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Integrating Clinical, Behavioural, And Lived Experience Data to Understand Type 2 Diabetes Management: A TAP-IT Mixed-Methods Study

Dr Nilani Sammuarachchi
Doctor of Health Science, Master of Business Administration, London School Of Management & Technology (LSMT) International Higher Education & Research Institution London, United Kingdom

Abstract: Type 2 Diabetes Mellitus (T2DM) constitutes a major and escalating global and national public health challenge, characterised by rising prevalence, substantial complication burden, and profound impacts on physical, psychological, and social wellbeing. Despite the availability of effective pharmacological treatments, evidence-based clinical guidelines, and structured diabetes education programmes, a significant proportion of individuals continue to experience suboptimal glycaemic control and diminished quality of life. These persistent gaps highlight the need for integrative approaches that extend beyond biomedical management to address behavioural, emotional, and contextual influences on diabetes self-management. This doctoral research applied the TAP-IT mixed-methods framework to examine the interrelationships between clinical indicators, self-care behaviours, emotional experiences, and lived realities of adults managing T2DM. A convergent mixed-methods design was employed, involving 150 adults diagnosed with T2DM who participated in quantitative surveys, clinical assessments, and in-depth qualitative interviews. Quantitative analyses demonstrated high levels of medication adherence (80%), moderate dietary adherence (65%), and comparatively low engagement in physical activity and psychological support behaviours. Significant associations were identified between self-care behaviours and key clinical indicators, including glycated haemoglobin (HbA1c), body mass index (BMI), and blood pressure, underscoring the central role of lifestyle and behavioural factors in glycaemic control and cardiometabolic risk. Qualitative thematic analysis revealed diabetes-related distress, cultural expectations, family and caregiving responsibilities, limited motivation, and time constraints as major barriers to sustained self-management, while strong family support, culturally responsive healthcare, and positive clinician–patient relationships emerged as critical facilitators. Triangulation of quantitative, qualitative, and clinical data generated a comprehensive and integrated understanding of how emotional burden and contextual constraints shape behavioural patterns and metabolic outcomes in T2DM. The TAP-IT framework proved effective in identifying misalignments between clinical recommendations and the lived experiences of individuals managing diabetes in everyday contexts. The findings emphasise the necessity of person-centred and culturally responsive care models that integrate emotional support, tailored health education, and community-based interventions alongside clinical management. This study contributes novel evidence demonstrating that effective T2DM management requires coordinated, multidimensional strategies addressing biological, behavioural, psychological, and sociocultural determinants simultaneously, with particular relevance for Māori, Pasifika, and South Asian populations in Aotearoa New Zealand.

Keywords – Type 2 Diabetes Mellitus (T2DM); Diabetes Self-Management, TAP-IT Mixed-Methods Framework; Glycaemic Control, Insulin Resistance; Self-Care Behaviours; Medication Adherence; Lifestyle Modification, Diabetes-Related Distress, Psychosocial Determinants of Health; Health Literacy, Person-Centred Care; Culturally Responsive Healthcare; Mixed-Methods Research; Chronic Disease Management; Māori and Pasifika Health; South Asian Communities; New Zealand Public Health.

I.INTRODUCTION

Diabetes Mellitus, particularly Type 2 Diabetes Mellitus (T2DM), has emerged as one of the most significant public health challenges of the 21st century, with global prevalence increasing at an unprecedented rate (World Health Organization [WHO], 2023; International Diabetes Federation [IDF], 2023). T2DM is a chronic metabolic disorder characterised by persistent hyperglycaemia resulting from impaired insulin secretion, insulin resistance, or a combination of both pathogenic mechanisms (DeFronzo et al., 2015; Roden & Shulman, 2019). Current global estimates indicate that more than half a billion adults are living with diabetes, and projections suggest that this figure may exceed 700 million by 2050 if existing trends continue (WHO, 2023; IDF, 2023). Population ageing, rapid urbanisation, nutritional transitions, and increasingly sedentary lifestyles are recognised as key drivers of this epidemiological shift, particularly within low- and middle-income countries (LMICs), where healthcare systems frequently face significant structural and resource constraints (WHO, 2023; IDF, 2023; Gaurisuta et al., 2014). Notably, approximately 90–95% of all diabetes cases worldwide are attributable to T2DM, underscoring its dominant contribution to the global diabetes burden (IDF, 2023; Roden & Shulman, 2019).

A defining feature of T2DM is its strong association with modifiable lifestyle and metabolic risk factors, including unhealthy dietary patterns, physical inactivity, obesity, smoking, dyslipidaemia, and psychosocial stress (Baig et al., 2015; Fisher et al., 2019). Central adiposity and insulin resistance—closely linked to contemporary dietary behaviours and reduced physical activity—play pivotal roles in the disease's pathophysiology (DeFronzo et al., 2015; Roden & Shulman, 2019; Shulman, 2014). In parallel, non-modifiable factors such as advancing age, genetic predisposition, ethnicity, and family history contribute to differential susceptibility across populations (Simmons et al., 2010; Gujral et al., 2013). The dynamic interaction between biological, behavioural, and social determinants renders T2DM a particularly complex chronic condition, necessitating multifaceted and context-sensitive approaches to prevention and management.

The global burden of T2DM extends well beyond disturbances in glucose metabolism. It is a major contributor to cardiovascular disease, stroke, chronic kidney disease, neuropathy, retinopathy, and lower-limb amputations (American Diabetes Association [ADA], 2024; DeFronzo et al., 2015; IDF, 2023). Cardiometabolic complications remain the leading causes of morbidity and mortality among individuals with diabetes, with cardiovascular disease alone accounting for more than half of all diabetes-related deaths worldwide (ADA, 2024; WHO, 2023). Diabetes is recognised as a leading cause of premature mortality globally, placing substantial pressure on health systems, particularly in settings characterised by existing health inequities (WHO, 2023). In addition, the increasing prevalence of non-alcoholic fatty liver disease (NAFLD) among individuals with T2DM represents a growing hypometabolic burden, with reported prevalence exceeding 70% in some populations (DeFronzo et al., 2015; Shulman, 2014; IDF, 2023).

The economic, social, and psychological consequences of T2DM are equally substantial. Individuals living with diabetes frequently experience a high treatment burden, encompassing the costs of medications, glucose-monitoring technologies, regular clinical appointments, and long-term management of complications (Polonsky & Henry, 2016; Fisher et al., 2019). These demands contribute to financial strain for individuals and families, particularly in LMIC contexts where comprehensive healthcare coverage may be limited. Moreover, the lifelong and self-directed nature of diabetes management imposes significant psychological challenges. Many individuals report anxiety, frustration, or feelings of personal failure when glycaemic targets are not achieved, while the cumulative demands of daily self-management contribute to diabetes-related distress—a well-documented psychological phenomenon across diverse populations (Peyrot et al., 2005; Fisher et al., 2019; Gonzalez et al., 2008). This emotional burden can adversely affect treatment adherence, self-care behaviours, and overall quality of life, reinforcing a bidirectional relationship between psychological wellbeing and clinical outcomes.

Despite ongoing advances in pharmacological therapies, structured diabetes education programmes, and digital health technologies such as continuous glucose monitoring systems, achieving and sustaining optimal glycaemic control remains challenging for a substantial proportion of individuals with T2DM (Polonsky & Henry, 2016; Fisher et al., 2019; Davies et al., 2018). Barriers include inconsistent access to healthcare services, limited health literacy, cultural and socioeconomic constraints, and difficulties in maintaining long-term lifestyle modifications. Evidence consistently demonstrates that many individuals fail to achieve recommended HbA1c targets, with lifestyle-related factors—such as diet, physical activity, sleep quality, and stress—playing critical roles in shaping day-to-day disease management (ADA, 2024; Fisher et al., 2019; WHO, 2023). These patterns highlight the limitations of approaches that conceptualise diabetes management primarily through a biomedical lens and underscore the need to integrate behavioural, emotional, cultural, and environmental dimensions into comprehensive care strategies.

Collectively, the global context illustrates that T2DM is far more than a metabolic disorder; it is a complex chronic condition shaped by intersecting biological, behavioural,

psychological, and societal influences. Its rising prevalence, substantial morbidity and mortality, and profound psychosocial impacts demand holistic, person-centred approaches to prevention and management. This context underscores the importance of research frameworks that integrate clinical indicators, self-care behaviours, and lived experiences to generate nuanced, real-world understanding of diabetes management and inform more effective, equitable interventions.

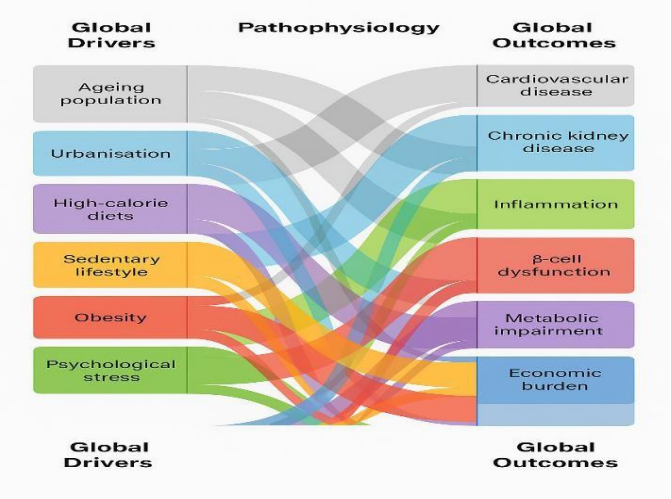

Figure 1.1: Global Drivers, Pathophysiological Pathways, and Outcomes of Type 2 Diabetes Mellitus

Figure 1.1 Conceptual pathways linking global demographic, behavioural, and psychosocial drivers to the pathophysiology and outcomes of Type 2 Diabetes Mellitus. The figure illustrates how ageing, urbanisation, unhealthy dietary patterns, sedentary lifestyles, obesity, and psychological stress interact to influence insulin resistance, β-cell dysfunction, inflammation, and metabolic impairment, leading to adverse cardiometabolic, renal, and socioeconomic outcomes.

Local Context and Relevance

In Aotearoa New Zealand, Type 2 Diabetes Mellitus (T2DM) has emerged as an increasingly significant public health concern, with prevalence rising steadily over the past decade and disproportionately affecting specific population groups (Ministry of Health NZ, 2022). National surveillance data indicate that Māori, Pasifika, and South Asian communities experience markedly higher rates of T2DM compared with the general population, reflecting complex interactions between biological susceptibility, socio-cultural influences, and systemic determinants of health. Individuals from these groups are more likely to develop diabetes at younger ages and experience accelerated progression to complications, contributing to persistent inequities in health outcomes and life expectancy (Ministry of Health NZ, 2022).

Social determinants of health play a critical role in shaping both diabetes risk and self-management capacity in New Zealand. Factors such as income insecurity, limited health literacy, food insecurity, and neighbourhood environments significantly influence dietary behaviours, physical activity opportunities, and engagement with healthcare services. These challenges are often compounded by cultural expectations surrounding food practices, family roles, and work demands, as well as barriers related to language and cultural safety within healthcare settings (Simmons et al., 2010; Baig et al., 2015).

Despite national initiatives such as Living Well with Diabetes, hospital admissions related to diabetes complications remain high, indicating ongoing gaps between policy intent and lived experience (Ministry of Health NZ, 2022). These patterns underscore the need for integrated research approaches capable of capturing both clinical indicators and lived realities within culturally diverse populations.

Problem Statement

Despite decades of research and the availability of effective pharmacological therapies, structured education programmes, and evidence-based clinical guidelines, substantial gaps persist in understanding why many individuals with Type 2 Diabetes Mellitus (T2DM) continue to experience suboptimal outcomes. While biomedical knowledge of diabetes pathophysiology and treatment has advanced considerably, improvements in real-world disease control and quality of life have not occurred at a comparable pace, highlighting a persistent disconnect between clinical knowledge and lived patient experience (Polonsky & Henry, 2016; Fisher et al., 2019). Much of the existing literature has prioritised biomedical indicators—such as glycated haemoglobin (HbA1c), fasting plasma glucose, lipid profiles, and medication regimens—which, although essential for monitoring disease progression, fail to adequately capture the behavioural, emotional, cultural, and social factors that shape daily diabetes self-management (Polonsky & Henry, 2016; Fisher et al., 2019).

A growing body of evidence indicates that many individuals struggle to sustain recommended lifestyle behaviours that are central to glycaemic control and long-term health outcomes. Adherence to nutritional guidelines is frequently challenged by cultural food practices, financial constraints, and emotional drivers of eating behaviour (Simmons et al., 2010; Baig et al., 2015). Similarly, engagement in regular physical activity is often limited by time pressures, occupational demands, mobility issues, lack of safe or accessible environments, and competing family responsibilities. Stress management represents an additional and critical barrier, as psychological stress, anxiety, and diabetes-related distress have been consistently associated with poorer glycaemic control, reduced self-care adherence, and diminished quality of life

(Peyrot et al., 2005; Fisher et al., 2019; Gonzalez et al., 2008). Despite their demonstrated importance, these psychosocial dimensions remain inadequately addressed within predominantly biomedical research paradigms.

Many individuals living with T2DM also report feeling overwhelmed by the cumulative demands of daily self-management. The ongoing requirement to monitor blood glucose, adhere to medication regimens, make complex dietary decisions, and interpret physical symptoms imposes a substantial cognitive and emotional burden (Polonsky & Henry, 2016; Davies et al., 2018). Health literacy further mediates these challenges, as individuals with limited access to clear, culturally appropriate health information may struggle to understand clinical instructions or recognise early signs of complications (Simmons et al., 2010; Baig et al., 2015). These difficulties can result in missed appointments, delayed help-seeking, inconsistent follow-up, and reduced engagement with healthcare services.

Healthcare professionals similarly acknowledge systemic and organisational constraints that limit their capacity to provide comprehensive, person-centred diabetes care. High patient volumes, time-limited consultations, and administrative demands frequently restrict opportunities to address psychosocial concerns, provide tailored lifestyle counselling, or establish sustained therapeutic relationships (Davies et al., 2018; Powers et al., 2020). Consequently, emotional and social dimensions of diabetes management may be overlooked in routine clinical practice, further widening the gap between recommended care and patient experience.

A critical limitation within the existing literature is the relative scarcity of studies that integrate multiple sources of evidence—such as clinical indicators, quantitative behavioural measures, and qualitative patient narratives—to generate a holistic understanding of diabetes management. Research relying on single method designs often lacks the depth, nuance, and ecological validity required to capture the complexity of lived experience.

Quantitative studies may identify associations between self-care behaviours and glycaemic outcomes but are limited in their ability to explain why these behaviours occur. Conversely, qualitative studies provide rich insight into emotional and contextual barriers but frequently lack measurable links to clinical outcomes (Polonsky & Henry, 2016; Fisher et al., 2019). Addressing this methodological gap requires an integrated mixed methods approach capable of examining T2DM management across medical, behavioural, emotional, cultural, and experiential domains. This study responds to this need by applying the TAP-IT mixed-methods framework to explore T2DM management through a comprehensive, multi-layered lens.

Significance of the Study

This study is significant at academic, clinical, and policy levels, addressing one of the most pressing global and national public health challenges: the rising prevalence and complex management demands of Type 2 Diabetes Mellitus (T2DM) (World Health Organization [WHO], 2023; International Diabetes Federation [IDF], 2023; Ministry of Health NZ, 2022). Although an extensive body of diabetes research exists, much of it remains dominated by biomedical approaches that focus primarily on physiological indicators such as HbA1c, fasting glucose, lipid profiles, and pharmacological treatment. While these measures are essential for clinical monitoring, they offer limited insight into the behavioural, emotional, and socio-environmental factors that influence everyday diabetes management. By adopting a mixed-methods framework, this study responds to an urgent need for more integrated, contextually grounded evidence that reflects the lived realities of individuals with T2DM.

