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Glucose Determination And Level Of Knowledge About Diabetes Among Selected Participants At Duba University

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Abstract
Background: *Diabetes is a chronic health condition that affects how your body turns food into energy. Most of the food you eat is broken down into sugar (also called glucose) and released into your bloodstream. When your blood sugar goes up, it signals your pancreas to release insulin. Insulin acts like a key to let the blood sugar into your body's cells for use as energy. If a person has diabetes, their body either does not make enough insulin or cannot use the insulin. When there is not enough insulin too much blood sugar stays in the bloodstream. It can cause serious health problems, such as heart disease, vision loss, and kidney disease. There isn't a cure yet for diabetes, but losing weight, eating healthy food, and being active can help. Taking medicine as needed, and getting diabetes self-management education and support can reduce the impact of diabetes on your life.*
Objective: *The reason for this study is to determine the glucose level of participants before and after the PowerPoint presentation and to assess the level of awareness of selected participants about diabetes. The major tool in gathering the data was 1-10 survey questionnaires. The first part of the questionnaire was the demographic profile of the participants in terms of the following: age, year level of students, and the type of participants. The second part of the survey questionnaire includes 1-10 questions about diabetes. Pre and post-tests were given to the students after the PowerPoint presentation about diabetes. The z-test was utilized as a statistical tool to get the differences of the means. The data gathered was encoded in Excel and SPSS to get the mean, percentage, frequency, and standard deviation.*
Result: *The result shows that the level of glucose in the pre and post-test are the same after the PowerPoint presentation. There was a fair level of knowledge of selected participants about diabetes in the pre and post-test after the PowerPoint presentation.*
Conclusion: *In conclusion, it is stated that there are no significant differences in pre and post-test glucose determination after the PowerPoint presentation. The level of knowledge of the participants in the pre-test was satisfactory and good in the post-test after the PowerPoint presentation about diabetes.*

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I. Introduction:

Glucose comes from the Greek word for "sweet." It is a type of sugar you obtain from foods you eat, and your body uses it for energy. As it goes through your bloodstream to your cells, it is called blood glucose or blood sugar. *DerSarkissian, C. (2020). https://www.webmd.com/diabetes/glucose-diabetes#1*. According to Nguyen, T. (2018), Glucose is recognized as a single sugar found in the blood. He said that diabetes is a chronic disease that can be encountered at any age and concerns an increasing number in developed countries today. from *http://urn.fi/URN:NBN:fi:amk-2018122022537*

Blood glucose differs on a person's health condition and whether the person is fasting or non-fasting. A person with no diabetes has 72–140 milligrams of glucose per 1 deciliter of blood. *Eske, J. (2020) emphasizes that* the person with slightly higher blood glucose or termed diabetic has 80–180 milligrams per deciliter (mg/dL). Atypical blood sugar levels occur when there is either high or little sugar in the blood. The blood sugar ranges for each are: Low blood sugar or hypoglycemia has 70 mg/dL or less. High blood sugar or hyperglycemia has more than 180 mg/dL. *https://www.medicalnewstoday.com/articles/glucose-blood-test#blood-sugar-levels*

Blood glucose normally retains within the 3.5-8.5 mmol/L (63-153 mg/dL) range because of the effect of two hormones in the pancreas. Wexler, D., Macias-Konstantopoulos, W., & Forcione, D. (2018) emphasized that glucagon secretion induced by falling blood glucose concentration, makes blood glucose become high in concentration. Insulin secretion, induced by rising blood glucose concentration, causes the blood sugar to become low concentration. *https://acutecaretesting.org/en/journal-scans/rare-cause-of-hypoglycemia-highlighted-in-case-study-report.*

Awareness is a requirement in diabetic management. Maintaining blood sugar levels within the normal range advised by the doctor is challenging for the patient. Physical activity is important as part of the diabetes

management plan. Exercise needs glucose. This will help to decrease blood sugar levels. Light activities like gardening in the household can improve the level of blood sugar. *Mayo Foundation for Medical Education and Research. (2020). https://www.mayoclinic.org/diseases-conditions/diabetes/in-depth/diabetes-management/art-20047963.*

