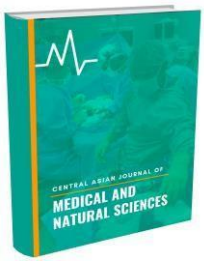

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Article

A statistical study on diabetes

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Abstract: Diabetes, sometimes referred to as diabetes mellitus (DM), is a collection of metabolic diseases characterized by persistently elevated blood sugar levels. If left untreated, symptoms may include increased thirst, increased appetite, and frequent urination. Many consequences, including acute diseases such diabetic ketoacidosis, hyperglycemia, hyperosmolar state, and even mortality, may result from diabetes. Serious ailments include heart disease, stroke, chronic renal disease, foot ulcers, nerve damage, vision damage, and cognitive decline are examples of long-term effects. We shall investigate the definition of diabetes, its many forms, its causes, its symptoms, and its preventative measures in this study.

Keywords: Statistical, Diabetes

1. Introduction

Diabetes results from insufficient insulin production by the pancreas or from ineffective insulin uptake by the body's cells[1]. Diabetes comes in three main forms: Diabetes Types 1, 2, and gestational[2].

1. The loss of beta cells causes the pancreas to produce insufficient insulin, which leads to type I diabetes. This kind was once referred to as "juvenile diabetes" or "insulin-dependent diabetes mellitus" (IDDM)[3].

2. Insulin resistance, a condition in which cells misrespond to insulin, is the precursor of type 2 diabetes. As the illness worsens, insulin insufficiency also appears. This model was once referred to as mule-partial disease or non-insulin-dependent diabetes mellitus (NIDDM). Obesity and inactivity combined are the most frequent causes[4].

3. The third main kind, gestational diabetes, causes increased blood sugar levels in pregnant women who have never had diabetes before. A balanced diet, frequent exercise, keeping a healthy weight, abstaining from tobacco, controlling blood pressure, and making sure your feet and eyes are taken care of are all important components of prevention and therapy for this illness.[4] Insulin injections are necessary to control Type 1 diabetes, although oral medicines are often used to treat Type 2 diabetes, which may be managed with or without insulin. Certain patients with Type 2 diabetes may benefit from obesity-related weight reduction surger[5]y. Usually, gestational diabetes goes away after giving delivery. An estimated 425 million individuals worldwide have diabetes as of 2017, with Type 2 diabetes making up 90% of cases and impacting 8.8% of adults, evenly divided between men and women.[1]

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2. Materials and Methods

Search problem:

According to data from the World Health Organization, there has been a rise in the prevalence of diabetes among gang members worldwide at all ages and in a variety of settings[6]. This is expected given that the disease causes dangerous complications like kidney and heart disease, amputation of limbs, and paralysis, as well as the premature death of children and adults[7].

Research Objective:

The research aims to identify the causes of diabetes that lead to an increase in the incidence of diabetes and to reach some recommendations and solutions that help and contribute to reducing the incidence of this disease[8].

Research hypothesis:

H0 There are no factors affecting the increased incidence of diabetes [9]

H1There are factors affecting the increase in the incidence of diabetes

3. Results and Discussion

How to make a search:

The study involved residents of Baghdad province as the research sample to gather essential data regarding research and insurance accuracy in answering questions. A statistical questionnaire prepared by student researchers was used to collect data, distributed among 50 individuals in Al Ain[7]. Data processing utilized the statistical software SPSS to extract results, employing the chi-square distribution for analysis. The research objectives were achieved through a descriptive analytical approach, aiming to elucidate the causes and treatment mechanisms of diabetes. Data was obtained via questionnaires tailored for this purpose, subsequently unloaded and analyzed using SPSS.

Types of diabetes:

A series of illnesses known as diabetes mellitus occur when the body either produces too little insulin, uses the insulin it does make improperly, or does both. High blood sugar levels result from the body's inability to transfer sugar from the blood into the cells when this occurs. One of the primary sources of energy in the blood is glucose, which is obtained from sugar. Blood sugar levels rise as a result of insulin resistance or insufficiency, which may cause a number of health issues. The primary kinds are[10]:

1. Type I diabetes
2. Type II diabetes
3. Pregnant diabetes

Causes of diabetes:

To prevent unexpected rises, diabetics need to maintain tight control over their blood sugar levels. Blood sugar levels may increase suddenly for a number of reasons. Sudden sugar consumption is one of the main causes of these surges[11].