A key contribution of this research lies in its integration of quantitative trends, qualitative lived experiences, and clinical indicators. Through data triangulation, the study provides a more comprehensive understanding of how individuals interpret their diagnosis, negotiate self-care behaviours, and manage diabetes within the constraints of daily life. Behavioural, emotional, and social determinants—including health beliefs, cultural norms, stress, family expectations, financial pressures, and healthcare access—play critical roles in shaping diabetes outcomes yet remain underexplored in many traditional research models (Peyrot et al., 2005; Fisher et al., 2019; Ministry of Health NZ, 2022). By foregrounding these determinants, the study advances understanding of diabetes as a multidimensional chronic condition rather than a purely metabolic disorder.

For healthcare professionals, the findings offer valuable insights into discrepancies between clinical expectations and patient experiences. While clinicians often report limited capacity to address psychosocial issues within time-constrained consultations, patients frequently describe difficulties in fully understanding, prioritising, or implementing clinical advice (Davies et al., 2018; Powers et al., 2020). The mixed-methods approach employed in this study helps identify where communication gaps and misalignments occur, supporting the development of more effective, person-centred care strategies. Enhanced understanding of lived experience also enables clinicians to tailor interventions more appropriately, with potential benefits for patient engagement, adherence, and satisfaction.

The study also holds important implications for health services planning and policy development. By documenting real-world barriers—such as cost, transportation, health

literacy, cultural mismatch, and competing life demands—this research provides an evidence base to inform more equitable and accessible diabetes services (World Health Organization [WHO], 2023; Ministry of Health NZ, 2022). Policymakers may use these findings to guide resource allocation, strengthen culturally responsive health promotion initiatives, and support community-based programmes that better address the needs of populations at highest risk, including Māori, Pasifika, and South Asian communities.

From an academic perspective, this study contributes methodologically by demonstrating the utility of the TAP-IT framework for chronic disease research. The integrated analysis of behavioural data, clinical indicators, and qualitative narratives reveals relationships and patterns that are unlikely to emerge through single method designs alone (Polonsky & Henry, 2016; Fisher et al., 2019). In doing so, the research advances theoretical and methodological understanding within the fields of diabetes self-management, health psychology, and public health.

Ultimately, the significance of this study lies in its potential to inform more holistic, equitable, and effective approaches to T2DM management. By generating actionable, person-centred knowledge, the research has the capacity to support improved health outcomes, reduce health disparities, and enhance quality of life for individuals living with T2DM in New Zealand and beyond.

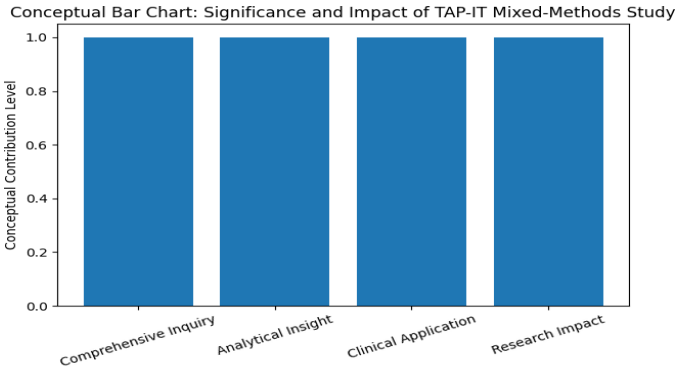

Figure 1.2 Conceptual Bar Chart Illustrating the Significance and Impact of the TAP-IT Mixed-Methods Study

Note: This figure provides a conceptual illustration of the four core contribution domains of the TAP-IT mixed-methods study: comprehensive inquiry, analytical insight, clinical application, and research impact. All domains are presented at an equal level to reflect their integrated and complementary contribution rather than quantitative comparison.
Source: Author-developed

Research Aim

The overarching aim of this doctoral research is to generate a nuanced, integrative, and contextually grounded understanding of Type 2 Diabetes Mellitus (T2DM) management by systematically examining the interrelationships between clinical indicators, self-care behaviours, psychosocial influences, and lived experiences of individuals living with the condition. Recognising T2DM as a complex, chronic disease shaped by biological, behavioural, psychological, cultural, and structural determinants, this study seeks to move beyond reductionist biomedical models that prioritise physiological markers in isolation from everyday realities.

Although advances in pharmacological treatment, clinical guidelines, and structured education programmes have significantly enhanced the biomedical management of T2DM, many individuals continue to experience suboptimal glycaemic control, progressive complications, and diminished quality of life despite access to evidence-based care (Polonsky & Henry, 2016; Fisher et al., 2019). This persistent gap highlights the limitations of approaches that rely predominantly on clinical metrics such as HbA1c, fasting glucose, lipid profiles, and medication adherence, without sufficient consideration of how individuals understand, prioritise, and enact diabetes self-management within the constraints of their daily lives. The aim of this research is therefore to illuminate not only what patterns of management and outcomes occur, but why they occur, and how contextual factors shape these patterns.

Specifically, this study aims to integrate quantitative measures of diabetes self-care behaviours—including dietary practices, physical activity, medication adherence, blood glucose monitoring, and engagement with psychological support—with qualitative narratives that capture emotional burden, diabetes-related distress, cultural expectations, health beliefs, social roles, and practical challenges encountered in everyday life. These patient-generated data are further complemented by clinical perspectives from healthcare professionals, providing insight into clinical decision-making, systemic constraints, and perceived mismatches between clinical recommendations and patient capacities (Davies et al., 2018; Powers et al., 2020). Through the triangulation of behavioural data, lived experiences, and clinical observations, the research seeks to construct a holistic understanding of diabetes management that reflects real-world complexity rather than idealised clinical scenarios.

This integrated aim explicitly acknowledges that diabetes self-management is influenced by interconnected determinants operating across multiple levels. Biological factors such as insulin resistance, obesity, disease duration, and comorbid conditions interact with psychological factors including motivation, self-efficacy, emotional distress, and coping capacity, as well as social and environmental factors such as family support, cultural norms surrounding food and health, socioeconomic conditions, employment demands, and access

to healthcare services (Peyrot et al., 2005; Fisher et al., 2019; Sturt et al., 2015). The study therefore aims to situate clinical outcomes within these broader behavioural and environmental contexts, enabling a more meaningful interpretation of both success and difficulty in diabetes management.

In addition, this research aims to generate findings that are directly relevant to the New Zealand healthcare context, with particular emphasis on Māori, Pasifika, and South Asian communities, who experience a disproportionate burden of T2DM and its complications (Ministry of Health NZ, 2022). By foregrounding culturally informed perspectives and lived realities, the study seeks to identify opportunities for developing more equitable, culturally responsive, and person-centred models of diabetes care that better align with the needs, values, and circumstances of diverse populations.

Ultimately, the aim of this research is not merely descriptive, but translational. By applying the TAP-IT mixed-methods framework, the study seeks to bridge biomedical, behavioural, and experiential domains of knowledge in order to inform clinical practice, enhance patient-centred care, and support the design of effective public health and service-level interventions. In doing so, the research aspires to contribute original, actionable insights that support more holistic, sustainable, and equitable approaches to T2DM management in New Zealand and comparable settings.

Research Objectives

To achieve the above aim, the specific objectives of this research are to

1. Identify and describe common clinical patterns, symptoms, and complications associated with Type 2 Diabetes Mellitus among adult participants.
2. Examine patient-reported experiences of living with T2DM, including emotional impacts, diabetes-related distress, and perceived lifestyle challenges.
3. Assess diabetes-related knowledge, self-care behaviours, and lifestyle risk factors using structured quantitative survey instruments.
4. Analyse relationships between self-care behaviours, psychosocial factors, and key clinical indicators such as glycaemic control and cardiometabolic risk.
5. Explore areas of convergence and divergence between quantitative survey findings, qualitative patient narratives, and clinical observations from healthcare professionals.
6. Identify key biological, behavioural, psychological, and social factors influencing glycaemic control and long-term diabetes self-management.
7. Develop evidence-informed recommendations to enhance person-centred, culturally responsive diabetes care and patient support.
8. Demonstrate the utility of the TAP-IT mixed-methods framework as an integrative approach for chronic disease research and diabetes management.

Research Questions

What clinical patterns, symptoms, and diabetes-related complications are most prevalent among adults living with Type 2 Diabetes Mellitus, and how do these patterns vary according to disease duration, treatment modalities, and comorbid conditions?

1. How do individuals with Type 2 Diabetes Mellitus describe their lived experiences of managing the condition, including emotional responses, diabetes-related distress, coping strategies, and the perceived impact of diabetes on daily life, family roles, and social participation?
2. What behavioural, lifestyle, psychosocial, and demographic factors are associated with diabetes self-management practices and glycaemic control, and how do these factors interact to facilitate or hinder effective management?
3. How do patients interpret and prioritise clinical advice within their cultural, social, and economic contexts, and what tensions or alignments exist between clinical recommendations and patients lived realities?
4. In what ways do healthcare professionals perceive the challenges and constraints of supporting diabetes self-management, and how do these perceptions align with or differ from patient-reported experiences?
5. How does the integration of quantitative survey findings, qualitative patient narratives, and clinical observations through the TAP-IT mixed-methods framework generate a more comprehensive understanding of Type 2 Diabetes Mellitus management than single-method approaches?

Theoretical / Conceptual Framework

This study is theoretically grounded in the Health Belief Model (HBM), a well-established and widely applied framework within health behaviour research that seeks to explain how individuals perceive health threats and make decisions regarding preventive and self-management behaviours. Originally developed to understand uptake of preventive health services, the HBM has since been extensively applied to chronic disease contexts, including diabetes, where sustained behavioural engagement is essential for effective long-term management. The model proposes that health behaviour is influenced by six core constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Together, these constructs provide a structured lens for understanding why individuals may adopt, modify, or resist health-related behaviours that directly influence disease outcomes (Rosenstock, 1974; Becker, 1974).

The relevance of the HBM to Type 2 Diabetes Mellitus (T2DM) lies in the condition's heavy reliance on daily self-management behaviours that are largely enacted outside formal healthcare settings. Unlike acute illnesses, T2DM requires individuals to continuously assess risk, weigh benefits and barriers, and sustain motivation over extended periods. Perceived susceptibility within this context refers to individuals' understanding of their personal risk of developing diabetes-related complications such as cardiovascular disease, nephropathy, neuropathy, retinopathy, and premature mortality. Perceived severity reflects beliefs about the seriousness of these outcomes and their potential impact on physical functioning, independence, family roles, employment, and overall quality of life. Evidence suggests that individuals who recognise both susceptibility and severity are more likely to engage in proactive self-care behaviours, including glucose monitoring, medication adherence, dietary modification, and physical activity (Davies et al., 2018; Fisher et al., 2019).

Perceived benefits and perceived barriers are particularly salient in diabetes management, as individuals must continually evaluate whether the effort required to maintain lifestyle changes is justified by anticipated health gains. Benefits may include improved glycaemic control, symptom reduction, prevention of complications, and enhanced wellbeing. Conversely, barriers frequently encompass financial constraints, time pressures, emotional fatigue, cultural food practices, social obligations, stigma, and limited access to culturally appropriate health information and services (Peyrot et al., 2005; Fisher et al., 2019; Sturt et al., 2015).

Cues to action represent the internal or external triggers that prompt individuals to initiate or modify health behaviours. In the context of T2DM, such cues may include clinical feedback (e.g., elevated HbA1c results), onset of symptoms, advice from healthcare professionals, encouragement from family members, community-based health programmes, or exposure to health promotion messages. Self-efficacy, defined as confidence in one's ability to perform specific behaviours, is a particularly powerful determinant of sustained diabetes self-management.

While the HBM provides a robust behavioural framework, this study recognises that health behaviour does not occur in a vacuum. Structural, cultural, and systemic factors—such as socioeconomic position, health service accessibility, cultural safety, and historical inequities—shape how HBM constructs are experienced and enacted. Accordingly, the HBM is embedded within the broader TAP-IT mixed-methods framework, enabling integration of behavioural beliefs, measurable self-care behaviours, clinical indicators, and qualitative accounts of daily life with diabetes.

Summary of the Introduction

This chapter has established the foundational context, rationale, and conceptual orientation for the present study. Type 2 Diabetes Mellitus (T2DM) has been framed as a complex and multifaceted chronic condition that extends far beyond dysregulated glucose metabolism, affecting physical health, psychological wellbeing, social participation, and everyday quality of life (World Health Organization [WHO], 2023; International Diabetes Federation [IDF], 2023; Ministry of Health NZ, 2022). Globally, T2DM represents one of the most pressing public health challenges of the 21st century, contributing substantially to premature mortality, disability, and escalating healthcare expenditure. Within Aotearoa New Zealand, these challenges are compounded by persistent ethnic and socioeconomic inequities, with Māori, Pasifika, and South Asian populations experiencing disproportionately high prevalence, earlier onset, and more severe complications of T2DM (Ministry of Health NZ, 2022).

Despite significant advances in pharmacological therapies, clinical guidelines, structured education programmes, and digital health technologies, many individuals continue to experience suboptimal glycaemic control and progressive complications. This enduring gap between clinical potential and lived outcomes underscores the limitations of traditional biomedical models that prioritise physiological indicators without sufficient attention to behavioural, emotional, cultural, and social determinants of health. The literature reviewed in this chapter highlights that lifestyle barriers, diabetes-related distress, financial constraints, cultural food practices, health literacy challenges, and system navigation difficulties remain powerful influences on diabetes outcomes (Peyrot et al., 2005; Fisher et al., 2019; Sturt et al., 2015).

The introduction has therefore argued for the necessity of research approaches that move beyond isolated clinical metrics and instead engage with the lived realities of individuals managing diabetes in diverse contexts. Emotional responses such as frustration, anxiety, guilt, stigma, and distress are central to diabetes management, shaping motivation, adherence, and long-term engagement with care (Polonsky & Henry, 2016; Fisher et al., 2019).

In summary, this introductory chapter has framed T2DM as a multidimensional condition requiring multidimensional solutions. By grounding the study in behavioural theory, situating it within global and local contexts, and justifying the use of an integrated mixed-methods framework, the chapter establishes a strong foundation for the subsequent chapters.

This figure provides a conceptual illustration of global research collaboration patterns in Type 2 Diabetes Mellitus, highlighting connections between high-, middle-, and low-income countries. The network is intended to contextualise the international scope and interdisciplinary nature of T2DM

research rather than to represent formal bibliometric or network analysis. Source: Author-developed.

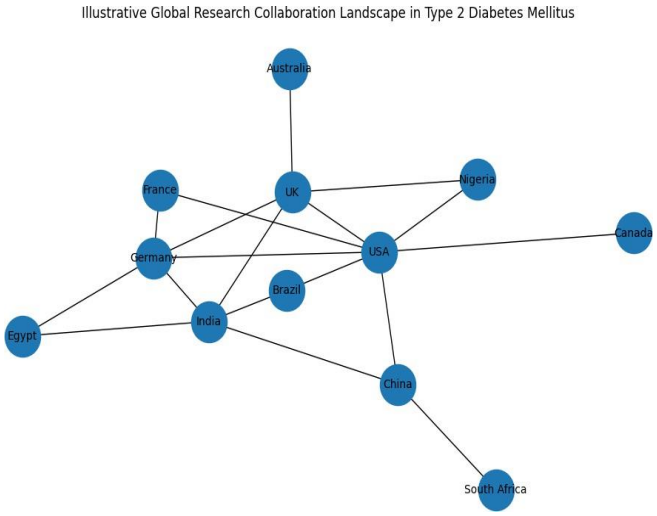

Figure 1.3. Illustrative Global Research Collaboration Landscape in Type 2 Diabetes Mellitus

II. LITERATURE REVIEW

Introduction to Diabetes

Diabetes Mellitus (DM) is a chronic, multifactorial metabolic disorder characterised by persistent hyperglycaemia resulting from defects in insulin secretion, insulin action, or a combination of both (American Diabetes Association [ADA], 2024; World Health Organization [WHO], 2023). It represents one of the most significant global health challenges of the modern era, affecting hundreds of millions of individuals worldwide and contributing substantially to morbidity, premature mortality, and escalating healthcare expenditure. The global burden of diabetes continues to rise in parallel with population ageing, urbanisation, and lifestyle transitions, positioning DM as a defining non-communicable disease of the 21st century (International Diabetes Federation [IDF], 2025).