According to the International Diabetes Federation, DM affects about 8.8% of the worldwide population over 20 years of age. Middle Eastern and North African (MENA) countries have a higher prevalence of DM compared to other regions in the world; the prevalence rate was 9.6% in 2017, and the rate is expected to increase to 12.1% by 2045. Similarly, Saudi Arabia has the highest rate of DM in the MENA region (prevalence rate of 17.7%). *Alanazi, F. K., Alotaibi, J. S., Paliadelis, P., Alqarawi, N., Alsharari, A., & Albagawi, B. (2018). . https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6201026/.*

Centers for Disease Control and Prevention *CDC)* (2020) emphasized that it is essential to keep your blood glucose level in the normal range to avoid health problems like heart disease, vision loss, and kidney damage. Keeping your blood sugar in range will help improve your mood and energy. A glucometer checks your blood sugar meter measures the amount of sugar in a small sample of blood, usually from your fingertip. It uses a sensor inserted under the skin to measure your blood sugar. CDC advises monitoring blood glucose levels to stay healthy. *https://www.cdc.gov/diabetes/managing/manage-blood-sugar.html.*

Rachel, N., & Falck, S. (2020) said that self-monitoring blood sugar levels is vital for effective diabetes management, helping to regulate meal scheduling, physical activity, and when to take medication, including insulin. While self-monitoring blood glucose (SMBG) machines vary, they will generally include a meter and test strip for generating readings and a lancing device to prick the skin to obtain a small quantity of blood. A person who is self-monitoring diabetes uses a device called a lancet to prick the skin. While the idea of drawing blood might cause distress for some people, the lancing of the finger to obtain a blood sample should be a gentle, simple procedure.

As projected by the American Diabetes Association (ADA), diabetes is a serious, chronic condition. and the seventh leading cause of death in the U.S. While diabetes itself is manageable, its complications can severely impact daily living, and some can be fatal if not treated immediately. Diabetes is a life-changing condition that requires careful blood sugar management and a healthy lifestyle for a person to be able to manage it correctly. *https://www.medicalnewstoday.com/articles/323627.*

Statement of the Problem

This study assessed the knowledge level of selected participants before and after the PowerPoint presentation about glucose awareness. Specifically, this study answered the following questions such as: what is the profile of the participants in terms of: 1). age, year level, and types of respondents; 2) what is the percentage of pre and post glucose level of selected participants after the PowerPoint presentation; 3) is there significant differences in pre and post-test of the glucose level of selected participants after the presentation; 4) what are the percentage of pre-test and post-test results of the answers of the participants in 1-10 survey questionnaires; 5)is there a significant difference between the result of pre-test and post-test in the survey questionnaires of the selected participants after the PowerPoint presentation?

Relevant general background

The study was conducted at Duba University in Laboratory 2. The participants are the selected MLT students and the staff at Duba University. A participant outside Duba University is not included in the study.

Importance of the study

This study identified the awareness and knowledge level of selected participants about diabetes. The result of this study is beneficial to students and staff in the university to pay attention to their glucose levels especially if they have a history of diabetes in the family.

II. Literature Review

Knowledge and awareness of diabetes mellitus and its risk factors in Saudi Arabia.

Saudi Arabia was dedicated to managing DM. The expenditures in healthcare were approximately 0.78 billion dollars. Sufficient knowledge and awareness in the community are important to control the prevalence of diabetes mellitus. To help diabetic patients, their families, nurses, and healthcare physicians need a high level of management and complications of diabetes. This study reviewed a better understanding of the Saudi population's diabetes mellitus. They summarize the peer-reviewed publication about the public knowledge and awareness of diabetes mellitus among the population of Saudi Arabia by following standard reporting guidelines outlined in PRISMA for preparation of a systematic review. The study conducted literature searches of PubMed, Scopus, BIOSIS Citation Index, and Web of Science using the following keywords: “Knowledge” OR

"Awareness" AND "Diabetes Mellitus" AND "Saudi Arabia." Records were screened, and relevant studies were selected and synthesized narratively. *(Alanazi, F. K., Alotaibi, J. S., Paliadelis, P., Alqarawi, N., Alsharari, A., & Albagawi, B. (2018). Saudi Medical Journal. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6201026/)*

This study has a similarity to our research because this study will determine the knowledge assessment of their participant; same with our study this research will determine the knowledge awareness of the participants by retrieving information from PRISMA guidelines. In our study, we will determine the blood glucose levels of the selected participants and distribute questionnaires to assess the knowledge of participants about diabetes.

Knowledge about Diabetes and Glycemic Control among Diabetic Patients in Saudi Arabia.