1. Food quality
2. Laziness and lack of exercise
3. Lack of sleep
4. Smoking
5. Exposure to psychological stress
6. Taking certain medications

Symptoms of diabetes:

There are many customs that in turn can be felt that you have diabetes, and the most famous of these symptoms are the following[12]:

1. Feeling dry in the mouth and stressed the need to drink water and can cause dry skin and itching
2. Numbness of the limbs and numbness of the limbs
3. Bad breath
4. Dark spots on the surface of the ice, such as the armpits or neck, are a sign of a higher risk of diabetes
5. Frequent need to urinate, as it is one of the months and first symptoms that accompanied diabetes, a condition that increases the person's need for spacing in quantities and times more than usual so that he may feel the need to urinate frequently and suddenly, especially during the night, and may eventually reach the occurrence of cases of involuntary urination[13]

Ways to prevent diabetes:

There are many methods used in order to prevent diabetes, and these are the most prominent methods and procedures that work to prevent diabetes as much as possible

1. Reduce the amount of sugar and processed carbs you eat.
2. Try to reduce your weight if you are obese or overweight.
3. Engage in regular exercise.
4. Stay hydrated by drinking plenty of water.
5. Watch out when you eat it.
6. Increase your vitamin D levels.
7. Drink coffee or tea.
8. Quit smoking cigarettes[14].

How to treat diabetes:

Although a particular therapy for diabetes cannot be identified, there are certain approaches that help lessen the severity of symptoms or problems[15]. In order to minimize symptoms and avoid major consequences, blood sugar levels should be kept within the normal range for controlling diabetes in the population exhibition[16]. The treatment strategy calls for constant observation, modifications to lifestyle, and maybe careful use of certain prescription drugs under supervision. In situations of type I diabetes, the specialized doctor also considers the kind of sugar that the patient may have; if this is the case, the doctor prescribes insulin that is administered with hate. Regarding type II diabetes, different people will need different pharmacological therapies depending on their blood sugar levels and individual diabetic symptoms[14].

Tables showing the characteristics and attributes of the research sample

1. General information about diabetes covered by research

Table 1. Illustrates The Distribution Of Research Sample Members By Gender

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
male	29	58.0	58.0	58
Female	21	42.0	42.0	100.0
Total	50	100.0	100.0	

From Table 1, it is evident that 29 respondents, constituting 58%, are male, while the remaining 42% are female[17].

Table 2 displays the distribution of research sample members by age.

	Frequency	Percent	Valid Percent	Cumulative Percent
18 Under	6	12.0	12.0	12.0
18-30	18	36.0	36.0	36.0
30-50	14	28.0	28.0	28.0
50-70	12	24.0	24.0	24.0
Total	50	100.0	100.0	100.0

Table (2) shows respondents by work The first act was younger than 18 years old 12%, the second age group from 18 to 30 years constituted 36%, the third age group from 30 to 50 years constituted 28%, and the last age group from 50 to 70 years was 24%[18]

Table (3) shows the distribution of the research sample according to the incidence of diabetes

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	32	68.0	68.0	68.0
no	16	32.0	32.0	100.0
Total	50	100.0	100.0	

Table (3) is related to the distribution of the sample members according to their population disease and also that 68% of the sample does not have population disease while the remaining number of the sample of 32% of those with diabetes

Chi-square test 3:

Using the statistical software SPSS v.20, a null hypothesis (H0) and an alternative hypothesis (H1) that was accepted within the sample levels 99 by 95% demonstrate the presence or lack of a link between the two variable phenomena.

Test of Chi-Square Independence[19]

A statistical technique called the Chi-Square technique of Independence is used to ascertain if two category variables are related. It contrasts the estimated p-value obtained from the data with a predefined significance threshold (alpha). It is established if there is a substantial association between the variables by comparing these values.

1. Formulation of hypotheses: alternative and null hypothesis [20]

Null hypothesis is the initial hypothesis.

When doing the test for the two variables and writing the empty in this manner, there is no connection between the variable I mean and a symbol for this hypothesis, which is supposed for my validity.

In the case of V1 and V2, when 1 and 2 variables are being studied and attained Preferably non-statistical English is written as follows[21]:

(There is no connection between the two variables.) H0: V1 exists separately from V2

The alternate theory is the second one.

The two variables under investigation have a link; this hypothesis is denoted by h1, and the methodology is expressed as follows.

V1 and V2, the two variables under investigation, are independent of one another. Preferably non-statistical English is written as follows:

H1: V1 is in need of V2.

2. Alpha Level of Significance

The likelihood of making a Type I mistake is represented by the significance level, which is often indicated by α (alpha) and chosen by the researcher when doing the Chi-Square test. When the null hypothesis (H_0) is rejected, implying a link between the variables when there isn't one, this is known as a Type I mistake[22].

