

**STUDY OF ECONOMIC BURDEN OF CHRONIC DISEASES IN THE
UNITED STATES OF AMERICA AND TO EXPLORE POTENTIAL
INTERVENTIONS THAT CAN HELP TO REDUCE THIS BURDEN**

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment of the reward for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Dr. Lubna W. Sayyed

Under the Supervision and Guidance of

Dr. Susmit Jain

2023

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DECLARATION BY STUDENT

I hereby declare that this dissertation titled “Study of Economic Burden of chronic diseases in the United States of America and to explore potential interventions that can help to reduce this burden” is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

A handwritten signature in blue ink, appearing to read 'Lubna Sayyed', with a horizontal line drawn through the middle of the signature.

Dr. Lubna Sayyed

23rd May, 2023

CERTIFICATE

This is to certify that Dr. Lubna W. Sayyed in partial fulfilment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur has successfully completed her Project at FIGmd, an MRO Company, Pune (Maharashtra) during 22 February 2023 – 22 May 2023.



Place: Pune

Preceptor: Dr. Devanshi Gulati

Date: 02/06/2023

Name of the organization: MRO Corp

CERTIFICATE

This is to certify that the dissertation ‘**Study of Economic burden of chronic diseases in the United States of America and to explore potential interventions that can help to reduce this burden**’ is a record of the research work undertaken by **Dr. Lubna Sayyed** in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

Dr. Susmit Jain

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IIHMR University, Jaipur

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ABSTRACT

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Title – Study of Economic burden of chronic diseases in the United States of America and to explore potential interventions that can help to reduce this burden.

Background Of the Study – Chronic diseases are conditions that are long lasting (1 year or more) and progress gradually over time. They are also called as ‘non-communicable diseases’. The economic burden of chronic diseases means the financial impact that chronic illnesses impose on individuals, families, communities, and healthcare system. It includes indirect as well as direct costs associated with chronic diseases. Direct costs include expenses directly related to healthcare. Indirect costs refer to the financial consequences beyond healthcare expenses.

The United States of America has a high prevalence of chronic diseases. This study was conducted in order to identify prevalence, and healthcare-related spending. To explore interventions and provide recommendations for all important stakeholders: individuals, healthcare providers and policymakers.

Objectives -

- 1) To identify the prevalence and cost of chronic diseases in the US, including healthcare spending and productivity losses.
- 2) To explore potential interventions to reduce the economic impact of chronic diseases.
- 3) To provide recommendations for policymakers, healthcare providers, and individuals on how to mitigate the economic impact of chronic diseases in the US.

Methodology – A descriptive study was undertaken through secondary research methods by using publicly accessible data sources and by use of Centres for Disease Control’s (CDC) public domain website to examine chronic disease prevalence, productivity loss and healthcare costs. The information was also obtained from selected US research studies that studied the economic impact of chronic diseases and proposed solutions to reduce that financial impact. The study was carried out between 22/02/2023 – 23/05/2023 and the

Sample size comprised of relevant studies that met the inclusion criteria. 27 such studies were identified and included in the study.

Results –Chronic diseases remain a major concern within the United States; where 198.6 million adults currently have one or more chronic illnesses - resulting in immense costs estimated at \$4.1 trillion every year equating to almost one-fifth (18%) of GDP. The largest population is affected by diabetes and chronic kidney disease are 37,300,000 and 37,000,000 cases respectively. It was found that diseases like Alzheimer's Disease cost up to \$355 billion each year followed by Diabetes up to \$327.0 billion. Heart disease and cancer therapy also lead to financial strain.

Interventions like lifestyle treatments, early identification, targeted public health campaigns, Patient-centred strategies and cost-containment strategies are possible ways of reducing the economic toll brought on by chronic diseases.

Conclusion –Chronic illness has a significant impact on individuals and their families financial situation; It also has a significant impact on the US healthcare system. In this situation, prompt diagnosis, prevention, or effective treatment become critical. Costs can be reduced through patient self-care and preventative measures like value-based care or multidisciplinary teams. The financial burden of chronic diseases can eventually be reduced by increasing investment through innovation.

Keywords –Chronic diseases, Economic burden, United States, Healthcare costs, Prevalence, Productivity losses, Interventions

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“I am first and foremost grateful and extremely indebted to **Dr. P.R Sodani, President, IIHMR University** for giving me this opportunity to learn”.

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ABBREVIATIONS

S. No.	Abbreviation	Full Form
1.	COPD	Chronic obstructive pulmonary disease
2.	US	United States
3.	CDC	Centers for Disease Control and Prevention
4.	GDP	Gross domestic product
5.	MEPS	Medical Expenditure Panel Survey
6.	CVD	Cardiovascular diseases
7.	CKD	Chronic kidney disease
8.	AI	Artificial intelligence
9.	COI	Cost of illness

Chapter 1: Introduction

Chronic diseases are conditions that are long lasting (1 year or more) and progress gradually over time. They are also called as 'non-communicable diseases'. The economic burden of chronic diseases means the financial impact which chronic illnesses impose on individuals, families, communities, and healthcare system.

It includes direct as well as indirect costs. Direct costs include expenses directly related to healthcare. Indirect costs refer to the financial consequences beyond healthcare expenses.

The United States of America has a high prevalence of chronic diseases.

In order to determine prevalence and healthcare-related costs, this study was carried out. To explore interventions and provide recommendations for all important stakeholders: individuals, healthcare providers and policymakers.

Chronic diseases that are included in study are:

Heart diseases

Heart disease is a term used to describe a number of disorders when an individual's pumping organ is attacked, negatively impacting the organ's performance. Although this phrase covers a number of distinct illnesses, including coronary artery disease, heart failure, arrhythmias, and valvular heart disease, it contributes to world's high death rates, greatly affecting everyday life.

Risk factors:

Heart disease risk factors typically fall into two groups, each of which is crucial to be aware of: the highly difficult to manage "non modifiable" and the "modifiable", which are categorized according to their titles.

These problems, such as age, gender (men are more at risk than women), and family history, become insurmountable. In contrast, it is important to follow a suitable treatment plan while seeking medical advice in any situation if you smoke, have high blood pressure, cholesterol, or a lot of trans fats in your diet.

Complications:

There are a variety of serious complications, including deadly ones:

- Heart Attack: Blocked blood supply to the heart muscle causes tightness in the chest and, in severe cases, cardiac arrest.
- Heart Failure: When the heart is unable to pump enough blood, heart failure occurs, causing breathlessness, difficulty with bodily functions, and fluid retention or swelling.
- Arrhythmias: Unusual heartbeat patterns interfere with the heart's normal ability to pump blood, causing symptoms like dizziness or fainting episodes that can be deadly if ignored.
- Stroke: Underlying cardiovascular issues make a person more vulnerable, which results in restricted or diminished blood flow, which ultimately damages the brain cells nearby.
- Peripheral Arterial Disease: Narrowed arteries that traverse body parts reduce blood flow, causing numbness and excruciating pain.
- Sudden Cardiac Arrest: A disease where your beating heart stops all of a sudden without any warning corresponding with symptoms mentioned above but acting promptly can save lives.

Breast cancer

Breast cancer is a disease that develops when breast cells begin to divide uncontrolled as a result of aberrant behaviour, causing tumours to grow within the body. Though it may sometimes affect men, the condition primarily affects women.

