

Incidence Versus Prevalence of Diabetes Mellitus in the United Arab Emirates: Which Measure Matters Most?

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Abstract

Background: Diabetes mellitus, particularly type 2 diabetes mellitus (T2DM), is a major public health challenge in the United Arab Emirates (UAE). Prevalence reflects the proportion of the population living with diabetes, whereas incidence measures the development of new cases and provides important information about disease risk and prevention.

Objective: To summarize evidence on diabetes prevalence and incidence in the UAE and critically appraise major diabetes-prevention and lifestyle-intervention trials relevant to the UAE.

Methods: UAE epidemiological studies and randomized controlled trials were reviewed alongside landmark prevention trials, including the Diabetes Prevention Program, the Finnish Diabetes Prevention Study, and the Da Qing Diabetes Prevention Study.

Results: Approximately 1.27 million UAE adults aged 20–79 years were estimated to have diabetes in 2024, representing a national prevalence of approximately 16.5%. Reported UAE incidence ranges from 4.8 cases per 1,000 person-years among Emirati residents in Ajman to 16.3 per 1,000 person-years among overweight and obese UAE nationals. International trials regularly show that intensive lifestyle intervention can reduce or delay the incidence of T2DM by approximately 58%. UAE-based trials have generally supported culturally adapted lifestyle interventions yet have focused on intermediate outcomes rather than incident diabetes.

Conclusion: Both prevalence and incidence should be routinely monitored in the UAE. Strengthening risk-based screening, culturally appropriate lifestyle interventions and prospective research is vital to reduce future diabetes incidence and its associated complications.

Keywords: Diabetes; incidence; prevalence; UAE; prevention; lifestyle intervention.

Introduction

Diabetes mellitus (DM) is one of the most important non-communicable diseases in the United Arab Emirates (UAE) [1]. The country has a substantial burden of type 2 diabetes mellitus (T2DM), caused by increasing obesity, physical inactivity, dietary changes, urbanization, population aging, genetic susceptibility, and other cardiometabolic risk factors [1]. Diabetes is associated with major cardiovascular, renal, neurological and ophthalmological complications and therefore represents an important priority for primary care and public health [1]. When we talk about diabetes, there are two key things to understand: how many people have it and how many new cases are happening. The first one is called prevalence, which is like a snapshot of how many people in a population have diabetes at a certain time [2]. The second one is incidence, which looks at how many new cases are popping up in people who didn't have diabetes before, over a specific period [2]. So, prevalence gives us an idea of the current burden on the healthcare system. At the same time, incidence helps us understand the risk of people developing diabetes and whether the things we're doing to prevent it are working. It's important to understand the difference between how many people have diabetes and how many new cases are being diagnosed in the UAE. Just because a lot of people have diabetes, it doesn't mean that a lot of new cases are happening at the same time. The number of people with diabetes is affected by many factors, such as how long people live with the disease, how well they survive, the age of the population, and how well we detect new cases [3] (Figure 1). This is important to know so we can plan the right care and support for people with diabetes.

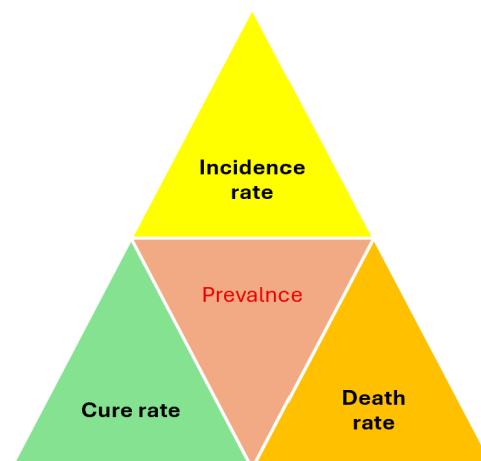


Figure 1: Prevalence triad.

Interpretation of Prevalence in Relation to Incidence, Mortality, and Cure Rates

When we talk about how common a disease is, we use a term called prevalence. This refers to the number of people in a population who have a specific disease at a certain point in time or over a certain period. It's different from incidence, which looks at how many new cases of a disease occur [4]. Prevalence gives us an idea of the total burden of a disease on a population. Numerous factors affect prevalence, including how often a disease occurs, how long it lasts, how often people die from it, and how often people get cured or go into

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remission. In populations that aren't changing much, we can estimate prevalence using a simple formula: prevalence is roughly equal to the incidence of the disease multiplied by the average duration of the disease. This helps us understand the overall impact of a disease on a community.

A high prevalence may therefore result from a high incidence, prolonged disease duration, improved survival, or a mixture of these factors [4]. Conversely, prevalence may remain relatively low despite a high incidence when the disease is associated with rapid mortality or short disease duration [4]. Mortality reduces prevalence by removing affected individuals from the pool of existing cases. Similarly, effective treatment that results in a cure or sustained remission reduces prevalence by shortening disease duration. In contrast, reduced mortality and improved survival among people with chronic disease can increase prevalence because affected individuals remain in the population for longer periods.

When we're talking about chronic diseases like type 2 diabetes, it's important to understand the difference between how many people have the disease and how many new cases are being diagnosed. Just because a lot of people have type 2 diabetes, it doesn't mean that a lot of new people are getting it. Instead, it could be that people are getting diagnosed and then living with the disease for a long time, which makes it seem like there are more people with it. As we get better at finding and treating diabetes, and at managing the risks that come with it, like heart problems, more people are living with the disease instead of dying from it. So, even if the same number of new people are getting type 2 diabetes every year, the total number of people living with it can still go up. This is because people are surviving longer with the disease, which is a good thing, but it also implies we need to think carefully about how we're interpreting the numbers and what they really mean.

When people recover from a disease, or when it goes away, it affects how many people have the disease at any given time. Diseases that can be treated successfully and don't last long usually don't have as many people with the disease compared to how many new cases there are. On the other hand, type 2 diabetes has typically been seen as a long-term condition that needs to be managed for a long time. Some people can get better if they lose a lot of weight, make big lifestyle changes, or take certain medicines. Because not many people get better and the disease lasts a long time, more people end up living with the disease.

When we look at health from a public perspective, we need to consider a few key things. First, there's incidence, which tells us how many new cases of a disease are happening. This is important for figuring out what's causing the disease and how we can prevent it from happening in the first place. Then, there's prevalence, which shows us how many people are currently living with the disease. This helps us plan how to care for them, what healthcare services and medicines they need, and how to manage the disease over the long term. We also need to think about mortality, which is how many people are dying from the disease. And finally, there are cure or remission rates, which tell us how well our treatments are working to make the disease go away or at least get it under control. All these pieces of information work together to give us a complete picture of a disease and how we can best tackle it.

When looking at how many people are affected by a disease, we shouldn't just consider how many people have it at a given time. For type 2 diabetes, it's more helpful to look at several factors together: how many people have it, how many new cases are diagnosed, how

many people die from it, and how many people get better. This gives us a better understanding of what's happening with the disease and helps us tell the difference between more new cases being diagnosed and people living longer with the disease they already have. By doing this, we can get a clearer picture of the disease and make more knowledgeable decisions.

Prevalence of diabetes in the UAE

Diabetes is a big health problem in the UAE. In fact, UAE is one of the countries with the highest number of diabetes cases worldwide. There are major studies detected the prevalence and incidence of diabetes mellitus mainly type 2 (Table 1). According to the International Diabetes Federation, about 1.27 million adults in the UAE, aged between 20 and 79, are living with diabetes as of 2024 [5]. This means that around 16.5% of the population has diabetes. When you compare this to other countries, the UAE's diabetes rate is even higher, at around 20.7% [5]. This makes diabetes one of the most major health issues facing the country.

