International Journal of Arts Humanities and Social Sciences Studies
Volume 9 Issue 9 ǁ September 2024
ISSN: 2582-1601
www.ijahss.com

Application of Intervention in Type 2 Diabetes in Adolescent Population (Two) Finale

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Abstract: *This comprehensive research study project examined the relationships between evaluate the effectiveness of self-care education to program that provides strategies and the change unhealthy lifestyle diet and activity behavior to healthy behaviors to reduce* ***HgA1c levels*** *of adolescent participants. This study project used the* ***theoretical framework*** *of "****Locke's Goal Setting Theory is an additional model stating the theory of goal setting is based on human behavior determined by goals it sets itself****" as a lens of analyses. This research study project used Quantitative "****Non Experimental Descriptive Statistics****" as a lens of collected secondary data analysis. This research study project collected 40 confidential secondary data from a* ***Clinic in Southwest Houston, Texas*** *for four months, after being exposed to the prescribed treatments' interventions. The research study project found that 40 secondary data were not robust enough to find any reasonable statistical generalized findings thereafter in this critical research study's project. Above all, the study also found that 4 months was too short to make any reasonable significant or insignificants statistical differences between and after in the data analyses. Collectively, 25 more participants were added for Pre-Tests analyses with a totality of 65 and 20 more participants were added for Post-Tests with a totality of 60 participants in 6 months instead of 4 months exposure to intervention. The study found some profound internal and external statistical significant differences between Pre-Tests and Post-Tests. The study demonstrated* ***that simple changes in ones' "LIFESTYLES" without any prescribed INSULINS' medications, has a profound significant positive effects in adolescents' A1Cs Levels' Measurements in 6 months or less. The research encouraged both parents and adolescents in the US should participate in such INTERVENTIONS which eventually bring some POSITIVE SOCIAL CHANGES to their families and possibly beyond.***

Key Notes: *HgA1c levels, A1C,* T2DM, *Teens, Adolescents, Blood Sugar Level, Parents, Activities, Inactivates, Clinic, Houston, Texas, Clinical, Self-care, Parental Care, and Levels of A1C, Diabetes, Overall Changes, Lifestyles' Changes .*

I. Introduction

Purpose of the Project Research Study

The purpose of the project was to evaluate the effectiveness of self-care education to program that provides strategies to change unhealthy lifestyle diet and activity behavior to healthy behaviors to reduce HgA1c levels of adolescent participants.

A Brief History of Type 2 Diabetes in the Adolescent Population

The rapid emergence of childhood Type 2 Diabetes Mellitus (T2DM) poses challenges to many physicians generally in the United States; especially those in the southern US, who find themselves generally ill-equipped to effectively, efficiently, and proficiently treat adult diseases encountered in children (Copeland et al., 2013). Evidence has shown that common life style behaviors of adolescents in general, lack of daily exercise, consumption of diets high in simple carbohydrates, and fatty foods account for T2DM. While it has been suggested by physicians that adolescents with T2DM should have a mobile lifestyle and adhere to a certain diet prescribed by their physician, these lifestyle changes are often difficult for the adolescent (Niddk, 2015). A diet high in simple carbohydrates and lack of daily exercise leads to preventable and expensive health issues associated with a diagnosis of Type 2 diabetes during adolescents.

Evidence indicates that a proper diet provides a reduction in the level of blood sugar levels in general. Furthermore, it improves the active work of the muscles contributes to the enhanced absorption of glucose, which significantly reduces the level of sugar in the blood (Jensen, Rustad, Kolnes, & Lai, 2011). Additionally, evidence had also shown that high physical activity in diabetes helps get rid of extra pounds; contrarily to low or lack of physical activity which is one of the main causes of high blood sugar. This T2DM concern has become an overwhelming issue for many physicians in the southern US cities. Therefore, due to this out of control health issues among adolescents in the southern US, this project was designed to focus on the effect on adolescents with T2DM HgA1c levels of an education program for adolescents and their parents on making healthy diet and exercise lifestyle changes as a primary intervention methodology.

