

A Brief Narrative Review on Prevalence of Diabetes in Tamil Nadu

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Abstract

The incidence of diabetes in Tamil Nadu has escalated significantly in recent decades, mirroring a wider national pattern observed throughout India. This narrative review synthesizes an extensive array of literature concerning the epidemiology, risk factors and health consequences associated with diabetes in Tamil Nadu, illuminating the complex interplay of various contributing elements. A key focus of this analysis is the examination of how genetic susceptibility interacts with rapid urban development, lifestyle modifications and socio-economic factors, culminating in a scenario that exacerbates the rising diabetes rates in the region. The review also investigates regional disparities, revealing marked differences in diabetes prevalence between urban and rural areas, as well as among diverse demographic segments, including age, gender and occupation. These disparities highlight the necessity for localized evaluations to enhance the understanding of diabetes distribution in varied contexts. Furthermore, the review identifies critical obstacles to effective diabetes management and prevention in Tamil Nadu such as limited access to healthcare, low public awareness and inadequate health promotion initiatives, which collectively impede efforts to address the diabetes epidemic. By scrutinizing these elements this review aspires to enrich the understanding of diabetes in Tamil Nadu and emphasizes the urgent need for targeted interventions that cater to the unique challenges faced by different communities. Such insights are vital for shaping public health strategies aimed at alleviating the escalating diabetes crisis in Tamil Nadu and fostering improved health outcomes throughout the state.

Keyword: Blood glucose levels, Diabetes, Noncommunicable diseases, Prevalence Rate, Tamil Nadu.

Introduction

Diabetes is a chronic metabolic disorder marked by elevated blood glucose levels due to inadequate insulin production or ineffective insulin utilization, which can lead to significant health complications if not properly managed. The condition encompasses various types

including Type 1, Type 2, Gestational diabetes, poses heightened risks for cardiovascular diseases, vision impairment and renal failure, necessitating urgent management strategies given its rising global prevalence [1, 2]. The incidence of diabetes in Tamil Nadu presents a substantial public health challenge with numerous investigations indicating distressing

rates across various population segments. The results suggest a multifaceted interaction of lifestyle determinants, occupational risks and demographic characteristics that are driving the increasing prevalence of diabetes within the state [3].

Diabetes mellitus is a multifaceted medical disorder categorized into two primary types: Type 1 and Type 2 each characterized by unique underlying causes. Type 1 diabetes arises when the immune system erroneously targets and destroys the insulin-secreting beta cells within the pancreas a process often influenced by genetic factors and autoimmune mechanisms resulting in an absolute deficiency of insulin. Conversely Type 2 diabetes which is more prevalent is largely influenced by lifestyle choices. This form of diabetes is characterized by either inadequate insulin production or insulin resistance wherein the body's cells do not adequately respond to insulin, culminating in increased blood glucose levels. Major risk factors for Type 2 diabetes encompass obesity, particularly with a concentration of fat in the abdominal region lack of physical activity, and poor dietary practices that are high in processed foods and sugars. Furthermore, insulin resistance is a critical concern in Type 2 diabetes commonly linked to obesity and a lack of physical exercise. Both diabetes types exhibit genetic influences with a family history being particularly significant in the context of Type 2 diabetes. Additional factors that may contribute include comorbidities such as hypertension and dyslipidaemia, along with advancing age which heightens the likelihood of developing Type 2 diabetes [4].

The estimated prevalence of diabetes in India stands at around (6.5%) on a national level, indicating a troubling trend. This issue is particularly in rural areas which experience a significantly higher burden of this chronic health condition compared to urban regions [5]. The incidence of diabetes within Tamil Nadu has been documented to be (40.3%) as per the systematic review undertaken in India spanning

the years 2000 to 2021 [6]. General Prevalence Rates The Tamil Nadu STEPS Survey (2020) documented a diabetes prevalence rate of (17.6%) among adults aged 18-69 with elevated rates particularly noted among the elderly and individuals with obesity. A research study conducted in the Erode district revealed a staggering (100%) prevalence of type 2 diabetes among the surveyed population emphasizing the critical health dilemma faced by rural communities [7].