The incidence of diabetes in regions of Saudi Arabia poses vigilant attention among medical experts. The incidence of diabetes is anticipated to increase in the future due to changes in diet and lifestyle of a person. There was a similarity in our research with this study. We both use the knowledge test of Michigan Diabetes Knowledge Test. These items were assessed for their reliability which was found to be 0.7 and 0.71 along with adequate internal consistency (Cronbach alpha), i.e., 0.702. Developed by the University of Michigan's Diabetes Research and Training, the MDKT was used, which is also accessible online at http://diabetesresearch.med.umich.edu/Tools_SurveyInstruments.php#dkt. *Abouammoh, N. A., & Alshamrani, M. A. (2020). Journal of Diabetes Research. https://www.hindawi.com/journals/jdr/2020/1239735/).* The only difference is that we used 10 items while this study used 14 items in the questionnaires. Even though students in MLT students have adequate knowledge, valuable attention is required to give a discussion about diabetes to help control the mortality of diabetes in Saudi Arabia.

Knowledge, Attitudes, and Practices Regarding Diabetes Mellitus Among DMSO

Knowledge, attitudes, and practices regarding diabetes mellitus (DM) among university students. The study was carried out at the Faculty of Medicine, Rabigh, King Abdulaziz University (KAU) Jeddah, Kingdom of Saudi Arabia (KSA), in 2018. All participants were registered students in the foundation year in the branch of KAU, Rabigh. A questionnaire was developed that had questions related to knowledge, attitudes, and practices. *(Gazzaz, Z. (2020, December 23). Retrieved January 26, 2021, from https://www.dovepress.com/knowledge-attitudes-and-practices-regarding-diabetes-mellitus-among-un-peer-reviewed-article-DMSO*

There is a similarity in our study in the distribution of questionnaires about the knowledge in diabetes. The differences are they will determine the knowledge, attitudes, and practices regarding diabetes mellitus (DM). In our study, we focus only on selected MLT students in the MLT department at the University of Tabuk, Duba branch.

Knowledge, Attitude, and Practice of Blood Glucose Monitoring in Rural Area among Diabetic Patients

According to the WHO, Pakistan is positioned seventh in the pervasiveness of Diabetes. In 2011, the assessed pervasiveness of diabetes in Pakistan was generally more than 350 million and it is expected to be more than 550 million by the year 2030. They conducted blood glucose observation among diabetics in the rural group of the Husain Abad community. A descriptive cross-sectional investigation configuration was led to evaluate learning. *Shabnum, S., & Sarwar, H. International Journal of Social Sciences and Management. Https://doi.org/10.3126/ijssm.v5i3.20615.*

In this study, they determined the blood glucose of participants the same as in our study. They made a cross-sectional investigation to evaluate the learning of participants. In our study, we will use survey questionnaires to assess the knowledge of students about diabetes.

Knowledge attitude and practice regarding diabetes mellitus among Nondiabetic and diabetic study participants in Bangladesh

This present study was undertaken to explore knowledge, attitude, and practice (KAP) regarding -diabetes mellitus (DM) among nondiabetic (nonDM) and type 2 diabetes mellitus (T2DM) patients in Bangladesh. From OPD and 19 health care centers. The participants were assessed by pre-structured interviews and administered questionnaires and categorized using pre-defined scores of poor, average, and good. *Fatema, K., Hossain, S., Natasha, K., Chowdhury, H. A., Akter, J., Khan, T., & Ali, L. (2017, January 26). BMC Public Health. https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-017-4285-9.*

The differences between our study in this research are, that we will determine the blood glucose of participants using a glucometer and we will use survey questionnaires to determine the glucose level and knowledge awareness of the participants in our study.

Knowledge Questionnaire on Diabetes Mellitus

Worldwide India leads in diabetes mellitus and within India, Kerala tops the list. Keeping in view increasing the burden of diabetes mellitus in Kerala, it is highly important to know about the awareness of the disease among the general population to chalk out culturally appropriate and need-oriented educational strategies. The objective of this study is to assess the knowledge of diabetes mellitus in the rural populace of Kerala using random interviews among six selected wards using the interview to assess the knowledge of the participants. Knowledge was assessed in four domains including general awareness of diabetes mellitus, its risk factors, complications, and lifestyle modifications. *Staff, D. T. N. (2018, April 19). diabetestalk.net.https://diabetestalk.net/diabetes/knowledge-questionnaire-on-diabetes-mellitus*. The difference between our study with this research is that we will conduct our study in the university with MLT students while in this study, they use the rural population. In our study, we will assess the knowledge of our participants using survey questionnaires.

