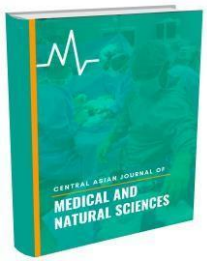

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Article

Does Every Diabetic Patient Have Obesity? or Does Every Obese Necessarily Have Diabetes?

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Abstract: This study explores the relationship between diabetes mellitus and obesity, we try to answer the popular question "Does every diabetic patient have obesity, or does every obese individual develop diabetes?" the data on the chart is collected from different countries worldwide, the research highlights different regions where diabetes and obesity are prevalence. The result show that high diabetes prevalence does not always correlate with high obesity rates, as seen in Pakistan, where genetic predispositions play a critical role. Conversely, countries like American Samoa exhibit high rates of both conditions due to dietary habits and sedentary lifestyles. The study underscores the impact of genetics, lifestyle, and environmental factors in shaping the global diabetes-obesity landscape. Ultimately, the study show that the importance of balanced diets, physical activity, and effective healthcare systems in mitigating the dual burden of diabetes and obesity.

Keywords: Diabetes mellitus, obesity, diabetes, glucose level, life style, genetics

1. Introduction

Human diet based on four basic macronutrients: protein, carbohydrate, and fats to make up a balanced, healthy body [1], when some of these macronutrients is taken in an exaggerated amount, it will have a negative effect. We will focus here on carbohydrate and how the bad carbohydrate or an excessive amount of it can lead to diabetes, and is it the main factor responsible for diabetes [2], The carbohydrate especially high glycaemic index, has a crucial role in Diabetes mellitus (DM), it is a group of diseases that cause group of complications such as obesity, cardiovascular disease, neuropathy, and others [3, 4], the spike of sugar level in blood, overtime, can lead to insulin resistance, or pancreatic β-cell disorder, and then diabetes mellitus. In T2DM the person consumes a lot of sugar so the glucose level is elevated in the bloodstream, the pancreas started excreting extra insulin, and it rejected from the cells for an unknown reason. Some these were physiological reasons and others perhaps for some hormones [5]. While T1DM occurred due to the total destruction in B cells, this happened due to the programming system of B cell apoptosis. It is most common in T1DM patients, that's happened due to transcription, growth factor, and hormone disorders. These factors also affecte the volume of B cells, which is increased when patient is increasing in size due to excessive sugar consumption. The B cells increasing size has opposite effect, as it accelerates their self-apoptosis [6] to

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control that we have to work on our bodies. As we know, there are three factors that affect our life directly: environmental condition, lifestyle, and genetics. They have to be contributed to cause any disease for someone. We can consider that genetics and environmental conditions are somehow imposed on a large layer of people, so let us agree that we can control over our lifestyle, so in this way, we can minimize the effective factors that may lead to diabetes mellitus [7]. Eating balance diet can protect people from diabetes mellitus and the complications that caused by it [8], and one of these complications is obesity [4]. Different studies have linked diabetes with obesity [9, 10, 11, 12]. In this study, we will explore and provide an answer to this widely common question: Does every diabetic patient have obesity? Or does every obesity necessarily have diabetes?.

2. Materials and Methods

We search about the obesity rate and diabetes rate in different country across various regions around the world, the including countries are Japan, China, Azerbaijan, Syria, Jourdan, Tunisian, USA, UK, Malysia, Singapore, India, gulf countries (Oman, Qatar, KSA,UAE, Kuwait, Bahrain), the information are taken from a sober papers, reports and website, published at sober journals, the information are taken and analysed to answer this question.

3. Results

Diabetes, obesity rate and life style effect.