Background on the Problem and Population of Interests

The purpose of the project is to evaluate the effectiveness of self-care education to program that provides strategies to change unhealthy lifestyle diet and activity behavior to healthy behaviors to reduce HgA1c levels of adolescent participants. A child is also in danger if his mother has gestational diabetes. This diabetes develops as a result of increased insensitivity to insulin during mother's pregnancy due to the increase of hormones of the placenta. The risk of diabetes affects the presence of diseases that are accompanied by a decrease in insulin. This may be a violation of fat metabolism or arterial hypertension. An elevated blood cholesterol level is also a risk factor. At the same time, blood vessels are destroyed; metabolism is disturbed, which increases the risk of diabetes mellitus. Miscarriage in type 2 diabetes in adolescents leads to obesity. Increased consumption of fats, simple carbohydrates and a small amount of fiber and proteins leads to the development of diabetes. Excessive weight in a child can be detected at an early age, even in 3-4 years of age. Beside the above, glucose metabolism disturbances are common among adolescents.

Adolescents who find glucose metabolism disturbances should be under medical observation and the parents of these children should ensure that they follow the guidelines and recommendation of the physicians. It should be noted that with age it becomes more difficult to lose weight and maintain normal body weight. To do this, it is enough to adhere to proper nutrition and exercise (Al-Rubeaan, 2015). This reduces the risk of developing diabetes mellitus. A sedentary lifestyle is harmful to the body. Regular exercise can lower the body's insensibility to insulin because muscle cells contain more insulin receptors than fatty ones. Exercise should be comprehensive and regular. According to data from adolescents with type 2 diabetes, the use of physical exercises has had a positive effect. Teenagers began to be less integrated because of their weight and started to follow their parents and physicians' recommended healthy lifestyles, active activities and food intake properly. "As a consequence, associated complications such as metabolic syndrome (MetS), type 2 diabetes mellitus (T2DM), cardiovascular diseases, respiratory illnesses, and psychosocial problems are now more frequently seen in pediatric populations" (Yvette, Lentferink, Marieke, Elst, Catharine, Knibbe, Marja, & van der Vorst, 2017, p. 7). Above all, another issue is the insulin resistance (IR) in this age range. "Identifying predictors of IR in the obese pediatric population is important as they can be used as a screening tool for those at risk for complications such as MetS and T2DM. Furthermore, since different predictors of IR are supposed in children and adolescents with obesity" (Yvette, Lentferink, Marieke, Elst, Catharine, Knibbe, Marja, & van der Vorst, 2017, p. 2).

Problem, Purpose, and Population of Interests

The problem to be addressed in this proposal is the lack of adequate evidence on the effectiveness of programs for adolescents with T2DM between the ages of 12 to 18 and their parents about strategies to help families change diet and activity behavior patterns. This lack of changes always leads to weight gain and lack of diabetic control such as the high intake of simple carbohydrates and fatty foods and sedentary adolescent activities. The purpose of the project is to evaluate the effectiveness of a self-care education program that

provides strategies to change unhealthy lifestyle diet and activity behaviors to healthy behaviors to reduce HgA1c levels of adolescent participants.

Currently, T2DM is no longer associated with adults only. Reports from Center for Disease Control and Prevention (CDC) indicate the prevalence of T2DM among children and adolescents in the USA has skyrocketed in the last 20 years and is still soaring (2011). Additionally, data obtained from CDC indicated that the mortality rate among adults alone increased by 27% between 1988 and 1994; and the statistics of cases among adolescents is overwhelming. Experts have termed it a pandemic that needs prompt intervention. The report contends that every out of every 2000 children born in the USA, 1 child will develop T2DM in their adolescence. Furthermore, the report suggested that the prevalence of this epidemic depends on the racial background of the children and the adolescents. Latino children are believed to at higher risks of getting T2DM in their lifetime and have higher odds than the children other racial backgrounds. For example, a study that was conducted in Cincinnati Children's hospital compared the rate of incidence of this disease among children of European descent to African-Americans (both boys and girls). The study found that the ratio was 3.5:6.1 respectively. The study concluded that African-American children were likely to get T2DM as compared to the European counterparts. Additionally, in California Diabetes Clinic, about 31% of Mexican-American children were found to be having T2DM as compared to 3% of the white children (Khunti, et al., 2015, p. 320).