A national health survey found that 11.8% of adults have diabetes, which is lower than the 18.9% reported in a similar survey in 2010 [6]. But we need to be careful when comparing these numbers because different surveys might use different methods to collect data, such as examining different age groups or using different criteria to diagnose diabetes. So, just because the numbers seem different, it doesn't necessarily mean that the actual number of people with diabetes is changing, it could just be because of the way the surveys were done. A big part of the country's residents are expats from all over the world, which means they have different genetic backgrounds, eating habits, and socioeconomic statuses. Because of this, the overall number of diabetes cases in the UAE may not capture the full picture, and there could be significant differences in how common the disease is across groups. The high prevalence is also closely linked to obesity and metabolic risk factors. Diabetes risk increases with age, excess adiposity, physical inactivity, hypertension, dyslipidaemia, family history, and prediabetes. These factors are common in the UAE and contribute to the substantial pool of individuals at risk of developing T2DM. It's important to know that when we look at how many people have diabetes, we might be missing some cases. This is because some people don't even know they have the disease. From a public health perspective, this is a big deal. When people have diabetes but don't know it, they can have high blood sugar levels for a long time before they get diagnosed. This can cause more complications, which is why it's so vital to catch diabetes early on.

Table 1: Major epidemiological studies in UAE.

Prevalence studies (Table 3)	Incidence studies (Table 4)
- Malik et al; national UAE, (15) - Al-Maskari et al; study (21) - Weqaya – Abu Dhabi (17) - Hamoudi et al. – Northern Emirates (18) - Dubai Household Health Survey (20) - Sulaiman et al STUDY (19)	- Sreedharan et al. – Ajman, (6) - Al Ain overweight/obese (8) - Abu Dhabi Risk Study (13)

Incidence of diabetes in the UAE

While prevalence data are abundant (Table 1), incidence data in the UAE are more limited. This is an important epidemiological gap because incidence provides information on how rapidly new cases replenish the diabetes population. In the UAE, a study was conducted to determine how many people were developing diabetes. They looked at people who lived in Ajman and found 101 new cases of diabetes in 2010 [6]. Researchers counted only people from the UAE and didn't include anyone with type 1 diabetes. What they found was that about 4.8 out of every 1,000 people got diabetes each year [6]. It was a bit higher for women, at 6.3 per 1,000, and lower for men, at 3.3 per 1,000. As people got older, the number of cases increased significantly. For example, men and women between 55 and 59 years old were more likely to get diabetes, with 23.4 out of 1,000 men and 32.4 out of 1,000 women getting the disease [6]. A recent study called the Abu Dhabi Risk Study looked at a large group of people - 8,699 to be exact - over a period of 9.2 years on average [7]. At the start, 6,772 of these people did not have diabetes, but by the end of the study, 643 of them had developed the disease [7]. This means that about 9.5% of the people in the study got diabetes over the course of the study [7]. What's more, the number of people with diabetes increased from 22.2% at the beginning to 28.5% by the end of the study [7]. This shows that diabetes is becoming more common, and it's important to understand the risks and take steps to prevent it. The study's findings underscore the need for further research and greater awareness of diabetes, especially in populations where the disease is on the rise. The way diabetes affects people is interesting. It shows how the number of new cases and the total number of

Table 3: Major prevalence epidemiological studies in UAE.

people with the disease are connected. Imagine a group of people who don't have diabetes at first, but over time, some of them start to develop it. This increases the total number of people with the disease. The study [7] also found important factors that can help predict who might develop diabetes in the future. It seems that how well your body regulates blood sugar at the start and some things you can change in your life, like your lifestyle, can play a big role in whether you get diabetes later. Incidence in high-risk populations: Diabetes is a big problem in groups of people who are more likely to get it, like those who are overweight or have prediabetes. A long study in Al Ain, UAE, followed 362 people who were overweight or obese for almost 9 years [8]. The study found that 16 out of every 1,000 people got type 2 diabetes each year. This is a high rate, and doctors and researchers are paying close attention to it [8]. The study's results are important because they can help us understand how to prevent and treat type 2 diabetes in people at high risk of developing it. The incidence was 17.7 per 1,000 person-years among men and 15.0 per 1,000 person-years among women. Older age and obesity among women and prediabetes among men were important predictors of diabetes development [8]. This research shows that we can't look at the number of new cases of a disease without considering the group of people it's affecting. For example, if we find that 16.3 out of every 1,000 people in a group of overweight or obese individuals get diabetes each year, we can't assume that's what will happen in the whole UAE population. But what it does tell us is that people who are overweight or obese are a key group to focus on when trying to prevent diabetes. They are more likely to get the disease, so helping them could make a big difference.

Study	Location/population	Design & period	Main finding	Relevance
Malik et al. [15]	UAE, Emiratis and expatriates	National cross-sectional survey, 1999–2000	20% crude diabetes prevalence; 25% among UAE citizens; 13–19% among expatriate groups	One of the earliest and most important national prevalence studies
Saadi et al. / Al Ain study [16]	Al Ain, Abu Dhabi	Population-based cross-sectional study	Age-standardized diabetes prevalence approximately 29% among adults aged 30–64 years; prediabetes ~24%	Important evidence of the high burden among Emiratis
Hajat et al. – Weqaya study [17]	Abu Dhabi nationals	Population cardiovascular screening, 2009–2010	Age-standardized diabetes prevalence 24.6%; crude prevalence about 18%	Very large population screening study; >50,000 participants
Hamoudi et al study [18]	Sharjah, Dubai and Northern Emirates	Cross-sectional study	Diabetes prevalence approximately 25.1% among UAE nationals	Important evidence from the Northern Emirates
Alawadi et al; Dubai Household Health Survey (DHHS) [20]	Dubai nationals and expatriates	Population survey, 2014/2017	19% among UAE nationals, 14.7% among expatriates; overall 15.2%	Most useful Dubai-specific population estimate
Sulaiman et al, Expatriate diabetes prevalence study [19]	UAE expatriates	Cross-sectional population study	Population-adjusted prevalence approximately 19.1%; ~64% of cases were previously undiagnosed	Demonstrates substantial diabetes burden among non-Emiratis

Table 4: Major incidence epidemiological studies.

Study	Location/population	Design & period	Main finding	Relevance
Sreedharan et al. [6]	Ajman Emiratis	Retrospective incidence study, 2010	4.8/1,000 person-years; women 6.3 vs men 3.3/1,000 PY	One of the earliest UAE-specific incidence studies
Regmi et al, Overweight/obese UAE nationals' cohort [8]	Al Ain, UAE nationals with BMI >25 kg/m ²	Retrospective cohort; median follow-up 8.7 years	T2DM incidence 16.3/1,000 person-years; men 17.7, women 15.0/1,000 PY	Important incidence study in a high-risk population
AlKetbi et AL, Abu Dhabi Risk Study (ADRS), [13]	Abu Dhabi Emiratis	Retrospective population cohort; follow-up ~9.2 years	Among 6,772 diabetes-free participants, 643 developed diabetes; incidence 7.4% over follow-up	Currently one of the strongest UAE studies for longitudinal diabetes incidence

Relationship between incidence and prevalence

Prevalence $\approx$ Incidence $\times$ Disease duration (death rate and cure rate). This relationship is most applicable when the population and disease process are relatively stable. Diabetes is a long-term condition that people live with for many years. So, even if fewer people are getting diagnosed with type 2 diabetes, the number of people already living with it can stay high. This is because people with diabetes are living longer, which means the number of people with the condition can keep going up, even if fewer new cases are being diagnosed. This distinction has major consequences for evaluating public health interventions. A successful diabetes prevention program should initially reduce incidence. A decline in prevalence may occur much later because millions of individuals may already be living with established diabetes. The UAE shouldn't just look at whether fewer people have

diabetes to see if prevention is working. Instead, they should check whether fewer new cases are being diagnosed and whether fewer people are progressing from prediabetes to diabetes. They should also look at whether obesity and other risk factors for diabetes are decreasing. This will give a better idea of whether their prevention efforts are really making a difference. By doing this, the UAE can get a more complete picture of how well their diabetes prevention strategies are working and make changes if needed.