In 2021, the prevalence of diabetes mellitus among the Indian population was noted to be a concerning (9.6%). Forecasts suggest that this rate may rise to an even more alarming (10.9%) by 2045 accentuating a significant and worrisome upward trend in the occurrence of this chronic metabolic condition in the years to come [8].

A recent investigation reveals that India has indicated with higher prevalence of the condition among males and individuals younger than 50 years, underscoring the necessity for focused screening and proactive intervention strategies. Additionally, research assessing the prevalence of diabetes and the level of household awareness in rural India has determined that a considerable portion of the population is impacted by the disease, with approximately 32 million individuals currently diagnosed nationwide a figure anticipated to increase to 79.4 million by the year 2030. This concerning forecast necessitates a heightened emphasis on enhancing household awareness, bolstering healthcare infrastructure and ensuring the widespread availability of screening and management resources in rural regions. Without proactive interventions, the nation risks encountering a significant public health crisis that could strain healthcare systems and adversely affect economic productivity [9].

The rising incidence of diabetes, frequently characterized as a pandemic due to its extensive effects, poses a significant challenge to health systems worldwide. Current estimates indicate that by 2045, the number of adults suffering

from this chronic metabolic disorder may reach a concerning total of 700 million. Furthermore, it is noteworthy that approximately (84%) of those affected are expected to live in developing countries, where access to healthcare resources and preventive strategies may be especially constrained [10].

Occupational Influence Agricultural labourers in Madurai demonstrated a diabetes prevalence of (29.3%) with exposure to pesticides correlated with increased rates (33.33% among pesticide applicators). This indicates that occupational hazards play a significant role in the prevalence of diabetes [11]. Risk Assessment the Indian Diabetic Risk Score (IDRS) screening revealed that (48.2%) of rural adults were classified as being at high risk for diabetes, highlighting the urgent necessity for early identification and intervention measures [12].

In spite of these alarming statistics some investigations indicate that enhanced awareness and screening initiatives could alleviate the escalating diabetes trend in Tamil Nadu. Nevertheless, the challenge persists in confronting lifestyle factors and occupational hazards that contribute to this public health crisis [13].

Methodology

A thorough and systematic narrative review was undertaken to investigate the complex dimensions of diabetes in Tamil Nadu. This review involved a comprehensive search of academic databases, including PubMed and Google Scholar, as well as local health repositories, to locate studies published between 2020 and 2024 that shed light on the prevalence, risk factors and health consequences of diabetes in the region. The criteria for selection prioritized research specifically related to Tamil Nadu, focusing on studies that provided epidemiological data, demographic information and detailed analyses pertinent to the region. The review also examined urban-rural health disparities, the

impact of occupational factors and the socio-economic determinants that influence diabetes prevalence. Additionally, data from governmental sources, such as the Tamil Nadu STEPS Survey, were incorporated to present a comprehensive overview of the diabetes landscape in the state. Through thematic analysis the review successfully identified and synthesized recurring themes, thereby offering a cohesive understanding of the diabetes epidemic. This methodological framework facilitated a detailed exploration of the interactions among genetic, environmental and socio-economic factors that contribute to the rising incidence of diabetes in Tamil Nadu while also emphasizing the unique challenges faced in managing and preventing the disease across various population segments within the state.

Prevalence of Diabetes in Chennai

Noncommunicable diseases (NCDs) account for approximately (75%) of deaths in Tamil Nadu, prompting the government to implement various control strategies via the Tamil Nadu Health Systems Reform Program (TNHSRP). This investigation sought to assess the prevalence of NCD risk factors and identify determinants of diabetes and hypertension to inform intervention strategies. A cross-sectional study, conducted in urban Chennai 2020 among adults aged 18-69, employing multi-stage sampling to compile data from 5780 participants based on WHO's STEPS methodology. Notably, current tobacco and alcohol usage was reported at (40%) and (39.1%) among men respectively, while (28.5%) of respondents were classified as overweight and (11.4%) as obese. The study revealed a hypertension prevalence of (33.9%) and diabetes at (17.6%) with older age, male gender and obesity identified as independent risk factors. The findings underscore a pressing need for policy-driven and systemic health interventions to alleviate the NCD burden in Tamil Nadu [14].

