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MY PLATE CONTENT CONCEPT BY INDONESIA IN PEOPLE WITH DIABETES MELITUS

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Abstract

The metabolic condition known as Diabetes mellitus (DM) is chronic and complex. Several risk factors for Diabetes mellitus include age, degree of education, tobacco smoking, and BMI. In Indonesia, the incidence of Diabetes Mellitus has increased in every year. Impaired absorption of insulin in people with Diabetes mellitus requires sufferers to be able to pay more attention to many things in fulfilling daily nutrition. The contents of my plate can be a choice of eating concepts for diabetics. This research is to find out how the concept of eating with the contents of my plates for people with DM. This study use study literature method, where the researcher collects and quotes the necessary information from various sources of scrutiny. From this research, metabolic syndrome in Diabetes is a condition in which a person experiences hyperglycemia. Liquid glucose and insulin in patients can no longer function and carry out their work in the body as they should. The nutritional intake of people with Diabetes mellitus must be considered, because if not this disease can become a disease that can cause other diseases. This can be overcome by dieting for sufferers, dieting in the sense of maintaining the sufferer's daily eating habits each day which in this case can be done with the concept of my plate contents. From this study it can be seen that people with Diabetes mellitus have a high risk of contracting other co-morbidities. Individuals with Diabetes mellitus are at significant risk. With a good lifestyle, the risk factors for other co-morbidities can be minimized. This makes it important to pay attention to food consumption with the concept of what's on my plate for diabetics.

Keywords

Food Consumption, Diabetes Mellitus, Eating, Nutritions

1. Introduction

Information gathered in 2021 from the IDF Atlas Of Internasional Diabetes Federation states that Indonesia ranks 5th with the largest number of people with Diabetes worldwide This figure has almost doubled in just two years, compared to 10.7 million in 2019. This number has nearly doubled in just two years, from 10.7 million in 2019. Diabetes mellitus is more common than it once was. Around 550 million people are thought to have Diabetes worldwide today. According to a 2019 survey, there are currently 463 million diabetics globally. By 2023 until 2045, that data is predicted to rise to 578 -700 million people. Predictions have shown that the impact of Diabetes on the world is anticipated to keep growing significantly (Webber, 2013). Diabetes is becoming more common. Nearly 550 million individuals worldwide are thought currently to have DM/Diabetes Mellitus. Approximately 463 million people worldwide are predicted to have Diabetes, with that number expected to rise to 578 million people in 2030 and 700 million people in 2045, according to a 2019 analysis. According to the Next predictions, the worldwide impact of Diabetes is projected to keep growing dramatically. According to future forecasts, Diabetes will probably continue to have a large negative impact on the world. Within 20 years, the current Diabetes rate is anticipated to double.(Aggarwal et al., 2022).

Not everyone in the world is equally affected by the epidemic. Diseases are unevenly distributed across the globe. Although the global prevalence of Diabetes is 3-4%, some countries and regions have higher Diabetes prevalence (Stefánsson & Einarsdóttir, 2015). Obesity and Type 2 Diabetes Mellitus (T2DM) are closely connected (Lesiewska et al., 2021) . A person with excessive weight gain can elevate the danger of Diabetes mellitus and cardiovascular disease(Sofer et al., 2015). Controlling glycemic levels can reduce complications and optimize the quality of life for people with Diabetes. A person with Diabetes mellitus should focus more on maintaining their glycemic levels (Anon n.d.). A person with Diabetes mellitus should focus more on keeping their glycemic levels. The first step in controlling carbohydrate substances in blood sugar in adult-onset Diabetes mellitus depends on variations, situation, age, and the status of Diabetes complications and metabolic disorders, severity of Diabetes and metabolic disorders. (Davies et al., 2019).

The explanation above is a reference for researchers to go deeper into what kind of diet can be followed by people who have Diabetes. For those with Diabetes mellitus, the contents of my plate can use the T model, which consists of 1/2 portion of carbohydrates, 1/4 fiber, and 1/4 protein. With the existence of this method in Indonesia, researchers want to spread more widely about the

content of my plate method, which is the concept of eating in Indonesia. With this method in Indonesia, researchers want to spread the contents of my plate method more widely, an Indonesian eating concept.