One's risk of developing this condition is increased by a number of factors, such as being a woman, getting older (one is more vulnerable after turning 50), having a family history of genetic disorders, having a mother, sister, or daughter who has experienced breast cancer in the past, and going through hormonal changes such as early puberty (before the age of 12) or late menopause.

one's way of life Similar decisions like increasing alcohol use, obesity, poor exercise levels, all carry additional dangers.

Serious conditions like invasion to other organs like the liver, lungs, or brain, or even lymphedema, which can cause swelling on the arms and breasts, are just a few of the well-known effects.

It is indicated that patients undertake frequent monitoring since breast cancer recurrence can happen even after effective treatment, either in the same afflicted location or in different sections of the body.

Prostate Cancer

Prostate cancer, often known as "prostate cancer," is a disease that can affect any male; it is fairly common in modern times and requires vigilance against its causes:

Older age group males are more prone to prostate cancer, which has been discovered to mostly affect middle-aged and older men. People with affected relatives are also more likely to develop the disease themselves, particularly those with the gene abnormalities. Additionally, compared to their Asian or Hispanic counterparts, African-American males appear to be more likely to get prostate cancer

If untreated, it eventually spreads into other bodily components, such as bones or organs. Significant urinary symptoms common in prostate cancer patients include stop-and-go urination and blood in the urine, which can be bothersome.

Different treatments for it, such as radiation, hormones, and surgery, may cause erectile dysfunction, leaks, and bowel problems in addition to psychological changes including anxiety and dejection over time by changing the overall body image.

Males must prioritise talks with their healthcare professionals about the available early screening methods in order to minimise any potential dangers associated with pancreatic cancer diagnosis.

Detection techniques, may be vital in spotting any early warning signals, when successful treatment is more likely.

Lung cancer

Lung cancer is a serious medical disorder that usually appears in the lungs of people with respiratory systems because of uncontrollable abnormal cell growths. Here is important information outlining risk factors and probable illness outcomes for this type of cancer, which is among the most fatal diseases known to humankind:

Risk elements

Cigarette Smoking: One of the carcinogenic consequences of tobacco use is aberrant respiratory cell development, with longer smoke sessions or higher doses being associated with increased risks. Smoke from other people's cigarettes may modestly enhance vulnerability when inhaled.

High susceptibility levels may result from exposure to radon gas, which is found seeping into homes from under rocks and soils and producing radioactive waste in areas like uranium mines.

Occupational dangers include high exposure risks from diesel fuel burning and working in businesses that produce harmful dust particles like asbestos.

Family History : Genetic predisposition may occur due to greater vulnerability in relatives with previously diagnosed comparable respiratory illnesses.

Previous Lung Disease: Patients with a history of certain respiratory disorders, such as pulmonary fibrosis or COPD

Exposure to environmental toxins and the rise in lung cancer linked to urban air pollution. Hazardous side effects are brought on by fine particulate matter or emissions from industrial vehicles.

Complications:

Metastasis: One's malignant development occurs when cells divert and spread to other tissues, especially the liver, brain, and bones, seriously endangering the person's life.

Respiratory issues: Complications brought on by the development of the disease include persistent coughing, shortness of breath during effort, and wheezing.

Pleural Effusion: Fluid accumulation around the lungs causes breathing problems that are manifested as excruciating chest discomfort. **Advanced Vena Cava Syndrome:** Large venous blockages develop around the neck of the afflicted person, which causes swelling in the upper thorax and frequently causes laboured breathing.

When lung cancer is developing, the body frequently produces hormones or other substances that set off paraneoplastic syndromes, which affect other organs and system functions and cause symptoms unrelated to the lungs, such as muscular weakness, hormonal imbalances, bone pain, and neurological problems.

Not only is receiving a lung cancer diagnosis physically painful, but it is also emotionally exhausting since it requires people to make substantial lifestyle adjustments while simultaneously managing anxiety, sadness, and other emotional discomfort.

Skin cancer

Skin cancer starts in the cells that make up our body's outer layer. The main cause of its growth is frequent ultraviolet radiation, which can be attained through tanning beds or from routine outdoor exposure without any form of protection..

Lighter skin, fair hair, and eyes, severe sunburns in childhood or adolescence, melanoma in the family's medical history, a personal history of cancerous tumours, prior exposure to radiation therapy, having a lot of atypical moles and precancerous skin lesions called actinic keratoses, and having weakened immune systems are all risk factors for developing skin cancer.

However, the kind and stage of the disease determine how severe it is.

Such cancers, especially in their final stages, can negatively affect nearby tissue areas through invasion. Metastasis, which may spread to the lymph nodes, lung, liver, or brain, also appears to be a possibility, especially in cases of advanced stage melanoma. Despite the fact that there are therapies for skin cancer, recurrence might still happen and necessitate further medical intervention even after successful treatments.

Additionally, receiving a diagnosis for this cancer frequently puts a great deal of emotional strain on those who are affected by it. These people may experience increased stress or anxiety as well as extended depressive episodes that may worsen if visible body parts like the hands or face are operated on. Last but not least, regardless of prior treatment, having a history of skin cancer raises the chance of getting cancer elsewhere on the body, making continual surveillance crucial in treating symptoms as soon as they arise in order to avoid more health concerns in the future.

Asthma

It is a chronic respiratory condition caused by airway constriction. All ages are affected, and it is prevalent. The following asthma risk factors might help you better understand how it starts:

Asthma runs in families, thus people who have allergic relatives are more likely to need this medication. The beginning stages of developing asthmatic problems can also be triggered by allergies like allergic rhinitis or eczema.

Environmental factors, including exposure to irritants like dust particles, allergies to pet hair, pollution from dangerous gases, and hazardous chemical work environments, can contribute to lung inflammation that affects one's ability to breathe. Asthma cases in the future have also been linked to respiratory illnesses in children, while adult obesity significantly raises the likelihood of developing asthma. While adult women experience more frequent occurrences than males, childhood boys experience it more commonly than girls.

Asthmatic people should be aware that the following factors may aggravate their condition:

Asthma sufferers may have respiratory symptoms such wheezing or tightness in the chest that considerably interfere with everyday activities and sleep cycles, causing restless nights and weariness throughout the day.

Unexpected asthma episodes can aggravate existing illnesses, necessitating quick medical care, or potentially posing a life-threatening hazard if ignored. Lung function in untreated asthmatic situations stagnates over time, which will damage your ability to move about later on.

Asthma-related sleep problems can result in emotional tension and worry, which can seriously impair day-to-day activities and negatively impact other facets of one's quality of life.

While certain drugs can help asthma sufferers, it is important to be aware of any potential negative effects from extended usage. Primary care providers should take these issues into consideration when prescribing treatment choices for patients who use oral corticosteroids

for an extended length of time since they may encounter unfavorable effects including weight gain or a higher risk of infection.

Chronic obstructive pulmonary disease (COPD)

It typically affects lungs and restricts ventilation. Chronic bronchitis and emphysema are two of the progressive lung illnesses included in this illness.

Several risk factors for developing COPD include:

- Smoking: Cigarette smoke and other environmental variables are the main contributors of COPD. The majority of instances of this condition are caused by long-term smoking, with risk rising with time and quantity of smoking.