The p-value that was found from the data analysis is compared with the α value that the researcher selected (e.g., $\alpha = 0.01$ or $\alpha = 0.05$). The likelihood of seeing the data or more extreme outcomes if the null hypothesis is correct is shown by the p-value. The researcher rejects the null hypothesis if the p-value is less than or equal to α.

Selecting a smaller α number (e.g., $\alpha = 0.01$) increases the test's rigor and lowers the possibility of a Type I mistake. Consequently, when $\alpha = 0.01$ is used, the test result is seen as more conservative and trustworthy in determining that a link exists between the variables since rejecting the null hypothesis requires greater evidence (a lower p-value). This method is often used in domains like quality control or medical research where reducing Type I mistakes is essential[23].

3. What does the term "p-value" mean?

Perfectly accurate. An important metric in hypothesis testing is the p-value, which shows how strong the evidence is against the null hypothesis (H_0). It is less probable that the observed findings are the product of chance when the p-value is smaller, since this indicates greater evidence against H_0.

This is an explanation[24]:

Decreased p-value: Strong evidence opposing H_0 is shown by a very low p-value (less than 0.05 or 0.01) in this case. In this instance, we may accept the alternative hypothesis (H_1), which suggests that the variables under investigation have a link, and reject the null hypothesis.

- **High p-value**: A high p-value (e.g., more than 0.05) indicates a lackluster case against H_0. In these cases, we are unable to reject the null hypothesis, suggesting that there is not enough data to draw the conclusion that the variables are related.

Therefore, p-values are usually interpreted by researchers using a pre-established significance threshold (α). A decreased p-value, which indicates a connection or effect between variables, supports the rejection of H_0 in favor of H_1.

4. Compare the outcome with the researcher's selected moral standard. The next stage is to interpret the outcome in light of other values[25].

If the researcher choose to use alpha = 0.01 or the morale level, we compare the two levels of significance and the p-value that come from the test in the following way.

It can be concluded that there is enough evidence to support the null hypothesis and that the two variables under study are independent of one another if the p-value is higher than

the significant level, which is 0.01 based on the results of the chi-squared test of independence[26].

Should the p-value be less than the moral level's 0.01 value The chi-squared test of independence value indicates that there is enough evidence to reject the imposition of nothingness, indicating that the two variables under investigation are not independent and have an impact on each other. Similarly, if the research determines that another significant level value should be chosen, a comparison between two values can be made[28]. You choose a nuclear 0.01 level. You may be certain that the selection is accurate to 99%, but often, in studies that don't need extremely exact precision, the researcher selects a different significant level, like 0.05. As a consequence, when the test value and result are obtained, it can be said that the result is 95% right[27].

Table 4. Does diet contribute to the treatment of diabetes

Sex	Does diet contribute to the treatment of diabetes			Total
	yes	sometimes	no	
male	7	17	4	28
female	15	6	0	21
Total	22	23	4	49

Table 5. Chi-Square Test

Chi-Square Tests	Value	df	Asymptotic Significance (2 sided)
Pearson Chi-Square	11.403a	2	.03
Likelihood Ratio	13.001	2	.002
Linear-by-Linear Association	10.952	1	.001
N of Valid Cases	49		

Examine hypothesis H0. There is no discernible connection between sex and whether nutrition plays a role in managing diabetes.

H1 There is a strong correlation between sex and whether or not nutrition helps with diabetes management.

Considering the data supplied:

- A two-sided asymptotic significance value of 0.03 is shown in Tables (4) and (5).

This translates to a 0.03 Chi-Square value.

- As a consequence, we accept the alternative hypothesis (H_1) and reject the null hypothesis (H_0).
- Consequently, there is a strong correlation between sex and whether or not nutrition plays a role in diabetes management.

Strong evidence against $H0_0$ is shown by the p-value (asymptotic significance) of 0.03, which is smaller than the normal significance threshold of $\alpha = 0.05$ (assuming it is used

here). Therefore, we conclude that there is a connection between sex and how well food works to manage diabetes.

Table 6. Age and Diabetes

Do you have diabetes	lifetime				Total
	Under 18	18-30	30-50	50-70	
yes	4	8	11	11	34
no	2	10	3	1	16
Total	6	18	14	12	50

Table 7. Chi-Square II Test

Chi-Square Tests	Value	df	Asymptotic Significance (2 sided)
Pearson Chi-Square	8.403a	3	.038
Likelihood Ratio	8.886	3	.031
Linear-by-Linear Association	4.968	1	.026
N of Valid Cases	50		

Test hypothesis

H0 Age and diabetes do not significantly correlate with one another.

H1 There is a strong correlation between diabetes and age.