The study examined fifty-four male subjects from a fertility clinic in Chennai, Tamil Nadu, classified by their glycaemic status to evaluate diabetes's effect on semen quality. Results indicated that diabetic individuals demonstrated significantly impaired semen parameters suggesting a correlation between hyperglycaemia and diminished male fertility potential. Furthermore, weak negative correlations were identified between blood glucose levels and semen attributes, reinforcing the necessity for effective diabetes management to enhance reproductive health outcomes [15].

The research, carried out in perambalur municipality area Chennai 2022 involved an evaluation of 118 operators of private buses and three-wheelers through a semi-structured questionnaire designed to collect information on socio-demographic factors, history of diabetes and associated risk factors in addition to anthropometric data and blood pressure measurements. The majority of participants were aged between 51 and 65 years (37.3%), with a significant number having completed secondary education and a considerable proportion classified within the class 2 socio-economic category. Many participants were part of nuclear family units and displayed lifestyle habits such as smoking, chewing tobacco and consuming alcohol. The study found an (11.9%) prevalence of (T2DM) among the drivers, highlighting critical risk factors such as age, educational attainment, smoking, tobacco consumption, hypertension, increased body mass index (BMI), and waist circumference. These results indicate a greater incidence of obesity, hypertension, and diabetes among professional drivers in comparison to the general population emphasizing the necessity for focused health interventions [16].

The investigation revealed that approximately (26.7%) of transgender individuals in Chennai were diagnosed with type 2 diabetes mellitus indicating a significant prevalence of this condition in the population. This research contributes to the literature by

addressing the health challenges faced by transgender individuals particularly with regard to non-communicable diseases which have been underrepresented in prior studies. The findings emphasize the urgent need for tailored health education and screening initiatives to enhance early detection and management of diabetes among this marginalized demographic [17].

A study in South Chennai identified a high prevalence of diabetes among adults attending medical camps with (10.3%) newly diagnosed and (22%) already known cases, highlighting significant gaps in diagnosis and management. Additionally (65.4%) of known diabetics presented with uncontrolled blood sugar levels and the mean random blood sugar level was recorded at 174.3 ± 95.3 mg/dl emphasizing the critical need for enhanced screening and management interventions particularly for older adults [18].

Prevalence of Diabetes in Coimbatore

The prevalence of diabetes mellitus in Coimbatore was found to be (32.44%) indicating that approximately one-third of the surveyed population is affected. The study involved 299 participants, revealing a concerning trend particularly among the elderly and those leading sedentary lifestyles, which are significant risk factors for diabetes. This underscores the urgent requirement for public health interventions to mitigate this growing epidemic in urban areas like Coimbatore [19].

The prevalence of diabetes in Coimbatore exemplifies the broader trends observed across India, a country marked by significant health outcome disparities between urban and rural areas. National health data indicates an overall diabetes prevalence of (6.5%). However, this statistic is not evenly distributed urban areas report significantly higher rates, with prevalence reaching (8.8%) among males and an alarming (9.0%) among females, in stark contrast to the considerably lower rates found in rural populations. These contrasting statistics

highlight the critical necessity for focused public health strategies that consider the socioeconomic and environmental determinants contributing to these disparities, thereby addressing the urgent health challenge of diabetes in both urban and rural contexts throughout the country [20].

In Coimbatore the incidence of diabetes is poised to reach alarming proportions, with projections suggesting it could escalate to as high as (40.3%). This situation raises significant public health alarms. Additionally, it is important to highlight that urban areas exhibit markedly higher diabetes rates compared to rural regions, indicating a potential link between urban living conditions and the prevalence of this chronic illness. In Coimbatore specifically the instant pace of urbanization is likely a critical factor intensifying lifestyle-related risk factors that lead to diabetes among the population. Therefore, the complex relationship between urban growth and health outcomes warrants comprehensive investigation to elucidate the underlying mechanisms driving these troubling trends in diabetes prevalence as well as to inform public health strategies [21].