Evidence from international randomized controlled trials

Although cohort studies provide evidence on diabetes incidence in the UAE, randomized controlled trials (RCTs) provide stronger evidence on interventions that can prevent or delay T2DM (Table 5).

Table 5: International randomized controlled trials.

Study	Population/design	Intervention	Main effect on diabetes incidence	Major strengths	Important limitations	Relevance to UAE
Diabetes Prevention Program (DPP)	3,234 high-risk adults with prediabetes; US multicentre RCT	Intensive lifestyle intervention, metformin, placebo	Incidence: 11.0, 7.8 and 4.8/100 person-years for placebo, metformin and lifestyle, respectively. Lifestyle reduced incidence by 58%, metformin by 31%. NNT $\approx$ 7 and 14 over 3 years.	Large sample, rigorous randomisation, standardized outcome assessment, direct comparison of lifestyle and pharmacotherapy	High-risk US population; intensive intervention requiring substantial resources; limited direct generalisability to UAE	Very strong evidence that intensive lifestyle modification can prevent/delay T2DM, but implementation must be culturally adapted
DPP Outcomes Study (DPP-OS)	Long-term follow-up of DPP; 2,776 participants, mean 15-year follow-up	Original lifestyle/metformin assignments with subsequent lifestyle reinforcement and metformin availability	Diabetes incidence remained 27% lower with lifestyle and 18% lower with metformin versus placebo. At 15 years, cumulative diabetes incidence was 55%, 56% and 62%, respectively.	Long follow-up; demonstrates durability; intention-to-treat analysis	Original treatment groups became less distinct because placebo participants received lifestyle education and metformin became available; therefore, long-term effect is smaller than the initial 58% reduction	Particularly important for long-term health-economic planning, showing that prevention delays rather than permanently eliminates diabetes
Finnish Diabetes Prevention Study (DPS)	Adults with impaired glucose tolerance; randomized lifestyle intervention vs control	Weight reduction, dietary modification, increased fibre and physical activity	4-year cumulative incidence 11% vs 23%; relative risk reduction 58%.	Independent replication of DPP findings in a European population; achievable behavioural targets	Participants had IGT and were therefore high risk; Finland differs from UAE in ethnicity, climate, diet and physical-activity patterns	Strong evidence for lifestyle prevention, but cultural adaptation is essential
Da Qing Diabetes Prevention Study	577 adults with IGT; cluster-randomized trial in China	Diet, exercise, combined diet/exercise vs control	At 6 years, diabetes incidence was 67.7% in controls vs 43.8% diet, 41.1% exercise and 46.0% combined intervention; risk reductions were 31%, 46% and 42%, respectively.	Asian population; long-term follow-up; important evidence outside Western populations	Older study; cluster rather than individual randomisation; historical Chinese healthcare and lifestyle environment differ considerably from UAE	Particularly useful for the UAE's diverse Asian population, but contemporary cultural and healthcare adaptation is required

Diabetes Prevention Program (DPP): The landmark Diabetes Prevention Program (DPP) randomized 3,234 adults with elevated glucose levels and high risk of diabetes to intensive lifestyle intervention, metformin, or placebo (9). The lifestyle intervention targeted at least 7% weight loss and at least 150 minutes of physical activity per week. Diabetes cases were tracked over almost 3 years. The results showed that people who didn't receive any special treatment got diabetes at a rate of 11 cases per 100 people per year. Those who took a medication called metformin got diabetes at a rate of 7.8 cases per 100 people per year. But the people who made healthy changes to their lifestyle got diabetes at the lowest rate - just 4.8 cases per 100 people per year. Making lifestyle changes was effective in preventing diabetes - it cut the risk by 58%. Taking metformin also helped, but not as much - it reduced the risk by 31%. To put it another way, for every 7 people who made lifestyle changes, 1 case of diabetes was prevented over 3 years. For metformin, it took 14 people to prevent 1 case of diabetes.

Critical appraisal of the DPP: The DPP is methodologically strong owing to its large sample size, randomized design, standardized diagnostic criteria, and a clinically meaningful primary outcome. The trial provides convincing evidence that T2DM is preventable or delayable among high-risk individuals. But can these results really be applied to the UAE? The study was done with a high-risk group of people in the US, and the treatment was very intense, with one-on-one counseling and a lot of support to change behaviour. It might be hard to do the same thing in the UAE's primary healthcare system. So, the study looked at people who were already at risk of developing diabetes, not just anyone. That's why the results shouldn't be taken to mean that diabetes will decline by 58% among all adults in the UAE. But the good news is that the things that helped in the study, like losing weight and being more active, can still make a big difference for people in the UAE.

Long-term DPP Outcomes Study [10]: The DPP Outcomes Study (DPPOS) followed participants for approximately 15 years (10). During long-term follow-up, diabetes incidence remained significantly lower in the original study's lifestyle and metformin groups than in the placebo group. Lifestyle intervention reduced diabetes incidence by 27% and metformin by 18% compared with placebo. After 15 years, the number of people who got diabetes was around 55% in the group that made lifestyle changes, 56% in the group that took metformin, and 62% in the group that took a placebo. **Critical appraisal:** One of the best things about the DPPOS study is that it lasted a long time, showing that preventing diabetes yields long-term benefits. But it also identifies a problem: the difference between the treatment and non-treatment groups gets smaller over time. This happens for a couple of reasons. First, people who weren't receiving any treatment initially were educated on how to live a healthier lifestyle. Also, as people get older, their risk of getting diabetes keeps going up. So, even if they were doing well at first, they might still develop diabetes later. This is something to think about when trying to prevent diabetes. One big problem with the DPPOS study is that it didn't remain a simple comparison among three groups throughout. Over time, some participants received additional lifestyle support or took metformin, which could have reduced the differences between the groups. So, when we look at the results after 15 years, we shouldn't think that a short program to change your lifestyle can really cut your chance of getting diabetes by 58% forever.

other didn't receive any special help. After four years, the group that got lifestyle help had a much lower rate of diabetes - about 11% of them got diabetes, compared to 23% of the people who didn't get any help. This means that changing your lifestyle can cut your risk of getting diabetes by about 58%. The intervention focused on weight reduction, dietary modification, reduced fat intake, increased fiber intake, and enhanced physical activity.

Critical appraisal: The Finnish Diabetes Prevention Study [10] provides strong evidence that lifestyle changes can make a real difference. What's interesting is that it produced results like the Diabetes Prevention Program, but with a different group of people in Europe. Instead of relying on medicine, the study focused on helping people set and achieve realistic goals for healthy living. But there's a catch, the people in the study already had trouble with their blood sugar levels, so they were more likely to get diabetes than the average person. This means we can't assume the results apply to everyone in the UAE. Also, Finland differs significantly from the UAE in weather, food, ethnicity, and how active people are, which could affect the outcome. This study is a big deal for healthcare in the UAE. It shows that finding people with prediabetes and helping them make big lifestyle changes before they get diabetes can really cut down on the number of cases.