According to a study done by American Diabetes Association, it was reported that approximately 193 000 under the age of 20years were diagnosed with diabetes. In 2011-2012, the yearly incidences of diagnosed T1DM stood at 17 900 while those with T2DM stood at 5 300. Diabetes is a considerable threat to population health, spares no segment of society, and disproportionately affects the poor, the aged, and racial and ethnic minorities. Given these staggering statistics, primary prevention is critical to reduce the future population burden of diabetes. Generally, information in the US indicates that Diabetes has become a costly chronic condition in the United States. For example a 2015 study conducted by the Health Care Cost Institute, found that the medical costs and productivity loss attributable to diabetes were estimated to be $245 billion in 2012. By comparison, the estimated total cost of diabetes in 2007 was $174 billion. Furthermore, by 2025 as study estimated, the number of people with diabetes is expected to double, placing increased demands on the healthcare system and creating opportunities for more integrated and innovative disease management.

Background of Problem

Currently, T2DM is no longer associated with adults only. Reports from Center for Disease Control (CDC) indicate the prevalence of T2DM among children and adolescents in the USA has skyrocketed in the last 20 years and is still soaring. Experts have termed it a pandemic that needs proper intervention. The report contends that every out of every 2000 children born in the USA, 1 child will develop T2DM in their adolescence. Furthermore, the report suggested that the prevalence of this epidemic depends on the racial background of the children and the adolescents. Also, a study done by American Diabetes Association, it was reported that approximately 193 000 under the age of 20years were diagnosed with diabetes. In 2011-2012, the yearly incidences of diagnosed T1DM stood at 17 900 while those with T2DM stood at 5 300. Diabetes is a considerable threat to population health, spares no segment of society, and disproportionately affects the poor, the aged, and racial and ethnic minorities. Given these staggering statistics, primary prevention is critical to reduce the future population burden of diabetes.

Policy, systems, and environmental changes (PSE) are also essential elements of a long-term agenda to prevent chronic diseases like diabetes. Policies and environmental changes function to make healthy behaviors more accessible or desirable and unhealthy exposures more difficult or even prohibited. System-level interventions aim to improve the functioning of an agency or organization, as well as the delivery of its services to the community (Nowinski, Konchak, Moran, O'Brien, Kandula, & Ackermann, 2016). Also, States have recognized the major effects diabetes plays, both in its impact on patients and on society. As of mid-2016, 46 states and the District of Columbia have some law that requires health insurance policy coverage for diabetes treatment. Laws in Mississippi and Missouri require only that insurers offer coverage, but not necessarily include the coverage in all active policies (NCLS, 2016).

Professional and Personal Interests of Problem

This research study professional and personal interests stipulated that the numbers of adolescents diagnosed with diabetes appears to be on the rise in all clinical settings across the board. For example, majorities of the patients are systematically obese; however, yearly physical forms have no data about checking A1C levels as to why this is the case. This is the primary focus of this research project.

Thesis Statement

The purpose of the project study was to evaluate the effectiveness of a self-care education program that provides strategies to change unhealthy lifestyle diet and activity behaviors to healthy behaviors to reduce HgA1c levels of adolescent participants. The thesis statement for this project study was as follows; "If adolescents with type 2 diabetics eliminate the regular consumption of high simple carbohydrate and fatty food diet by eliminating or reducing fast food consumption and add more active exercise by decreasing the amount of sedentary activities such as use of computer and other electronic devices they will have fewer complications and decrease in their HgA1c levels."