- Environmental Factors: COPD development is also influenced by prolonged exposure to indoor and outdoor air pollution. These contaminants include things like dust, secondhand smoking, chemical vapours, and biomass fuels.

- Genetics: Alpha 1 antitrypsin deficiency, a less prevalent condition in COPD patients, raises the likelihood of getting the disease even among nonsmokers.

- Occupational Exposure: Working in specific industries including mining, construction, agriculture, and manufacturing for an extended period of time can expose you to dust, chemicals, and gases that might raise your chance of getting COPD.

- Age & Asthma: Generalised respiratory symptoms are often noticed in people over the age of 40. Affected people may also have long-term or uncontrolled asthma, which raises their chance of developing COPD. Let's now examine some potential issues that might result from having this condition:

- Exacerbations: These occur when a person's symptoms of chronic obstructive pulmonary disease suddenly get worse; such episodes may call for hospitalisation intervention with antibiotic infections or, alternatively, the use of bronchodilators.

- Reduced Lung Function: Over time, the restrictive nature of COPD tends to have an adverse effect on lung functionality, frequently making fundamental tasks more challenging for those who are affected.

In addition to affecting blood pressure in the lungs' arteries, COPD also puts more strain on the heart, which might result in serious cardiac issues if not properly controlled under medical supervision.

Additionally, this respiratory illness has systemic repercussions that go beyond problems with lung functioning and have an impact beyond only breathing problems. Unintentional weight loss brought on by respiratory difficulties or metabolic impairment—muscle wasting—caused by problems with oxygen intake are only a few symptoms. - extreme exhaustion and sadness, which are frequently observed in people with chronic diseases - the biggest risk for an increased risk of cardiovascular disease or musculoskeletal disorders such as advanced osteoporosis all represent serious health hazards that call for careful attention.

For effective symptom control and to delay the onset of disease, prompt diagnosis, smoking cessation action(s), appropriate therapeutic intervention, and management education are essential.

Treatment options include medications, which typically require proper medical consultation before prescription initiation, pulmonary rehab techniques that focus on enhancing quality of life, including maintaining physical mobility or cognitive abilities, oxygen therapy aimed at relieving restricted breath cycles caused by damage to the lungs, and changes in lung composition.-coping mechanisms that include healthy meal plans made in accordance with dietary requirements, supported by advice from qualified professionals, and aimed at sustaining optimal lung function over a longer length of time.

By enabling prompt treatments during advanced stages of sickness, regular follow-ups with healthcare experts may prevent potentially hazardous consequences from developing over time.

When people reach out sooner, they receive fast initial evaluations as well as the essential coaching to follow verified medical procedures for proactively obtaining optimal health care outcomes as directed in their treatment plan.

Stroke

A stroke, sometimes referred to as a cerebrovascular accident (CVA), happens when there is a disruption in the blood flow to the brain, depriving the brain's cells of oxygen and nutrition. Tissue in the brain may quickly perish as a result of this. Hemorrhagic strokes and ischemic strokes both result from bleeding from blood vessels that have ruptured, respectively. The following details regarding stroke, its dangers, and its complications:

Risk elements

Hypertension - It may harm blood vessels and raise the risk of rupture or obstruction.

Smoking: Smoking harms blood vessels and raises the chance of clot development, which raises the risk of stroke.

Diabetes: Due to high blood pressure, high blood sugar, and other related medical issues.

Obesity: Having a large waistline or being fat raises your chance of developing several cardiovascular disorders, including stroke.

Sedentary living: Living a sedentary lifestyle and not getting enough exercise might increase your chance of developing diabetes, hypertension, and obesity, which all can lead to stroke

High cholesterol: It can cause artery plaque to form, which raises the risk of a stroke.

Complications:

Disability: Depending on the extent and location of the damage to the brain, stroke can result in varying degrees of physical and cognitive disability. A person with a disability may experience changes in behaviour or emotions, speech or swallowing difficulty, memory issues, or paralysis or weakness in their limbs.

Communication problems: Aphasia- Communication can be impacted by this.

Cognitive deficiencies, such as issues with memory, concentration, reasoning, or problem-solving, may be brought on by a stroke.

Impact on the mind and emotions: Stroke survivors may struggle with emotional problems such sadness, anxiety, irritability, and a reduced quality of life.

Stroke can damage the swallowing muscles, causing dysphagia (difficulty swallowing), which increases the risk of aspiration pneumonia or malnutrition.

Strokes that recur: Having one stroke makes it more likely that you will have another one in the future. Reducing the risk of further strokes requires both preventive interventions and risk factor management.

Alzheimer's disease

It is a degenerative neurological ailment that has substantial effects on a person's cognitive abilities, particularly their capacity for memory retention. One of the most prevalent types of dementia in the world, it affects many people every year.

There are number of known risk factors, including getting older than 65, inheriting specific gene mutations, having a parent or sibling who has the disease, having Down syndrome, and being a woman, which may be related to the fact that women live longer than men.

The ensuing cardiovascular health and mild cognitive impairment that does not match the standard diagnostic criteria for dementia diagnosis also play a part.

Progressive memory loss, which starts with difficulties remembering current events but later results in serious failures in personal information like life experiences, is a hallmark of complications of Alzheimer's disease.

Alzheimer's disease impairs cognitive function, which gradually reduces a person's capacity to perform tasks requiring critical thought over time. For example, judgement or problem-solving skills may be hampered by difficulty concentrating, which frequently results in communication breakdowns.

Early symptoms of this loss of function include early-stage behavioural issues like aggression, depression, anxiety, and frequent hallucinations. These symptoms eventually progress to more severe, pervasive symptoms, such as the inability to perform basic tasks like bathing and dressing without assistance from a supervisor and a financial management impairment that necessitates treatment.

Diseases that typically develop before to first illness diagnosis coincidentally together with rising demands for time and effort from pertinent caretakers present a significant problem when taking into consideration the complexity involved with dementia treatment.

Diabetes

Diabetes is of two types - type 1 and type 2.

When the immune system attacks and destroys the insulin-producing pancreatic cells, type 1 diabetes results. Type 1 diabetics are required to take insulin therapy for the remainder of their life in order to manage their blood sugar levels.

Type 2 diabetes starts to develop when the body either ceases generating enough insulin to maintain blood sugar levels within the normal range or when it develops an insulin resistance.

Family history, obesity, sedentary lifestyle, bad food, age, gestational diabetes during pregnancy, and specific ethnicities are some of the risk factors for acquiring diabetes.

Diabetes issues can have an impact on a number of bodily organs, including cardiovascular problems including heart attacks and stroke.

If uncontrolled high blood sugar levels are maintained for a lengthy period of time, diabetes may begin to affect several body parts. One consequence of this is neuropathy, a disorder that causes numbness, discomfort, tingling, or weakness in the extremities and may even have an impact on general body functions in people outside of the cell.

Another concern linked to excessive blood sugar levels is nephropathy, which develops when your kidneys are damaged and can no longer filter waste from your circulation adequately.

uncontrolled diabetes may result in diabetic retinopathy, which affects the retina vessels, cataracts, and glaucoma, which, if unchecked, can cause partial or whole vision loss. In certain circumstances, catastrophic consequences like amputations may result when nerve damage or poor circulation cause wounds on your feet to heal slowly.