2. Method

The relevant data for this study is gathered using the literature review method. A review of the literature was done in order to find papers about Diabetes mellitus nutritions. For a good understanding of the hypotheses and theories that have been obtained for this research from international journal publications as well as NBC, Google Scholar, PubMed, and Elesvier, and google scholar it was necessary to investigate numerous international journals. Keywords such as "metabolism", "metabolic syndrome", "Diabetes", "diet", "food", "insulin resistance", and "intermitten" were utilized. Published articles with full text accessibility and availability in English were the inclusion criteria.

3. Results and discussion

3.1. Definition

3.1.1. Metabolic Syndrome

The word "metabolic syndrome" (MetS) refers to a collection of related medical problems. (Taghipour et al. 2019). People who have at least three of the following conditions, including hypertension DM, and central obesity, are said to have metabolic syndrome. obesity. In addition, cardiovascular and renal diseases are also part of metabolic syndrome diseases (Alshelleh et al., 2019).

3.1.2. Diabetes Mellitus (DM)

Diabetes mellitus is a recurring, multifaceted, disordered metabolism. Data show that between the ages of 20-79, there were 463 million adults worldwide with Diabetes in 2019. Some of them already had Diabetes. A decrease in the general expression of angiogenic factors, such as in the heart, vascular system, and wounds, is a characteristic of Diabetes mellitus (Tan et al., 2021). It is predicted that there will be 629 million diabetics worldwide by 2045. The World Health Organization (WHO) claims the number of those with Diabetes increased between 108 million in 1980 and 422 million in 2014. In low- and middle-income countries than in high-income countries, Diabetes prevalence is rising more swiftly. Diabetes is now the main factor in renal disease, heart

disease, stroke, blindness, and amputation of limbs. Type-1 Diabetes is identified by an inadequate synthesis of insulin by the human body due to pancreatic cell injury. The reason for this reaction is currently unknown. However, genetic and environmental factors may both play a role. Type-2 is where the pancreatic cells cannot produce enough insulin for the proper functioning of the body cells experiencing resistance to insulin use. In this case, it is necessary to adopt a healthy lifestyle with regular exercise and a low-calorie diet because the lifestyle of the patient is typically to blame for the risk factors for type 2 Diabetes. Risk factors for type 2 Diabetes include Obesity or overweight (Chellappan et al., 2023).

3.1.3. Diet

Those with Diabetes mellitus should follow certain dietary guidelines and get enough nourishment. Diet is a term used to describe the kind, quantity, and makeup of food a person consumes regularly. Consuming foods high in protein, fat, sugar, or carbohydrates can increase your chance of developing Diabetes mellitus. The more food consumed, the more likely it is to cause Diabetes mellitus. In addition, most sufferers of Type-1 Diabetes mellitus have a normal diet because type-1 disease is based on genetic factors, and type-2 has a poor diet, namely more nutritional status (Obesity), the aspect of not implementing a healthy lifestyle (Asyumdah et al., 2020).

3.1.4. Food

In Diabetes mellitus, a high intake of fiber and complex carbohydrates is necessary. Because complex carbohydrates and fiber are processed long enough in digestion and can delay sustainable hunger, this makes sugar levels in the body more stable. (Fajarini and Sartika 2019) Recommended DF (dietary fiber) intake The American Diabetes Association advises patients with Diabetes to consume fiber by recommendations for the general population to boost consumption to 14 g of fiber per 1000 calories, or roughly 25 g for women and 38 g for men, per day. Although it is advised that 50% of all grains taken should be whole grains, no precise recommendations are offered regarding the optimum type of DF consumption. (Weickert & Pfeiffer, 2018)

Recommended dietary composition variations are 50% to 60% complex carbs, 25% to 45% fiber, 30% fat, 1g/kg/day (for general patients), or 0.8g/kg/day (for nephropathy and macroalbuminuria) of protein. Oil use should be no more than three teaspoons daily and less than

5g/day for sodium intake. Patients also use the diabetic plate method, which is half a plate of vegetables, a quarter of protein, and a quarter of complex carbohydrates (Wicaksana et al., 2020).

