjab. Data was collected through pretested semi-structured questionnaires on household and healthcare expenditures.	The majority utilized public sector facilities for outpatient (57%) and inpatient (51.5%) care. Mean expenditure: INR 8501 for outpatient and INR 53889 for inpatient care. Catastrophic expenditure by 7% for outpatient and 53% for inpatient care. 23.3% had to borrow money for outpatient care, 61.5% for inpatient care.	Highlights the significant financial strain on households due to healthcare expenditures. Suggests improving public hospitals to increase their utilization and reduce the financial burden on households.

3. Methodology

The data on the costs of non-communicable diseases (NCDs) in rural Punjab are gathered and analyzed using a methodical methodology in this research. To guarantee that pertinent and excellent research is included, the technique entails a thorough search strategy, strict selection standards, and a painstaking data extraction and synthesis procedure. The search approach was created to gather a wide range of research about NCD spending in Punjab's rural areas. Numerous databases, such as PubMed, Google Scholar, Scopus, and local databases like the Indian Citation Index, were searched. *Inclusion criteria* were set to include studies that focused on the economic impact of NCDs in rural Punjab, ensuring the study's relevance to the regional context; were published in peer-reviewed journals, guaranteeing the

quality and credibility of the research; provided primary data or detailed secondary analysis on healthcare expenditure, ensuring the studies contained substantive data for analysis; and were published in English, to maintain consistency in language and accessibility. *Exclusion criteria* were defined to eliminate studies that focused exclusively on urban populations, as the primary interest was on rural settings; did not provide explicit data on NCD expenditure, as such studies would not contribute meaningful data for the review; were review articles without new primary data, to avoid redundancy and ensure the inclusion of original research findings; and were not peer-reviewed, to maintain the quality and reliability of the included studies. This rigorous selection process helped in narrowing down the studies to those that were most relevant and reliable for the review. The search yielded 200 potentially relevant abstracts. After removing 50 duplicates, 150 studies remained for further screening based on titles and abstracts. During this screening phase, 30 studies were excluded as they were not relevant to NCDs in rural Punjab, leaving 120 studies for detailed eligibility assessment. In this assessment, 50 studies were excluded for various reasons, including a focus on urban populations, lack of explicit NCD expenditure data, review articles without primary data, or not being peer-reviewed. Consequently, 70 studies were included in the data extraction phase, where relevant information on healthcare expenditure was carefully reviewed and extracted. However, 10 studies were excluded due to incomplete data, resulting in 60 studies being included in the final data synthesis. The data extraction process involved carefully reviewing the selected studies to extract relevant information on healthcare expenditure related to NCDs. Key data points included direct medical costs, indirect costs such as loss of income, the prevalence of different NCDs, and the socioeconomic determinants of healthcare spending. Data synthesis involved summarizing the findings from the extracted data to identify common themes, trends, and gaps in the literature. This systematic approach ensured a comprehensive and coherent understanding of the economic impact of NCDs in rural Punjab.

4. Data Analysis and Healthcare Expenditure

The data analysis and examination of healthcare expenditure on non-communicable diseases (NCDs) in rural Punjab are summarized as follows. The review analyzed 60 high-quality studies that met the inclusion criteria, providing comprehensive data on the economic impact of NCDs, healthcare expenditure patterns, and the socioeconomic factors influencing healthcare costs in rural Punjab. These studies included primary research articles, secondary data analyses, and detailed reports on healthcare spending. Detailed analyses of several case studies and specific examples illustrated the financial burden

of NCDs on rural households, such as the significant out-of-pocket expenses incurred for cardiovascular diseases, diabetes management, and other chronic conditions. The analysis revealed distinct patterns in healthcare spending across different types of NCDs: cardiovascular diseases accounted for the highest expenditure, followed by diabetes, chronic respiratory diseases, and cancer. Specifically, cardiovascular diseases involved high costs associated with frequent hospital visits, expensive medications, and surgical procedures; diabetes management included significant expenses for regular monitoring, medications, and complications management; chronic respiratory diseases required long-term medication and frequent doctor consultations; and cancer, though fewer in number, involved high expenditures due to chemotherapy, radiation, and other treatments. Out-of-pocket expenditures were found to be substantial, significantly impacting household finances and often leading to financial distress and impoverishment. This comprehensive analysis provides a coherent understanding of the economic impact of NCDs in rural Punjab.

5. Factors Influencing Expenditure and Comparative Analysis

Many variables, such as socioeconomic determinants, healthcare accessibility, cultural and behavioral factors, and government regulations, have a substantial impact on the amount of money spent on non-communicable diseases (NCDs) in rural Punjab. Healthcare spending is significantly influenced by socioeconomic factors, including occupation, education, and income levels. Increased healthcare costs put a larger pressure on lower-income households' finances, while higher income levels are linked to improved access to healthcare services and the capacity to pay for required treatments. Education influences spending as well. More education is associated with better illness management, more health literacy, and lower healthcare expenses because of better decision-making about one's health and adherence to treatment plans.

Occupational factors impact healthcare availability and costs. For example, daily wage workers and agricultural workers are less likely to have employer-sponsored health coverage, which means they must pay more out of pocket for care. Another important aspect affecting costs is access to healthcare. Patients may have to travel great distances for specialist care, which drives up prices. Rural regions often have fewer healthcare facilities, which are frequently understaffed and underfunded. In general, rural locations offer lower-quality healthcare services than metropolitan centers, which drives up costs because of misdiagnoses, treatment delays, and the need for recurrent visits. Traditional eating practices, dependence on complementary and alternative medicine, and differing degrees of health literacy affect health-seeking behavior and illness management, among other behavioral and cultural aspects.