Diabetes patients may also be more prone than non-diabetics to bacterial or fungal infections of the skin. If a person has previously struggled with high levels of hyperglycemia, there is

also a risk of mental health difficulties; symptoms like dementia and cognitive loss increase the chance of Alzheimer's disease.

Purpose of research

The two main goals of this study are as follows: one is breaking down how ongoing sicknesses have made a monetary weight in the US while giving ideas for potential mediations that could diminish it.

The study employs a variety of methods, including estimates of disease-related productivity losses and healthcare-related spending, prevalence estimates, and cost estimates.

The results can assist with measuring what serious a monetary mean for they have created over the long run in the public eye because of these conditions deteriorating impacts.

It proposes various arrangements requiring anticipation strategies like early identification and effective administration approaches embraced by capable specialists like policymakers or medical services suppliers the same.

The study also contributes to the creation of a complete package that includes sufficient information and recommendations for all important stakeholders: individuals, the healthcare industry, and policymakers alike. Along these lines empowering them all by and large towards growing better systems pointed toward diminishing their financial weight, explicitly those connected with ongoing sicknesses.

One broadly suggested strategy for handling costly medical care issues is by carrying out this particular nourishing arrangement.

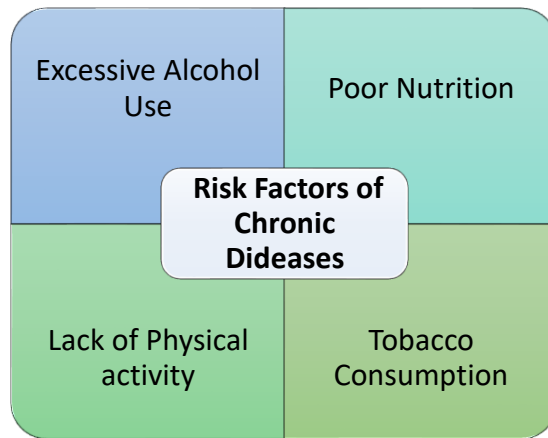


Figure 1.1- Chronic diseases Risk factors

Likewise, keeping up with restraint from tobacco items or stopping by and large has critical advantages towards forestalling dangerous infections mostly heart-related disorders and a few kinds of malignant growth close by diabetes gambles as well as lung confusions prompting early demise In this lies a promising arrangement concerning checking monetary repercussions connected to constant sicknesses cross country.

Reception of a fair and nutritious eating routine, which incorporates a different scope of organic products, while restricting added sugars, immersed fats, and sodium, can possibly forestall, delay, and oversee constant infections like coronary illness and diabetes.

Carrying out this dietary methodology can assist with alleviating the monetary weight of such circumstances. Smoking end or ceasing from smoking out and out significantly affects bringing down the gamble of serious medical conditions, including coronary illness, malignant growth, diabetes, lung sickness, and sudden passing. In the United States, this intervention has the potential to lessen the financial burden of chronic diseases.

Research Question

What is the economic burden of chronic diseases on the United States, and what potential interventions can be implemented to reduce this burden?

Objectives of study

- 1) To identify the prevalence and cost of chronic diseases in the US, including healthcare spending and productivity losses.
- 2) To explore potential interventions to reduce the economic impact of chronic diseases.
- 3) To provide recommendations for policymakers, healthcare providers, and individuals on how to mitigate the economic impact of chronic diseases in the US.

Chapter 2: Review of Literature

Table 2.1 – Review of literature

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
1.	“Economic Costs of Diabetes in the U.S. in 2017”	American Diabetes Association	2018	-Article showed that in the US the complete financial expense of diabetes in 2017 was 327,000,000,000. -Economic burden of diabetes raised by 26% from 2012 to 2017 due to increased predominance of diabetes and the high expense per individual having diabetes. - Discoveries feature the requirement for viable avoidance and methodologies to lessen the financial expenses of diabetes.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
2	“Health Care Expenditure Burden of Cancer Care in the United States”	Joohyun Park, Kevin A. Look	2019	- Among the four most common malignancies, those with lung cancer had the greatest annual health care spending, more than four times that of those without the condition. - The need for comprehensive policies and initiatives to lower the cost of cancer treatment is highlighted by the fact that spending predictions differed by age group, method of payment, and service type.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
3	“Impact of exacerbations on health care cost and resource utilization in chronic obstructive pulmonary disease patients with chronic bronchitis from a predominantly Medicare population”	Margaret K Pasquale, Shawn X Sun, Frank Song, Heather J Hartnett, Stephen A Stemkowski	2012	- Patients with COPD continue to experience exacerbations while being treated with maintenance drugs, which drives up medical expenses. In addition to offering patients respite and therapeutic benefits, reducing the intensity and frequency of exacerbations can also lessen the financial burden of the condition. - The current study made the observation that patients who have more exacerbations pay a much greater price. To further avoid or limit COPD exacerbations, as well as to lower the expense and suffering associated with this condition, it is evident that novel drugs and disease management measures are required.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
4	“Projected Costs of Informal Caregiving for Cardiovascular Disease: 2015 to 2035: A Policy Statement From the American Heart Association”	Sandra B. Dunbar, Olga A. Khavjou, Tamilyn Bakas, Gail Hunt, Rebecca A. Kirch, Alyssa R. Leib, R. Sean Morrison, Diana C. Poehler, Veronique L. Roger and Laurie P. Whitsel and On behalf of the American Heart Association	2018	- Given the high expenditure of providing care for individuals having CVD, the total cost of CVD in 2035 is expected to rise to ‘\$1.2 trillion’. - By 2035, 45% of the US population is predicted to have CVD; thus, planning must take caregiving demands as they increase into account. - To finally lessen the burden of CVD, it is important to creat of appropriate care policies. - Collaboration between industry associations, patient as well as family representatives groups, and decision-makers might significantly alter this alarming scenario.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
5	“2021 Alzheimer's disease facts and figures”	No authors listed	2019	- 6.2 million Americans age 65 and more seasoned are believed to be impacted with Alzheimer's dementia right now. On the off chance that clinical advances are not made to forestall, dial back, or fix Alzheimer's infection, this figure could ascend to 13.8 million by 2060. -Mortality: Alzheimer's infection is the 6th most normal reason for death from one side of the country to the other and the fifth generally normal among individuals 65 and more seasoned. Alzheimer's sickness was answerable for 121,499 fatalities in 2019, up over 145% from 2000 to 2019. -The article highlights rise in prevalence rates, caregiver burden, economic costs, and disparities in healthcare. It emphasizes the need to address these challenges and promote equitable dementia care, increase diversity in the dementia care workforce.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
6	“The direct and indirect financial costs of informal cancer care: A scoping review”	Chelsea Coumoundouros 1, Lydia Ould Brahim 2, Sylvie D Lambert 2 3, Jane McCusker	2019	-Care time was shown to be the biggest financial expense for cancer carer. -The palliative stage of the disease had the greatest carer expenses, showing that the degree of care needed at this point greatly contributes to the financial burden faced by carers. -The study drew attention to gaps in the literature, specifically the paucity of data on cancer carer expenses. -This shows that in order to alleviate the financial burden that carers experience, further research and specialised assistance programmes are required.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
7	“The enormous financial impact of stroke disability”	Jennifer Juhl Majersik, Daniel Woo	2020	- Ischemic stroke is recognised to have a large societal cost, which is estimated to be close to \$50 billion (US dollars) annually in the US. - This amount covers the hospital stay for immediate care and early rehabilitation, as well as any follow-up doctor visits, medicines, long-term care, and lost wages from being unable to work. -When determining whether novel stroke medicines are acceptable, policymakers take into account these costs and if a new therapy gives enough therapeutic value to justify them.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
8	“The Economic Costs of Type 2 Diabetes: A Global Systematic Review”	Till Seuring, Olga Archangelidi & Marc Suhrcke	2015	-Expense of-disease (COI) research on diabetes utilize different strategies and cost assessments, with direct expenses much of the time being higher than backhanded costs. The scope of direct expenses was \$242 in Mexico to \$11,917 in the USA, though the scope of aberrant expenses was \$45 in Pakistan to \$16,914 in the Bahamas. -A critical piece of the expense trouble in low-and center pay nations was borne by patients all through of-pocket treatment charges, as opposed to major league salary nations, where expenses were disseminated in an unexpected way. . - The study discovered a link between a nation's GDP per person and direct diabetes expenditures, Even after accounting for GDP per person, the USA stands out for having extremely high prices.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
9	“Preventable Cancer Burden Associated With Poor Diet in the United States”	Zhang FF, Cudhea F, Shan Z, Michaud DS, Imamura F, Eom H, Ruan M, Rehm CD, Liu J, Du M, Kim D, Lizewski L, Wilde P, Mozaffarian D.	2019	- Illnesses most frequently linked to nutrition was seen in men, those of relatively advanced age (45–64), and people of colour (non-Hispanic blacks, Hispanics, and others) -Over 80.000 new instances of adult cancer were reported in the United States in 2015, according to estimates that a poor diet had a part in this.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
10	“Chronic Condition Combinations and Productivity Loss Among Employed Nonelderly Adults (18 to 64 Years)”	Meraya, Abdulkarim M. MS; Sambamoorthi, Usha PhD	2016	- Persons with diabetes/heart disease and adults with arthritis/hypertension missed considerably more days of work than those without these conditions.. -Adults with diabetes/hypertension had significantly fewer missed work days. Certain chronic condition combinations have a high burden of disease in terms of productivity loss. - Workplace wellness initiatives that address several health issues concurrently should be introduced to reduce missing workdays.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
11	“Absenteeism and Employer Costs Associated With Chronic Diseases and Health Risk Factors in the US Workforce”	Asay, G. R., Roy, K., Lang, J. E., Payne, R. L., & Howard, D. H	2016	-Depending on the risk factor or ongoing illness, non-appearance measurements varied from 1 to 2 days for each person each year. Aside from the actual latency and weight evaluations, the risk factor specific assessments in MEPS and MarketScan were equivalent. -Absenteeism rose as a result of more ailments or risk factors being recorded. -Every condition or risk factor has a direct correlation to yearly absenteeism expenses that exceeded \$2 billion nationwide.