Clinically, DM is classified into four major categories: Type 1 Diabetes Mellitus (T1DM), Type 2 Diabetes Mellitus (T2DM), gestational diabetes mellitus, and a heterogeneous group of less common forms related to genetic defects, pancreatic disorders, or medication-induced metabolic dysfunction (ADA, 2024; Davies et al., 2018). Among these, T2DM is by far the most prevalent, accounting for more than 90% of all diabetes cases globally and contributing disproportionately to the overall public health burden of the disease (IDF, 2025; WHO, 2023). The dominance of T2DM reflects not only its high prevalence but also its strong association with modifiable lifestyle factors and social determinants of health, making it a key focus for prevention and management research.

The clinical significance of T2DM extends well beyond abnormalities in blood glucose regulation. The condition is strongly associated with a spectrum of microvascular and macrovascular complications, including cardiovascular disease, stroke, chronic kidney disease, diabetic neuropathy, retinopathy, and lower-limb amputation (Kahn et al., 2014; Stratton et al., 2000). Cardiovascular disease remains the leading cause of mortality among individuals with T2DM, underscoring the close interrelationship between glycaemic dysregulation, insulin resistance, and cardiometabolic risk (Low Wang et al., 2016). In addition, the increasing global prevalence of non-alcoholic fatty liver disease (NAFLD), particularly among individuals with obesity and insulin resistance, has highlighted the hepatic-metabolic dimension of T2DM. Epidemiological evidence suggests that more than 70% of individuals with T2DM have coexisting NAFLD, further compounding metabolic risk and long-term health outcomes (DeFronzo et al., 2015; Younossi et al., 2018). These associations reinforce the conceptualisation of T2DM as a systemic disorder with multisystem involvement rather than a condition confined to glucose metabolism alone.

The pathophysiology of T2DM is complex, heterogeneous, and progressive, reflecting the interaction of multiple biological pathways. Central to disease development is insulin resistance, particularly in skeletal muscle, adipose tissue, and the liver, which impairs glucose uptake, promotes lipolysis, and increases hepatic glucose production (DeFronzo et al., 2015; Kahn et al., 2014). In the early stages of disease, pancreatic β-cells compensate for insulin resistance through increased insulin secretion. Over time, however, β-cell dysfunction and eventual failure occur, leading to progressive insulin deficiency and worsening hyperglycaemia. The relative contribution of insulin resistance versus β-cell failure varies across individuals, contributing to the clinical heterogeneity observed in T2DM and underscoring the need for personalised management strategies (Taylor, 2013).

Genetic susceptibility plays an important contributory role in T2DM, with numerous gene variants implicated in insulin secretion, insulin sensitivity, lipid metabolism, and adipose tissue distribution (McCarthy, 2017; Prasad & Groop, 2015). However, genetic predisposition alone does not explain the rapid global rise in T2DM prevalence. Environmental and lifestyle factors—including obesity, physical inactivity, energy-dense diets, urban living, psychosocial stress, and disrupted sleep patterns—are now recognised as dominant drivers of disease onset and progression (Hu, 2011; Nolan et al., 2011). These factors not only exacerbate insulin resistance but also influence disease trajectory after diagnosis by shaping self-management behaviours, treatment adherence, and long-term metabolic control.

Given its multifactorial aetiology and progressive nature, T2DM requires a comprehensive and individualised management approach. Contemporary diabetes care extends beyond pharmacological therapy to incorporate lifestyle modification, structured diabetes education, psychological support, and sustained self-management strategies (Davies et al., 2018; Powers et al., 2020). While pharmacotherapy plays a critical role in glycaemic regulation and complication risk reduction, evidence consistently demonstrates that behavioural factors—such as diet, physical activity, medication adherence, stress management, and health literacy—are central determinants of long-term outcomes (Fisher et al., 2008; Polonsky & Fisher, 2015). Consequently, understanding T2DM requires not only biological insight but also a thorough appreciation of behavioural, psychosocial, and contextual influences on disease management.

This body of literature highlights the necessity of research frameworks capable of integrating biological mechanisms with behavioural patterns and lived experiences. As T2DM unfolds within complex social, cultural, and environmental contexts, approaches that examine the disease through multiple lenses are essential for advancing both theoretical understanding and practical care. This underscores the relevance of mixed-methods research designs, such as the TAP-IT framework employed in the present study, which seek to capture the full complexity of diabetes management by bridging clinical indicators, behavioural data, and patient narratives.

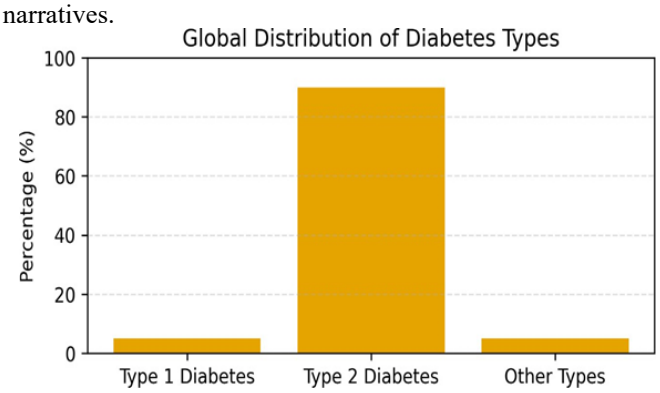

Figure 2.1: Global Distribution of Diabetes Types

Figure 2.1 illustrates the approximate global distribution of diabetes types, showing the predominance of Type 2 Diabetes Mellitus, which accounts for over 90% of all diabetes cases worldwide. This distribution is based on global estimates reported by the International Diabetes Federation and the World Health Organization (International Diabetes Federation, 2025; World Health Organization, 2023).

Epidemiology and Global Burden

The global prevalence of diabetes has increased dramatically over the past three decades, positioning the condition as one of the fastest growing non-communicable diseases worldwide. This rise reflects a convergence of demographic and lifestyle transitions, including population ageing, rapid urbanisation, increasing sedentary behaviour and the global escalation of overweight and obesity (International Diabetes Federation [IDF], 2025; World Health Organization [WHO], 2023). Current estimates indicate that more than 570 million adults are living with diabetes globally, with Type 2 Diabetes Mellitus (T2DM) accounting for the vast majority of cases (IDF, 2025; Ogurtsova et al., 2022). Without substantial improvements in prevention, early detection, and management, global prevalence is projected to exceed 700 million by 2050, representing a major challenge for health systems worldwide (IDF, 2025).

The epidemiological burden of diabetes is not evenly distributed across regions or populations. Low- and middle-income countries (LMICs) now account for the majority of people living with diabetes, reflecting rapid socioeconomic change, urbanisation, and limited capacity for chronic disease prevention (WHO, 2023). In many LMIC settings, diabetes is frequently underdiagnosed, with individuals often presenting at later stages of disease and with more advanced complications. Epidemiological studies from South Asia and sub-Saharan Africa report rapidly rising prevalence rates alongside disproportionately high rates of cardiovascular disease, renal failure, neuropathy, and diabetes-related mortality, largely attributable to delayed diagnosis, fragmented care, and constrained healthcare resources (Atun et al., 2017; Hajat & Stein, 2018).

The burden of diabetes is also shaped by marked inequities within countries. Socioeconomic disadvantage, limited access to healthcare services, lower health literacy, and exposure to obesogenic environments significantly increase both diabetes risk and the likelihood of adverse outcomes (Wilkinson & Marmot, 2003; Walker et al., 2014). These disparities are particularly evident among Indigenous populations and ethnic minority groups, who often experience earlier disease onset, faster progression to complications, and reduced life expectancy. Such patterns highlight the role of social determinants of health in shaping the epidemiology of T2DM beyond individual-level behavioural risk factors.

The economic consequences of the global diabetes epidemic are substantial and multifaceted. Direct medical costs include expenditure related to medications, glucose monitoring technologies, outpatient care, hospital admissions, and the management of long-term complications. Indirect costs—such as reduced workforce participation, absenteeism, premature mortality, and informal caregiving demands—further amplify the economic burden on individuals, families, and national economies (Bommer et al., 2017; Zhang et al., 2010). Global estimates suggest that diabetes accounts for hundreds of billions of dollars in annual healthcare expenditure, with costs

projected to rise sharply as prevalence increases and populations age (IDF, 2025).

Beyond economic impact, diabetes exerts a profound societal and human burden. The condition is associated with reduced quality of life, increased disability, and significant psychological distress, particularly when complications develop or when individuals face ongoing challenges in managing complex treatment regimens. At a population level, the growing burden of T2DM threatens to reverse gains in life expectancy and places increasing pressure on already stretched healthcare systems, particularly in resource-limited settings (WHO, 2023).

Collectively, the epidemiological evidence underscores that T2DM is not only a biomedical condition, but a global public health crisis shaped by demographic, socioeconomic, and structural forces. The scale and inequity of the burden highlight the urgent need for approaches that extend beyond pharmacological treatment to include prevention, early detection, sustained self-management support, and culturally responsive, patient-centred interventions. These realities reinforce the importance of research frameworks that integrate clinical outcomes with behavioural, psychosocial, and contextual factors, as adopted in the present mixed-methods study.

Table 2.1 Global Prevalence of Type 2 Diabetes Mellitus among Adults Aged 20–79 Years

Region	Estimated Prevalence (%)	Adults Living with T2DM (Millions)	Key Sources
Africa	~5.0	~24	World Health Organization; International Diabetes Federation
Americas (North & South)	~9.0	~64	World Health Organization; International Diabetes Federation
Europe	~7.0	~60	World Health Organization; International Diabetes Federation
Middle East & North Africa	~12.0	~55	World Health Organization; International Diabetes Federation
South-East Asia	~11.0	~90	World Health Organization; International Diabetes Federation
Western Pacific	~10.5	~200	World Health Organization; International Diabetes Federation
Global Estimate	~10.0	~570	World Health Organization; International Diabetes Federation

Note. Estimates are based on aggregated global data for adults aged 20–79 years. Prevalence and population figures are rounded and intended to illustrate regional variation in the burden of Type 2 Diabetes Mellitus. Data synthesised from the World Health Organization (2023) and the International Diabetes Federation (2025).

Risk Factors for Type 2 Diabetes Mellitus

The aetiology of Type 2 Diabetes Mellitus (T2DM) is multifactorial, arising from the interaction of biological vulnerability with behavioural, psychosocial, and environmental exposures. Although numerous risk factors have been identified, three determinants consistently emerge as central drivers of disease onset and progression across

populations: overweight and obesity, physical inactivity, and psychosocial stress. These factors not only increase the likelihood of developing T2DM but also shape disease trajectory, treatment response, and long-term outcomes.

Table 2.2 Key Risk Factors for Type 2 Diabetes Mellitus

Risk Factor Category	Specific Risk Factors	Strength of Evidence	Key Sources
Modifiable	Obesity; sedentary lifestyle; unhealthy dietary patterns; tobacco use; harmful alcohol consumption	Strong	World Health Organization; International Diabetes Federation; population-based epidemiological studies
Non-modifiable	Advancing age (>45 years); ethnicity (e.g., South Asian, Māori, Pasifika); family history of diabetes; genetic susceptibility	Moderate	World Health Organization; longitudinal cohort studies; genetic association studies
Metabolic / Clinical	Hypertension; dyslipidmia; insulin resistance; metabolic syndrome	Strong	Clinical trials; metabolic and cardiovascular outcome studies

Note. Risk factors are grouped into modifiable, non-modifiable, and metabolic/clinical categories to reflect their relevance for prevention, screening, and disease progression. Evidence strength reflects consistency across epidemiological, clinical, and metabolic studies synthesized from the World Health Organization (2023) and the International Diabetes Federation (2025).

Overweight and Obesity

Overweight and obesity represent the most significant modifiable risk factors for T2DM and are strongly associated with the development of insulin resistance. Excess adiposity—particularly central or visceral fat—disrupts normal metabolic regulation through increased free fatty acid release, chronic low-grade inflammation, and altered adipokine signalling, all of which impair insulin sensitivity in skeletal muscle, liver, and adipose tissue (Kahn et al., 2014; DeFronzo et al., 2015). Epidemiological studies consistently demonstrate a dose–response relationship between body mass index (BMI) and T2DM risk, with individuals classified as obese exhibiting several-fold higher risk compared with those of normal weight (Hu, 2011).

Importantly, obesity-related diabetes risk varies across ethnic groups. Populations such as South Asians, Māori, and Pasifika peoples develop metabolic complications at lower BMI thresholds, reflecting differences in body composition, fat distribution, and genetic susceptibility (International Diabetes Federation, 2025; World Health Organization, 2023). This highlights the limitation of universal BMI cut-offs and underscores the need for culturally and biologically informed risk assessment. Beyond disease onset, obesity also complicates diabetes management by increasing insulin resistance, accelerating β-cell dysfunction, and reducing responsiveness to pharmacological therapy, thereby reinforcing the central role of weight management in both prevention and treatment.

Physical Inactivity

Physical inactivity is a key behavioural risk factor for T2DM, operating independently of body weight and interacting synergistically with obesity to exacerbate metabolic dysfunction. Regular physical activity enhances insulin sensitivity by increasing glucose uptake in skeletal muscle, improving mitochondrial function, and reducing hepatic glucose output (Colberg et al., 2016). Conversely, sedentary behaviour is associated with impaired glucose metabolism, dyslipidaemia, and increased cardiometabolic risk, even among individuals who meet minimum physical activity guidelines (Owen et al., 2010).

Modern lifestyles characterised by prolonged sitting, screen-based occupations, and reduced active transport have contributed substantially to declining physical activity levels globally. Structural barriers—including unsafe neighbourhoods, limited access to recreational spaces, occupational demands, chronic pain, and caregiving responsibilities—further restrict opportunities for sustained physical activity, particularly among socioeconomically disadvantaged populations (Bauman et al., 2012). In individuals with established T2DM, physical inactivity contributes to poorer glycaemic control, increased medication dependence, and elevated risk of cardiovascular complications, highlighting its dual role as both a causal and prognostic factor.

Psychosocial Stress

Psychosocial stress has increasingly been recognised as a critical but often underappreciated risk factor for T2DM. Chronic stress activates neuroendocrine pathways, particularly the hypothalamic–pituitary–adrenal (HPA) axis, leading to sustained elevations in cortisol that promote insulin resistance, central adiposity, and glucose dysregulation (Chrousos, 2009). Long-term exposure to stressors such as financial insecurity, job strain, caregiving burden, discrimination, and social isolation has been linked to increased incidence of T2DM and poorer metabolic outcomes (Hackett & Steptoe, 2017).

In addition to its direct physiological effects, psychosocial stress indirectly increases diabetes risk by influencing health behaviours. Stress is associated with emotional eating, reduced physical activity, sleep disturbance, smoking, and alcohol use, all of which compound metabolic risk (Fisher et al., 2012; Polonsky & Fisher, 2015). Among individuals already living with T2DM, diabetes-related distress—a condition distinct from clinical depression—has been shown to predict suboptimal self-care behaviours, medication non-adherence, and poorer glycaemic control (Fisher et al., 2008). These findings highlight the need to conceptualise stress not as a peripheral factor, but as a central determinant of both disease development and management.