Significance of the Problem to Nursing and all Healthcare Practitioners

Face by this organization/s. It should be noted that the over outcomes of this project should assist the nursing and healthcare practitioners as highlighted below The problem of increased incidence and prevalence of T2DM in adolescents has the following impact on local, state, national, international nursing and healthcare. Additionally, the significance of this project is even that nursing and healthcare practitioners should be no longer confuse about the proper ways to tackle T2DM in their private or public facilities. The overwhelming lack of collaboration in between and in within nursing and healthcare practitioners internally and externally is yet another challenge.

Benefits of the Project to Nursing and All other Healthcare Practitioners

First, it should be noted as previously pinpointed above that taking into account our research in patients undergoing exercise in Type 2 Diabetes, there should be some significant improvements not only with problem with adolescents' weight, but also in the reduction of A1C levels which can benefit the DNP provider and also be utilized as evidence-based practice. The improvement and the benefits to nursing practice can also be observed and qualified in the points listed below.

- Healing of the cardiovascular system. Diabetes mellitus affects the work of the heart and blood vessels. Sports activities contribute to their healing, including peripheral vessels, which are particularly suffering from high sugar (Lee, Song, & Kwon, 2018).
- Improvement of metabolism. Regular exercise helps the body absorb food better, while accelerating the elimination of toxins and other harmful substances.
- Increased tissue sensitivity to insulin. Insulin resistance of the cells is the main reason for the development of type 2 diabetes. Physical exercises effectively deal with this problem, which significantly improves the patient's condition (Lee, Song, & Kwon, 2018).
- Reducing cholesterol levels in the blood. High cholesterol is an additional factor in the development of complications in diabetes. Exercise helps lower cholesterol, which has a beneficial effect on the cardiovascular system.

As can be seen from the foregoing, sports loads help to significantly improve the condition of a patient with diabetes and prevent the development of complications.

The Benefits of the Project to all MDs, DNPs, MNPs Healthcare practitioners at Local, Regional, National, and Global levels

Policy, Systems, and environmental changes (PSE) are also essential elements of a long-term agenda to prevent chronic diseases like diabetes. Policies and environmental changes function to make healthy behaviors more accessible or desirable and unhealthy exposures more difficult or even prohibited. System-level interventions aim to improve the functioning of an agency or organization, as well as the delivery of its services to the community (Nowinski, Konchak, Moran, O'Brien, Kandula, & Ackermann, 2016). Also, States have recognized the major effects diabetes plays, both in its impact on patients and on society. As of mid-2016, 46 states and the District of Columbia have some law that requires health insurance policy coverage for diabetes treatment. Laws in Mississippi and Missouri require only that insurers offer coverage, but not necessarily include the coverage in all active policies (NCLS, 2016). Benefits to Patients and Advanced Practice Nursing Care the benefits of the project to the patient also is reduction in A1C levels which is beneficial to the APRN as it becomes an evidence-based tool.

Research Design

This research project study used quantitative methodology by using "**Non-Experimental Descriptive Statistics**" as a way of analyzing collected from the participants who were exposed to treatment by exposing them to the designed treatments' interventions or issues of interests. The participants were exposed to the designed treatments' interventions for four months during the period of this research study; **it should be noted**

that all participants were approved by the parents on a volunteering bases due to the ages. Parental "**Informed Consents**" forms were read, reviewed, approved, and signed by the parents of the participants prior to conducting this research project study; however, parents were advised that their children can withdraw from the study at any time with no negative implications.

Data Collection

Secondary data were collected from a confidential clinic in **Southwest Houston** in **Houston, Texas** for this study and to protect the clinic, the data were coded without any participants' demographics such dates of births (DOBs), Social Security Numbers (SSN), Names, home addresses, and academics grades, just to mentions a few. Altogether, 40 teens and adolescents were selected to participate in this research study, between the age of 12 and 19 years. There were 25 girls and 15 boys to begin this study; 20 were Black, 11 were Hispanics, 5 were White, 3 were Asians, and 1 was Pacific Islander. It should be noted that all participants were scheduled to come to the clinic every two weeks for the measurements of the levels of their A1C for four months.

II. Hypothesis

This study hypothesized one critical major hypothesis

Alternative Hypothesis *H1:*

There were significant effects of adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project.