S.NO.	TITLE	AUTHOR	YEAR	FINDINGS
12	“Indirect costs in chronic obstructive pulmonary disease: a review of the economic burden on employers and individuals in the United States”	Patel JG, Nagar SP, Dalal AA	2014	-Significant indirect expenditures are related to COPD. The illness burdens both people and companies in terms of lost revenue due to absenteeism, activity limitations, and disability as well as the costs associated with lost productivity. - Gaining a more comprehensive understanding of the societal burden of COPD requires taking into account both direct and indirect expenses.

Chapter 3: Methodology

Research question

What is the economic burden of chronic diseases on the United States, and what potential interventions can be implemented to reduce this burden?

Research design

Descriptive & Exploratory

Study Setting

Online platform- research was conducted using online platforms and sources to gather information and data for analysis.

Organization- FIGmd an MRO company, Pune, Maharashtra.

Duration of the Study

Three months (22nd Feb 2023 – 22rd May 2023)

Study population

Inclusion criteria:

- 1) Studies that were conducted in the United States
- 2) Studies that examine the economic burden of one or more chronic diseases
- 3) Studies that provide data on the cost of chronic diseases to individuals, families, or society as a whole
- 4) Studies that explore potential interventions to reduce the economic burden of chronic diseases

Exclusion criteria:

- 1) Studies that were conducted outside the United States
- 2) Studies that do not focus on chronic diseases or their economic burden
- 3) Studies that do not provide data on the cost of chronic diseases
- 4) Studies that do not explore potential interventions to minimize the financial impact of chronic diseases

Study tools:

Study tools included databases such as PubMed, Google Scholar, Government websites, Government publications to identify relevant studies.

Research procedures/ approaches

Relevant databases were searched using appropriate keywords. studies that met the inclusion criteria were evaluated to obtain the data

Public domain website - Centres for Disease Control and Prevention (CDC) and publicly accessible data sources were used to obtain the data

Data contained facts about the potential therapies to lessen the economic impact of chronic illnesses as well as additional important study material.

Sample Size

The sample size comprised of relevant studies that met the inclusion criteria. 27 such studies were identified and included in the study.

Sampling Technique

Purposive sampling- To select relevant reports, articles, or case studies.

Ethical considerations

It was ensured that data was used for the purpose for which it was collected . The strict observance of ethical codes governing the use of data, such as ensuring that obtained materials are only used for their intended purposes and that no unprofessional or illegal practices are employed, was given top priority.

Chapter 4: Results

With few options and expensive treatments consuming much-needed resources, managing chronic diseases presents life-altering challenges for nearly 60% of all Americans today.

40% Adults have two or more chronic illness and 70% deaths are due chronic diseases.

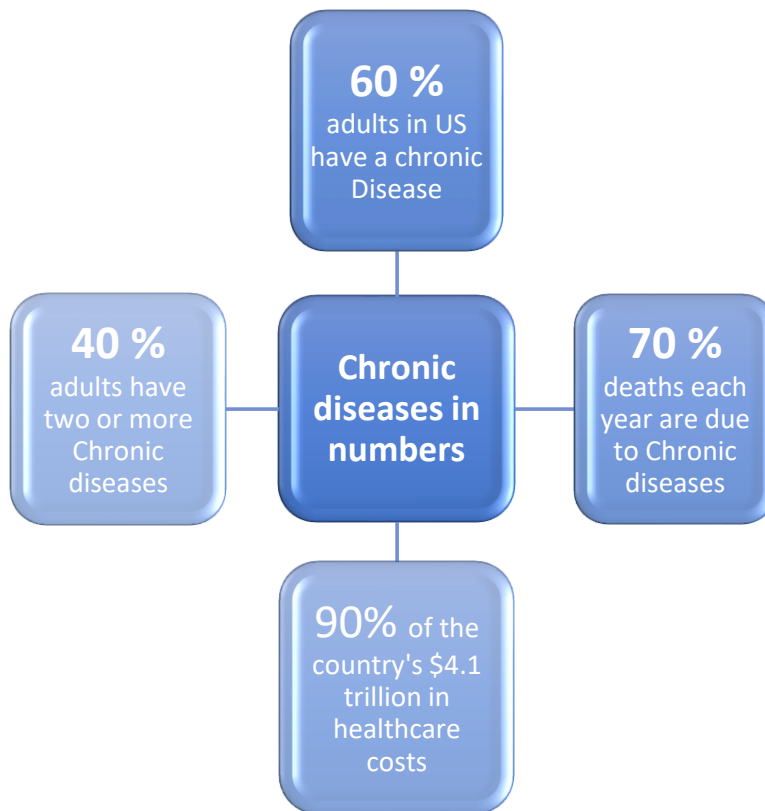


Figure 4.1- Chronic diseases in numbers

These afflictions including malignant growth, coronary illness, ongoing kidney sicknesses diabetes-lung-related ailments have been tormenting individuals across America throughout recent decades. Medical services costs - assessed at \$4.1 trillion or more with a huge number of individuals impacted by at least one such side effects everyday.