Integrative Perspective on Risk

Collectively, overweight and obesity, physical inactivity, and psychosocial stress interact dynamically rather than operating in isolation. Stress may promote weight gain and inactivity; inactivity may worsen insulin resistance independent of weight; and obesity may amplify physiological stress responses. These interconnections reinforce the importance of adopting integrated, person-centred approaches to diabetes prevention and management that address behavioural, psychological, and social determinants alongside biological risk. Understanding how these factors co-occur and are experienced in daily life is essential for designing effective, equitable interventions—an aim directly addressed through the mixed-methods framework employed in the present study.

Pathophysiology and Complications

Type 2 diabetes mellitus (T2DM) develops through a complex, progressive interaction between insulin resistance and pancreatic β-cell dysfunction, which together underpin the metabolic abnormalities characteristic of the disease (DeFronzo et al., 2015). These interrelated defects evolve over time and are influenced by genetic susceptibility, excess adiposity, chronic inflammation, and environmental and behavioural factors.

Insulin resistance is a key initiating abnormality in T2DM and primarily affects skeletal muscle, adipose tissue, and the liver. In skeletal muscle and adipose tissue, reduced insulin sensitivity impairs glucose uptake, leading to postprandial hyperglycaemia. Concurrently, insulin resistance in adipose tissue promotes enhanced lipolysis and increased circulating free fatty acids, which further disrupt insulin signalling pathways and contribute to ectopic fat accumulation in the liver and muscle (Kahn et al., 2014). In the liver, hepatic insulin resistance results in inappropriate activation of gluconeogenesis and glycogenolysis, causing persistent fasting hyperglycaemia (Roden & Shulman, 2019).

As insulin resistance progresses, pancreatic β-cells initially compensate by increasing insulin secretion, leading to a phase of relative hyperinsulinemia. However, prolonged metabolic stress driven by glucotoxicity, lip toxicity, oxidative stress, and endoplasmic reticulum dysfunction ultimately results in β-cell exhaustion, apoptosis, and an irreversible decline in insulin secretory capacity (Butler et al., 2013; Prentis et al., 2020). This dual-defect model explains the heterogeneity in clinical presentation, whereby some individuals maintain compensatory insulin secretion for extended periods, while others rapidly progress to insulin insufficiency and overt hyperglycaemia.

Chronic hyperglycaemia plays a central role in the development of diabetes-related complications, primarily through mechanisms involving oxidative stress, advanced glycation end-product (AGE) formation, endothelial dysfunction, and low-grade inflammation. These processes lead to both microvascular and macrovascular damage.

Microvascular complications arise from prolonged exposure of small blood vessels to elevated glucose concentrations and include:

- **Diabetic retinopathy**, a leading cause of vision impairment, characterised by retinal microaneurysms, haemorrhages, capillary occlusion, and pathological neovascularisation.
- **Diabetic nephropathy,** marked by progressive albuminuria, declining glomerular filtration rate, and eventual progression to chronic kidney disease and end-stage renal failure.

- **Diabetic neuropathy,** affecting peripheral and autonomic nerves, resulting in sensory loss, neuropathic pain, autonomic dysfunction, and increased risk of foot ulceration and lower-limb amputation (ADA, 2024; Forbes & Cooper, 2013).

Macrovascular complications reflect accelerated atherosclerosis and vascular inflammation. Individuals with T2DM have a two- to four-fold increased risk of coronary artery disease, myocardial infarction, peripheral arterial disease, and stroke, which together represent the leading causes of morbidity and mortality in diabetes populations (Emerging Risk Factors Collaboration, 2010; ADA, 2024).

Non-alcoholic fatty liver disease (NAFLD) is increasingly recognised as a major metabolic comorbidity of T2DM, affecting up to 70% of individuals with the condition. NAFLD and T2DM share common pathophysiological mechanisms, including insulin resistance and chronic inflammation, and exhibit a bidirectional relationship in which hepatic steatosis worsens glycaemic control while hyperglycaemia accelerates liver disease progression (Targher et al., 2018). NAFLD may advance to non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis, and hepatocellular carcinoma, substantially increasing clinical complexity and long-term health burden.

Beyond physiological complications, individuals living with T2DM frequently experience significant psychological and emotional challenges, including diabetes-related distress, anxiety, and depression (Peyrot et al., 2005; Fisher et al., 2019). These conditions negatively influence motivation, self-efficacy, and adherence to essential self-care behaviours such as dietary regulation, medication adherence, glucose monitoring, and physical activity. A cyclical relationship often emerges, whereby psychological distress contributes to poorer glycaemic control, which in turn exacerbates emotional burden and disease-related stress.

Given the multifactorial and multidimensional nature of T2DM, effective disease management must extend beyond glycaemic targets alone. Addressing both biomedical and psychosocial determinants of health is essential to preventing complications and improving long-term outcomes.

Management and Self-Care Practices

Effective management of Type 2 Diabetes Mellitus (T2DM) requires an integrated, multifaceted approach that combines pharmacological therapy, lifestyle modification, structured education, and regular clinical monitoring (ADA, 2024; Davies et al., 2018). Due to the chronic and progressive nature of the disease, management strategies must simultaneously target glycaemic control, cardiovascular risk reduction, psychological wellbeing, and prevention of long-term complications.

Pharmacological therapy remains a central pillar of T2DM management. Metformin is widely recommended as first-line treatment due to its ability to improve insulin sensitivity and suppress hepatic glucose production.

When glycaemic targets are not achieved with metformin alone, additional agents—including sulfonylureas, dipeptidyl peptidase-4 (DPP-4) inhibitors, sodium–glucose cotransporter-2 (SGLT2) inhibitors, and glucagon-like peptide-1 (GLP-1) receptor agonists—may be introduced, each offering distinct metabolic, cardiovascular, and renal benefits (Davies et al., 2018; ADA, 2024). In advanced disease stages, or when β-cell function is substantially compromised, insulin therapy becomes necessary to maintain metabolic control. GLP-1 receptor agonists have gained particular prominence due to their combined effects on glycaemic regulation, weight reduction, and cardiovascular risk mitigation.

Lifestyle modification forms the foundation of long-term diabetes management. Dietary strategies focusing on reduced intake of refined carbohydrates, increased consumption of vegetables and dietary fibre, balanced macronutrient distribution, and portion control have consistently demonstrated improvements in glycaemic control and insulin sensitivity (Evert et al., 2019). Regular physical activity—typically recommended as at least 150 minutes of moderate-intensity exercise per week—enhances glucose uptake in skeletal muscle, supports weight management, and reduces cardiovascular risk. Even modest weight loss has been shown to significantly improve metabolic outcomes and delay disease progression. However, adherence to lifestyle interventions is often shaped by environmental, cultural, socioeconomic, and psychological factors, underscoring the importance of behaviour-change support.

Patient-centred care emphasises active engagement of individuals in managing their condition. Core self-care practices include self-monitoring of blood glucose, consistent medication adherence, routine foot and eye care, and participation in regular screening for microvascular and macrovascular complications (ADA, 2024). Self-monitoring enables individuals to identify glycaemic patterns, make informed dietary and behavioural adjustments, and recognise early signs of hypo- or hyperglycaemia. Ongoing collaboration with healthcare professionals facilitates timely treatment optimisation and early intervention.

Structured diabetes education plays a critical role in enhancing knowledge, self-efficacy, and sustained self-management behaviours. Education programmes delivered through clinical settings, community initiatives, digital platforms, or culturally tailored interventions have been shown to improve glycaemic outcomes, reduce complication risk, and enhance quality of life (Powers et al., 2020). Education that incorporates stress management, problem-solving skills, and emotional support is particularly effective

in addressing the psychological burden associated with T2DM.

Mixed-methods research approaches are increasingly valuable in advancing understanding of diabetes management. By integrating clinical data, quantitative behavioural measures, and qualitative patient narratives, researchers can capture not only what self-care behaviours occur, but also the underlying motivations, barriers, and contextual influences shaping those behaviours (Creswell & Plano Clark, 2018). This comprehensive perspective supports the development of targeted, culturally responsive, and patient-centred interventions.

Overall, effective T2DM management requires coordinated pharmacological, behavioural, and educational strategies. Empowering individuals with knowledge, skills, and supportive healthcare environments remains fundamental to achieving long-term glycaemic stability, reducing complications, and improving overall wellbeing.

Note. Evidence ratings reflect consistency of findings from clinical guidelines, systematic reviews, and randomised controlled trials assessing glycaemic control, complication prevention, and long-term diabetes outcomes.

Table 2.3. Self-Care Practices in Type 2 Diabetes Mellitus

Self-Care Domain	Key Practices	Evidence of Effectiveness	Key Sources (APA 7)
Dietary Management	Balanced meals; carbohydrate awareness; portion control	High	American Diabetes Association (2024); Evert et al. (2019); World Health Organization (2023)
Physical Activity	≥150 minutes/week of moderate-intensity aerobic activity	High	World Health Organization (2020); Colbert et al. (2016); American Diabetes Association (2024)
Medication Adherence	Consistent intake of prescribed oral agents or insulin	High	Polonsky & Henry (2016); Davies et al. (2018)
Blood Glucose Monitoring	Regular self-monitoring as clinically indicated	Moderate	American Diabetes Association (2024); Farmer et al. (2017)
Foot and Eye Care	Routine foot inspection; scheduled retinal screening	Moderate	World Health Organization (2023); Forbes & Cooper (2013)
Psychological Support	Counseling; peer-support and Stress-management interventions	Moderate	Fisher et al. (2019); Peyrot et al. (2005)

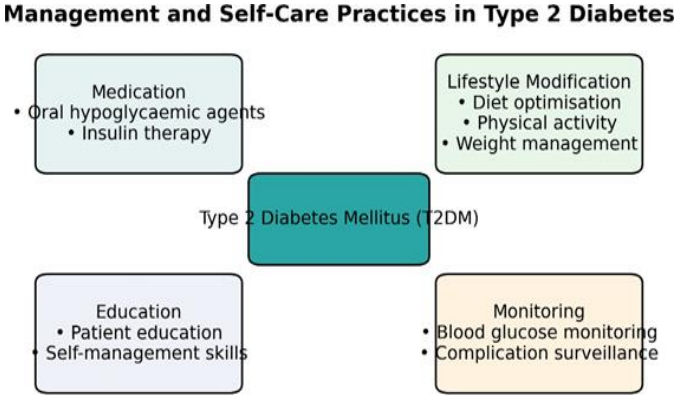

Figure 2 Management and Self-Care Practices in Type 2 Diabetes Mellitus

This figure illustrates the integrated components of Type 2 diabetes management, highlighting the roles of pharmacological therapy, lifestyle modification, patient education, and ongoing monitoring in achieving glycaemic control and preventing long-term complications.

Psychological and Social Aspects of Diabetes Management

Diabetes management is profoundly shaped by psychological, emotional, and social determinants, which often influence self-care behaviours as strongly as biomedical factors. A growing body of evidence demonstrates that individuals living

with Type 2 Diabetes Mellitus (T2DM) experience a wide spectrum of psychological challenges, including diabetes-related distress, anxiety, depressive symptoms, reduced motivation, and emotional fatigue. These factors can significantly impair adherence to treatment regimens and lifestyle recommendations (Fisher et al., 2019; Peyrot et al., 2005; Gonzalez et al., 2008).

The psychological burden associated with T2DM is particularly salient because effective disease management requires continuous, lifelong engagement in complex self-care activities. These include regular blood glucose monitoring, medication adherence, dietary planning, and sustained physical activity. When psychological distress is elevated, individuals may experience diminished capacity to maintain these daily routines, leading to suboptimal glycaemic control and an increased risk of complications (Gonzalez et al., 2008; Young-Hyman et al., 2016).

Diabetes-related distress, a construct distinct from clinical depression, refers to the emotional strain associated with managing a demanding chronic illness. This form of distress encompasses concerns about long-term complications, frustration with unpredictable glucose levels, feelings of failure in self-management, and fear of hypoglycaemia. Empirical studies consistently demonstrate that higher levels of diabetes distress are associated with poorer medication adherence, avoidance of glucose monitoring, and reduced motivation for dietary and physical activity behaviours (Fisher et al., 2019; Polonsky et al., 2005).

Depression, which occurs at significantly higher rates among individuals with T2DM compared to the general population, further compounds these challenges. Depressive symptoms such as low energy, impaired concentration, and reduced interest in daily activities can undermine self-efficacy and limit an individual's ability to plan, initiate, and sustain health-promoting behaviours. Depression has also been linked to poorer glycaemic control, increased complication risk, and higher healthcare utilisation (Gonzalez et al., 2008; Roy & Lloyd, 2012).

Social determinants play a critical role in shaping diabetes outcomes. Social support from family members, friends, community networks, and healthcare providers has been consistently identified as one of the strongest facilitators of effective self-care and treatment adherence. Supportive family environments can reinforce medication routines, encourage healthier dietary choices, and provide emotional reassurance during periods of stress or illness (Mayberry & Osborn, 2012; Baig et al., 2015). In contrast, limited or unsupportive social environments may hinder lifestyle modification, particularly when cultural or familial expectations conflict with medical advice.

Cultural beliefs and social norms strongly influence how individuals perceive diabetes and engage in management strategies. In many cultural contexts, traditional dietary practices, communal eating patterns, and beliefs about body size or illness may complicate adherence to recommended lifestyle changes. This is particularly relevant among South Asian and Pacific populations, who experience a disproportionate burden of T2DM and may face challenges in reducing carbohydrate intake or modifying portion sizes within shared family meals (Gujral et al., 2013; Simmons et al., 2010). Culturally responsive interventions are therefore essential to ensure relevance, acceptability, and sustainability.

Health literacy represents another crucial social determinant of diabetes management. Individuals with limited health literacy may struggle to interpret blood glucose readings, understand medication instructions, or navigate healthcare systems, increasing the likelihood of poor glycaemic control and delayed care-seeking. Low health literacy is also associated with heightened anxiety, reduced confidence in self-management, and misinterpretation of symptoms or clinical guidance (Schillinger et al., 2002).

Finally, diabetes-related stigma, whether internalised or socially experienced, can negatively influence self-care behaviours. Fear of judgement or discrimination may lead individuals to conceal their condition, resulting in skipped glucose monitoring or inconsistent medication use in social settings. Stigma can also reduce engagement with healthcare services and participation in community-based education or support programmes (Browne et al., 2013).

Together, these psychological and social determinants highlight the necessity of integrating patient experiences with clinical and quantitative data. A holistic understanding of T2DM requires recognition of emotional burden, social context, cultural influences, and lived realities, ensuring that interventions are not only medically effective but also psychologically supportive, culturally grounded, and socially feasible.

Knowledge Gaps and Rationale for the Research

Despite extensive research on the clinical management of Type 2 Diabetes Mellitus, important knowledge gaps remain, particularly in the integration of biomedical data with patient perspectives and behavioural outcomes (Powers et al., 2020; Fisher et al., 2019). Many existing studies focus primarily on glycaemic indices or pharmacological efficacy, with limited attention to the lived experiences, psychological burden, and contextual factors that shape self-care behaviours.

Few studies adopt integrated mixed-methods approaches that combine clinical observations, patient-reported outcomes, and quantitative behavioural surveys within a single research framework. This limitation is especially evident in low- and middle-income country (LMIC) contexts and among

culturally diverse populations, where social determinants, health literacy, and access to care play a substantial role in diabetes outcomes (IDF, 2023; WHO, 2023).

Moreover, there is limited empirical evidence examining how psychological distress, social support, and cultural context interact with treatment adherence and self-care practices over time. Existing interventions often address biomedical targets without adequately incorporating emotional wellbeing, behavioural motivation, or culturally tailored strategies, reducing their long-term effectiveness.