Rationale of topic selection

The reason for this study is to identify the awareness and knowledge level of selected participants about diabetes. They want further understanding of diabetes because it is one of the most common diseases in Saudi Arabia.

Research Objectives:

This study determined the percentage of the glucose level of participants before and after the PowerPoint presentation about diabetes and assessed the level of knowledge of participants before and after the PowerPoint presentation about diabetes.

Hypothesis

This study hypothesized that there are no significant differences between the pre and post-blood glucose levels of participants after the PowerPoint presentation. There are no significant differences between the pre and post-test results in the survey questionnaire after the PowerPoint presentation.

Scope and Limitation of the Study

The study was limited to selected participants in Duba University. It is conducted in Laboratory 2 in the Medical Laboratory Technology Department at Duba University. Z test was used in this study. The age group was between 18-52 years old. Participants above 52 years old were not included in the study and with 112 estimated number of student and 50 staff in Duba University, 58 students and two staff participated in the study.

III. Materials and Methods:

The major tool in gathering the data based on the presentation in the statement of the problem was 1-10 survey questionnaires. The first part of the questionnaire was the demographic profile of the participants in terms of the following: age, year level of students, and the type of participants. The second part of the survey questionnaire includes 1-10 questions about diabetes. Pre and post-tests were given to the students after the PowerPoint presentation about diabetes.

IV. Results and Discussion

Based on the results of the statement of the problem the following results were formulated.

1. In the profile of the participants in terms of age, eighteen to twenty-two years old participants have 54 (69.2%) with the highest number of participants. Twenty-three to twenty-seven years old participants have 3 (3.8%). Twenty-eight to thirty-two years old participants have 1 (1.3%). Forty-three to forty-seven years old participants have 2 (2.6%). In the profile of participants in terms of year level, the second-year level of participants demonstrated 5 (7.4%). Third-year level shows 29 (42.6%) with the highest number of participants in the study. The fourth year's level indicates 19 (27.9%). Irregular students show 5 (7.4%). In the types of participants, the total number of students who participated in the study (was 58 (74.4%) with the highest number of participants while 2 (2.6%) participated by the guard.

2. Pre and post-test results of blood determination. The participant with 62 (91.2%) had the normal result of blood glucose levels while 6 (8.8%) participants had high glucose levels.

3. Is there a significant difference in the pre- and post-glucose levels of participants after the PowerPoint presentation?

Of the participants, 62 (91.2%) had the normal result of blood glucose levels while 6 (8.8%) participants had high glucose levels. There is no significant difference in the post and pre-test of the glucose level of students.

4. What is the percentage of pre-test and post-test results of the answers of the participants in 1-10 survey questionnaires?

In pre-test question number one. Forty (68.3%) have the correct answer while in post post-test, 55 (91.7%) have the correct answer which means, the participants have a very good level of knowledge about the diabetic diet is a healthy diet for most people. Centers for Disease Control and Prevention (CDC) stated that a food plan is your guide for when, what, and how much to eat to get the diet you need while keeping your blood sugar levels within your normal range.

In the Pre-test, question number two. 27 (45%) got the correct answer, while in the post-test, 39 (65%) had the correct answer. The participants have a satisfactory level of knowledge about the highest carbohydrates in baked potato as compared to Swiss cheese, baked chicken, and peanut butter. According to diabetestalk.net (2018), potatoes are bad carbohydrates for diabetics, because potatoes are complex carbohydrates like rice and wheat. The glycemic index rating of potatoes makes them a bad carbohydrate. Any GI score above 70 is high and causes a rapid spike in blood sugar. Higuera, V (2019) emphasizes that, instead of baking, boiling, or frying regular potatoes, prepare yams or sweet potatoes. Both are low-fat and low-calorie and help steady the level of blood sugar.

Pre test, question number three: 22 (36.7%) has the correct answer. Post test, 24 (40%) has the correct answer. The participants have a satisfactory level of knowledge about; low fat milk (2%) has highest fat compared to orange juice, corn, and honey. Kerr, G (2019) mentioned in his article that, two percent milk must be fortified with vitamin A to be nutritionally equivalent to whole milk. Whole milk typically has 395 International Unit of vitamin A, while 2 percent has 464 IU per cup.