Table 4.1- Adults with one or more chronic conditions

Total population	Adults with one or more chronic conditions
331 million	198.6 million

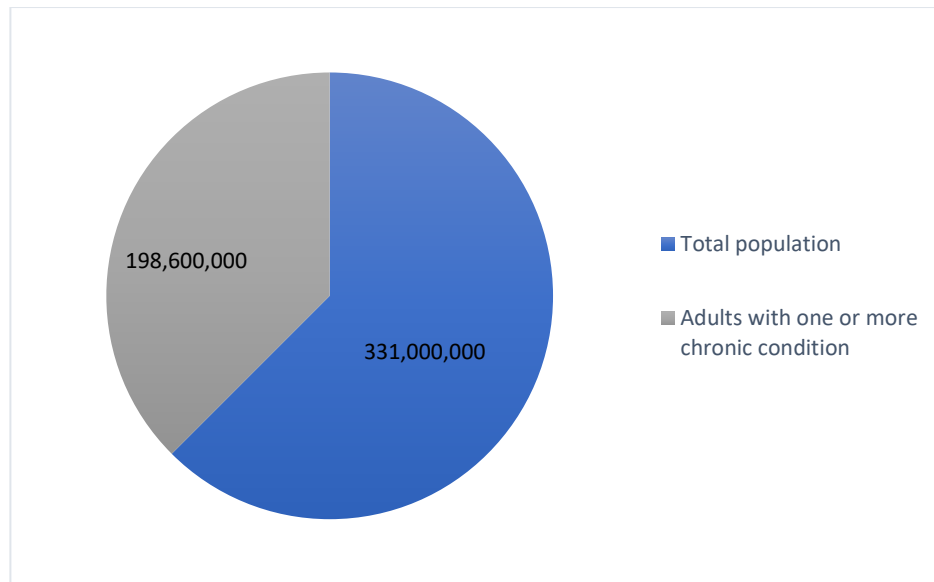


Figure 4.2- Adults with one or more chronic conditions

Of the 331 million people in the country, 198.6 million adults suffer from one or more chronic conditions. Patients who experience the ill effects of ongoing sicknesses and their families deal with the burden. Furthermore, the US medical services framework is under significant strain because of the commonness of ongoing illnesses, and the resources expected to oversee them.

Prevalence-

Table 4.2 – Prevalence of Chronic Diseases

Chronic Diseases	Prevalence
Heart Disease	20,100,000
Breast Cancer	1,095,754
Colorectal Cancer	485,288
Prostate Cancer	924,837
Lung Cancer	416,765
Skin Cancer	362,890
Asthma	26,000,000
COPD	16,000,000
Stroke	7,800,000
Alzheimer's Disease	5,800,000
Diabetes	37,300,000
CKD	37,000,000

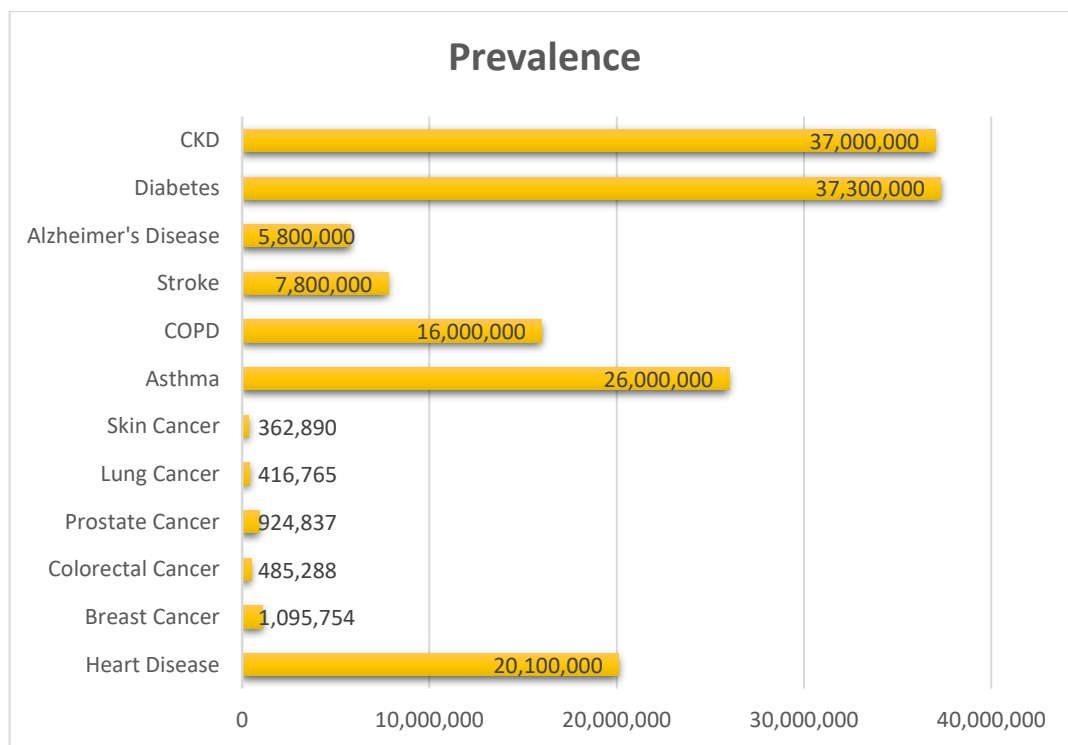


Figure 4.3 Prevalence of Chronic Diseases

The largest population is affected by diabetes and chronic kidney disease are 37,300,000 and 37,000,000 cases respectively. 26,000,000 cases are of asthma .Heart disease with 20,100,000 cases, and. 16,000,000 individuals are affected by COPD, stroke and Alzheimer's disease affected 7,800,000 individuals 5,800,000 individuals. 1,095,754 individuals are affected by Breast cancer , while prostate cancer affected 924,837 individuals ,colorectal cancer affected 485,288 individuals .Individuals affected by Lung cancer and skin cancer are 416,765 and 362,890 respectively,. These prevalence figures highlight the widespread impact of these chronic diseases, underscoring the need for preventive measures, early detection, and effective management strategies to address their burden on individuals and public health.

Total Costs of Chronic Diseases-

Since the United States spent about \$4.1 trillion or 18% of its GDP on health care in year, 2021, it has become more important than ever to control health care costs globally.

It's simple to gauge the importance of healthcare sector experts who can pinpoint expensive medical conditions that demand immediate attention through intervention programmes leading to positive behavioural changes among patients while closely examining comparative expenditure and outcome statistics globally.