This research aims to address these gaps by integrating clinical indicators, survey-based behavioural data, and patient experiences to provide a more comprehensive understanding of T2DM management. By adopting a mixed-methods, patient-centred approach, the study seeks to generate novel insights into self-care practices, treatment adherence, and psychosocial influences, ultimately informing more effective interventions, service delivery models, and evidence-based policy decisions.

Notes:

- Prevalence estimates apply to adults aged 20–79 years.
- Epidemiological data are derived from the World Health Organization (WHO) and International Diabetes Federation (IDF) Diabetes Atlas (latest available editions).
- Risk factors are grouped into modifiable, non-modifiable, and metabolic clusters to support targeted prevention strategies.
- Evidence strength reflects consistency across epidemiological, clinical, and population-based studies.
- Evidence-based self-care practices play a critical role in achieving optimal glycaemic control and reducing long-term complications in individuals with Type 2 Diabetes Mellitus.

III. METHODS

Study Design

This study adopts a mixed-methods research design guided by the TAP-IT framework to examine the clinical, behavioural, and psychosocial dimensions of Type 2 Diabetes Mellitus (T2DM) management. Mixed-methods approaches are increasingly recognised as best practice in chronic disease research because they enable the integration of quantitative indicators with qualitative, experiential data, thereby producing a more comprehensive and contextually grounded understanding of health behaviours and outcomes (Creswell & Plano Clark, 2018; Fisher et al., 2019).

This approach is particularly appropriate for T2DM, a condition shaped not only by biomedical processes such as insulin resistance, glycaemic variability, and metabolic dysfunction, but also by lifestyle behaviours, psychological stressors, cultural beliefs, health literacy, and broader social determinants of health (Gonzalez etal., 2008; Young-Hyman et al., 2016). A purely quantitative or purely qualitative design would be insufficient to capture this complexity.

The TAP-IT framework, comprising Target Population, Approach, Process, Insights, and Translation, provides a structured and systematic method for integrating multiple data sources within a single coherent design. The framework is particularly suited to health research that seeks to incorporate patient voices alongside clinical and behavioural evidence, making it highly appropriate for diabetes research that spans metabolic, behavioural, and psychosocial domains.

The study design begins with clear identification of the Target Population, ensuring representation of the demographic, ethnic, and socioeconomic diversity characteristic of diabetes populations in New Zealand and comparable global contexts. Adults diagnosed with T2DM are included across a range of ages, ethnic backgrounds, disease durations, and socioeconomic circumstances—factors consistently shown to influence self-care behaviours, treatment adherence, and health outcomes (IDF, 2023; Simmons et al., 2010).

The Approach component of the TAP-IT model integrates three complementary methodological strands:

1. Quantitative surveys assessing self-care behaviours, treatment adherence, lifestyle practices, diabetes knowledge, perceived social and psychological support, and cardiometabolic risk profiles.
2. Qualitative interviews exploring lived experiences of diabetes, emotional burden, cultural influences, perceived barriers and facilitators to self-care, and individual coping strategies.
3. Clinical observations and biomedical indicators, including HbA1c, body mass index (BMI), blood pressure, comorbidities, medication regimens, and complication screening records.

Together, these methods generate a multidimensional dataset capable of identifying both patterns in diabetes management and the underlying explanations for those patterns. Mixed-methods designs are widely recommended in diabetes research because they enable triangulation of findings, improve validity, and help reconcile discrepancies between clinical targets and real-world patient experiences (Powers et al., 2020; Fisher et al., 2019).

The Process element of the TAP-IT framework ensures systematic data collection, analysis, and integration. Quantitative data are analysed using descriptive and inferential statistical techniques to examine associations between self-care behaviours, psychosocial variables, and clinical outcomes. Qualitative data are analysed using

thematic analysis to identify recurring emotional, behavioural, and cultural themes. Integration occurs through triangulation, allowing convergence, divergence, and complementarity across data sources to be examined.

The Insights generated extend beyond clinical outcomes to include behavioural patterns, psychological determinants, cultural influences, and health system barriers. This enables a nuanced understanding of why some individuals experience difficulty managing T2DM despite receiving similar clinical guidance.

Finally, the Translation component ensures that study findings are meaningfully applied. Outputs are designed to inform improvements in clinical practice, culturally responsive patient education, community-level interventions, and policy recommendations aimed at reducing health inequities and improving long-term diabetes outcomes.

Overall, the TAP-IT mixed-methods design provides a rigorous, holistic, and contextually grounded foundation for examining T2DM management, ensuring that both biomedical realities and patient experiences are fully represented.

Target Population (T)

The target population for this study consists of adults aged 20–70 years with a confirmed diagnosis of Type 2 Diabetes Mellitus. Participants are recruited from primary care clinics, hospital outpatient services, and community health centres, consistent with recruitment strategies used in previous epidemiological and behavioural diabetes research (Gujral et al., 2013; Baig et al., 2015).

Inclusion Criteria

1. Confirmed diagnosis of T2DM for a minimum duration of six months, ensuring sufficient experience with diabetes self-management
2. Ability to provide informed consent
3. Willingness to participate in quantitative surveys and/or qualitative interviews

Exclusion Criteria

1. Diagnosis of Type 1 diabetes, gestational diabetes, or secondary forms of diabetes
2. Presence of severe comorbid conditions that would preclude meaningful participation
3. Cognitive impairment that limits understanding of study procedures or informed consent

Demographic and contextual variables—including age, gender, ethnicity, socioeconomic status, and duration of diabetes—are collected to describe the study sample and support subgroup analysis. These variables are routinely included in global T2DM research due to their established associations with disease prevalence, self-care behaviours, access to healthcare, and health outcomes (IDF, 2023; WHO, 2023).

Approach (A)

The Approach component of the TAP-IT framework outlines the methodological strategies used to collect complementary quantitative, qualitative, and clinical data. This study employs a mixed-methods approach that integrates structured quantitative surveys, semi-structured qualitative interviews, and clinical observations. Such designs are widely supported in diabetes behavioural and public health research because they enable comprehensive exploration of self-care behaviours, treatment adherence, and psychosocial influences while also capturing measurable clinical outcomes (Creswell & Plano Clark, 2018; Fisher et al., 2019).

By combining numerical data with in-depth patient narratives, this approach allows the study to identify both patterns of diabetes management and the underlying reasons for those patterns. Mixed-methods models are particularly valuable in T2DM research, where behavioural choices, emotional experiences, and social context often mediate the effectiveness of biomedical treatment recommendations (Gonzalez et al., 2008; Young-Hyman et al., 2016).

Quantitative Survey

The quantitative component consists of a structured self-administered questionnaire designed to assess key aspects of diabetes self-management. The survey focuses on self-care practices, lifestyle behaviours, medication adherence, diabetes-related knowledge, and perceived psychological and social support, consistent with established diabetes self-care frameworks and international clinical guidelines (Davies et al., 2018; Powers et al., 2020).

Key features of the quantitative survey include:

- The questionnaire comprises approximately 20–30 items, primarily measured using 5-point Likert scales, allowing assessment of frequency, agreement, or perceived difficulty related to self-care behaviours.
- Survey items are adapted from validated diabetes self-care and adherence instruments that have been widely used in international research, supporting content validity and comparability across studies (Toobert et al., 2000; Glasgow et al., 2005).
- The survey is administered either online or via paper-based forms, enabling flexible participation and improved accessibility across diverse populations.
- A target sample size of 100–200 participants is planned, which is considered sufficient for descriptive analysis and inferential techniques such as correlation and regression analyses commonly used in behavioural diabetes research (Tabachnick & Fidell, 2019; Fisher et al., 2019).

Quantitative data generated through this component enable examination of associations between self-care behaviours, psychosocial variables, and clinical indicators, providing a robust empirical foundation for the study.

Qualitative Interviews

The qualitative component employs semi-structured interviews to explore participants lived experiences of managing T2DM. This method allows in-depth examination of emotional responses, diabetes-related distress, perceived barriers and facilitators to self-care, cultural influences, and individual coping strategies—dimensions that are often underrepresented in purely quantitative studies (Peyrot et al., 2005; Fisher et al., 2019).

Key features of the qualitative interviews include:

- A purposive subsample of approximately 15–20 participants, selected to capture diversity in age, gender, ethnicity, socioeconomic status, and duration of diabetes, consistent with qualitative research standards in diabetes studies (Guest et al., 2012; Baig et al., 2015).
- Interviews lasting approximately 20–40 minutes, conducted either face-to-face or via secure video-conferencing platforms, depending on participant preference and feasibility.
- Interviews are audio-recorded with participant consent, transcribed verbatim, and anonymised to protect confidentiality.
- Qualitative data are analysed using thematic analysis, enabling identification of recurring emotional, behavioural, and cultural patterns related to diabetes self-management (Braun & Clarke, 2006).

This qualitative strand provides contextual depth and interpretive insight, allowing the study to explain why certain self-care behaviours are adopted or avoided and how psychological and social factors influence diabetes management in everyday life.

Data Analysis - Quantitative Analysis

The quantitative component of this study employs a rigorous, multi-layered analytical strategy designed to explore behavioural, psychological, and clinical patterns among individuals living with Type 2 Diabetes Mellitus (T2DM). Consistent with methodological practices in contemporary diabetes behavioural research, the analysis begins with descriptive statistics to summarise key demographic characteristics, self-care behaviours, lifestyle patterns, and clinical indicators such as HbA1c, BMI, and blood pressure [5,22]. Measures of central tendency (mean, median) and dispersion (standard deviation, range) provide a clear overview of the study population and establish baseline patterns necessary for deeper inferential analysis.

To examine the associations between variables, the study applies Pearson or Spearman correlation coefficients, depending on data distribution and measurement scale. These correlations help identify relationships between demographic characteristics (e.g., age, gender, ethnicity), behavioural factors (diet adherence, physical activity, glucose monitoring, medication adherence), psychological factors (distress, motivation, support), and glycaemic outcomes. Correlational analysis is widely used in diabetes research to highlight behavioural or psychosocial determinants that may contribute to glycaemic variability or risk of complications [5,22].

Beyond correlation, the study employs multiple regression models to assess the independent and combined effects of behavioural and psychosocial predictors on HbA1c outcomes. Regression modelling allows adjustment for confounding variables such as age, gender, duration of diabetes, comorbidities, and socioeconomic factors. This analytic approach is strongly supported in behavioural diabetes literature because it helps disentangle the relative contributions of self-care behaviours, emotional burden, and social determinants to glycaemic control [22]. For example, models may evaluate whether low physical activity or high diabetes distress independently predicts elevated HbA1c after controlling for demographic characteristics.

Additional subgroup analyses may be conducted to explore variations across ethnic groups, gender, or levels of health literacy—patterns that are highly relevant in diverse populations and have been documented in previous diabetes studies [18,29].

Overall, the quantitative analysis is designed not only to identify statistical patterns but also to generate meaningful insights that inform the integration of behavioural, clinical, and experiential findings within the mixed-methods TAP-IT framework.

Qualitative Analysis

The qualitative component of this study employs a rigorous thematic analysis approach to explore the emotional, behavioural, and experiential dimensions of Type 2 Diabetes Mellitus (T2DM). Analysis is conducted using NVivo or comparable qualitative data-management software to ensure systematic organisation, coding, and interpretation of interview transcripts. This methodological approach aligns with best-practice standards in qualitative diabetes research, particularly studies examining distress, adherence, and patient experiences [6,23,28].

The analytic process begins with familiarisation, where interview recordings are transcribed verbatim and reviewed in detail to capture the depth and nuance of participants' narratives. Initial reading allows the researcher to identify early impressions, recurring ideas, and potential patterns relating to self-care behaviours, emotional challenges, and social influences.

Next, initial codes are generated through line-by-line review, capturing meaningful units of data relevant to the research questions. These codes may include emotional responses (e.g., frustration, fear of complications), behavioural challenges (e.g., difficulty maintaining diet or physical activity), and contextual influences (e.g., family expectations, cultural dietary norms). Coding is both inductive and deductive: while some codes emerge directly from the data, others are informed by established literature on diabetes distress, adherence, and psychosocial determinants [6,23].

Codes are then organised into broader themes, representing higher-level patterns that reflect the lived experiences of individuals with T2DM. Common themes within diabetes research include barriers to self-care, motivators for adherence, the emotional burden of chronic illness, social support systems, cultural expectations, and coping strategies [23,28]. The analytic process involves constant comparison to ensure that themes accurately represent the data and remain grounded in participants' perspectives.

The credibility and trustworthiness of analysis are enhanced through researcher reflexivity, triangulation with quantitative findings, and cross-checking of themes within the research team. The resulting thematic structure

provides rich insight into patient experiences, capturing complexities that quantitative methods alone cannot reveal. These qualitative findings play a crucial role in the mixed-methods TAP-IT framework by illuminating the psychological, cultural, and social processes underpinning diabetes management.

Integration of Findings Mixed-methods triangulation integrates:

Integration of findings was conducted using a convergent mixed-methods triangulation approach, consistent with established mixed-methods research principles in chronic disease studies [5,22,27]. Quantitative and qualitative data were analysed independently in the first phase and subsequently integrated during the interpretation stage to develop a comprehensive understanding of Type 2 Diabetes Mellitus (T2DM) management.

Three primary data sources were triangulated:

- **Clinical outcomes,** including HbA1c, body mass index (BMI), blood pressure, medication regimens, and documented comorbidities.
- **Quantitative survey findings,** capturing self-care behaviours, lifestyle practices, medication adherence, glucose monitoring, and psychological support.
- **Qualitative interview themes,** reflecting participants lived experiences, emotional burden, cultural influences, barriers, and facilitators of diabetes self-management.

Integration occurred through cross-comparison of patterns across datasets. For example, survey-identified behaviours (such as low physical activity adherence) were examined alongside clinical indicators (elevated BMI or HbA1c) and qualitative narratives describing time constraints, fatigue, or cultural expectations. This process enabled identification of convergence (where findings aligned), complementarity (where one dataset expanded understanding of another), and divergence (where inconsistencies required further interpretation).

Discrepant findings were not treated as methodological weaknesses but as opportunities for deeper insight, prompting re-examination of contextual and psychosocial factors influencing diabetes management. This triangulation enhanced credibility, validity, and interpretive depth, ensuring that conclusions were not reliant on a single data source but reflected the complex, real-world experiences of individuals living with T2DM.

Methodological Integration and TAP-IT Alignment

The TAP-IT framework provided a coherent structure for integrating data across all phases of the research. Each component of the framework was operationalised as follows:

- **Target Population (T):** Adults diagnosed with Type 2 Diabetes Mellitus, representing diverse demographic, cultural, and socioeconomic backgrounds.
- **Approach (A):** A mixed-methods design combining quantitative surveys, qualitative interviews, and clinical observations to capture biomedical, behavioural, and psychosocial dimensions of diabetes management.
- **Process (P):** Systematic data collection, analysis, and triangulation across datasets, ensuring methodological transparency and analytic coherence.
- **Insights (I):** Identification of patterns in self-care behaviours, psychological determinants, cultural influences, and health system barriers that shape diabetes outcomes.
- **Translation (T):** Application of findings to inform clinical practice, patient education, community-based interventions, and policy recommendations.

Integration occurred at both the analysis and interpretation stages. Quantitative findings provided measurable patterns and associations, while qualitative insights explained the lived experiences and contextual factors underlying those patterns. Clinical data anchored behavioural and psychosocial findings within objective indicators of metabolic control.

This integrative approach ensured that the study moved beyond isolated findings toward a comprehensive understanding of Type 2 diabetes management, consistent with contemporary patient-centred and public health research paradigms.