Pre test Question number four: 19 (31.7%) has the correct answer. In post test, 28 (46.7) got the correct answer about; A1C is a measure of your average blood glucose level for the past 6-12 weeks. . Center for Disease Control and Prevention (CDC) 2018, explained that, A1C test measures your average blood sugar levels over the past 3 months to diagnose prediabetes and diabetes. Higher A1C levels are linked to diabetes complications, reaching and maintaining individual A1C goal is important in diabetic patient. The students got a satisfactory level of knowledge about this question.

Pre test Question number five: 23 (38.3%) has the correct answer while post test, 16(26.7%) has the correct answer. The participants have a satisfactory level of knowledge about the rising effect of unsweetened fruit juice on blood glucose. Bruso, J (2015) said that 1-cup serving of grapefruit juice provides all the vitamin C you need for the day 72 milligrams. However, since it contains carbohydrates, it can also raise your blood glucose levels if you consume it in large amounts.

Pre-test Question number six: 24 (38.3%) has the correct answer. while post-test, 38 (63.3%) had the correct answer. The participants got a good level of knowledge in question about, how heavy exercise may result in low blood glucose. Mischel, F (2019) believed that exercise can cause low blood sugar when the body's stores of blood sugar are used up too quickly. Diabetic person has important things to understand about low blood sugar about exercise. If left untreated, hypoglycemia can have serious health consequences. Nada, N (2021) posted that, test blood glucose before an activity. The blood sugar higher than 100 mg/dl and lower than 250 mg/dl will not get a person to a hypoglycemia state.

Pre-test Question number seven: 16 (26.7%) had the correct answer while post-test, 25 (41.7%) had the correct answer. The participants have a satisfactory level of knowledge about diet soft drinks should not be used to treat low blood glucose. Diet soft drinks cannot be used to treat an episode of hypoglycemia because they do not have any sugar. Examples of foods that raise your sugar quickly like, five to six pieces of hard candy or jelly beans and One tablespoon (15 milliliters) of sugar, corn syrup, or honey. *https://www.mayoclinic.org/diseases-conditions/diabetic-hypoglycemia/diagnosis-treatment/drc-20371529*

Pre test Question number eight: 45 (75%) has the correct answer and post test, 49 (81.7%) has the correct answer. Participants have a very good level of knowledge about drinking juice if beginning to have a low blood glucose level. National Institute of Diabetes and Digestive and Kidney Diseases published that if the person feels to begin hypoglycemia symptoms, drink 15 grams of carbohydrates immediately, like ½ cup of fruit juice, not low calorie or reduced sugar.

Pre test Question number nine: 39(65%) has the correct answer while post test, 48 (80%) has the correct answer. Participants have a very good level of knowledge about blood testing is the best method for home glucose testing. Dansinger, M (2019) stated that, traditional home glucose monitoring can let the person prick their finger with a small, sharp needle, put a drop of blood on test strip, and place the strip into the meter that displays their blood sugar level.

In the analysis of pre and post test results in survey questionnaires, the test for mean, standard deviation. The mean value of 0.45 in pre test and mean value of 0.65. Standard deviation in pre test is 0.4234 in pre test while in post test has 0.4863. The Z test computed value is 2.40 and Z test table value of 1.96. 2.40 is more than 1.96 therefore there is a significant difference with the critical value for two tailed tests of 1.96 value.

V. Conclusions and Recommendations

Based on the findings of the study, the following conclusions were formulated such as the participants who participated in the study were mostly, eighteen to twenty-two years old, third-year level students. The pre- and post-blood glucose determination of participants had the same result with 62 (91.2%) having normal result of blood glucose levels while 6 (8.8%) participants had high glucose levels. There are no significant differences between the pre-and post-glucose determination because it is the same values.

Most of the participants got 91.7 in question number one about the healthy diet of diabetic patients with a very good level of knowledge. Very good level of knowledge of participants in question number 10, with 83.3%, question number 8 with 81.7%, and question 9 with 80% correct answers. Good level of knowledge of participants in questions number 2, and 6. The satisfactory level of participants in questions 3, 4, and 7 while the insufficient level of knowledge of students was 26.7% about the effect of unsweetened fruit juice on the blood glucose level of diabetic patients. The glucose levels of participants had no significant differences before and after the PowerPoint presentation. The level of knowledge of the participants in the pre-test was satisfactory and good in the post-test after the PowerPoint presentation about diabetes. In the analysis of data, standard deviation and The Z test were utilized and there is a significant difference with the critical value for two-tailed tests of 1.96 values.