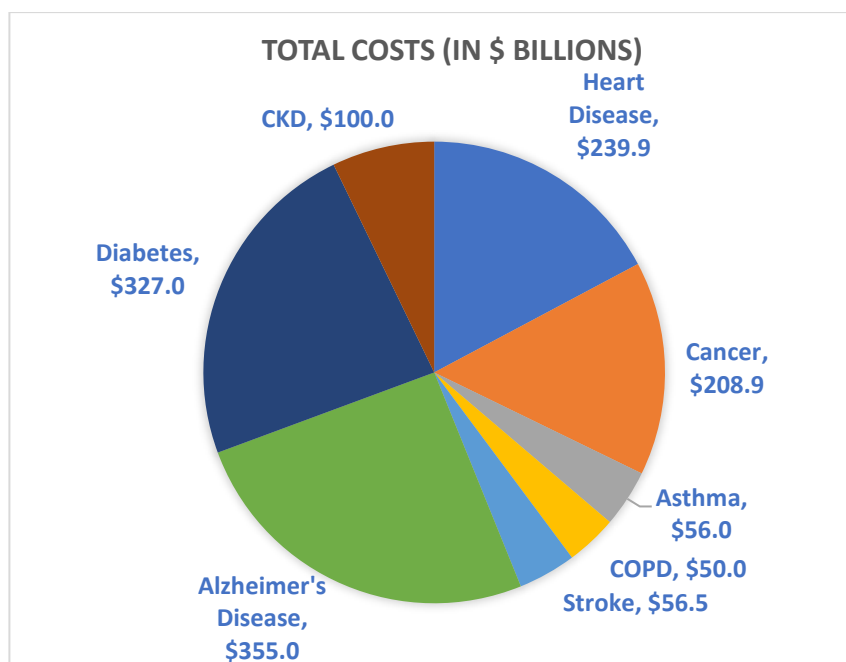


Figure 4.4- Total Costs of Chronic Diseases

As per the Complete Expenses of Ongoing Illnesses study, Alzheimer's disease keeps on being the most costly constant condition on the costing around \$355 billion altogether. Diabetes came in costing generally \$327 billion.

With a worldwide expense of \$208.9 billion, Cancer almost totally offsets any remaining illnesses as far as damage, including medical services consumption, interest in therapy projects, and lost efficiency.

Coronary illness is positioned third with an expense of around \$239.9 billion.

Furthermore, the expense of persistent renal sickness is assessed to be \$100 billion, the expense of stroke and asthma is assessed to be \$56.5 billion and \$56 billion, separately, and the expense of constant obstructive pneumonic infection (COPD) is \$50 billion yearly on an overall scale.

Potential Interventions

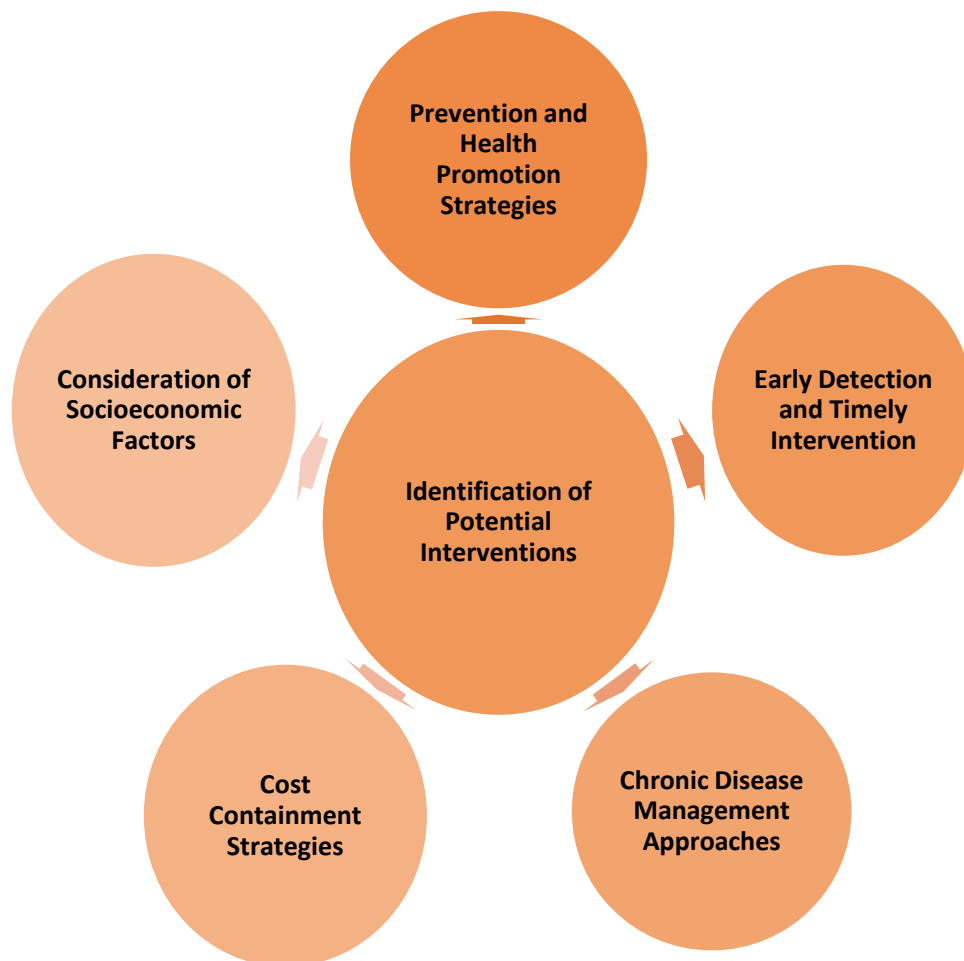


Figure 4.5- Potential Interventions

Identification of Potential Interventions:

Numerous treatments have emerged as a result of a thorough study of scholarly publications and publicly available data sources. These interventions show promise for reducing the economic toll brought on by chronic illnesses. These treatments range widely in their areas of concern and deal with cost-effective solutions as well as speedy identification methods and preventative strategies.

Prevention and Health Promotion Strategies:

In order to lessen the financial burden of chronic illnesses, the study emphasised the value of preventative measures and health promotion methods. Results indicated that investments in community-based programmes, lifestyle treatments, and targeted public health campaigns might result in considerable cost savings by delaying the start or development of chronic illnesses.

Early Detection and Timely Intervention:

The study emphasized the value of early identification and prompt treatment in reducing the financial burden of chronic diseases. Potential treatments that might help with early diagnosis of chronic illnesses, enabling quick treatment and lowering healthcare costs, were identified as screening programmes, diagnostic instruments, and improved referral pathways.

Chronic Disease Management Approaches:

The study investigated several disease-specific therapies and integrated care models as well as general methods to managing chronic diseases. Results showed that patient-centered strategies, multidisciplinary teams, and complete care coordination might increase quality of life, improve health outcomes, and perhaps lower long-term healthcare expenditures.

Cost Containment Strategies:

In-depth examination of cost-containment strategies designed to lessen the financial effect of chronic illnesses was another aspect of this study. This included a variety of tactics such using health technology evaluations to inform resource management decisions and value-based care models to change payment laws, introduce novel funding mechanisms, and reform reimbursement policies

Consideration of Socioeconomic Factors:

The study emphasised the need of taking socioeconomic variables into account when developing strategies to reduce the financial cost of chronic illnesses. Results indicated that addressing socioeconomic determinants of health, lowering health inequities, and enacting fair policies might help to make treatments more successful and long-lasting.