Tables (6) and (7) show that there is a substantial correlation between age and diabetes based on the values of Asymptotic Significance (2-sided) (0.03) and Chi-Square (0.03), which lead to the acceptance of (h0) and (h1).

Table 8. Is there a relationship between the disease and the genetic factor and whether periodic blood sugar screening helps reduce the incidence of the disease

Does checking blood sugar help reduce the incidence of the disease?	Is there a relationship between the disease and the genetic factor			Total
	yes	Once in a while	no	
yes	13	7	0	20
Once in a while	17	5	1	23
no	5	2	0	7
Total	35	14	1	50

Table 9. Chi-Square Test III

Chi-Square Tests	Value	df	Asymptotic Significance (2 sided)
Pearson Chi-Square	1.979a	4	.741
Likelihood Ratio	2.352	4	.671
Linear-by-Linear Association	0.114	1	.736
N of Valid Cases	50		

Examine hypothesis H0. The illness and the genetic component do not significantly correlate, nor does the frequency of blood sugar checks seem to lower the disease's occurrence.

H1 There is a strong link between the hereditary component and the condition, and it is unclear whether routine blood sugar monitoring lowers the disease's occurrence.

Assume (h0) and accept (h1) based on Tables (8) and (9) which show the values of Asymptotic Significance (2-sided) (0.03) and Chi-Square (0.741). Consequently, there is a noteworthy connection between Are there any hereditary factors associated with the condition, and does routine blood sugar testing assist lower the disease's incidence?

Table 10. Is there a relationship between the disease and the genetic factor and can a diabetic patient exercise

Is there a relationship between the disease and the genetic factor	Can a diabetic patient exercise			Total
	yes	Once in a while	no	
yes	22	10	3	35
Once in a while	6	7	1	14
no	0	1	0	1
Total	28	18	4	50

Table 11. Fourth Chi-Square Test

Chi-Square Tests	Value	df	Asymptotic Significance (2 sided)
Pearson Chi-Square	3.829a	4	.430
Likelihood Ratio	4.080	4	.395
Linear-by-Linear Association	1.334	1	.248

N of Valid Cases	50		

Test hypothesis

H0 Can a patient with diabetes engage in physical activity? There is no discernible connection between the hereditary component and the illness.

H1 Can a patient with diabetes engage in physical activity? There is a strong correlation between the hereditary component and the illness.

Based on the information provided:

- An asymptotic significance (2-sided) value of 0.03 is shown in Tables (10) and (11).
- 0.430 is the Chi-Square value.
- As a consequence, we accept the alternative hypothesis (H_1) and reject the null hypothesis (H_0).
- Consequently, there is a strong link between the hereditary component and the illness.

Regarding whether a diabetic patient can exercise:

- The Chi-Square test results do not directly address the ability of diabetic patients to exercise.
- Exercise is generally recommended for diabetic patients as part of a healthy lifestyle to manage blood sugar levels and improve overall health.
- Specific exercise recommendations should be tailored to individual patient circumstances, considering their overall health status, type of diabetes, and any other medical conditions.

In conclusion, the Chi-Square test findings do not directly address the question of whether diabetic individuals can exercise, but they do point to a substantial association between the condition and hereditary variables. However, when done under proper medical supervision, exercise is often good for diabetes individuals..

1. Through the analysis of research data, it is found that
   - From Table (1), the research sample included 58% males and 42% females
   - Table No. Two Distribution of sample members by work was 28%, the age groups of 18 to 30, followed by the age group 30 to 50 for 28%, then the age group 50 to 70 for 24%, and the remaining 12% The age group younger than 18 years
   - From Table three, it was found that 68% of the sample members are infected and the remaining 32% are not infected
2. It appeared through analysis tables that there is a significant relationship between each of the following
   - Age and do you have diabetes
   - Are you diabetic or does one of your parents have diabetes?
   - Does obesity increase the likelihood of developing population disease and can a diabetic patient exercise
3. Through the tables of analyses there is no relationship between whether periodic checking of blood sugar helps almost from diabetes and is there a relationship between the disease and the genetic factor

4. Conclusion

Upon conclusion of this study, it is evident that diabetes poses a worldwide health dilemma that necessitates collaborative endeavors to address and mitigate its

proliferation. This study examines the many classifications, etiologies, and manifestations of diabetes, along with the strategies used for its prevention and treatment. Gaining a profound comprehension of the aspects that impact the rise in diabetes cases may aid in the formulation of efficient approaches to mitigate this escalation. The study findings shown a substantial correlation between many characteristics, including age, gender, food, and illness incidence. This underscores the need of targeting health awareness and treatments towards these factors.

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