Questionnaire used:

We are inviting you to participate in our research by answering the survey questionnaires about Diabetes.

Name: _____

Please check:

Age:

A. 18-22	B. 23-27	C. 28-32	D. 33-37	E. 38-42	F. 43-47	G.48-52	H.53-57	I. 58-62

Year Level for students:

A. Second year	B. Third year	C. Fourth year	D. Irregular student

Type of participants:

A. Student	B. Teacher	C. Employee Write the branch:	D. Guard	E. Cleaner

English with arabic questionnaires:

1.The diabetes diet is: a. the way most American people eat b. a healthy diet for most people c. too high in carbohydrate for most people d. too high in protein for most people	6.A low blood glucose reaction may be caused by: a. heavy exercise b. infection c. overeating d. not taking your insulin
2. Which of the following is highest in carbohydrate? a. Baked chicken b. Swiss cheese c. Baked potato d. Peanut butter	7. Which should not be used to treat a low blood glucose? a. 3 hard candies b. 1/2 cup orange juice c. 1 cup diet soft drink d. 1 cup skim milk
3. Which of the following is highest in fat? a. Low fat (2%) milk b. Orange juice c. Corn d. Honey	8. If you are beginning to have a low blood glucose reaction, you should? a. exercise b. lie down and rest c. drink some juice d. take rapid-acting insulin
4.A1C is a measure of your average blood glucose level for the past: a. day b. week c. 6-12 weeks d. 6 months	9. Which is the best method for home glucose testing? a. Urine testing b. Blood testing c. Both are equally good
5. What effect does unsweetened fruit juice have on blood glucose? a. Lowers it b. Raises it c. Has no effect	10. High blood glucose may be caused by? a. not enough insulin b. skipping meals c. delaying your snack d. skipping your exercise

Thank you for answering the survey!

List of Tables

Table 1
Distribution of Respondents in Terms of Age

Age	Frequency	Percent
18-22	54	90
23-27	3	5.0
28-32	1	1.7
43-47	2	3.3
Total	60	100

Table 1. illustrates based on the findings of the statement of the problem the following findings were formulated. In the profile of the participants in terms of age, eighteen to twenty-two years old participants demonstrate 54 (69.2%). Twenty-three to twenty-seven years old participants show 3 (3.8%). Twenty-eight to thirty-two years old participants illustrate that 1 (1.3%). Forty-three to forty-seven years old participants point up that 2 (2.6%).

Table 2
Distribution of Respondents in Terms of Year Level of Student

Year level	Frequency	Percent
Second Year	5	7.4
Third year	29	42.6
Fourth Year	19	27.9
Irregular student	5	7.4
Total	58	85.3

Table 2. demonstrates that the second-year level of participants demonstrates 5 (7.4%). Third-year level shows 29 (42.6%). The fourth year's level indicates 19 (27.9%). Irregular students show 5 (7.4%).

Table 3
Distribution of Respondents in Terms of Types of Participants

	Frequency	Percent
Student	58	96
Guard	2	3.3
Total	60	100

Table 3. Shows the distribution of respondents in terms of types of participants: The total number of students was 58 (74.4%) while 2 (2.6%) participated by the guard.

Table 4
Pre and Post Test in Blood Glucose Determination

Pre-Test	Result	Frequency	Percent	Valid Percent
	Normal	62	91.2	91.2
	High	6	8.8	8.8
	Total	68	100	100
Post Test	Result	Frequency	Percent	Valid Percent
	Normal	62	91.2	91.2
	High	6	8.8	8.8
	Total	68	100	100

Table 4 shows the frequency and percentage of pre and post-test glucose determination. In the Pre-test, 62 (91.2%) had normal blood glucose levels, and 6 (8.8%) high blood glucose levels. In the Post-test, 62 (91.2%) had normal blood glucose levels, and 6 (8.8%) had high blood glucose levels.