Null Hypothesis *HO:*

There were insignificant effects of adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project.

PICOT Research Question

What are the effects of adolescents' HgA1c levels over a 4 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project?

PICOT

PICOT		
	Population	Adolescent
	Intervention or Issue of interest	Will providing diet education and cardiovascular exercise program to both parents and Adolescent diagnose with T2DM teaching them about eliminating the regular consumption of high simple carbohydrate and fatty food diet, and add more active daily exercise by decreasing the amount of sedentary activities such as use of computers and other electronic devises
	Comparison	No diet education, no cardiovascular exercise, and sedentary activities.
	Outcome/s	Reduction in A1C levels back to near normal range or normal range.
	Timeframe	Within 4 months

Scope of the Problem

First, adolescents with type 2 diabetes should be ready to participate in this project under the supervision of their parents collectively. Secondly, adolescents with type 2 diabetes along with their parents should follow the guidelines of suggested lifestyles' changes by adhering to the exercise schedules. Finally, adolescent with type 2 diabetes should eliminate regular consumption of high simple carbohydrate and fatty from their diet by eliminating fast food consumption and the following goal and objectives will guide should guide the adolescents and their completion of the DNP Project.

Project Fit with Existing Knowledge Base

Goal: Decrease A1C levels in the adolescent population with T2DM by enrolling adolescents and their parents in a self-care education program to introduce healthy diet and exercise strategies.

Objective One: By the end of month one, adolescent and parent triads will be identified and enrolled in project and education program. Pre-intervention HgA1c levels will be collected from adolescent or parents at the time of enrollment in the project.

Objective Two: By end of month three education program for groups will be completed. ,

Objective Three: By end of four months data will be gathered for 3 month post pretest HgA1c levels.

Review of Literature

The purpose of the project is to evaluate the effectiveness of a self-care education program that provides strategies to change unhealthy lifestyle diet and activity behaviors to healthy behaviors to reduce HgA1c levels of adolescent participants. On the threshold of the 21st century, research in the field of molecular biology and immunology opened new perspectives in understanding diabetes mellitus, as well as genetic possibilities for predicting the development of this disease in any patient (Gow et al., 2016). Presently principles and effective methods of diabetes therapy have been developed, allowing the patient to maintain a sufficiently high quality of life physically, mentally, and socially (Zwald et al., 2015). Contrary to popular beliefs, dietary factors do not per se refer to the causes of diabetes.

However, nutrition is the cornerstone of any treatment for this disease. It is difficult to find another condition in which the lifelong self-control of the patient for his nutrition, the knowledge of the relationship of nutrition with the therapy of diabetes mellitus with insulin or other medications would be so important (McCarthy, 2015). It is necessary to emphasize the role of nutrition in preventing the progression of diabetes mellitus, the development of acute (hypoglycemia, ketoacidosis) and chronic complications. Education on this subject will allow for patients to engage in self-care, and in recent years, some traditional approaches to diabetes diet therapy have undergone scientifically substantiated changes, potentially improving a patient's rate of success. The most important trends of hypoglycemic therapy at the present stage of clinical development of studying diabetes in the last decade are:

- use of the principles of evidence-based medicine
- lifestyle change as the most important condition for effective treatment
- treatment to the goal, based on early pharmacotherapy, an early rational combination of oral hypoglycemic drugs and early insulin therapy (Lee, 2014)
- stratification of hypoglycemic therapy from the degree of compensation of carbohydrate metabolism (Wu, 2017)

It is known adequate glycemic control significantly reduces the risk of developing micro vascular complications of diabetes, slows the progressive deterioration in the function of cells and improves the quality of life of patients. Relatively recently, a stable regimen for the treatment of diabetes was formed based on the stepwise intensification of regimes of hypoglycemic therapy, the most important principle of which was early insulin therapy (Zvarova, 2013). To engage in this treatment, traditional oral hypoglycemic drugs to influence the natural course of DM2 must fail. This treatment consists of a steady decrease in secretary activity of pancreatic in-cells since the development of initial disturbances of carbohydrate metabolism. According to UKPDS (United Kingdom Prospective Diabetes Study), at the time of diagnosis of DM2, the function of cells is reduced by an average of 40-70%, and in 10-12 years from the onset of the disease, most patients need constant insulin therapy (Esposito et al., 2015). Avoiding this outcome inadvertently sets a goal for the patient, which in turn will prompt action. After being educated, both aforementioned theories will be put into action by the patient. While the above reviewed literature addressed the implications associated with diabetics, they did not address how to introduce interventions to the participants and that is the focus of this proposed project.