Da Qing Diabetes Prevention Study: The study randomized individuals with impaired glucose tolerance to diet, exercise, combined diet and exercise, or control [12]. The study demonstrated that lifestyle intervention reduced progression from impaired glucose tolerance to diabetes. **Critical appraisal:** The Da Qing study [12] is important for the UAE because it focused on Asian people, providing useful information that's not just based on Western studies. Also, the study followed people over a long period, showing that lifestyle changes may have long-lasting benefits. But the thing is, this study was done a long time ago in China, and the people, food, money, and healthcare are all very different from what we have in the UAE now. Also, the study was conducted with many people, not just in doctors' offices, so we would need to make some changes to make it work in our modern healthcare system. In conclusion, diabetes incidence can be reduced by structured lifestyle modification among high-risk individuals. **UAE-based randomized clinical trials:** The UAE has made significant discoveries about how lifestyle changes can help manage diabetes. A study called Skills for Change [13] looked at how to help adults with type 2 diabetes manage their condition. It involved 382 people with type 2 diabetes from six public healthcare centers in Al Ain [13]. The study was divided into two groups: three centers got a special program, and the other three didn't. The program included teaching people about healthy eating and exercise, and it was based on a theory that says people learn new behaviours by watching and imitating others. The program was delivered in one-on-one sessions and group meetings over a period of 12 months [13].

Structured diet and exercise education trial

A new study in the UAE examined how a specialized diet and exercise program could help people with diabetes [14]. The program was led by a dietitian who taught patients about healthy eating and exercise. The study had 192 patients and lasted for a year. At the end of the year, the patients who followed the program had lost more weight than those who didn't [14]. On average, they lost about 1.86 kg/m² more than the others [14]. This is a significant difference, indicating that the program was effective in helping patients lose weight and manage their diabetes. The study's results are promising and could be useful for other people with diabetes who want to make healthy lifestyle changes [14].

Finnish Diabetes Prevention Study: A large study in Finland [10] looked at people at risk of developing diabetes because their bodies weren't handling sugar well. They divided these people into two groups: one group received help to change their lifestyle, and the

Critical appraisal: One of the main advantages of this study is its randomized design, which makes the results more reliable. Also, the fact that the intervention lasted a full year is a big plus, as it shows how the treatment works overtime. Another good thing is that a specialized dietitian was involved, which means the intervention could be used in real-world health settings, such as primary care, where patients often see a team of doctors and other experts. But the study had some limitations, it was small, and it focused on body mass index, or BMI, rather than preventing diabetes. So, while it shows that the intervention can help address an important risk factor for diabetes, it doesn't directly prove that it can prevent people from developing diabetes in the first place. It does show that it can help with a key risk factor, which is a good thing, but it's not enough to say for sure that it can prevent diabetes. Reducing BMI is an intermediate outcome; preventing diabetes is a clinical endpoint. Future UAE trials should ideally follow high-risk participants for several years and use incident, laboratory-confirmed T2DM as the primary endpoint.

Some large studies, such as the DPP [9], Finnish [10] DPS [11], and Da Qing [12], have shown that lifestyle changes can greatly help prevent diabetes. But these studies were conducted in different parts of the world, with different populations, diets, and medical systems. We're not sure whether the same things would work in the UAE, because it's a unique place with its own culture and way of life. The UAE lifestyle RCTs improve local applicability but have generally focused on patients with established diabetes and intermediate outcomes such as HbA1c, BMI, and physical activity. They therefore augment rather than replace international diabetes-prevention trials. There's a big gap in research right now: the UAE really needs some large-scale, long-term studies that involve multiple centers and look at adults who are at risk of getting diabetes or already have prediabetes. These studies should track how many people develop diabetes over several years - that should be the focus.

Consequences for UAE primary healthcare

The evidence has multiple practical implications. First, primary healthcare should identify people at high risk of diabetes using age, BMI, family history, blood pressure, lipid profile, HbA1c and other validated risk factors. For people with prediabetes, it's better to have a planned approach to changing their lifestyle rather than just getting general advice. What works best is setting specific goals for weight loss and increased activity, as the Diabetes Prevention Program has shown. Giving people clear targets to aim for is more effective than just telling them to try to do better. This approach helps people make real changes that can prevent diabetes. When it comes to helping people in the UAE, we need to ensure our plans correspond to their culture. This means that when we advise on food, we should talk about foods that are easy to find in the UAE and consider traditional ways people eat. We should also think about how people can stay active even when it's hot outside and find ways to exercise indoors. To track diabetes, we need to measure two important things: how many people already have it and how many new cases are occurring. The first one, called prevalence, helps us plan for healthcare resources. The second one, called incidence, shows us if our prevention programs are working.

Critical appraisal of the UAE diabetes evidence

Malik et al. study [15] National UAE survey. Diabetes is a big problem in the UAE. A recent survey found that about 20% of adults in the country have diabetes. This number rises to 25% for UAE citizens and a whopping 40% for people over 55. What's even more surprising is that 41% of people with diabetes didn't even know they had it. The survey was well done, with a good sample of people from across the UAE and a high response rate of 89%. The researchers used strict

World Health Organization criteria to diagnose diabetes, rather than depending solely on people's self-reports of their health. This helped them get a more accurate picture of how many people really have diabetes. The results are important because they show that diabetes is a major health issue in the UAE, and many people don't even know they have it. The study has a major flaw - it's old. The survey was conducted in 1999-2000, over 20 years ago. Since then, the UAE has changed significantly in its population, dietary habits, and disease patterns. This means the results are no longer relevant today. Another issue is that the study only looked at a snapshot of the population at one point in time, so it can't tell us how things changed over time or how many new cases of diabetes occurred. Also, the UAE has a very diverse population, with people from many different ethnic backgrounds and countries, which could mean that the overall results may mask important differences between these groups. This study is good at showing how common diabetes was when the survey was done, and it's a great example for the whole country. However, the information might not be totally relevant today.

Al Ain population study, Saadi et al study [16]: The Al Ain population-based study provides important evidence specifically among Emirati adults. It reported an age-standardized diabetes prevalence of approximately 29.0% and prediabetes of 24.2% among adults aged 30-64 years. One of the best things about this study is that it examined diabetes objectively, rather than just relying on doctors' diagnoses. This makes the results more precise and dependable. Also, the fact that the study accounted for the age of the participants helps make the results more comparable across groups. Overall, the study delivers important information about the high risk of metabolic problems among Emiratis, which is very useful to know. However, there are some limitations to consider. The study only looked at people from Al Ain, not the whole of the UAE, and it didn't include younger or older adults. Also, most of the participants in the study were Emirati, which makes it difficult to compare the results with national studies. Another issue is that this type of study can't show whether things like obesity, high blood pressure, or other risk factors happened before diabetes developed. So, just because the numbers seem higher than Malik et al. found doesn't necessarily mean diabetes is on the rise. There are other factors at play here, such as the population makeup, the age range of the people studied, and the methods used to collect data. These differences could explain the apparent increase in diabetes cases. Critical judgment: Strong population-based evidence for diabetes among Emiratis but limited national generalizability and no ability to measure incidence.

Weqaya Abu Dhabi, Hajat et al study [17]: The Weqaya program is notably valuable for its large population-based screening cohort and standardized cardiovascular risk assessment. In 2009-2010, the age-standardized prevalence of diabetes was 24.6%, compared with a crude prevalence of approximately 17.6%, while age-standardized prediabetes prevalence was 29.5%. One of the biggest advantages of Weqaya is its large scale. The project covered a significant portion of the Emirati population in Abu Dhabi and provided standardized measurements of several risk factors for heart disease and diabetes. What's interesting is the big difference between the crude and age-standardized prevalence rates - it shows just how much age can affect our insight into the effect of diabetes. This suggests that age plays a huge role in determining the burden of diabetes, and by taking age into account, we can get a more accurate picture of the situation. But there's a problem with using Weqaya for this purpose - it was mainly a screening program, not a long-term study that follows people over time. This means we can't use the data to figure out how many new cases of a disease are happening. There's also a risk of biased results because the people who participate in the screening might be differ-

ent from those who don't. And the most important thing is that the findings are mostly relevant to Abu Dhabi, so we shouldn't assume they apply to everyone in the UAE, especially expats, without being careful. Critical judgment: Excellent evidence for cardiometabolic burden among Emiratis in Abu Dhabi, but less suitable for estimating national prevalence or incidence.