In one of the research findings, it was said that a connection existed between the consumption of a high-fiber diet by people with Diabetes and a decrease in the area under the plasma glucose and insulin concentration curve for 24 hours. The ADA also suggests high dietary fiber intake because it is more effective glycemic control, lowers plasma lipid contents, and lowers hyperinsulinemia in those with type 2 Diabetes (Mao et al., 2021).

3.2. Problem Magnitude

A total of 351.7 million working-age people (20 to 64 years old) will have Diabetes in 2019, according to the 9th edition of the IDF Diabetes Atlas. These figures are anticipated to increase to 417.3 and 486.1 million, respectively, by 2030 and 2045. The region will see the largest gain as the economy moves from a low-income to a middle-income status. China, India, and the US are predicted to continue to have the largest diabetes mellitus populations in the world by 2030. With 10.7 million diabetics, Indonesia ranks eighth overall (Indrahadi et al., 2021).

Table 1: *Top 10 Nations or Regions for Adults (20-79 Years Old) with Diabetes in 2019, 2030 And 2045*

2019			2030			2045		
Rank	Country or territory	Number of people with diabetes (millions)	Rank	Country or territory	Number of people with diabetes (millions)	Rank	Country or territory	Number of people with diabetes (millions)
1	China	116.4 (108.6–145.7) ⁱ	1	China	140.5 (130.3–172.3)	1	China	147.2 (134.7–176.2)
2	India	77.0 (62.4–96.4)	2	India	101.0 (81.6–125.6)	2	India	134.2 (108.5–165.7)
3	United States of America	31.0 (26.7–35.8)	3	United States of America	34.4 (29.7–39.8)	3	Pakistan	37.1 (15.8–58.5)
4	Pakistan	19.4 (7.9–30.4)	4	Pakistan	26.2 (10.9–41.4)	4	United States of America	36.0 (31.0–41.6)
5	Brazil	16.8 (15.0–18.7)	5	Brazil	21.5 (19.3–24.0)	5	Brazil	26.0 (23.2–28.7)
6	Mexico	12.8 (7.2–15.4)	6	Mexico	17.2 (9.7–20.6)	6	Mexico	22.3 (12.7–26.8)
7	Indonesia	10.7 (9.2–11.5)	7	Indonesia	13.7 (11.9–14.9)	7	Egypt	16.9 (9.0–19.4)
8	Germany	9.5 (7.8–10.6)	8	Egypt	11.9 (6.4–13.5)	8	Indonesia	16.6 (14.6–18.2)
9	Egypt	8.9 (4.8–10.1)	9	Bangladesh	11.4 (9.4–14.4)	9	Bangladesh	15.0 (12.4–18.9)
10	Bangladesh	8.4 (7.0–10.7)	10	Germany	10.1 (8.4–11.3)	10	Turkey	10.4 (7.4–13.3)

i 95% confidence intervals are reported in brackets.

(Source: *IDF Diabetes Atlas 2019*)

In 2020, the International Diabetes Federation estimated that more than 6% of the nation's 172 million adults had Diabetes. With 10.3 million persons living with Diabetes mellitus in 2017, Indonesia was placed sixth. The number of individuals with Diabetes mellitus will rise from 10.3 million in 2017 to 16.7 million in 2045. (2021, Chalidyanto) The national prevalence of Diabetes (population aged 15 years and over) based on Indonesian Basic Health Research in 2013 and 2018 indicates that the proportion of people with Diabetes mellitus in the population over 15 years has increased, recorded at 6.9%, and grew by 2% in 2018. (Indrahadi et al., 2021)

In Jakarta, Indonesia, 76.5% of persons with type 2 diabetes also have diabetes mellitus, which is the proportion of people with Diabetes in that country. In a similar vein, Jakarta has the greatest percentage of people with Diabetes Mellitus based on doctor diagnoses in those

under the age of 15, at 3.4%, and Nusa Tenggara Timur has the lowest rate (0.9%). (Mao et al., 2021)

Due to the major shift from traditional to modern lives brought about by socioeconomic development over the past 40–50 years, this is influenced. As a result, technological advancements have resulted in a lack of physical activity, an abundance of consumption of foods high in fat, sugar, and calories, and high levels of mental stress. It have the potential to reduce insulin sensitivity and cause obesity (Wicaksana et al., 2020).