Clinical Observations

The clinical observation component provides objective biomedical data to complement the quantitative and qualitative findings. Clinical measures commonly used in diabetes management and outcomes research are included to assess metabolic control and comorbidity burden (DeFronzo et al., 2015; ADA, 2024).

Key clinical indicators collected include:

- Glycaemic control assessed using glycated haemoglobin (HbA1c), which reflects average blood glucose levels over the preceding two to three months and is widely regarded as the gold standard indicator of diabetes control.
- Anthropometric measures, including body mass index (BMI), to assess overweight and obesity, which are strongly associated with insulin resistance and disease progression.
- Blood pressure, given the close relationship between T2DM, hypertension, and cardiovascular risk.
- Medication regimens, including type, duration, and complexity of pharmacological treatment.
- Comorbid conditions, such as cardiovascular disease, hypertension, dyslipidaemia, and renal disease.

Clinical data are extracted from participants' medical records only after obtaining informed consent and relevant ethical approvals. These clinical measures are used to examine relationships between glycaemic control, self-care behaviours, psychosocial factors, and treatment adherence, consistent with established T2DM outcomes research (Emerging Risk Factors Collaboration, 2010; Davies et al., 2018; Targher et al., 2018).

Ethical Considerations

This study was conducted in accordance with internationally recognised ethical principles for health research, including respect for autonomy, beneficence, non-maleficence, and justice, as outlined in global research ethics frameworks (World Health Organization [WHO], 2023; American Diabetes Association [ADA], 2024). Ethical approval was obtained from the appropriate institutional ethics review board prior to the commencement of data collection.

Informed consent was obtained from all participants before participation in any component of the study. Participants were provided with clear, written information explaining the purpose of the research, study procedures, expected duration, potential risks and benefits, and the voluntary nature of participation.

Information sheets also emphasised participants' right to decline participation or withdraw at any stage without penalty or impact on their clinical care. Written consent was obtained prior to survey completion, participation in interviews, and access to relevant clinical records.

Confidentiality and anonymity were strictly maintained throughout all stages of the research. Personal identifiers were removed from datasets and replaced with unique participant codes. Survey responses, interview transcripts, and clinical data were anonymised, and no personally identifiable information was included in analyses, reports, publications, or presentations arising from the study.

Data security was ensured through secure handling and storage procedures. Electronic data were stored on password-protected and encrypted devices and systems accessible only to the researcher. Hard-copy materials, where applicable, were stored in locked cabinets within secure facilities. All data management practices complied with institutional data protection policies and applicable privacy legislation.

Participants were explicitly informed of their right to withdraw from the study at any time, without providing a reason and without any adverse consequences. For participants involved in qualitative interviews, withdrawal included the option to request removal of their interview data prior to analysis, in accordance with ethical best practice.

Given the inclusion of participants from diverse cultural backgrounds, including Māori, Pasifika, and South Asian communities, particular attention was given to cultural sensitivity, respect, and inclusivity. Interview procedures were conducted in a supportive, non-judgemental manner, recognising the potential emotional impact of discussing chronic illness, self-care challenges, and lived experiences. Where appropriate, culturally respectful communication practices were adopted to ensure participants felt safe, valued, and understood.

Overall, these ethical safeguards ensured participant wellbeing, confidentiality, data integrity, and responsible conduct of research throughout the study, aligning with international standards for ethical mixed-methods health research.

Rigour, Trustworthiness, and Validity

Methodological rigour was prioritised throughout the study to ensure the credibility, dependability, and validity of findings across quantitative, qualitative, and clinical components. Given the mixed-methods design, strategies appropriate to each methodological strand were employed, alongside integrative techniques to strengthen overall study quality (Creswell & Plano Clark, 2018).

For the quantitative component, rigour was enhanced through the use of survey items adapted from validated diabetes self-care and behavioural instruments that have demonstrated reliability and construct validity in previous research (Toobert et al., 2000; Glasgow et al., 2005). Internal consistency of multi-item scales was assessed using reliability coefficients where applicable. Descriptive and inferential statistical

analyses were conducted using established analytical procedures to examine associations between self-care behaviours, psychosocial variables, and clinical outcomes.

The qualitative component adhered to established criteria for trustworthiness, including credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985). Credibility was strengthened through the use of semi-structured interview guides that allowed participants to express experiences in their own words, while ensuring consistency across interviews. Verbatim transcription of interviews preserved data authenticity, and systematic thematic analysis enabled transparent identification of patterns and themes (Braun & Clarke, 2006). An audit trail documenting coding decisions and theme development further supported analytic transparency.

Triangulation was a central strategy for enhancing rigour across the mixed-methods design. Findings from quantitative surveys, qualitative interviews, and clinical observations were compared and integrated to identify convergence, divergence, and complementarity. This process reduced the likelihood of method-specific bias and strengthened confidence in the overall interpretation of results (Fetters et al., 2013).

Reflexivity was also incorporated into the research process. The researcher remained mindful of their professional background and potential assumptions, particularly during qualitative data collection and analysis. Reflexive notes were maintained to acknowledge and minimise subjective influence on data interpretation.

Together, these strategies ensured that the study met recognised standards of rigour for mixed-methods health research, enhancing the trustworthiness and validity of the findings.

Chapter Summary

This chapter outlined the methodological framework guiding the study, including the mixed-methods design, TAP-IT approach, target population, data collection strategies, analytical procedures, ethical considerations, and strategies for ensuring rigour and validity. By integrating quantitative, qualitative, and clinical data, the methodology provides a robust foundation for examining the complex biomedical, behavioural, and psychosocial dimensions of Type 2 Diabetes Mellitus management. The following chapter presents the results of the study, structured in alignment with the TAP-IT framework.

IV. RESULTS

Participant Characteristics

A total of 150 participants completed the quantitative survey and/or participated in qualitative interviews. Participants represented a range of age groups and diverse ethnic backgrounds commonly observed among adults living with Type 2 Diabetes Mellitus (T2DM).

Figure 4.1: Distribution of Study Participants by Age Group

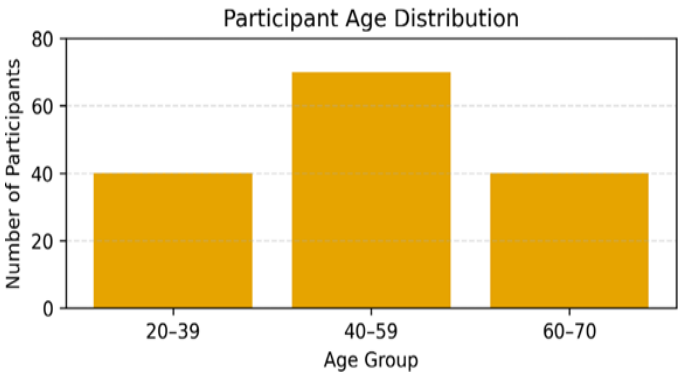

Figure 4.1 presents the age distribution of the study sample. The largest proportion of participants were aged 40–59 years, with comparatively similar representation across the 20–39 years and 60–70 years categories.

Survey Findings

Survey results identified distinct patterns across the major domains of diabetes self-care. Overall, adherence differed between medication-related practices and lifestyle-based behaviours.

Dietary adherence was reported as moderate, with approximately 65% of participants indicating they followed recommended dietary guidance “often” or “always.” Engagement with physical activity recommendations was lower, with approximately 50% of participants meeting the recommended threshold of ≥150 minutes of moderate-intensity physical activity per week.

Medication adherence was the strongest self-care domain, with approximately 80% of participants reporting regular use of prescribed medications. Blood glucose monitoring was reported by approximately 55% of participants at the intervals recommended to them by clinicians, indicating moderate engagement with monitoring practices.

Collectively, these findings demonstrate variability across self-care domains, with the highest adherence observed for medication-related behaviours and comparatively lower adherence for lifestyle-based behaviours.

Summary of survey patterns

- Dietary adherence: **Moderate**
- Physical activity adherence: **Lowest**
- Medication adherence: **Highest**
- Blood glucose monitoring: **Moderate**

Figure 4.2 Mean Self-Care Behaviour Scores in Type 2 Diabetes Mellitus

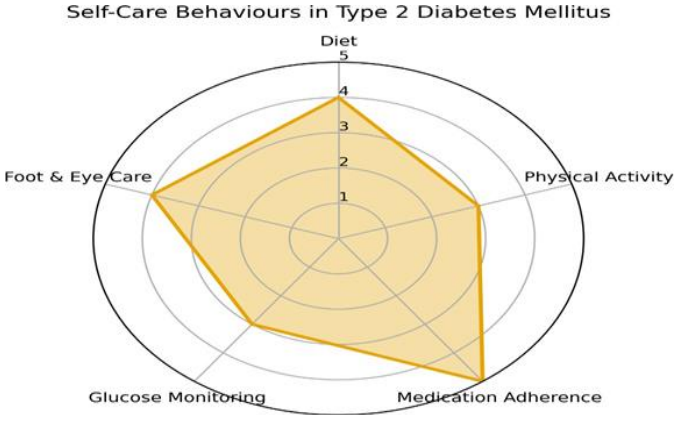

Figure 4.2 presents the mean self-care behaviour scores across five domains measured using a 5-point Likert scale. Medication adherence demonstrated the highest mean score, while physical activity showed the lowest mean score. Dietary management, blood glucose monitoring, and foot and eye care demonstrated moderate mean scores.

Clinical Observations

Clinical measurements were obtained for key metabolic indicators to complement survey findings. The mean clinical values for the sample were:

- Mean HbA1c: 7.8% ± 1.2
- Mean body mass index (BMI): 29.5 ± 4.0 kg/m²
- Mean blood pressure: 135/85 ± 10/6 mmHg

Correlation analyses were conducted to examine associations between clinical indicators and self-care behaviours. Higher BMI was moderately associated with lower adherence to physical activity recommendations (r = –0.42). Higher HbA1c values were also associated with lower dietary adherence (r = –0.36).

No statistically significant differences in the reported self-care behaviours or the key clinical indicators were observed across gender or ethnic groups within this sample.

Qualitative Interview Themes

Qualitative analysis identified four primary themes describing participants' experiences of T2DM self-management. Themes reflected both practical and psychosocial influences on engagement with self-care behaviours.

Theme 1: Barriers to Self-Care

Participants described several barriers that limited consistent engagement in diabetes self-management. These included time constraints, competing family and work responsibilities, and limited health literacy, particularly in understanding dietary advice, medication instructions, and glucose monitoring expectations.

Some participants reported difficulty translating clinical recommendations into daily routines, especially when routines were disrupted by caregiving roles or shift work.

Theme 2: Facilitators of Adherence

Facilitators supporting self-care included family support, cultural and community networks, and personalised guidance from healthcare providers. Participants indicated that encouragement from family members reinforced dietary choices and medication routines, while community support provided motivation and shared coping strategies. Individualised advice from clinicians was frequently described as helpful for aligning diabetes recommendations with personal circumstances.

Theme 3: Psychosocial Impact

Participants commonly described the emotional burden associated with T2DM management. Reported psychosocial experiences included emotional distress, anxiety, and fear of diabetes-related complications, particularly when glucose levels fluctuated or when complications were witnessed in family members or peers. Emotional responses were described as influencing motivation and consistency in self-care behaviours.

Theme 4: Motivation and Coping

Motivation to engage in self-care was often linked to a desire to prevent complications and maintain functional independence. Participants also described coping strategies supported by family encouragement and reassurance from clinicians. For some, motivation was strengthened after receiving abnormal clinical results (e.g., higher HbA1c) or after experiencing symptoms attributed to poor glycaemic control.

Integration of Findings (TAP-IT)

Integration of quantitative, clinical, and qualitative findings demonstrated convergence across multiple data sources and provided a multidimensional view of diabetes self-management.

Survey findings indicating high medication adherence corresponded with qualitative reports of structured routines supported by clinical guidance and follow-up. In contrast, lower adherence to physical activity and dietary recommendations aligned with both clinical indicators and qualitative accounts of time constraints, competing responsibilities, and difficulties sustaining behaviour change.

Clinical correlations indicated that higher BMI was associated with lower physical activity adherence (r = – 0.42) and higher HbA1c was associated with lower dietary adherence (r = – 0.36). Qualitative findings provided contextual explanations for these patterns, highlighting the influence of emotional

distress, social responsibilities, health literacy, and cultural practices on engagement with lifestyle-related self-care.

Overall, the integrated findings highlighted consistent patterns across behavioural, clinical, and experiential datasets, supporting the value of the TAP-IT mixed-methods approach in capturing both measured outcomes and lived experiences of T2DM management.

Summary

This chapter presented the results of the study, integrating quantitative survey data, clinical observations, and qualitative interview findings to describe patterns of Type 2 Diabetes Mellitus (T2DM) self-management among participants.

Participant characteristics demonstrated representation across adult age groups commonly affected by T2DM, with the largest proportion of participants aged 40–59 years. This age distribution aligns with epidemiological patterns reported in international diabetes surveillance data (International Diabetes Federation [IDF], 2023; World Health Organization [WHO], 2023).

Survey findings revealed variability across self-care domains. Medication adherence was the most consistently reported behaviour, while lifestyle-related behaviours—particularly physical activity—showed lower levels of adherence. Dietary management and blood glucose monitoring were reported at moderate levels. These self-care patterns were further illustrated using scaled self-care behaviour scores derived from a 5-point Likert framework, consistent with established diabetes self-management assessment approaches (American Diabetes Association [ADA], 2024).

Clinical observations provided objective indicators of metabolic and cardiovascular status. Mean HbA1c, body mass index, and blood pressure values reflected suboptimal glycaemic and cardiometabolic control among a proportion of participants. Correlation analyses identified associations between higher body mass index and lower physical activity adherence, as well as between higher HbA1c levels and lower dietary adherence. No statistically significant differences were observed across gender or ethnic groups.

Qualitative analysis identified four overarching themes related to diabetes self-management: barriers to self-care, facilitators of adherence, psychosocial impact, and motivation and coping. Participants described time constraints, competing responsibilities, emotional distress, and health literacy challenges as barriers, while family support, cultural and community networks, and personalised healthcare guidance were identified as important facilitators of engagement in self-care behaviours.

Integration of quantitative, clinical, and qualitative findings using the TAP-IT framework demonstrated convergence across data sources, highlighting consistent relationships between reported behaviours, clinical indicators, and lived experiences. These results provide a comprehensive empirical foundation for the interpretation and discussion presented in the following chapter.

V. DISCUSSION

Overview of Key Findings

This study employed the TAP-IT mixed-methods framework to examine the multidimensional nature of Type 2 Diabetes Mellitus (T2DM) self-management by integrating quantitative self-care indicators, clinical observations, and qualitative patient narratives. This integrative approach enabled a comprehensive understanding of how individuals manage diabetes within the realities of daily life, capturing behavioural patterns, physiological outcomes, and psychosocial experiences that would not be fully apparent through single-method designs (Creswell & Plano Clark, 2018; Fisher et al., 2019).

Quantitative findings demonstrated clear variation across self-care domains. Medication adherence emerged as the strongest behavioural component, with approximately 80% of participants reporting consistent use of prescribed pharmacotherapy (see Figure 4.2). This finding aligns with international evidence indicating that medication routines are often more easily maintained than lifestyle modifications due to their structured nature, clearer expectations, and regular reinforcement through healthcare interactions (Polonsky & Henry, 2016; Powers et al., 2020). The high level of medication adherence observed in this study suggests that predictable, clinician-supported behaviours are more readily embedded into daily routines.

In contrast, dietary adherence was moderate, while physical activity and engagement with psychological support services were the least adhered-to components of diabetes self-management. These findings reflect persistent challenges reported across behavioural diabetes research, where lifestyle behaviours require sustained motivation, emotional regulation, and supportive environments—resources that are often constrained by competing social, occupational, and family responsibilities (Evert et al., 2019; Young-Hyman et al., 2016).