In contrast, data from the UKPDS and ADOPT (the Adult Diabetes Outcome Progression Trial) study found that annual HbA1c values in all groups receiving both traditional and intensive therapy were maintained within target values, but only during the first year of observation, and during subsequent monitoring, it significantly increased (Crump et al., 2016). The time-limited effectiveness of hypoglycemic therapy is due to "traditional" drugs affecting primary mechanisms of the pathogenesis of DM2, those being insulin resistance,

impaired pancreatic function, and glucagon secretion (Van Buren et al, 2014). Once more, to avoid these outcomes the patient will be prompted to engage in self-care, likely after learning how detrimental these consequences may be.

In addition to the above, a large number of contraindications and side effects limit the use of hypoglycemic drugs for the treatment of diabetes, making self-care and goal setting essential to the individual's future health and potential survival. Drawbacks regarding the medical treatment include narrowing the possibility of practical use of metformin, the most commonly used hypoglycemic drug, including limited effectiveness in monotherapy and an inability to maintain a long-term hypoglycemic effect, contraindications to use in patients with cardiac, respiratory, renal and hepatic insufficiency, frequent gastrointestinal disorders, and poor compatibility with alcohol.

In this regard, it is of great practical importance to determine the criteria for an "ideal" hypoglycemic drug (Copeland et al., 2013). It can be divided into physiological , or the influence on the basic mechanisms of the pathogenesis of DM2, the ability to preserve and restore the function of the cells, the glucose dependence of the hypoglycemic effect, and clinical, or high and long-term hypoglycemic activity, positive effect on disease outcomes, good evidence base, the presence of pleiotropic effects, usability and accessibility. Once again, while the above reviewed literature addressed the implications associated with diabetics, they did not address how to introduce interventions to the participants and that is the focus of this proposed project.

Drugs beginning hypoglycemic therapy should correspond with the maximum number of the above properties. Given the known limitations and shortcomings of metformin, it becomes apparent its choice in modern international consensus and algorithms as a first-line therapy for diabetes is a compromise, and it remains necessary to search for more physiological, safe and effective medicines (Demmer et al., 2013). Essentially, sometimes this medication simply does not work. In other instances, side effects outweigh the benefit of the drug. As a result, effective treatment is often in the hands of the patient or the young individual who could potentially be diagnosed with diabetes. There is doubt that the reviewed literature clearly indicated the significance about the proactive and active ways to overcome diabetics in general, they did not pinpoint the roles that self-education does in enhancing diabetics in teens; and that is the focus of this project.

Theoretical Framework

Locke's Goal Setting Theory is an additional model stating the theory of goal setting is based on human behavior determined by goals it sets itself. Having the goal, as such, prompts actions to be carried out. It supposes setting goals is a conscious process, and realized goals and intentions are the underlying definition of human behavior (Locke & Latham, 2013). This theory presents many questions. For example, why should it be chosen? How does it relate to diabetes? Miller and Bauman (2014) point out in their research goal setting is the newest way to change behavior in medicine and diabetes. Locke's Goal Setting Theory further postulates if those at risk of diabetes, or those who have diabetes set a goal, for example to reverse the impact of a diagnosed condition, the goal will prompt action. The delivery of this education will allow for individuals to set a goal, i.e. reversing the impact of diabetes or avoiding it. This will prompt lifestyle changes and the formation of new habits.