3.3. Clinical Symptoms

Based on research conducted by (Afroj A. Shaikh et al., 2022) there are several signs and symptoms of Diabetes Mellitus including:

Table 2: *A Table with Sign and Symbtoms in Diabetes Mellitus Patients*

S. No.	Sign	Symptoms
1	Extreme hunger (Polyphagia)	Dry mouth and skin
2	Excessive thirst (Polydipsia)	Foot pain
3	Frequent urination (Polyuria)	Yeast Infection
4	Slow wound healing	Genital and skin infection
5	Akantosis Nigrikans	Fatigue
6	Weight loss	Nausea
7	Dehydration	Pain in Stomach
8	Pain	Vomiting
9	Flushed face	Blurred Vision

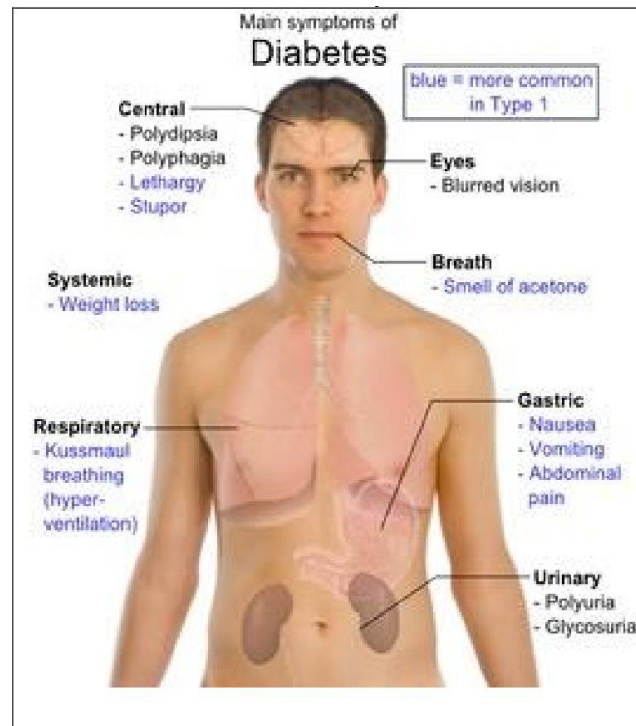
In the research (Dwivedi et al., n.d.) they found that when the sugar level in the blood gets too high, it can make a person have symptoms of Diabetes. Diabetes can make you feel thirsty all the time, and you might lose weight even if you are eating normally. You might also need to go to the bathroom often and need help seeing clearly. Sometimes, when you get hurt, it might take longer for your boo-boos to get better because you might feel really tired all the time.

1. Male Symptoms: Along with the typical symptoms, men with Diabetes may also experience erectile dysfunction (ED), diminished sex, and weak muscles.

2. Symptoms in Women: Diabetes in Women may also experience urinary tract infections, yeast infections, and dry and itchy skin. Women with Diabetes may also have problems with their pee, get itchy down there, and have dry skin.