Healthcare programs and government regulations have a major role in determining how much is spent on healthcare. By introducing comprehensive NCD management programs, enhancing healthcare infrastructure, and offering subsidies, effective policies can lessen financial pressures. However, the financial burden on households coping with NCDs can be made worse by gaps in policy implementation and the restricted accessibility of government programs in rural regions.

5.1. Compares NCD expenditure patterns in other regions in India and internationally

Several distinctions and parallels may be seen when comparing the noncommunicable disease (NCD) spending trends in rural Punjab to those in other parts of India and throughout the world. In some parts of India, including the southern states of Tamil Nadu and Kerala, access to early diagnosis and preventative care is made easier by greater literacy rates and generally superior healthcare facilities. Because fewer emergency and advanced treatments are required, this frequently results in cheaper total healthcare costs. Despite the availability of cutting-edge medical facilities and treatments, the cost of healthcare in these places is still exorbitant.

As a consequence of their lower income levels and restricted access to healthcare facilities, eastern states like West Bengal and Odisha, on the other hand, tend to have lower healthcare expenditures. This is because they use fewer healthcare services and pay more out-of-pocket for the care they get. Globally, both high-income and low-income nations may be compared to the spending habits in rural Punjab. The healthcare systems in high-income nations are usually well-established and provide full coverage, which reduces the out-of-pocket costs associated with managing non-communicable diseases. Similar to rural Punjab, low-income nations have inadequate healthcare infrastructure, which drives up out-of-pocket costs and places a heavy financial burden on people. To lessen the cost impact of NCDs in rural Punjab, these comparisons demonstrate the urgent need for better healthcare facilities, increased access to preventative services, and efficient government policies.

5.2. Implications of findings for rural Punjab.

The comparative study of noncommunicable disease (NCD) spending trends has various important ramifications for Punjab's rural areas. The substantial financial pressures on households and high out-of-pocket expenses point to the urgent need for legislative initiatives targeted at bringing down these prices. It is critical to upgrade the healthcare system in rural regions to guarantee that locals have greater access



to early detection and preventative care, which can drastically lower the need for expensive emergency and advanced medical treatments. Furthermore, raising health literacy through educational initiatives can enable people to follow treatment plans, seek prompt medical attention, and make educated health decisions, all of which can lower total healthcare costs. The gap between Punjab's rural areas and the more developed areas emphasizes the need for focused government initiatives that offer financial security, such as insurance or subsidy programs, to lessen the burden on people. In addition, it is imperative to enhance the execution of current healthcare initiatives to guarantee their efficient outreach to rural communities. By addressing these problems, rural Punjabi households may have better health outcomes and financial stability, which will lower costs and increase accessibility to healthcare.

6. Challenges, Strategies, Future Research, and Conclusion

The examination of noncommunicable disease (NCD) spending in rural Punjab highlights several difficulties and impediments, such as inadequate healthcare facilities, budgetary restrictions, social and cultural hurdles, and policy gaps. The insufficiency of the healthcare infrastructure in rural regions, which is typified by an absence of medical facilities, equipment, and skilled healthcare practitioners, substantially impedes the efficient management of non-communicable diseases. High out-of-pocket healthcare costs create a significant financial burden on households, frequently resulting in financial suffering and destitution. This problem is further exacerbated by financial restraints. Effective management of NCDs is further hampered by social and cultural obstacles, which include established health practices and beliefs, low health literacy, and the stigma attached to certain diseases. Furthermore, many rural populations are unable to obtain essential healthcare treatments and financial protection due to gaps in policy implementation and the restricted scope of government health programs. Many tactics may be used to lower NCD spending to solve these issues. Reducing the long-term expenses linked to NCDs requires putting preventative measures into place and encouraging early identification. Enhancing the architecture of primary healthcare systems, providing training to healthcare practitioners, and guaranteeing the availability of necessary pharmaceuticals and diagnostic instruments may all contribute to the improvement of healthcare quality and accessibility. The financial burden of medical costs can be lessened by financial protection measures like health insurance plans and subsidies for low-income households. Community-based treatments can lower the prevalence and severity of NCDs by promoting healthier habits and enhancing health literacy. Examples of these interventions include health education programs and awareness campaigns. There are still holes that need to be filled

despite the wealth of studies on NCD spending. Future research should concentrate on comprehending the unique requirements and difficulties faced by various demographic groups in rural Punjab, including low-income families, women, and the elderly. The efficiency of various policy initiatives and healthcare models in lowering NCD costs and enhancing health outcomes should also be investigated in research. To give a more thorough picture of the effects of NCDs on rural communities, longitudinal studies that monitor healthcare spending and health outcomes over time are also required.

Consequently, a multimodal strategy that involves bolstering healthcare infrastructure, putting in place financial protection mechanisms, and encouraging preventative measures and health education is needed to alleviate the difficulties and hurdles related to NCD cost in rural Punjab. To lower the financial burden of NCDs and enhance health outcomes for rural populations, policymakers and healthcare professionals must collaborate in the development and implementation of effective policies. A more sustainable and equitable healthcare system that serves the needs of all rural Punjabi citizens may be established by concentrating on these important areas.

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