Prevalence of Diabetes in Erode

This study examines the prevalence and incidence of type 2 diabetes mellitus within Erode district's rural population in Tamil Nadu, India, emphasizing the escalating issue of diabetes in low- and middle-income countries particularly due to lifestyle factors. A year-long cross-sectional study involving 870 participants revealed that the majority were unemployed illiterate females aged 56-65 with a significant history of diabetes and hypertension most participants were treated with oral hypoglycaemic agents notably metformin. The results indicate a strong correlation between poor lifestyle choices and diabetes prevalence highlighting the necessity for tailored health initiatives to mitigate health risks and enhance the quality of life for those affected [22].

Research conducted in the Erode district of Tamil Nadu provides significant insights into the prevalence and characteristics of type 2 diabetes mellitus among the local general public. The study involved a sample of 177 individuals, comprising 85 diagnosed with type 2 diabetes and 92 who were non-diabetic with participants aged between 28 and 70 years. This demographic range allows for a thorough examination of the impact of diabetes across different age groups within the district. A notable finding was that (63.52%) of the diabetic participants presented with dyslipidaemia, highlighting a strong correlation between diabetes and abnormal lipid levels which can elevate the risk of cardiovascular issues if not adequately addressed. Furthermore, the research indicated that (43.47%) of non-diabetic participants also exhibited dyslipidaemia revealing the widespread nature of this condition within the general population, independent of diabetes status. This observation suggests a more extensive health concern within the community, indicating a pressing need for health interventions aimed at addressing dyslipidaemia on a broader scale. These results not only emphasize the serious comorbidities linked to diabetes but also highlight the critical necessity for preventive measures and management strategies to address dyslipidaemia throughout the Erode district [23].

Prevalence of Diabetes in Kanyakumari

The study highlights the significant prevalence of diabetes among women in the Kanyakumari district particularly affecting those aged 40 to 50. The analysis underscores the health and economic challenges posed by the disease with (84.3%) of women reporting fatigue (64.3%) experiencing leg discomfort, and notable percentages facing visual impairment, cardiovascular issues and hypertension. The financial burden is also substantial, with most healthcare costs directed

toward allopathic treatments, followed by homeopathy and Siddha medicine. The findings stress the need for targeted health interventions and educational efforts to address the rising incidence of diabetes and its complications in this population [24].

The rising incidence of diabetes in the Kanyakumari district, situated in the southern Indian state of Tamil Nadu, exemplifies the wider epidemiological patterns observed throughout India where a notable increase in diabetes cases has raised significant concerns among healthcare professionals and policymakers. Research indicates that diabetes prevalence rates in Tamil Nadu can reach concerning levels with estimates suggesting that as much as (40.3%) of the population may be impacted. This situation is particularly when considering the stark contrast between urban and rural regions as urban areas typically demonstrate significantly higher diabetes rates than their rural counterparts [25].

In Kanyakumari, the alarming rates of Type 2 diabetes and prediabetes present a critical public health concern with contemporary research findings emerging from adjacent regions in Kerala revealing that the prevalence of Type 2 diabetes stands at a staggering (24%) while the prevalence of prediabetes has been recorded at (18.1%) thereby underscoring the urgent need for comprehensive public health interventions and awareness campaigns aimed at mitigating this growing health crisis. Such high prevalence rates not only reflect individual health challenges but also highlight systemic issues related to lifestyle, diet and healthcare access, which warrant immediate attention and action from both governmental and non-governmental organizations dedicated to improving the health outcomes of the affected populations [26].

Prevalence of Diabetes in Kancheepuram

Diabetes in India presents a significant public health challenge with a prevalence rate of (8.7%) surpassing the global average.