Type 1 Diabetes

Figure 1: Symptoms of Diabetes type-1



(Source: *The History, Definition and Classification of Diabetes Mellitus 2013*

<https://www.semanticscholar.org/paper/2.1.-THE-HISTORY%2C-DEFINITION-AND-CLASSIFICATION-OF/dfa679438608a5c52fb9b749811ad3e1c383db78>)

In people with this type of Diabetes, the signs of the disease come on fast and are very noticeable. Sometimes, when someone has Diabetes, their body can get sick and make too much acid. This can happen very fast and is called diabetic ketoacidosis. Early signs of diabetic ketoacidosis, particularly in youngsters, often include nausea, vomiting, exhaustion, and stomach discomfort. In addition to the usual symptoms of Diabetes, such as excessive thirst and urination. (Grunbaum, 2023) The blood's acidity is being adjusted by the body (see Acidosis), breathing becomes deep and quick, and the breath smells like acetone. If untreated, diabetic ketoacidosis can quickly lead to coma and death. When type 1 diabetes first develops, some patients go through

a protracted but brief period (the honeymoon phase) in which their blood glucose levels are nearly normal due to a partial recovery of their insulin secretion.

Type 2 Diabetes

Before being diagnosed, people with type 2 diabetes may not exhibit any symptoms for years or even decades. Subtle signs could exist. Initial increases in urination and thirst are mild, but they gradually worsen over weeks or months. After a while, the person starts to feel drained, tends to have blurry vision, and could become dehydrated. Blood sugar levels can occasionally drop very low in the early stages of Diabetes, a condition known as hypoglycemia. Even if type 2 diabetes has gone untreated for a long period, because persons with type 2 diabetes make insulin, they typically do not have ketoacidosis. (Grunbaum, 2023)

Rarely blood glucose levels can even approach 1000 mg/dL (55.5 mmol/L), which is extremely high. Other types of stress, such as infections or pharmaceutical use, frequently contribute to this rise. Hyperosmolar hyperglycemic state, which is caused when blood sugar levels rise too high, can cause a person to become severely dehydrated and experience confusion, sleepiness, and seizures. Through routine blood glucose checks, many persons with type 2 diabetes are identified before their blood glucose levels become extremely high.

If blood glucose levels significantly rise, both types of Diabetes (Type 1 and Type 2 diabetes) may present with remarkably similar symptoms (Grunbaum 2023). Symptoms of high blood sugar include:

1. An increase in thirst.
2. An increase in urination.
3. An increase in hunger.

The Glucose levels exceed 160-180 mg/dL (8.9 to 10.0 mmol/L); it might be found in urine. When there is an increase in the urine's level of Glucose, the kidneys release more water to dilute the excessive amount of Glucose. Because their kidneys produce an extreme volume of urine, people with Diabetes frequently urinate (polyuria). A polydipsia, or overproduction of pee, causes excessive thirst. After urinating the extra calories, the person can lose weight. They frequently go through acute hunger periods to make up for it (Grunbaum 2023).

Other diabetic symptoms include.

1. Distorted vision.
2. Sleepiness.
3. Queasy
4. Reduced resistance to physical activity.

In the early stages of T2DM, there are usually no symptoms of Diabetes. Common symptoms of Diabetes are as follows:

1. Increased thirst as water and electrolytes in the body decrease (polydipsia).
 2. Increased hunger due to reduced glucose levels in tissues (polyphagia).
 3. The condition of urine containing glucose usually occurs when the blood glucose level is 10 mg/dL(glycosuria).
 4. Increases the osmolarity of the glomerular filtrate and reabsorption of water is inhibited in the renaltubules resulting in increased urine volume (polyuria).
 5. Dehydration due to increased glucose levels causes hypertonic extracellular fluid and water in the cellsto escape.
 6. Fatigue due to impaired CHO utilization results in exhaustion and loss of body tissue despite normalor increased food intake.
 7. Body fluid loss, muscular tissue breakdown, and fat conversion all contribute to weight loss.
 8. And other symptoms include reduced vision, cramps, constipation, and candidiasis infection.
- (Hardianto, 2021)

3.4. Risk Factors

Obesity, age, race/ethnicity, and family history greater than or equivalent to forty; prior Diabetes risk factors include hypertension, hyperlipidemia, poor glucose tolerance or impaired fasting glucose levels, and a background of gestational diabetic mellitus. Common risk factors for Diabetes include genetic factors based on family history, adiposity, race/ethnicity, age greater than or equal to forty years, experience with low glucose tolerance or impaired fasting glucose, history of hypertension, hyperlipidemia, and history of gestational Diabetes (Almotairi, 2022). The possibility of developing diabetes mellitus exists in people with a family history of the disease. Someone will likely develop diabetes mellitus through a family history of the disease. Age is the second risk factor influencing the prevalence of Diabetes mellitus, however. (Mayasari &