Hamoudi et al, study [18]: This is a cross-sectional analysis of 3,203 participants from the UAE National Diabetes and Lifestyle Study (UAEDIAB), including UAE nationals and diverse expatriate ethnic groups. Diabetes was assessed objectively using fasting plasma glucose, HbA1c, and self-reported diabetes. Diabetes prevalence was particularly high among UAE nationals (approximately 21% in men and 23% in women) and Asian non-Arabs. A major strength was the multi-ethnic population, allowing for comparison of diabetes prevalence across ethnic groups in the UAE. Objective biochemical measurements and adjustment for potential confounders strengthened the validity of the findings. The study also identified established risk factors, including older age, obesity, family history, hypertension, high triglycerides and low HDL cholesterol. However, the cross-sectional design prevents assessment of temporality and causality. The sample was not necessarily nationally representative, and differences in subgroup scale and composition may have introduced selection bias. Broad ethnic categories may also mask differences in country of origin, socioeconomic status and lifestyle among expatriates. Overall, Hamoudi et al. provide important evidence of substantial ethnic variation in diabetes prevalence in the UAE, supporting targeted screening and prevention strategies. However, it should be interpreted as prevalence evidence rather than incidence or causal evidence.

Sulaiman et al study [19]: Sulaiman et al. conducted a cross-sectional study of 2,724 UAE migrants recruited from visa-renewal centers during 2013–2014. Diabetes prevalence was 15.5%, increasing to 19.1% (95% CI 17.6–20.5%) after age- and sex-standardization, with 64.2% of cases previously undiagnosed. Diabetes was associated with older age, obesity, family history, hypertension, and dyslipidaemia.

The study's major strengths were its large, multi-ethnic migrant population and objective glucose assessment, which together addressed an important gap in UAE epidemiological research. However, the cross-sectional design precludes causal inference; recruitment through visa centers yields a predominantly male, relatively young sample; and the absence of systematic OGTTs limits generalizability and may underestimate prevalence.

Overall, the study shows a substantial and largely undiagnosed diabetes burden among UAE migrants and supports the need for inclusive diabetes screening and prevention strategies.

Dubai Household Health Survey, Al Awaadi et al. [20]: It provides particularly relevant evidence for Dubai. The reported prevalence was 19.0% among UAE nationals, 14.7% among expatriates, and 15.2% overall. One of the main advantages of this study resides in its focus on the Dubai population, including both citizens and expats. This makes it much more relevant for understanding diabetes trends in Dubai, especially compared to studies based in other areas like Abu Dhabi or Al Ain. The study also does a great job of capturing the heterogeneous makeup of Dubai's population, which is important for getting an accurate picture of what's going on with diabetes in the city. It's hard to compare this study to others that have examined glucose tolerance because how diabetes is diagnosed and how data are collected can affect the results. Also, when people are surveyed at home, they might not always report their information accurately or respond at all, which can lead to biased results. This is especially true

when lab tests aren't always available to confirm the findings. The study's results only show how common diabetes is in a specific group of people, rather than how many new cases are being diagnosed. What's important to know is that about 10.8% of people have diabetes without even realizing it. This is a big deal for public health because it means the number of people we think have diabetes might be much lower than the actual number. The reason is that we often count only people who have already been diagnosed, which doesn't account for those who haven't been diagnosed yet. This can give us a false sense of the true effects of diabetes on our communities. When looking at a study that's really useful for talking about diabetes in Dubai, we need to think carefully about how it was done and what it's trying to say. This is important if we want to compare it to other studies that used blood tests to diagnose diabetes. We have to consider the methods and results of this study before we can directly compare it to others.

Incidence studies

Sreedharan et al study [6]: Ajman Researchers in the UAE made a big discovery about diabetes. They found out how many new cases of type 2 diabetes happened in one year. In 2010, they looked at the medical records of people in Ajman and found 101 new cases of type 2 diabetes among Emiratis. This means that out of every 1,000 people, about 4.8 got diabetes that year. What's interesting is that women were more likely to get diabetes than men. The age group that got diabetes the most was people between 55 and 59 years old. This study is important because it helps us understand how common diabetes is in the UAE and who is most at risk of getting it. One of the best things about this study is that it looked at new cases of the disease, rather than just how many people already have it. This gives us a better idea of how often new cases are happening. The study also used data from multiple healthcare facilities serving the people of the Emirates, making the results more reliable. But there are some big limitations to this study. It only looked at what happened over a year, and not that many new cases were found. Also, the study relied on people going to the doctor for diagnosis, so it might have missed cases that were treated elsewhere or went undiagnosed. This could mean that the actual number of new cases is higher than the study found. The study should therefore be interpreted as an estimate of the incidence of clinically detected diabetes, rather than the biological incidence of all newly developing diabetes. Critical judgment: Important pioneering incidence evidence, but limited by short follow-up, small case numbers and potential under-ascertainment.

Al Ain overweight/obese cohort, Regmi et al study [8]: The study in Al Ain gives us more reliable long-term results than the one in Ajman, mainly because it tracked participants for a much longer time - a median of 8.7 years. Looking at 362 UAE nationals who were either overweight or obese, the researchers found that the rate of developing type 2 diabetes was 16.3 cases per 1,000 people per year. To be more precise, this rate fell within the range of 12.1 to 21.4 cases per 1,000 people per year, yielding a 95% confidence interval. The principal strength is the ability to establish a temporal relationship between baseline risk factors and subsequent diabetes. The study also identified important predictors, including age ≥ 44 years, obesity in women and prediabetes in men. But it's also important to remember that this study was done with people who were already at high risk. They were either overweight or obese and were getting care at a special clinic. So, when we look at the results, we see that 16.3 out of every 1,000 people got diabetes each year. We can't compare this directly to another study that found 4.8 out of every 1,000 people got diabetes each year. The people in those two studies were different from the start, so it's not fair to say that one study is contradicting the other. The main difference is that the people in this study were

already more likely to get diabetes because of their weight and other health issues. Being overweight is a major factor in getting diabetes, especially for people from the UAE. This is important to know because it can help doctors and patients better understand the risks. Critical judgment: Stronger evidence for determinants of diabetes development than the Ajman study, but poor generalizability to the entire UAE population.

Abu Dhabi Risk Study; Ali et al. [13] contemporary longitudinal evidence: The Abu Dhabi Risk Study is a big deal because it provides up-to-date information. It looked at 8,699 people over an average of about 9.2 years. Of the 6,772 people who didn't have diabetes when the study started, 643 developed it. This means that about 7.4% of the people in the study got diabetes over time. As the study went on, the number of people with diabetes kept going up, and it eventually reached 28.5%. It's worth noting that men were more likely to have diabetes than women. This is arguably the strongest contemporary evidence for incident diabetes among Emiratis in your list. Its large cohort, prolonged follow-up, and use of Cox regression allow examination of predictors of incident diabetes. Higher baseline HbA1c and current smoking were among the significant predictors. The result they found, 7.4%, does not match the number of cases per 1,000 people per year. This is important to understand. The 7.4% refers to the percentage of people who didn't have the disease at the start but got diabetes during the study. On the other hand, the number of cases per 1,000 people per year accounts for the total time each person was at risk of contracting the disease. So, we can't directly compare the 7.4% result to other numbers, such as 4.8 or 16.3 cases per 1,000 people per year. The retrospective nature of the cohort also creates possible limitations due to missing data, changes in diagnostic practices, and incomplete capture of cases occurring outside the healthcare system.