Alarming, nearly (50%) of cases remain undiagnosed, leading to severe health complications as many individuals are only diagnosed at an advanced stage. Research from the Kancheepuram district of Tamil Nadu shows that (32.8%) of diabetics suffer from at least one chronic complication excluding retinopathy. Limited access to diabetic care in low and middle-income regions exacerbates these issues, contributing to delayed diagnoses and treatment. Economically, diabetes imposes a heavy burden with (11%) of global health expenditures on adult care dedicated to managing the disease underscoring the need for improved screening, awareness and healthcare access in India [27].

The investigation in the rural Kancheepuram District uncovered a significant prevalence of Gestational Diabetes Mellitus (GDM) with approximately (40%) of pregnant women being diagnosed with the condition. Focusing on women in the 24 to 28 weeks gestational age bracket a critical period for GDM diagnosis the study provided relevant insights into this demographic. The research further identified that factors such as age, gravida status, parity and obesity are strongly associated with the incidence of GDM, indicating that these variables may elevate the risk of developing diabetes during pregnancy [28].

The research was conducted in the Kancheepuram district of Tamil Nadu offers essential insights into the alarming rates of diabetes within the Irula tribal community, revealing significant public health issues confronting this indigenous group. Notably, (25.9%) of the population is affected by diabetes while an additional (49.4%) are classified as prediabetic indicating a pressing health crisis that necessitates prompt action. Utilizing a cross-sectional methodology, the study involved surveying 85 individuals from the Irula tribe through door-to-door visits to gather extensive demographic information including age, gender, education, income and lifestyle habits. Blood glucose levels were

assessed with glucometers, defining diabetes as levels at or above 200 mg/dl and prediabetes as levels ranging from 140 to 199 mg/dl. The research identifies a range of socio-economic determinants, including low literacy rates widespread poverty and substance abuse as contributing factors to the elevated prevalence of diabetes and prediabetes which collectively impede access to healthcare and diminish awareness regarding diabetes prevention and management. These results highlight the critical need for customized health interventions aimed at addressing the unique challenges faced by the Irula tribal population with the goal of reducing diabetes prevalence and enhancing health outcomes for this at-risk community [29].

Prevalence of Diabetes in Madurai

This study investigates the prevalence of diabetes mellitus (DM) among agricultural workers in rural Tamil Nadu a region noted for its significantly high DM rates. Previous research indicated a prevalence of (15.0%) among agricultural labourers compared to (8.7%) in non-agricultural populations with endocrine-disrupting chemicals (EDCs) in pesticides proposed as possible influencing factors. Conducted in 2023 this analytical cross-sectional study involved 150 agricultural workers from Madurai East selected through multistage cluster sampling. The sample was predominantly female (66%) of experience in agriculture. Participants were evaluated for sociodemographic factors, pesticide exposure and diabetic status. Fasting capillary blood glucose levels were measured using an Accu-Chek glucometer. The results indicated a DM prevalence of (29.3%) with rates of (33.33%) among pesticide applicators and (29.1%) among other agricultural workers [30].

Research conducted in Tamil Nadu indicates a concerning high incidence of type 2 diabetes mellitus among rural populations, which may also reflect comparable patterns in urban areas such as Madurai. The study involved 530 participants aged between 20 and

70 years, with an average age of 45. It was observed that (48%) of the participants fell within the 50 to 70 age brackets, highlighting the increased vulnerability of older adults to diabetes and its associated complications. The gender distribution revealed 272 females and 258 males, suggesting that the impact of diabetes is significant across both sexes. Importantly, (78%) of the participants resided in rural areas, emphasizing the critical diabetes crisis faced by these communities, which may have repercussions for urban centres like Madurai. The research identified a range of risk factors associated with type 2 diabetes including physical inactivity, low literacy levels, poor dietary habits, chronic stress, hypertension, obesity, tobacco use, alcohol consumption, family history and sedentary lifestyles. These elements contribute to the elevated prevalence of diabetes and highlight the necessity for focused preventive and management interventions. While specific data for Madurai was not included the findings imply that similar risk factors may be influencing diabetes rates in both rural and urban contexts throughout Tamil Nadu [31].