Table 5
Pre and Post Test Results in Survey Questionnaires

Question number	Type of answer	Pre Test		Post Test	
		Frequency	Percentage	Frequency	Percentage
1. What is a diabetic diet	Wrong answer	19	31.7	5	8.3
	Correct answer	41	68.3	55	91.7
2. Which of these has highest carbohydrates	Wrong answer	33	55	21	35
	Correct answer	27	45	39	65
3. Which of the following is highest in fat?	Wrong answer	38	63.3	36	60
	Correct answer	22	36.7	24	40
4. How many weeks will A1C measure the average blood glucose level for the past?	Wrong answer	41	68.3	32	53.3
	Correct answer	19	31.7	28	46.7
5.What effect does unsweetened fruit juice have on blood glucose?	Wrong answer	37	61.7	44	73.3
	Correct answer	23	38.3	16	26.7
6. Which of these is the reaction of low blood glucose?	Wrong answer	37	61.7	22	36.7
	Correct answer	24	38.3	38	63.3
7. Which should not be used to treat low blood glucose?	Wrong answer	44	73.3	35	58.3
	Correct answer	16	26.7	25	41.7
8. If the person beginning to have a low blood glucose reaction, they should?	Wrong answer	15	25	11	18.3
	Correct answer	45	75	49	81.7
9. Which is the best method for home glucose testing?	Wrong answer	21	35	12	20
	Correct answer	39	65	48	80
10. Which of these is the cause of high blood glucose?	Wrong answer	17	28.3	10	16.7
	Correct answer	43	71.7	50	83.3

Table 5 shows the pre and post-test results in survey questionnaires. In Pretest Question number one. Forty (68.3%) had the correct answer and Nineteen (31.7%) had the wrong answer. while post-test, 55 (91.7%) had the correct answer, and five (8.3%) had the wrong answer. In Pre-test Question number two. 27 (45%) had the correct answer and 33 (55%) had the wrong answer. while post-test, 39 (65%) had the correct answer and 21 (35%) had the wrong answer. Pre-test Question number three: 22 (36.7%) had the correct answer and 38 (63.3%) had the wrong answer. while post-test, 24 (40%) had the correct answer and 36 (60%) had the wrong answer. Pre-test Question number four: 19 (31.7%) had the correct answer and 41 (68.3%) has the wrong answer. while post-test, 28 (46.7) had the correct answer and 32 (53.3%) had the wrong answer. Pre-test Question number five: 23 (38.3%) have the correct answer and 37 (61.7%) have the wrong answer. while post-test, 16(26.7%) had the correct answer and 44 (73.3%) had the wrong answer. Pretest Question number six: 24 (38.3%) have the correct answer and 37 (61.7%) have the wrong answer. while post-test, 38 (63.3%) have the correct answer and 22 (36.7%) have the wrong answer. Pretest Question number seven: 16 (26.7%) have the correct answer and 44 (73.3%) has the wrong answer while, post-test, 25 (41.7%) have the correct answer and 35 (58.3%) have the wrong answer. Pretest Question number eight: 45 (75%) have the correct answer and 15 (25%) have the wrong answer. while post-test, 49 (81.7%) had the correct answer and 11 (18.3%) had the wrong answer Pretest Question number nine: 39(65%) had the correct answer and 21(35%) had the wrong Answer while post-test, 48 (80%) has the correct answer and 12 (20%) has the wrong answer. Pretest Question number ten: 43 (71.7%) have the correct answer and 17 (28.3%) have the wrong answer. While on, the post-test, 50 (83.3%) has the correct answer and 10 (16.7%) had the wrong answer.

Pre and Post Test Mean and Standard Deviation using Survey Questionnaires

Pre-test			Post-test		
Question #	Mean	Std. Deviation	Question #	Mean	Std. Deviation
1	0.68	0.47	1	0.92	0.28

2	0.45	0.50	2	0.65	0.48
3	0.37	0.49	3	0.40	0.49
4	0.32	0.47	4	0.47	0.50
5	0.38	0.49	5	0.27	0.45
6	0.38	0.49	6	0.63	0.49
7	0.27	0.45	7	0.42	0.50
8	0.75	0.44	8	0.82	0.39
9	0.65	0.48	9	0.80	0.40
10	0.72	0.45	10	0.83	0.38

Table 6 illustrates the mean and standard deviation of pre and post-test in survey questionnaires

Table 7
Analysis of the Test Using Mean Value, Standard Deviation, and Z Test Value

Analysis of the test:

	Mean Value	Standard deviation	Z test value (computed)	Z test Table value	Decision
Pre-test	0.45	0.4234	2.40	1.96	There is significant differences
Post-test	0.65	0.4867			