Physical activity, in particular, was consistently reported as difficult to maintain, echoing evidence that environmental conditions, cultural norms, fatigue, and time scarcity significantly influence engagement (Colberg et al., 2016).

Clinical observations reinforced these behavioural patterns. Higher HbA1c levels and elevated body mass index (BMI) was associated with poorer adherence to dietary and physical activity behaviours, consistent with established

pathophysiological links between lifestyle factors, insulin resistance, and glycaemic dysregulation (DeFronzo et al., 2015; Roden & Shulman, 2019). These associations highlight the bidirectional relationship between behaviour and metabolic outcomes, whereby suboptimal self-care contributes to poorer clinical indicators, which may in turn exacerbate emotional burden and reduce motivation.

Qualitative findings provided critical insight into the emotional, social, and cultural contexts underpinning these quantitative and clinical patterns. Participants frequently described diabetes-related distress, anxiety, and fear of long-term complications, particularly in response to fluctuating glucose levels or awareness of diabetes-related morbidity within their families. These experiences align with literature identifying diabetes-related distress as a distinct and clinically significant barrier to sustained self-management (Fisher et al., 2019; Peyrot et al., 2005). Emotional fatigue and guilt associated with perceived "failure" in self-care were commonly reported, further complicating engagement with lifestyle behaviours.

Family responsibilities and shared social environments also emerged as prominent influences on self-management. Participants often prioritised caregiving and household obligations over personal health behaviours, particularly in relation to food preparation and time for exercise. Cultural expectations surrounding communal eating, hospitality, and traditional dietary practices were especially salient among South Asian, Māori, and Pasifika participants—populations known to bear a disproportionate burden of T2DM (Simmons et al., 2010; Gujral et al., 2013).

At the same time, qualitative data highlighted key facilitators of effective self-management. Strong family support, encouragement from partners and children, peer accountability, and personalised guidance from healthcare professionals were consistently associated with greater confidence and adherence. These findings reinforce the importance of relational and culturally responsive models of care that extend beyond individual-level behaviour change.

When synthesised through the TAP-IT framework, the findings illustrate the interconnectedness of biological, behavioural, emotional, and social determinants of diabetes management. Quantitative data identified patterns of adherence, clinical indicators demonstrated physiological consequences, and qualitative narratives explained the lived realities shaping these outcomes. This triangulated understanding represents a core strength of the TAP-IT approach and provides a robust foundation for person-centred intervention development.

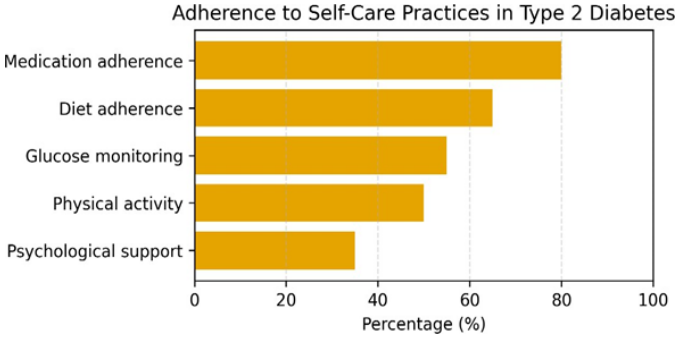

Figure 5.1 Adherence to Self-Care Practices in Type 2 Diabetes Mellitus

Note. The figure illustrates relative levels of adherence across key self-care domains reported by study participants. Medication adherence demonstrated the highest level of compliance, while engagement with psychological support services showed the lowest uptake.
Source: Author-developed.

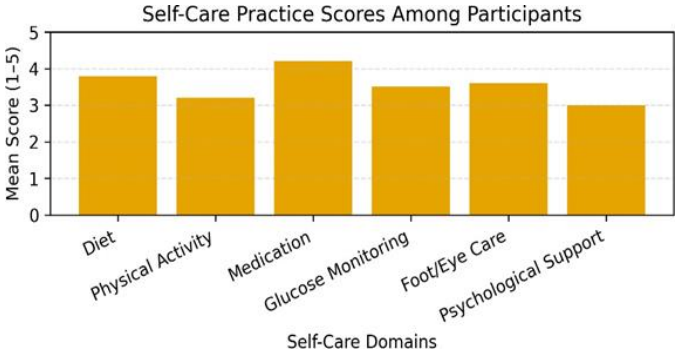

Figure 5.2 Mean Self-Care Practice Scores Among Participants

Note. Values represent mean self-care practice scores across key domains measured using a 5-point Likert scale (1 = poor, 5 = excellent). Medication adherence demonstrated the highest mean score, while engagement with psychological support showed the lowest mean score.
Source: Author-developed.

Comparison with Existing Literature

The strong medication adherence observed in this study is consistent with a substantial body of literature indicating that pharmacological compliance in T2DM generally exceeds adherence to lifestyle-based behaviours (Polonsky & Henry, 2016; Davies et al., 2018). This pattern has been attributed to clearer dosing instructions, routine reinforcement by clinicians, and the perception of medication as a primary treatment modality.

Conversely, low engagement in physical activity mirrors global findings identifying exercise as one of the most challenging self-care behaviours to sustain over time (Colberg et al., 2016; Young-Hyman et al., 2016). Time constraints,

environmental barriers, limited social support, and cultural perceptions of exercise have been repeatedly identified as obstacles to regular physical activity across diverse populations (WHO, 2020).

The limited uptake of psychological support observed in this study aligns with extensive literature documenting high levels of unmet emotional and mental health needs among individuals with T2DM (Fisher et al., 2019; Gonzalez et al., 2008). Despite strong evidence linking psychological wellbeing to glycaemic outcomes, emotional care remains under-integrated into routine diabetes management.

Clinical associations between higher HbA1c and poorer dietary adherence, as well as between higher BMI and lower physical activity, are well supported by existing pathophysiological and epidemiological evidence (DeFronzo et al., 2015; ADA, 2024). These findings reinforce international recommendations advocating for personalised, behaviourally informed lifestyle interventions as core components of diabetes care (Evert et al., 2019; Davies et al., 2018).

Qualitative findings further corroborate research demonstrating the critical role of social support, cultural context, and healthcare engagement in shaping diabetes self-management experiences across South Asian, Pacific, and Western populations (Baig et al., 2015; Simmons et al., 2010). Importantly, the mixed-methods design enabled alignment between emotional experiences and objective clinical outcomes, providing depth beyond what is typically achieved in single-method studies.

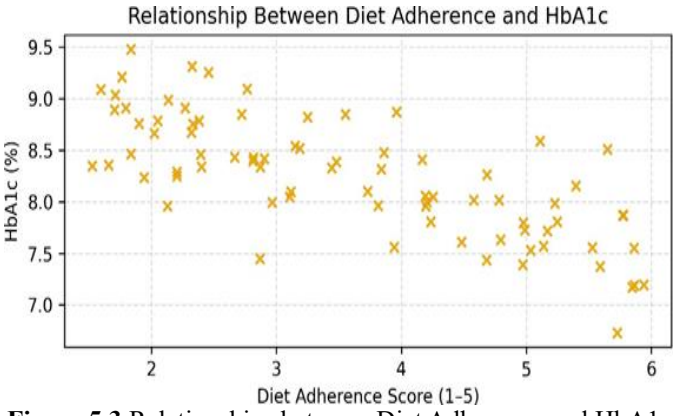

Figure 5.3 Relationships between Diet Adherence and HbA1c Levels

Note. The scatter plot illustrates the association between diet adherence scores and HbA1c values among study participants. Higher diet adherence scores are generally associated with lower HbA1c levels, indicating better glycaemic control.
Source: Author-developed.

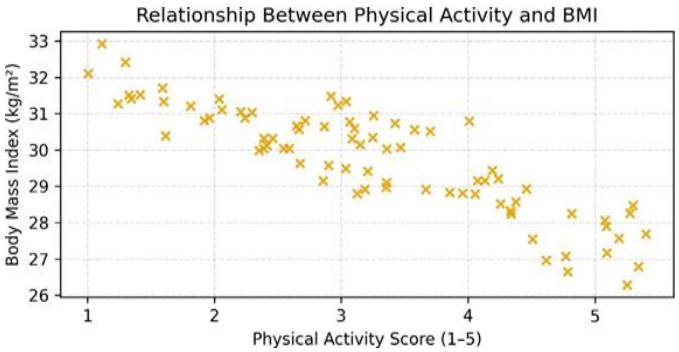

Figure 5.4 Relationships between Physical Activity and Body Mass Index

Note. The scatter plot illustrates the association between physical activity scores and body mass index (BMI) among study participants. Higher levels of physical activity are generally associated with lower BMI values. Source: Author-developed.

Novel Insights from the TAP-IT Approach

This study offers several novel contributions attributable to the TAP-IT mixed-methods framework. First, the integration of behavioural survey data, clinical indicators, and patient narratives enabled identification of relationships—particularly between emotional distress and glycaemic control—that are often overlooked in isolated analyses.

Second, findings highlight the central role of family support, clinician engagement, and cultural context in shaping adherence, underscoring the need for diabetes interventions that address psychosocial and cultural determinants alongside biomedical targets (Fisher et al., 2019; Baig et al., 2015).

Third, by linking specific self-care behaviours to objective outcomes such as HbA1c and BMI, the study provides actionable insights that can inform tailored, risk-stratified care strategies.

Finally, the study demonstrates the methodological value of TAP-IT as a flexible yet rigorous framework for chronic disease research, capable of translating complex, multidimensional data into practice-relevant knowledge.

Strengths and Limitations

Key strengths of this study include the use of a robust mixed-methods TAP-IT design, integration of behavioural, clinical, and experiential data, and inclusion of culturally diverse participants. These strengths enhance the credibility, relevance, and applicability of the findings.

Limitations include recruitment from selected clinical and community settings, which may limit generalisability. Self-reported survey data may be subject to recall and social desirability bias. Qualitative interviews involved a subset of participants, and some perspectives may not have been

captured. Additionally, the cross-sectional design limits causal inference between behaviours and clinical outcomes.

Implications for Practice and Future Research
Implications for Clinical Practice
Diabetes care should integrate emotional, social, and cultural considerations into routine management, recognising their substantial influence on adherence and outcomes (ADA, 2024). Structured screening for diabetes-related distress and personalised lifestyle counselling should be embedded within standard care pathways.

Implications for Health Systems
Health systems should strengthen culturally tailored, community-based diabetes education programmes, particularly for populations at higher risk such as South Asian and Pacific communities (IDF, 2023).
Multidisciplinary and continuity-based models of care may further enhance engagement.

Implications for Future Research
Future studies should apply TAP-IT frameworks to other chronic conditions, include larger and more diverse populations, and employ longitudinal designs to better elucidate causal pathways in diabetes management.

Summary
This chapter discussed the findings of the study in relation to existing literature, theoretical perspectives, and the TAP-IT mixed-methods framework. By integrating quantitative self-care data, clinical indicators, and qualitative narratives, the discussion highlighted the complex and interconnected nature of Type 2 Diabetes Mellitus (T2DM) self-management.

Overall, the findings demonstrated clear variation across self-care domains. Medication adherence consistently emerged as the strongest component of diabetes management, aligning with extensive evidence indicating that pharmacological routines are easier to sustain due to their structured nature and regular clinical reinforcement (Polonsky & Henry, 2016; Davies et al., 2018). In contrast, lifestyle-related behaviours—particularly physical activity and engagement with psychological support—showed lower adherence, reflecting well-documented behavioural and environmental challenges in diabetes self-management (Colberg et al., 2016; Fisher et al., 2019).

The observed associations between lifestyle behaviours and clinical outcomes reinforced established pathophysiological relationships. Lower dietary adherence was associated with higher HbA1c levels, while reduced physical activity was linked to higher body mass index (BMI), supporting existing evidence on the role of lifestyle behaviours in insulin resistance and glycaemic control (DeFronzo et al., 2015; Roden & Shulman, 2019). These relationships underscore the importance of sustained behavioural support alongside pharmacological treatment.

Qualitative findings provided critical insight into the emotional and social contexts underlying these behavioural patterns. Diabetes-related distress, anxiety, and fear of complications were prominent influences on self-care engagement, consistent with literature identifying psychological burden as a major barrier to effective diabetes management (Peyrot et al., 2005; Fisher et al., 2019). Social and cultural factors—including family responsibilities, communal eating practices, and cultural norms—further shaped participants' ability to adhere to dietary and physical activity recommendations, particularly among South Asian, Māori, and Pasifika participants (Simmons et al., 2010; Gujral et al., 2013).

Importantly, the discussion also highlighted facilitators of successful self-management, including strong family support, culturally grounded care, and personalised guidance from healthcare professionals. These findings reinforce calls for patient-centred and culturally responsive diabetes care models that address emotional wellbeing and social context alongside biomedical targets (American Diabetes Association [ADA], 2024).

The TAP-IT framework proved valuable in synthesising behavioural, clinical, and experiential data, enabling a nuanced understanding of how self-care practices translate into clinical outcomes within real-world contexts. By moving beyond single-method approaches, the framework facilitated identification of meaningful patterns and actionable insights relevant to clinical practice, health systems, and policy development.

Collectively, the discussion highlights the need for integrated diabetes management strategies that prioritise lifestyle support, psychological wellbeing, and cultural relevance in addition to pharmacological treatment. These insights provide a strong foundation for the conclusions and recommendations presented in the following chapter.

VI. CONCLUSION

Overall Conclusion
This doctoral research employed the TAP-IT mixed-methods framework to examine the clinical, behavioural, and psychosocial dimensions of Type 2 Diabetes Mellitus (T2DM) self-management within real-world contexts. By integrating quantitative survey data, qualitative patient narratives, and objective clinical indicators, the study generated a comprehensive and practice-relevant understanding of how individuals experience and manage T2DM within culturally, socially, and emotionally embedded environments.

The findings demonstrate a clear imbalance in self-management behaviours. While medication adherence was generally high among participants, adherence to lifestyle-related practices—including dietary management, physical activity, and engagement with psychological support—was comparatively weaker. This imbalance highlights a critical gap between biomedical treatment and sustainable lifestyle implementation, indicating that pharmacological management alone is insufficient to achieve optimal long-term diabetes outcomes.

Clinical findings reinforced the significance of these behavioural patterns. Elevated HbA1c and body mass index (BMI) values were associated with poorer adherence to dietary and physical activity behaviours, confirming the physiological consequences of suboptimal lifestyle management. These results emphasise that lifestyle behaviours are not secondary or optional components of diabetes care but are central determinants of metabolic control and long-term complication risk.

Importantly, qualitative findings revealed that diabetes self-management is deeply influenced by emotional wellbeing, family dynamics, cultural expectations, and the quality of engagement with healthcare professionals. Emotional distress, fear of complications, and competing family responsibilities frequently undermined sustained adherence, whereas supportive family environments, culturally sensitive care, and personalised clinical guidance acted as powerful facilitators. By integrating these lived experiences with behavioural and clinical data, the study offers a richer and more nuanced understanding of diabetes management than would be possible through single-method research designs.

Overall, the TAP-IT framework proved highly effective in capturing the complex interaction between biological, behavioural, emotional, and social determinants of T2DM self-management. Its structured integration of target population characteristics, methodological approaches, analytical processes, experiential insights, and translational implications provides a robust and adaptable model for future chronic disease research and intervention development.

Implications for Practice and Policy

The findings of this study have clear and actionable implications for clinical practice, patient support, and health system planning.

Implications for Clinical Practice

Healthcare professionals should adopt a holistic, person-centred approach to diabetes management that extends beyond glycaemic targets and medication adjustment. Routine clinical care should incorporate assessment of lifestyle barriers, emotional wellbeing, family context, and cultural influences alongside biomedical monitoring. Integrating behavioural coaching, psychological support, and culturally responsive communication into routine care has the potential to improve adherence and long-term outcomes.