The research indicates a troubling prevalence of prediabetes estimated at around (15%) within the urban demographic, which poses a considerable risk for the development of Type 2 Diabetes Mellitus. The investigation employed a cross-sectional survey involving 1,050 participants aged 18 years and older conducted across sixteen screening centres while adhering to rigorous ethical standards. Prediabetes was defined by fasting plasma glucose levels ranging from 100 mg/dl to 126 mg/dl, with individuals previously diagnosed with diabetes excluded to ensure a precise evaluation of risk. The study pinpointed significant risk factors associated with prediabetes, particularly a familial history of diabetes and high serum cholesterol levels emphasizing the urgent need for focused public health strategies in Madurai to combat this escalating health issue [32].

The research conducted in Tamil Nadu particularly in Madurai reveals alarming rates of diabetes prevalence especially in sub-urban areas where the rate stands at (25.8%). In contrast, the prevalence is lower in rural areas at (16.1%) and in urban populations at (23%). This variation highlights the considerable diabetes burden in sub-urban regions, emphasizing the necessity for immediate public health initiatives. Additionally, the study identifies gender-specific differences, indicating that individuals in sub-urban settings, irrespective of gender, are at a greater risk of diabetes compared to their rural counterparts. Moreover, the presence of hypertension is frequently observed across all demographic groups exacerbating the health challenges encountered by those affected. This comorbidity implies that residents of Madurai may be facing multiple health issues concurrently, which complicates the management of these diseases. The findings of this study call for further investigation into the risk factors associated with diabetes in various populations, including specific locales like Madurai, to guide the development of targeted health interventions aimed at addressing the increasing prevalence of diabetes and related non-communicable diseases in Tamil Nadu [33].

Prevalence of Diabetes in Salem

The research conducted in a rural community of Salem district, Tamil Nadu, offers significant insights into the prevalence and distribution of diabetes among its residents. A screening of 425 individuals revealed a concerning prevalence rate of (52.7%) with 224 confirmed cases highlighting the pressing need for public health initiatives aimed at enhancing diabetes awareness and management. Of those diagnosed (31.3%) were already cognizant of their condition while (6.1%) were newly identified, illustrating the critical importance of screenings in uncovering previously undiagnosed cases. Furthermore (15.3%) of the

individuals screened were categorized as pre-diabetic indicating a considerable risk for the development of diabetes in the future. The study also identified demographic patterns revealing that (62.5%) of diabetic patients were illiterate and (71%) reported insufficient physical activity suggesting a potential correlation between sedentary lifestyles and the prevalence of diabetes. Key risk factors identified included age, body mass index (BMI) and tobacco use all of which were positively correlated with diabetes. Additionally, pre-diabetes risk factors encompassed family history, hypertension and lifestyle choices such as alcohol consumption. The gender analysis among pre-diabetics indicated a higher prevalence in females (58.5%) compared to males (41.5%) prompting further investigation into gender-specific risk factors [34].

The elevated mortality rate associated with diabetes in Salem district. This alarming figure highlights diabetes as a critical public health concern that necessitates prompt action from healthcare leaders and policymakers. The research indicates that the prevalence of diabetes in Salem is significantly shaped by socio-economic and cultural determinants. Effective management of diabetes is crucial for reducing the likelihood of complications and lowering mortality rates as the study advocates for consistent blood glucose monitoring, nutritious diets, regular physical activity, adherence to prescribed medications and routine healthcare appointments. Implementing these strategies can greatly enhance the quality of life for individuals living with diabetes. Furthermore, the study highlights the worsening of diabetes-related health risks within marginalized communities, emphasizing the urgent need for targeted health education and intervention initiatives that specifically address these disparities. This strategy would contribute to establishing a more equitable healthcare landscape that serves all residents of Salem [35].