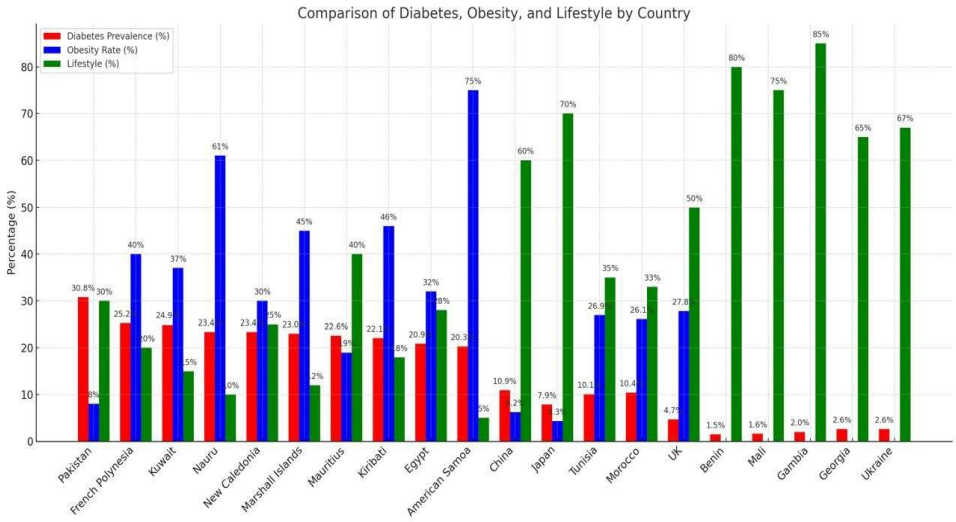

Fig1.Diabetes and obesity rate in several countries across various regions around the world

4. Discussion

The chart explain the different categories of people according the Diabetes multiuse, first 10 countries observed the High Diabetes Prevalence Countries, They include Pakistan, French Polynesia, Kuwait, Nauru, New Caledonia, Marshall Islands, Mauritius, Kiribati, Egypt, American Samoa, we observed that diabetes Prevalence, Extremely high, exceeding 20% in all country, and the highest country was Pakistan which reach 30.8%, the average is 22.2% in these countries[13,14,15].

Obesity Rates, Countries like Marshall Islands (45%), kiribati (46%),Nauru (61%), and American Samoa (75%) exhibit some of the highest rate of the obesity globally, and that is directly correlating with the diabetes prevalence there [13,14,15], The Lifestyle in these countries has increased the risk significantly, due to the shifting towards the

processed and energy-dense foods, in addition to the limitation in the physical activity due to urbanization and cultural habits further exacerbates the issue.

We will explain in details some factors and habits on each country and at the end we will discover the reality about the link between diabetes and obesity, for example, Pakistan has a high diabetes prevalence (30.8%) but a relatively low obesity rate (3%) among the first ten countries in the chart. This might be due to the several factors, Genetic Predisposition, South Asians, including Pakistanis, are genetically more prone to insulin resistance, which increases the risk of diabetes even in people with lower body weight[16], Physical Inactivity; Despite lower obesity also play a significant role , many individuals in Pakistan have diet High in Carbohydrates ,like white rice, bread, and sugary beverages, which contribute to insulin resistance[17],also South Asians tend to store fat around vital organs (visceral fat), which increases diabetes risk without necessarily raising overall body weight [18], urbanization has increased stress levels and reduced physical activity in urban areas, contributing to diabetes prevalence[19].

In Countries like, French Polynesia, Kuwait, Nauru, Marshall Islands, American Samoa, there are a common Characteristics, Lifestyle; People in these countries tend to have sedentary routines, they depend on vehicles instead of walking and rarely enrolled in physical activities. Also, the work environments have effects like if they often desk-based, with minimum exercise in daily life, in addition the diets are have influenced by Westernized eating patterns, which mean that include fast food, sugary drinks, and snacks, also the traditional foods which often healthy have been replaced by imported foods, which is calorie-dense options. For example, in American Samoa, the traditional fish plate and the root vegetables plates have been replaced by the processed canned meats and instant noodles [20], about the genetic Predisposition; Many Pacific Island nations like Nauru and the Marshall Islands have populations with a higher genetic predisposition to insulin resistance and weight gain when exposed to high-calorie diets [21].

Countries like, New Caledonia, Mauritius, Kiribati, Egypt are classifying as moderate Obesity and Diabetes Rates, Poor Lifestyle Adherence, the lifestyle of these countries experience a mix of urban and rural lifestyles [22]. In urban areas we can see more sedentary behaviour, while in rural regions we can note more physical activity but also lack access to the options of healthy food. For example, in Egypt, urbanization let people prefer the sedentary jobs and less active transfers. The diets in these countries also often consist of foods with high sugar and fats [23]. People in Mauritius, they prefer tea which is high sugar and the fried foods, that is the same habits for Egyptian people, they aften eat foods rich in pastries and sugary beverages. These eating habits contribute to obesity and diabetes. In Mauritius, genetic studies suggest a predisposition to Type 2 diabetes and that combined with modern high-calorie diets, other countries like, Nauru, American Samoa have lifestyle minimal physical activity, and depend on vehicles over walking even for short distances [24]. Traditional physical labour has been replaced by sedentary jobs or unemployment, further limiting calorie expenditure, people dependence on imported foods like canned meats, instant noodles, and sugary beverages has replaced the nutritious traditional diets based on fish, taro, and coconuts [25]. In American Samoa, processed foods often account for the majority of daily caloric intake, as we mention previously Pacific Islanders, including those in Nauru, have a genetic predisposition to store fat very efficient, which was advantageous in past when people were struggle to find their food but is now detrimental because people depending on high-calorie and low-nutrient diets [26].