Chapter 5: Discussion

According to this study, chronic diseases place a large financial strain on patients and public US healthcare systems, emphasising their impact in the US. Based on prevalence figures, which show that over 198.6 million individuals suffer from comparable disorders, there is a pressing need for effective mitigation techniques that address the prevalence of these illnesses worldwide.

Therefore, it is crucial to first identify costly medical diseases and then promote treatments aimed at patient behavioural changes, supporting cost-saving options, and comparing costs with commensurate benefits across various nations.

Of these persistent chronic conditions, greatest expense influence is because of Alzheimer's disease, counting clinical expenses, treatment expenses, and productivity lost, it costs \$355 billion every year. Furthermore, diabetes, coronary illness, and malignant growth have major monetary outcomes and are anticipated to cost \$327 billion, \$239 billion, and \$208 billion, respectively.

Additionally, conditions such as COPD, asthma, and chronic renal disease all contribute significantly to the cost of healthcare; thus, preventative measures must be targeted in interventions. Public health initiatives that increase awareness while promoting routine check-ups and vaccines can significantly reduce the need for expensive treatment procedures in the future.

Utilising hospital value-based care models, which incentivize based on quality outcomes rather than imposed volume service supply, may lower economic costs related to patient-centered care interventions, eventually leading to better results & lower costs.

Finally, in order to achieve healthier outcomes in America's diverse society, interdisciplinary care teams made up of various health professionals from different fields are committed to providing comprehensive healthcare approaches that are conducive to lower costs and in line with shared patient-centered ethical considerations.

In particular, when it comes to managing chronic illnesses where self-management techniques are essential, patient outcomes can be significantly improved through a methodical approach that integrates the expertise of various healthcare professionals such as

doctors, nurses, chemists, and others in providing comprehensive care that accounts for all physical and psychological requirements of patients.

Additionally, by empowering people with tools like education materials and resources, healthcare costs can be reduced overall as people become more aware of their habits and can make educated decisions about healthy behaviour. This eliminates the need for medication and ensures overall improvement.

Chapter 6: Conclusion and Recommendations

Conclusion

Families must deal with serious financial obligations related to chronic illnesses together with the unrelenting financial demands of the US health service sector. Complex medical conditions like Alzheimer's disease, diabetes diagnosis complications like cardiovascular disease, or cancer necessitate quick action towards preventative measures along with timely accurate diagnoses through efficient remediation techniques that tackle such terrifying challenges head-on with mighty efficiency and minimal cost impacts.

Improved health outcomes are possible by implementing coordinated preventive procedures that improve care quality through carefully considered valuing principles that support targeted care provision efficacy, complemented by tailored interdisciplinary support frameworks focused exclusively on providing comprehensive patient-directed management of a caregiver program specifically designed to address each patient's specific needs.

As a result, it is the joint responsibility of policymakers, concerned public officials, skilled medical professionals, and patients to establish initiatives leading to the achievement of sustainable economic stability for everyone, subject to successfully addressing this distinctly difficult challenge as one team united under our collective responsibility to each other's welfare needs.

In order to effectively manage such chronic diseases and simultaneously lessen their detrimental economic impact on our communities, ongoing research and new financial investments are essential.

Recommendations

For policymakers

Implement policies promoting healthy environments:

Establishing an environment that facilitates good health comes from implementing relevant policies aimed at achieving this objective. The promotion of physical activity through setting up park systems coupled with recreational centers is essential.

Pathways customized specially to encourage walking or cycling via inclusive policies will undoubtedly promote better health outcomes. Additionally facilitating healthy eating habits by putting in place measures such as affordable price regimes/subsidies targeting nutritious foodstuffs

Invest in early detection and intervention:

Allocate resources to improve early detection methods for chronic diseases. Develop innovative screening techniques and diagnostic tools that can identify health issues at their earliest stages, allowing for timely interventions and more cost-effective treatments.

Support research and innovation:

Allocate funds to enhance chronic disease early detection techniques. Create cutting-edge screening methods and diagnostic instruments that can spot health problems in the early stages, enabling prompt interventions and more affordable treatments.

For Healthcare Providers

Emphasize preventive care:

For the best possible patient outcomes, healthcare practitioners must focus on preventative care.

In order to facilitate early identification of underlying problems and allow doctors to advise or suggest treatment plans before they become complex cases requiring significant medical attention, it is essential to emphasise measures like timely screenings, vaccination administration, and educational initiatives. When practised uniformly, prevention-focused behaviour encourages better life cycles and results in lower financial costs for both patients and individuals.

Enhance health literacy:

Enhancing patient understanding of their conditions and giving them the tools to manage their own treatment is essential for encouraging excellent healthcare outcomes and reducing expenditures associated with unnecessary medical spending. Improved patient comprehension of critical information about chronic illnesses, such as symptoms, different management strategies, and accessible drugs, should be a goal for health practitioners. Effective communication on these subjects empowers people to make well-informed decisions about long-term self-care techniques, treatment regimens, and preventative behaviours, improving patient outcomes.

Utilize artificial intelligence (AI) for early detection:

Health systems are challenged with reducing medical expenses while enhancing patient outcomes by utilising cutting-edge technology like artificial intelligence (AI) for early illness detection tactics.

We can now access enormous amounts of patient-generated health data, including electronic health records (EHRs), genetic data, and wearable device data, which contains hidden insights on chronic disease onset indicators that could be easily missed by manual evaluation processes.

Using these Early Detection approach frameworks during the first phases highlights possible areas where changes might occur right away, eliminating persisting risks brought on by late detection.

Implement predictive analytics for resource allocation:

Using population health data and illness patterns, predictive analytics may be used to estimate future demands for healthcare resources, such as hospital beds, specialist services, and pharmaceuticals. With this proactive strategy, healthcare practitioners may efficiently allocate resources, reduce the burden on the healthcare system, and maximize cost control for the management of chronic diseases.

Encourage Chronic Disease Management Programs:

Offer and promote patient education, support, and resource programmes for managing chronic diseases. These programmes can improve patient's self-management abilities, increase adherence to prescribed treatments, and lower expensive readmissions to the hospital.

For Individuals

Embrace digital health tools:

To track and manage your health, use smartphone applications, wearable technology, and remote monitoring tools. These technologies can assist you in keeping tabs on your vital signs, tracking your symptoms, staying on top of your prescription regimen, and corresponding with medical professionals remotely, hence minimising the need for frequent in-person visits and perhaps cutting healthcare expenditures.

Adhere to treatment plans:

It's important to follow the advice given about prescribed drugs, treatments, and lifestyle choices. Complications, hospitalisations, and higher healthcare expenses might result from poor adherence. To make sure you stick to your treatment plan, use tools like pill organisers and medication reminders.

Stay informed about insurance coverage:

Review your health insurance policy on a regular basis to understand the coverage offered for managing chronic conditions. To make educated judgements and reduce your healthcare expenditure, be aware of deductibles, co-pays, and limits.

Disease Management Education:

Attend disease management programs and workshops to learn self-care techniques and strategies for effectively managing the condition.

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