Prevalence of Diabetes in Thanjavur

The prevalence of diabetes within the geographic region of Thanjavur, situated in the southern Indian state of Tamil Nadu, highlights a concerning trend particularly among rural populations where healthcare access is often restricted. Studies conducted in this locale indicate a significant rise in diabetes rates over the years with notable figures showing an increase from 9.2% to 13.4% in preurban areas, while urban centres have experienced an even steeper rise, escalating from 16.4% to 20.3%. These troubling statistics call for immediate attention and intervention, as they not only reflect a burgeoning public health crisis but also underscore the necessity for comprehensive strategies aimed at addressing the root causes of the increasing diabetes prevalence in these communities [36].

The prevalence of diabetes in the Thanjavur region exemplifies broader trends observed across India, where the condition is increasingly recognized as a significant public health issue. Nationally, the estimated diabetes prevalence stands at approximately (6.5%) with urban areas exhibiting notably higher rates compared to rural regions. This disparity underscores the influence of geographical and socio-economic factors on health outcomes [37].

Prevalence of Diabetes in Tiruchirappalli

The prevalence of diabetes in the Tiruchirappalli District of Tamil Nadu presents a concerning and significant upward trend particularly among rural populations. Recent empirical studies and analyses have shown a substantial increase in diabetes cases over the past decade with urban areas reporting prevalence rates of (21.9%) while rural areas although lower still reflect a notable rate of (13.4%). This difference highlights a pressing public health issue that requires immediate focus and intervention to mitigate the growing impact of diabetes across various communities in the region [38].

Diabetes mellitus has become a significant public health concern in Tiruchirappalli, Tamil Nadu, mirroring national trends observed throughout India. According to the International Diabetes Federation, approximately 65.1 million individuals in India were diagnosed with diabetes in 2014 with forecasts suggesting an increase to around 109 million by the year 2030. A local investigation involving 300 participants aged between 35 and 75 years with type 2 diabetes underscores the pressing need for focused interventions aimed at this at-risk population. The study notably identifies gender differences revealing those women with diabetes face higher incidences of urinary tract infections and vitamin D deficiency than their male counterparts, indicating particular biological and sociocultural vulnerabilities. The link between type 2 diabetes and these associated health issues highlights the critical need for comprehensive management strategies especially since diabetes is associated with various health risks particularly among individuals aged 35 to 55 years. Collectively, these findings demonstrate that diabetes is not only widespread but also profoundly affects health outcomes in Tiruchirappalli thereby necessitating integrated public health strategies to tackle the complex challenges presented by this chronic disease [39].

Conclusion

This narrative review highlights the escalating diabetes epidemic in Tamil Nadu driven by a multifaceted interaction of genetic, environmental and socio-economic factors that contribute to a significant rise in cases. The prevalence of diabetes exhibits considerable variation across urban, rural and occupational demographics each facing distinct challenges that facilitate the disease's proliferation. The rapid pace of urbanization has led to lifestyle modifications including a higher intake of calorie-rich foods, sedentary behavior and decreased physical activity which collectively

heighten diabetes risk among urban and suburban populations. In contrast, rural communities often experience these lifestyle changes alongside restricted access to healthcare services, complicating early diagnosis and timely treatment. Furthermore, specific occupations particularly in agriculture are linked to an increased risk of diabetes due to stress and exposure to potentially harmful substances like pesticides which may worsen metabolic health. The review underscores the necessity for tailored public health interventions that cater to the specific needs of diverse populations. Implementing screening programs that effectively reach rural and occupational groups is vital for the early identification and management of diabetes. Educational initiatives should focus on raising

awareness regarding lifestyle-related risks, nutritional choices, the significance of regular physical activity and the occupational hazards associated with diabetes. Enhancing healthcare accessibility is also imperative particularly for rural areas where diabetes care resources are challenging to access. Tackling these issues is essential not only for improving health outcomes but also for mitigating the economic impact of diabetes on individuals and the healthcare system. The management of diabetes incurs significant costs, and untreated conditions can lead to serious complications that further burden public health resources. Therefore, comprehensive public health strategies must prioritize improved screening efforts.

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