Critical judgment: The most informative recent longitudinal study in this group, particularly to understand predictors and long-term development of diabetes, although its predominantly Emirati population limits extrapolation to the UAE's large expatriate population.

Overall critical appraisal: Research in the UAE has shown a meaningful shift in how diabetes is studied, moving from just looking at how common it is at a single point in time to also tracking how many new cases are emerging over time.

The study by Malik et al. [15] is important to understand how common diabetes was back then. What made this study strong was the way it was done they used a method called stratified multistage random sampling, and they got a high response rate of 89%. This meant they could make fairly accurate estimates of how common diabetes was across the country. They found out that about 20% of people had diabetes, and when they looked just at citizens of the UAE, that number went up to 25%. But here's the thing - they also found that 41% of people who had diabetes didn't even know they had it. The problem with this study is that it's a bit old - the data was collected back in 1999-2000, so it might not be totally representative of what's going on in the UAE today.

New studies in Al Ain [16], Weqaya [17], Hamoudi [18], and Dubai [19] have all shown that a lot of people in the UAE have diabetes. This is not simply a problem in one area but across the country. These studies all found similar results, making it clear that diabetes is a major issue in the UAE. But because they only looked at a single point in time, we can't tell whether the differences in how many people diabetes have are due to more people getting it or to people just living longer with the disease. It could also be that some areas are better

at detecting and treating diabetes, or that people living in different areas differ in some way.

The Sreedharan study [6] is a big step forward because it measured something directly. It found that a certain condition happens to about 4.8 out of 1,000 people each year. This is a lot lower than what Regmi and others found - they said it happens to about 16.3 out of 1,000 people each year. But we shouldn't think these numbers are contradictory. The thing is, Sreedharan [6] looked at the general population in Ajman, whereas Regmi [8] and others focused on people from the UAE who are overweight or obese. So, the people Regmi [8] and others studied were already at higher risk of developing this condition. The study by Regmi et al. [8] is helpful for primary care doctors because it shows that the number of people developing a certain condition increases significantly among those who are overweight. One of the best things about this study is that it followed people for a long time, with a median follow-up of 8.7 years. But there are some limitations, it only recruited people from one place and only included people from the UAE who were overweight or obese. This means the results might not generalize to the entire UAE population, as the authors themselves point out.

The ADRS study [13] is really standing out from the rest because of its strong and recent findings. It examined a large group of 8,699 people from the UAE and followed them for about 9.2 years. Out of the 6,772 people who didn't have diabetes at the start, the study found 643 new cases of the disease. This means that about 9.5% of the people in the study developed diabetes over the course of the study. What's also interesting is that the researchers were able to create a prediction model that can accurately forecast who might get diabetes, it's got a c-statistic of 0.837, which is a good sign that it's working well.

Diabetes Prevalence Versus Incidence in the UAE: A Health Economics Perspective

Diabetes mellitus represents a major health-economic challenge in the United Arab Emirates (UAE), where epidemiological studies consistently demonstrate a high burden of disease. Comprehending the distinction between prevalence and incidence is essential for health-economic planning because the two measures answer different policy questions. Prevalence reflects the number of people living with diabetes at a particular time and therefore provides an estimate of the existing healthcare burden [21]. In contrast, incidence measures the occurrence of new cases over time and provides insight into the future growth of that burden [21].

From a health-economic perspective, prevalence is particularly important for estimating current healthcare expenditure. A high prevalence translates into a large population demanding continuous management, including glucose-lowering therapy, monitoring, consultations, laboratory investigations and screening for complications. UAE studies illustrate this substantial burden [21,22]. Malik et al. reported approximately 20% crude diabetes prevalence in the national survey conducted in 1999–2000, while subsequent studies among Emiratis reported prevalence approaching 25–29% [15,16]. More recent Dubai Household Health Survey data reported diabetes prevalence of 15.2% overall, including 19.0% among UAE nationals and 14.7% among expatriates [20]. These differences accentuate the importance of population structure and methodology when estimating healthcare needs.

Table 6: Critical appraisal of the Major studies in UAE.

Study	Location / population	Design & period	Main finding	Strengths	Limitations / critical appraisal	Relevance
Malik et al., [15]	National UAE sample including Emiratis and expatriates	Stratified multistage cross-sectional survey, 1999–2000	Crude diabetes prevalence 20%; 25% among UAE citizens and 13–19% among expatriates. Diabetes increased with age, reaching 40% after age 55. 41% of diabetes cases were previously undiagnosed.	Large, nationally representative sampling strategy; high 89% response rate; biochemical diagnosis using WHO criteria; included multiple ethnic groups	Cross-sectional design cannot establish incidence, causality or temporal relationships. Data are now >20 years old and may not reflect current UAE demographics, obesity or diabetes patterns. Diagnostic criteria and population structure have also changed.	Landmark baseline prevalence study. Provides important historical evidence that diabetes was already highly prevalent in the UAE at the beginning of the 21st century.
Saddji et al. / Al Ain study [16]	Al Ain, Abu Dhabi; UAE nationals	Population-based cross-sectional study	Age-standardised diabetes prevalence approximately 29% among adults aged 30–64 years; prediabetes approximately 24%	Biochemical assessment and population-based sampling; focused on UAE nationals; demonstrated the particularly high metabolic burden among Emiratis	Cross-sectional design prevents determination of new-case rates. Restricted age range and geographical setting limit national generalisability. The high prevalence may partly reflect selection of older/high-risk participants.	Important evidence that diabetes prevalence among Emiratis is substantially higher than many international populations. Also provides a useful comparator for later incidence studies.
Hajat et al. – Weqaya study [17]	Abu Dhabi nationals	Large population cardiovascular screening programme, 2009–2010	Age-standardised diabetes prevalence 24.6%; crude prevalence approximately 18%	Very large population-based screening programme; >50,000 participants; standardized cardiovascular/metabolic measurements; provides substantial statistical power	Screening participants may differ from the entire Abu Dhabi population; primarily UAE nationals, limiting applicability to expatriates. Cross-sectional design cannot establish incidence. Screening participation may introduce selection bias.	Important population-level contemporary prevalence estimate and provides the baseline population from which later longitudinal ADRS data were derived.
Hamoudi et al. [18]	Sharjah, Dubai and Northern Emirates; UAE nationals	Cross-sectional population study	Diabetes prevalence approximately 25.1% among UAE nationals	Extends evidence beyond Abu Dhabi and Al Ain; demonstrates that the high burden is not confined to one emirate	Cross-sectional design; potential heterogeneity in sampling and diagnostic methods; limited ability to determine temporal trends or incident disease	Supports the conclusion that high diabetes prevalence is a national rather than emirate-specific phenomenon.
Dubai Household Health Survey (DHHS), Al Waadi et al. [20]	Dubai nationals and expatriates	Population health survey, 2014/2017	Diabetes approximately 19% among UAE nationals, 14.7% among expatriates, overall, approximately 15.2%	Provides Dubai-specific population data; includes both Emiratis and expatriates; useful for understanding the	Survey design limits causal inference; self-reported components can underestimate undiagnosed disease; differences between	Particularly relevant to Dubai primary care, because it provides population-level estimates for the emirate and demonstrates differences by nationality.