We can divide this category (high diabetes rate countries to)

High Obesity + Low Activity, Countries, like French Polynesia, Kuwait, Nauru, Marshall Islands, American Samoa. Example: In Kuwait, fast food is a cultural norm, with families consuming high-calorie meals like fried chicken and soda daily. Physical activity levels are among the lowest globally, with many relying on domestic helpers for household chores.

Moderate Rates with Poor Adherence, Countries like New Caledonia, Mauritius, Kiribati, Egypt, Example: In Egypt, sugary tea, fried falafel, and pastries dominate the diet. Urbanization has led to less manual labour and fewer opportunities for physical exercise.

Low Obesity + High Diabetes, Country like Pakistan, Example; The diet is carb-heavy, including white rice, parathas, and sweet dishes, with limited fibre intake. Genetic predispositions combined with sedentary lifestyles and poor dietary habits drive diabetes rates.

Extreme Obesity Crisis, Countries like, Nauru and American Samoa; Example: In Nauru, reliance on imported processed foods has led to one of the highest obesity rates globally. People rarely engage in physical activity, and cultural norms prioritize caloric intake over health.

The next group of countries with moderate diabetes rates includes China, Japan, Tunisia, Morocco, and the UK. Diabetes levels range from 4.7% in the UK to 10.9% in China, showing a rising but still manageable trend. Obesity rates, however, differ quite a lot. Japan has an impressively low obesity rate of just 4.3%, while countries like Tunisia, Morocco, and the UK have rates well over 25%. Lifestyle factors play a big part in these differences. Take Japan, for example – their traditional diet, full of fish, soy, and vegetables, along with an active lifestyle, helps keep diabetes risks low. On the other hand, urbanisation in places like China, Tunisia, and Morocco has led to more processed foods being consumed. In the UK, a high obesity rate of 27.8% points to issues with calorie-heavy diets and sedentary habits. As more countries shift towards Western-style diets, diabetes rates are starting to rise, especially in developing nations. This shows how sticking to traditional diets and active ways of life, like in Japan, can really help prevent diabetes. [27,28].

The third countries are low diabetes prevalence countries include, Benin, Mali, Gambia, Georgia, and Ukraine, diabetes rates are remarkably low, staying under 3%. In Benin and Mali, for instance, the prevalence is just 1.5% and 1.6%, respectively. Obesity is also uncommon, particularly in Sub-Saharan Africa. This is largely down to their lifestyle and diet. Traditional meals are rich in fibre and low in processed sugars and fats. Moreover, physical activity is a natural part of everyday life, as many rely on manual work and have limited access to motorised transport. Together, these factors help keep diabetes rates low [29].

- High-prevalence countries require urgent interventions, such as dietary education, increased physical activity, and improved healthcare access.
- Moderate-prevalence nations must focus on prevention to avoid joining the high-prevalence group.
- Low-prevalence regions must safeguard against urbanization-induced risks while strengthening healthcare infrastructure

5. Conclusion

Obesity, diabetes, and lifestyle are closely connected. Obesity is a major risk factor for type 2 diabetes because it leads to insulin resistance. A sedentary lifestyle, an unhealthy diet, and lack of regular exercise worsen the situation. Interestingly, some countries report high obesity rates but low levels of diabetes, while others experience the reverse. This can often be attributed to genetics, eating habits, and the quality of healthcare. For instance, certain populations may have genetic defences against diabetes despite higher obesity rates, whereas others might be more prone due to poor dietary choices. Access to effective healthcare and early intervention also make a significant difference. Ultimately, both obesity and diabetes are influenced by a combination of lifestyle, genetics, and healthcare quality.

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