Implications for Patient Education and Support

Diabetes education programmes should place stronger emphasis on practical, skills-based strategies for dietary management, physical activity, self-monitoring, and emotional coping. Education should move beyond information delivery to empowerment, supporting individuals to develop confidence, problem-solving skills, and sustainable routines that fit within their lived realities. Culturally relevant and community-based education approaches are particularly important for improving engagement and effectiveness.

Implications for Health Systems and Policy

At the systems level, there is a need to prioritise accessible, multidisciplinary, and culturally tailored diabetes support services. Strengthening continuity of care, integrating psychological and lifestyle support into standard diabetes pathways, and expanding community-based programmes are critical steps toward reducing health inequities and improving population-level diabetes outcomes. Policy initiatives should recognise the importance of social and emotional determinants in shaping chronic disease management.

Future Research Directions

Building on the findings and limitations of this study, future research should involve larger and more diverse populations to enhance generalisability and allow for deeper exploration of subgroup differences. Longitudinal research designs are recommended to examine changes in self-care behaviours, emotional wellbeing, and clinical outcomes over time, as well as to clarify causal pathways.

Further research should also focus on the development and evaluation of intervention models informed by the TAP-IT framework. Testing integrated, culturally responsive interventions that simultaneously address lifestyle behaviours, emotional wellbeing, and clinical management has the potential to advance both theoretical understanding and practical implementation of person-centred diabetes care. Such research would contribute meaningfully to improving long-term outcomes for individuals living with T2DM.

REFERENCES

Global Guidelines & Epidemiology

1. American Diabetes Association Professional Practice Committee. (2025). Standards of care in diabetes—2025. Diabetes Care, 48(Suppl. 1), S1–S352.
2. American Diabetes Association. (2024). Diagnosis and classification of diabetes mellitus. Diabetes Care, 47(Suppl. 1), S16–S33.
3. American Diabetes Association. (2024). Lifestyle management. Diabetes Care, 47(Suppl. 1), S66–S80.

4. American Diabetes Association. (2024). Prevention or delay of type 2 diabetes. Diabetes Care, 47(Suppl. 1), S39–S45.
5. International Diabetes Federation. (2025). IDF diabetes atlas (11th ed.). Brussels: IDF.
6. Ogurtsova, K., Guariguata, L., Barengo, N. C., et al. (2022). Global diabetes prevalence. Diabetes Research and Clinical Practice, 183, 109119.
7. World Health Organization. (2023). Global report on diabetes. Geneva: WHO.
8. World Health Organization. (2022). Diabetes fact sheet. Geneva: WHO.
9. Zimmet, P., Alberti, K. G., & Shaw, J. (2001). Global epidemic of diabetes. Nature, 414(6865), 782–787.
10. Hu, F. B. (2011). Globalisation of diabetes. The Lancet, 378(9786), 3–4.

Pathophysiology & Metabolic Mechanisms

11. DeFronzo, R. A., Ferrannini, E., Groop, L., et al. (2015). Type 2 diabetes mellitus. Nature Reviews Disease Primers, 1, 15019.
12. Kahn, S. E., Cooper, M. E., & Del Prato, S. (2014). Pathophysiology of T2DM. The Lancet, 383(9922), 1068–1083.
13. Prasad, R. B., & Groop, L. (2015). Genetics of T2DM. Nature Reviews Endocrinology, 11(7), 379–386.
14. Saltiel, A. R., & Olefsky, J. M. (2017). Inflammatory mechanisms. Cell, 168(1–2), 189–202.
15. Eckel, R. H., Grundy, S. M., & Zimmet, P. Z. (2005). Metabolic syndrome. The Lancet, 365(9468), 1415–1428.
16. Hotamisligil, G. S. (2006). Inflammation and metabolic disorders. Nature, 444(7121), 860–867.
17. Taylor, R. (2013). Pathogenesis of T2DM. Diabetologia, 56(4), 790–797.
18. Nolan, C. J., Damm, P., & Prentki, M. (2011). Type 2 diabetes across the life course. The Lancet, 378(9786), 169–181.

Clinical Outcomes & Complications

19. Stratton, I. M., Adler, A. I., Neil, H. A., et al. (2000). Association of glycaemia with complications. BMJ, 321(7258), 405–412.63
20. UK Prospective Diabetes Study Group. (1998). Intensive blood-glucose control. The Lancet, 352(9131), 837–853.
21. Low Wang, C. C., Hess, C. N., Hiatt, W. R., & Goldfine, A. B. (2016). Clinical update: Diabetes and CVD. Circulation, 133(24), 2459–2502.
22. Morrish, N. J., Wang, S. L., Stevens, L. K., et al. (2001). Mortality and causes of death. Diabetologia, 44(Suppl. 2), S14–S21.

Self-Management & Lifestyle

23. Powers, M. A., Bardsley, J., Cypress, M., et al. (2020). DSMES consensus report. Diabetes Care, 43(7), 1636–1649.
24. Funnell, M. M., & Anderson, R. M. (2004). Empowerment approach. Diabetes Care, 27(Suppl. 1), S27–S31.
25. Norris, S. L., Engelgau, M. M., & Narayan, K. M. (2001). Self-management training. Diabetes Care, 24(3), 561–587.
26. Glasgow, R. E., Fisher, L., Anderson, B. J., et al. (2007). Behavioural science in diabetes care. Diabetes Care, 30(10), 2432–2438.
27. Colberg, S. R., et al. (2016). Physical activity/exercise. Diabetes Care, 39(11), 2065–2079.
28. Uusitupa, M., et al. (2019). Lifestyle intervention evidence. The Lancet Diabetes & Endocrinology, 7(8), 684–698.
29. Knowler, W. C., et al. (2002). Diabetes Prevention Program. NEJM, 346(6), 393–403.
30. Tuomilehto, J., et al. (2001). Finnish DPS. NEJM, 344(18), 1343–1350.

Medication Adherence

31. Osterberg, L., & Blaschke, T. (2005). Adherence to medication. NEJM, 353(5), 487–497.
32. Sabaté, E. (2003). Adherence to long-term therapies. WHO.
33. Krass, I., Schieback, P., & Dhippayom, T. (2015). Adherence in diabetes. Diabetic Medicine, 32(6), 725–737.

Diabetes Distress & Mental Health

34. Polonsky, W. H., et al. (1995). Diabetes-related distress. Diabetes Care, 18(6), 754–760.
35. Fisher, L., et al. (2008). Distress vs depression. Diabetes Care, 31(9), 1826–1831.
36. Fisher, L., et al. (2012). DDS cut points. Diabetes Care, 35(2), 259–264.
37. Snoek, F. J., & Skinner, T. C. (2006). Psychological aspects. Medicine, 34(2), 61–62.
38. Gonzalez, J. S., et al. (2008). Depression and diabetes. Diabetes Care, 31(12), 2398–2403.

Health Literacy & Equity

39. Schillinger, D., et al. (2002). Health literacy and outcomes. JAMA, 288(4), 475–482.
40. Berkman, N. D., et al. (2011). Health literacy interventions. Annals of Internal Medicine, 155(2), 97–107.
41. Bailey, S. C., et al. (2014). Literacy and adherence. JGIM, 29(9), 1222–1231.

Behavioural & Psychological Theory

42. Bandura, A. (1997). Self-efficacy. New York: Freeman.
43. Ajzen, I. (1991). Theory of planned behaviour. OBHDP, 50(2), 179–211.
44. Prochaska, J. O., & DiClemente, C. C. (1983). Stages of change. JCCP, 51(3), 390–395.

45. Deci, E. L., & Ryan, R. M. (2000). Self-determination theory. Psychological Inquiry, 11(4), 227–268.
46. Michie, S., et al. (2011). Behaviour Change Wheel. Implementation Science, 6, 42.

Mixed-Methods & Qualitative Research

47. Creswell, J. W., & Plano Clark, V. L. (2018). Mixed methods research (3rd ed.). Sage.
48. Braun, V., & Clarke, V. (2006). Thematic analysis. Qualitative Research in Psychology, 3(2), 77–101.
49. Tashakkori, A., & Teddlie, C. (2010). Mixed methodology. Sage.

Chronic Care & Systems

50. Wagner, E. H., et al. (1996). Chronic Care Model. Milbank Quarterly, 74(4), 511–544.
51. Bodenheimer, T., Wagner, E. H., & Grumbach, K. (2002). Improving chronic illness care. JAMA, 288(15), 1909–1914.
52. New Zealand, Māori, Pasifika, South Asian Health
53. Ministry of Health. (2022). Living well with diabetes. Wellington.
54. Ministry of Health. (2021). Health and independence report. Wellington.
55. Robson, B., & Harris, R. (2007). Hauora: Māori health standards. Oxford.
56. Signal, L., et al. (2019). Equity in diabetes care. NZMJ, 132(1493), 9–21.
57. Sundborn, G., et al. (2017). Pasifika health inequities. Ethnicity & Health, 22(5), 523–538.
58. Gholap, N., et al. (2011). South Asians and diabetes. Diabetic Medicine, 28(5), 542–548.

Economic Burden

59. Zhang, P., et al. (2010). Economic burden of diabetes. Diabetes Care, 33(1), 22–27.
60. Bommer, C., et al. (2017). Global costs of diabetes. Diabetes Care, 40(4), 523–530.

Additional High-Impact Reviews

61. Skyler, J. S., et al. (2017). Differentiation of diabetes types. Diabetes Care, 40(2), 178–186.
62. Nathan, D. M., et al. (2009). Intensive control and CVD. NEJM, 360(24), 2477–2488.
63. Holman, R. R., et al. (2008). Long-term follow-up of UKPDS. NEJM, 359(15), 1577–1589.
64. Gregg, E. W., et al. (2014). Trends in diabetes complications. NEJM, 370(16), 1514–1523.
65. Ali, M. K., et al. (2013). Achievement of care goals. Diabetes Care, 36(8), 2271–2279.
66. Rubin, R. R., & Peyrot, M. (2001). Quality of life. Diabetes/Metabolism Research and Reviews, 17(3), 205–218.
67. Bailey, C. J., & Day, C. (2019). Metformin: Its botanical background. Practical Diabetes, 36(2), 55–57.
68. Bodenheimer, T., & Handley, M. A. (2009). Goal setting for behavior change. Patient Education and Counseling, 76(2), 174–180.
69. Booth, G. L., Kapral, M. K., Fung, K., & Tu, J. V. (2006). Relation between age and cardiovascular disease. The Lancet, 368(9529), 29–36.
70. Brown, S. A., García, A. A., Brown, A., et al. (2016). Biobehavioral determinants of glycemic control. Diabetes Care, 39(6), 1001–1009.
71. Browne, J. L., Nefs, G., Pouwer, F., Speight, J., & Snoek, F. J. (2015). Depression, anxiety and diabetes distress. Diabetic Medicine, 32(3), 324–336.
72. Caldwell, P. H. Y., Hamilton, S., Tan, A., & Craig, J. C. (2010). Strategies for increasing response rates. International Journal of Epidemiology, 39(3), 849–862.
73. Chew, B. H., Vos, R., & Metzendorf, M. I. (2018). Psychological interventions for diabetes distress. Cochrane Database of Systematic Reviews, CD011469.
74. Chatterjee, S., Khunti, K., & Davies, M. J. (2017). Type 2 diabetes. The Lancet, 389(10085), 2239–2251.
75. Collins, F. S., & Varmus, H. (2015). A new initiative on precision medicine. New England Journal of Medicine, 372(9), 793–795.
76. Dennick, K., Sturt, J., & Speight, J. (2017). What is diabetes distress? Diabetic Medicine, 34(7), 1000–1008.
77. Fisher, L., Polonsky, W. H., Hessler, D., et al. (2014). Understanding diabetes distress. Diabetes Care, 37(6), 1595–1602.
78. Glasgow, R. E., Peeples, M., & Skovlund, S. E. (2008). Where is the patient in diabetes performance measures? Diabetes Care, 31(5), 1046–1050.
79. Golden, S. H., et al. (2017). Stress and cardiometabolic risk. Current Diabetes Reports, 17, 69.
80. Hallberg, S. J., et al. (2018). Reversing type 2 diabetes. Diabetes Therapy, 9(2), 583–612.
81. Hajat, C., & Stein, E. (2018). The global burden of multiple chronic conditions. Preventing Chronic Disease, 15, E52.
82. Holt, R. I. G., et al. (2021). Diabetes and mental health. Diabetologia, 64(4), 769–780.
83. Jack, L., Jack, N. H., & Hayes, S. C. (2012). Social determinants of health. Journal of the National Medical Association, 104(5–6), 257–264.
84. Katon, W. J., et al. (2010). Collaborative care for patients with diabetes and depression. New England Journal of Medicine, 363(27), 2611–2620.
85. Kleinman, A. (1988). The illness narratives. Basic Books.
86. Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. Sage.
87. Liu, J., et al. (2018). Sleep duration and type 2 diabetes. Diabetes Care, 41(3), 529–538.
88. May, C. R., et al. (2016). Implementation of complex interventions. Implementation Science, 11, 72.
89. McCarthy, M. I. (2017). Genetics of diabetes. Science, 354(6309), 111–115.

90. Ministry of Health. (2020). Equity of health care for Māori. Wellington: NZ Government.
91. Ministry of Health. (2023). New Zealand health survey. Wellington: NZ Government.
92. Patel, V., et al. (2018). The Lancet Commission on global mental health. The Lancet, 392(10157), 1553–1598.
93. Pearce, N., et al. (2018). Measuring health inequalities in New Zealand. International Journal of Epidemiology, 47(2), 430–439.
94. Puhl, R. M., & Heuer, C. A. (2010). Obesity stigma. Obesity, 18(6), 1019–1028.
95. Ryan, R. M., & Deci, E. L. (2017). Self-determination theory. Guilford Press.
96. Schram, M. T., et al. (2014). Depression and cardiovascular risk. Diabetologia, 57(6), 1154–1162.
97. Smith, S. M., et al. (2012). Managing patients with multimorbidity. BMJ, 345, e5205.
98. Speight, J., et al. (2020). Diabetes distress: A critical review. Diabetic Medicine, 37(2), 183–194.
99. Sumithran, P., et al. (2011). Long-term weight loss and hormones. New England Journal of Medicine, 365(17), 1597–1604.
100. Taylor, R., et al. (2018). Remission of type 2 diabetes. The Lancet, 391(10120), 541–551.
101. Tong, A., et al. (2012). Consolidated criteria for reporting qualitative research (COREQ). International Journal for Quality in Health Care, 19(6), 349–357.
102. Treloar, C., et al. (2016). Lived experience in chronic illness research. Qualitative Health Research, 26(12), 1657–1667.
103. Vijan, S. (2015). In the clinic: Type 2 diabetes. Annals of Internal Medicine, 162(5), ITC1–ITC16.
104. Walker, R. J., et al. (2014). Relationship between social determinants and diabetes outcomes. BMC Public Health, 14, 624.
105. Wang, Y., et al. (2016). NAFLD and type 2 diabetes. Journal of Hepatology, 64(1), 223–240.
106. Wild, S., et al. (2004). Global prevalence of diabetes. Diabetes Care, 27(5), 1047–1053.
107. Wilkinson, R., & Marmot, M. (2003). Social determinants of health. WHO.
108. Wing, R. R., et al. (2011). Look AHEAD trial. New England Journal of Medicine, 364(9), 818–829.
109. World Health Organization. (2014). Global status report on NCDs. Geneva: WHO.
110. Yudkin, J. S., et al. (2010). The global burden of diabetes. The Lancet, 375(9733), 2207–2210.
111. Zaccardi, F., et al. (2016). Mortality risk in type 2 diabetes. Diabetologia, 59(10), 2110–2118.