				heterogeneous Dubai population	survey waves and diagnostic definitions complicate direct temporal comparisons	
Sulaiman, et al. [19], Expatriate diabetes prevalence study	UAE expatriate population	Cross-sectional population study	Population-adjusted prevalence approximately 19.1%; approximately 64% of cases previously undiagnosed	Addresses an important evidence gap because expatriates constitute a large proportion of UAE residents; highlights undiagnosed diabetes	Heterogeneity among expatriates makes a single estimate difficult to generalize; cross-sectional design; potential differences in access to healthcare and screening	Demonstrates that diabetes prevention and screening cannot focus exclusively on Emirati citizens; expatriate populations represent a major component of the UAE diabetes burden.
Sreedharan et al. [6] – Incidence of T2DM among Emirati Residents in Ajman	Emirati residents in Ajman	Retrospective incidence study, 2010	4.8/1,000 person-years; women 6.3 vs men 3.3/1,000 PY; highest rates at age 55–59 years	One of the earliest UAE-specific incidence studies; included all primary healthcare centres and major hospitals in Ajman; provides actual new-case incidence, rather than prevalence	Only one year of incident-case ascertainment; retrospective design; possible under-ascertainment of undiagnosed cases; restricted to Ajman Emiratis; cannot be directly compared with high-risk cohorts	Important transition from prevalence to incidence epidemiology in the UAE. Demonstrates increasing diabetes risk with age and a female predominance. (PubMed)
Regmi et al. [8] overweight/obese UAE nationals cohort	Al Ain; UAE nationals with BMI ≥25 kg/m ²	Retrospective cohort; median follow-up 8.7 years	T2DM incidence 16.3/1,000 person-years; 17.7 in men and 15.0 in women	Long follow-up; objective HbA1c and anthropometric measurements; incident diabetes based on physician diagnosis or HbA1c ≥6.5%; Cox regression identified predictors	High-risk selected population, so incidence cannot be extrapolated to all UAE adults. Single tertiary centre; retrospective data; some potentially important confounders such as family history and changes in physical activity/weight were unavailable. (BMI Open)	Strong evidence that obesity substantially increases incident diabetes. Particularly relevant for risk-stratified screening and primary prevention.
Abu Dhabi Risk Study (ADRS), [7]	8,699 UAE nationals participating in Abu Dhabi screening; 6,772 diabetes-free at baseline	Retrospective population-based cohort; approximately 9.2 years average follow-up	643/6,772 developed diabetes; detailed results report 9.5% cumulative incidence over 12 years. Diabetes prevalence increased to 28.5%.	Largest and most contemporary UAE evidence; population-based; long follow-up; baseline screening data; Cox modelling; prediction model showed good discrimination (c-statistic 0.837)	Retrospective design; participants derived from the Weqaya screening programme rather than a completely independent national cohort; HbA1c testing was performed according to clinical practice rather than uniformly for all participants; restricted to UAE nationals	Currently one of the strongest studies for understanding longitudinal diabetes development in UAE nationals. Particularly useful for identifying predictors and developing risk-prediction strategies.

The economic consequences of prevalence go beyond direct medical costs [21]. Diabetes is a long-term condition needing lifelong management and can lead to cardiovascular disease, chronic kidney disease, retinopathy, neuropathy, and lower-limb complications. Consequently, the cost of diabetes is driven not only by the number of people with diabetes but also by disease duration and complication rates [21]. A health system with a large prevalent population therefore faces sustained expenditure even if the number of newly diagnosed cases begins to decline [21].

When we look at how many new cases of a disease are happening, it can really help us plan and figure out ways to prevent it. If the number of new cases is rising, it means more people will need lifelong treatment. Some studies in the UAE have shown that there are a lot of new cases of type 2 diabetes, especially among certain groups of people. For example, in Ajman [6], about 4.8 out of every 1,000 people get type 2 diabetes each year. But in Al Ain [16], the number is much higher - about 16.3 out of every 1,000 people who are overweight or obese get type 2 diabetes each year. This is a big deal because it shows just how important it is to prevent obesity, since people who are at high risk are much more likely to need treatment for diabetes in the future.

When figuring out how cost-effective something is, looking at how often it happens is important. This is especially true for things like programs that help people change their lifestyles, manage obesity, test for diabetes, and use medication to prevent it. If we can prevent new cases of diabetes, the healthcare system can save money in the long run by avoiding the costs of medication, monitoring, and managing complications. So, looking at how often something happens gives us a better idea of whether preventing it is a good use of our money. However, prevalence and incidence should not be considered competing measures. They are complementary. Prevalence determines the current resource requirement, whereas incidence predicts the future expansion of that requirement. A high-prevalence, high-incidence environment such as the UAE requires simultaneous investment in efficient disease management and primary prevention.

From a health economics perspective, UAE policy should therefore integrate prevalence data with incidence data, obesity rates, population aging, treatment costs, and complication rates. Such an approach could allow decision-makers to shift resources from predominantly reactive diabetes management toward cost-effective prevention, early detection, and risk-factor modification, while continuing to provide adequate services for the large population already living with diabetes.

Cost of diabetes prevalence versus incidence in the UAE

Prevalence creates the larger present healthcare burden because it represents all people currently living with diabetes who require ongoing medication, monitoring, consultations, and screening for complications. The UAE has approximately 1.27 million adults living with diabetes, and IDF estimates diabetes-related healthcare expenditure at approximately US\$2.02 billion, or about US\$1,583 per person with diabetes [5]. A recent study in the UAE examined the cost of treating diabetes. The study, conducted by Al-Maskari [21] and his team, followed 150 patients in Al Ain to assess the annual cost of their care. They found that patients who didn't have any complications from diabetes cost around \$1,605 per year to treat. But when patients had microvascular complications, the cost went up to around \$3,453 per year (21). If they had macrovascular complications, the cost was even higher, at around \$10,300 per year. And if they had both types of complications, the cost was the highest, at around \$15,104 per year [21]. This study helps us understand how costly diabetes treatment

can be, especially when complications arise.

This demonstrates an important relationship:

Prevalent diabetes → long-term treatment → complications → progressively higher healthcare costs.

When you're first diagnosed with diabetes, the costs might not seem too bad. You'll need to pay for doctor's visits, tests, and medicine, but it won't break the bank. The problem is, if you have diabetes for a long time - we're talking decades - the costs can really add up. In fact, a study in the UAE [21] found that the cost of treating diabetes increases significantly over time. For people who've had diabetes for less than 5 years, the cost is around \$3,004 per year. But for those who've been living with diabetes for more than 20 years, the cost jumps to \$9,783 per year. That's a big difference, and it shows how important it is to manage diabetes and to try to prevent it from worsening over time. Therefore, reducing incidence is potentially much more cost-saving than simply treating established prevalence. Preventing one new case of diabetes potentially avoids years of medication, monitoring, consultations and—most importantly—future complications such as myocardial infarction, stroke, nephropathy, retinopathy and hospitalization.

Why incidence prevention may be more cost-effective

The economic argument can be represented as:

Prevention of incident diabetes → fewer prevalent cases → fewer complications → lower lifetime healthcare expenditure.

In the UAE, it's a big deal that many people with diabetes don't even know they have it, about 64% of cases are thought to be undiagnosed [5]. And to make matters worse, over 1.3 million adults in the country have something called impaired fasting glucose [5], which is a sign that they might be at risk of developing diabetes, according to estimates from the International Diabetes Federation. There isn't enough information specific to the UAE to determine exactly how much money can be saved by preventing a single case of diabetes. Most studies conducted in the UAE focus on the cost of diabetes rather than the effectiveness of different treatments. So, while we know that preventing diabetes makes sense financially, we can't say for sure how cost-effective it is in the UAE.