Indahyati, 2021). Based on research conducted by (Safitri et al., 2021) there are several risk factors for Diabetes Mellitus, including:

1. Based on Age

People aged >35 years are more likely to suffer from Diabetes in urban areas. People aged >35 years have a 5.60-fold risk of developing Diabetes compared to people aged ≤35 years. This is in line with the review that cases of Diabetes mellitus increase with age, especially those aged over 40 years (Amoussou-Guenou et al., 2015).

2. Education Level

Diabetes prevalence in metropolitan regions is correlated with low levels of education. Compared to individuals with high education levels, those with poor education have a 1.69 times higher risk of having Diabetes.

3. Smoking Status

Based on IFLS 5 data, smoking is not a factor in the incidence of Diabetes in urban Indonesia. According to this study, the majority of diabetics profess not to smoke.

4. Body Mass Index

People who fall into the overweight and obese BMI categories—those who also have high blood lipid levels, high diastolic blood pressure, and a big waist circumference—should be concerned about the possibility of developing metabolic syndrome. The study found no correlation between the prevalence of Diabetes in metropolitan areas and any of the BMI categories (underweight, normal, overweight, and obese). In addition, based on research conducted by (Siahaan et al., 2023) there are several risk factors for Diabetes Mellitus, including:

(a) Age: The age group >50 years have a 0.336 times higher risk of developing type 2 DM than the age group <50 years. In research (Liyanage, 2019), the highest age group at risk of developing Diabetes Mellitus is between 41 to 55 years.

(b) Consumption of Meat and Fried Foods: High levels of trans fats, saturated fats, and cholesterol can be found in meat and fried foods. Blood levels of adiponectin, which increases insulin sensitivity, are reduced due to high-fat eating. Patients with low adiponectin levels have a higher prevalence of Diabetes and Obesity.

(c) *Diet*: An imbalance in the body's intake of carbohydrates and other nutrients results from unhealthily balanced diets that include junk food, fried meals, and sugar-sweetened beverages. Type 2 DM is the result of the pancreas working too hard as a result of excessively high sugar levels.

(d) *Alcohol Consumption*: Alcohol can affect glucose metabolism by inhibiting the process of gluconeogenesis and glycogenolysis, which triggers hypoglycemia. This hypoglycemia begins with excessive food consumption, including carbohydrates, which can cause an increase in blood glucose levels in DM patients.

(e) *Smoking Habit*: Smoking habit increases the risk of 0.835 higher suffering from Diabetes than non-smokers. This is because the nicotine content in cigarettes increases the formation of free radicals that cause inflammation and reduce insulin sensitivity.

3.5. Measurement Method

3.5.1. SF-FFQ Questionnaire

By aggregating the anticipated number of servings that teenagers ingested via a one-time interview, this measure evaluates the frequency of food consumed over the course of the previous month.

3.6. Impact of Diabetes Mellitus

Diabetes mellitus is the leading cause of premature death worldwide. (Vlad and Popa 2012) Diabetes mellitus can reduce quality of life and life expectancy, it can also cause microvascular complications and macrovascular complications that lead to blindness, kidney failure, myocardial infarction, stroke, and the need to amputate limbs

4. CONCLUSION

Excessive weight gain can increase the risk of Diabetes mellitus and cardiovascular disease. Indonesia is ranked 5th with the most sufferers in the world. This research was carried out using a literature review method so that the results were that the more food consumed, the greater the possibility of causing Diabetes mellitus. So, it is recommended for people with

Diabetes mellitus to consume a high intake of fiber and complex carbohydrates because they are more effective in controlling glycemia, reducing plasma lipid content, and reducing hyperinsulinemia. This journal can be followed up for future research with a wider scope by using analytical methods using primary data or going directly to the field.

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