Conclusion

The UAE has a substantial diabetes burden, with approximately 1.27 million adults estimated to be living with diabetes in 2024 [5]. However, prevalence alone does not adequately describe the dynamics of the epidemic. UAE cohort studies show ongoing development of new diabetes, with incidence particularly high among older adults and people with obesity or prediabetes [6,8,13]. Research has shown that the best way to prevent diabetes is through lifestyle changes. Studies have proven that making healthy changes can really reduce the risk of getting diabetes. For example, a large study called the DPP [9] found that people who made intensive lifestyle changes, such as eating healthier and exercising more, were 58% less likely to develop diabetes. Other studies in Finland [10] and Da Qing [12] also showed that lifestyle changes can help delay or even prevent type 2 diabetes. What's even more promising is that these benefits can last for a long time. One study [11] found that people who made lifestyle changes were still seeing benefits 15 years later, even if they weren't as strong as they were at first. UAE-based randomized studies additionally demonstrate that culturally adapted diet, exercise and lifestyle interventions can improve metabolic outcomes in local healthcare settings [13,14]. However, these studies have important limitations, particularly short follow-up, relatively small sample sizes and the use of intermediate outcomes rather than incident diabetes.

A major conclusion for a UAE diabetes epidemiology paper is that the UAE has considerably more evidence on prevalence than incidence. The recent ADRS study is therefore particularly important because it provides longitudinal evidence of new diabetes cases and helps address the historical gap in UAE incidence data.

Overall, the UAE requires a prevention strategy that combines population-level risk reduction, targeted screening of high-risk individuals, intensive lifestyle intervention and longitudinal surveillance of diabetes incidence. Future research needs to prioritize multicentre prospective studies and pragmatic RCTs specifically designed for the UAE population. Such an approach would provide stronger evidence for reducing the number of new diabetes cases and, ultimately, the country's long-term prevalence and diabetes-related complications.

Key messages

High burden: Approximately 1.27 million adults in the UAE were estimated to have diabetes in 2024, showing a major public health challenge.

Incidence vs prevalence: Prevalence measures the existing burden, while incidence measures new diabetes cases and is more informative for evaluating prevention.

High-risk groups: Diabetes incidence is particularly high among people with obesity, prediabetes, older age, and other cardiometabolic risk factors.

Prevention works: Major trials, including the Diabetes Prevention Program and Finnish Diabetes Prevention Study, demonstrated approximately 58% reductions in diabetes incidence through intensive lifestyle intervention.

UAE priorities: Primary care should strengthen risk-based screening, culturally adapted lifestyle programs, and longitudinal monitoring of diabetes incidence, supported by prospective UAE-specific prevention trials.

References

1. Razzak HA, Harbi A, Shelpai W, Qawas A (2018) Epidemiology of diabetes mellitus in the United Arab Emirates. *Current diabetes reviews* 14(6): 542-549.
2. Noordzij M, Dekker FW, Zoccali C, Jager KJ (2010) Measures of disease frequency: prevalence and incidence. *Nephron Clinical Practice* 115(1): c17-20.
3. Deshpande AD, Harris-Hayes M, Schootman M (2008) Epidemiology of diabetes and diabetes-related complications. *Physical therapy* 88(11): 1254-1264.
4. Haberman S (1978) Mathematical treatment of the incidence and prevalence of disease. *Social Science & Medicine. Part A: Medical Psychology & Medical Sociology* 12: 147-152.
5. United Arab Emirates (2011) Diabetes country report 2011 = 2050. *Diabetes Trends in the UAE | IDF Atlas* (accessed on 7/8/2026)
6. Sreedharan J, Muttappallymyalil J, Al Sharbatti S, Hassoun S, Safadi R (2015) Incidence of type 2 diabetes mellitus among Emirati residents in Ajman, United Arab Emirates. *Korean Journal of Family Medicine* 36(5): 253.
7. Baynouna AlKetbi LM, AlKetbi R, AlShamsi MS, Nagelkerke N, Afandi B (2025) Incidence and predictors of type 2 diabetes mellitus in a population-based cohort study in Abu Dhabi. *Scientific Reports* 15(1): 23639.
8. Regmi D, Al-Shamsi S, Govender RD, Al Kaabi J (2020) Incidence and risk factors of type 2 diabetes mellitus in an overweight and obese population: a long-term retrospective cohort study from a Gulf state. *BMJ open* 10(7): e035813.
9. Diabetes Prevention Program (DPP) Research Group (2002) The Diabetes Prevention Program (DPP) description of lifestyle intervention. *Diabetes care* 25(12): 2165-2171.
10. Diabetes Prevention Program Research Group (2009) 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *The Lancet* 374(9702): 1677-1686.
11. Uusitupa M, Louheranta A, Lindström J, Valle T, Sundvall J, et al. (2000) The Finnish diabetes prevention study. *British Journal of Nutrition* 83(S1): S137-142.
12. Li G, Zhang P, Wang J, Gregg EW, Yang W, et al. (2008) The long-term effect of lifestyle interventions to prevent diabetes in the China Da Qing Diabetes Prevention Study: a 20-year follow-up study. *The Lancet* 371(9626): 1783-1789.
13. Ali HI, Al Ketbi LB, Platat C, Abdi El Baki H, Elmi F, et al. (2024) Impact of Skills for Change Program on metabolic control, diet and physical activity levels in adults with type 2 diabetes: A cluster randomized trial. *Plos one* 19(5): e0304639.
14. El-Deyarbi M, Ahmed LA, King J, Al Nuaimi H, Al Juboori A, et al. (2024) Effect of structured diet with exercise education on anthropometry and lifestyle modification in patients with type 2 diabetes: A 12-month randomized clinical trial. *Diabetes Research and Clinical Practice* 213: 111754.
15. Malik M, Bakir A, Abi Saab B, Roglic G, King H (2005) Glucose intolerance and associated factors in the multi-ethnic population of the United Arab Emirates: results of a national survey. *Diabetes research and clinical practice* 69(2): 188-195.
16. Saadi H, Carruthers SG, Nagelkerke N, Al-Maskari F, Afandi B, et al. (2007) Prevalence of diabetes mellitus and its complications in a population-based sample in Al Ain, United Arab Emirates. *Diabetes research and clinical practice* 78(3): 369-377.
17. Hajat C, Harrison O, Al Siksek Z (2012) Wegaya: a population-wide cardiovascular screening program in Abu Dhabi, United Arab Emirates. *American journal of public health* 102(5): 909-914.
18. Hamoudi R, Saheb Sharif-Askari N, Saheb Sharif-Askari F, Abusnana S, Aljaibaji H, et al. (2019) Prediabetes and diabetes prevalence and risk factors comparison between ethnic groups in the United Arab Emirates. *Scientific reports* 9(1): 17437.
19. Sulaiman N, Albadawi S, Abusnana S, Mairghani M, Hussein A, Al Awadi F, et al. (2018) High prevalence of diabetes among migrants in the United Arab Emirates using a cross-sectional survey. *Sci Rep* 8: 6862.
20. Alawadi F, Hassanein M, Suliman E, Hussain HY, Mamdouh H, et al. (2020) The prevalence of diabetes and pre-diabetes among the Dubai population: findings from Dubai household health surveys, 2014 and 2017. *Dubai Diabetes and Endocrinology Journal* 26(2): 78-84.
21. Al-Maskari F, El-Sadig M, Nagelkerke N (2010) Assessment of the direct medical costs of diabetes mellitus and its complications in the United Arab Emirates. *BMC public health* 10(1): 679.
22. Lee SM, Song I, Suh D, Chang C, Suh DC (2018) Treatment costs and factors associated with glycemic control among patients with diabetes in the United Arab Emirates. *Journal of obesity & metabolic syndrome* 27(4): 238.