Bauman and Miller (2014), note initially, Goal Setting Theory of diabetes did not get much attention. After repeated studies, however, the influence of this theory on patients was revealed (Bauman and Miller, 2014). Eight studies were conducted according to the Goal Setting theory. After checking the research, it was found patients had improved self-esteem; in addition, the bolshevist began to engage in physical activity and consume food designated by the doctor. Each study aimed at ensuring patients could care for them while enduring this disease. The majority of teens did not consider it necessary to take medication and proper ways to take care of their medical conditions. As noted by Bauman and Miller (2014), "There was a significant improvement in the number of goals of the patient (average number of goals increased from 0.67 to 1.09, $P < 0.001$); however, during the four months of follow-up there was no significant change in body weight." However, improvement was reached nevertheless. The Locke's Goal Setting Theory in 2013 as reexamined by Bauman and Miller in 2014 will be used as lens of analyses in this project.

Synthesis and Analysis of Evidence

In summary, type 2 diabetes mellitus arises primarily from insulin resistance at the active sites of the hormone. This implies that individuals that are having this disease have considerably higher amounts of insulin compared to their counterparts who suffer from type one diabetes mellitus. However, insulin deficiency also exists in type diabetes mellitus. Other factors that are also indicated in the pathogenesis of this disease include

excessive or inappropriate secretion of the hormone glucagon. Different scholars have conducted various studies on type two diabetes mellitus. A synthesis of the evidence from these researchers is essential in understanding the concepts, emerging trends, the pathogenesis, prognosis, and treatment of this disease.

The onset of the management of diabetes in any population depends on the screening modality that is used in the population. Particularly, differences in population dynamics necessitate the adoption an appropriate models that fit all is specific and sensitive to the type of diabetes that is being screened in the population of interest. After observing several errors in the diagnosis of diabetes in the pediatric population, Lee et al. (2013) a study aimed at characterization of family physician and pediatrician screening practices for type 2 diabetes among the adolescent population. The study adopted the use of questionnaires. The surveys were mailed to 1,400 physicians. However, only 52% of the target population responded to the inquiries. This was a large sample size given the total number of pediatricians and family physicians in this country. However, the choice of the electronic method of interview is the greatest weakness of the study. Even though the electronic method reduced the total budget of the study and the time taken to conduct the entire survey, it is difficult to confirm the authenticity of the emails. The researchers did not specify the method that was used to confirm that it was the targeted individuals that were responding to the mails.

Furthermore, evidence collected by Lee et al. (2013) indicates the fasting glucose and HbA1c was the most popular test in the diagnosis of "type 2 diabetes" in the adolescents' population in the US. Unfortunately, only 38% of the respondents were aware of the updated American Diabetic Association (ADA) guidelines on the diagnosis of diabetes in the pediatric population. The main factor that leads to the recommendation of the use of HbA1c as a screening test is the unrealistic fasting periods required in the fasting blood sugar test (Wu Haibin, 2017). Particularly, some adolescents are not able to withstand the fasting durations that are recommended in the guideline. On the contrary, the patient does not have to skip meals to generate accurate HbA1c results (Zvarova, Zvarova, Callas, & Malone-Rising, 2012). The HbA1c test is more specific than the fasting blood sugar test. Despite the success of this study in unveiling poor practice amongst several healthcare workers in the diagnosis of diabetes, the study did not consider the reasons as to why the physician opt for undocumented methods of testing (Pasieka, & Riddell, 2018). Besides, the cost-benefit approach to the diagnostic criteria is not analyzed by the researcher. This, therefore, creates a knowledge gap which requires filling through research about the factors affecting the preferences of the various screening models in diabetic patients.

Demmer, Zuk, Rosenbaum, and Desvarieux (2013) conducted an epidemiologic study that aimed at updating the prevalence of diabetes among the US adolescent. In this study, the Continuous National Health and Nutrition Examination Survey between 1999 and 2010 were used as the main database to obtain information about the disease in the target population. This retrospective study obtained 4,661 adolescent from the archive documents through random sampling. The sample used was representative of the entire population thereby increasing the value of the results obtained from the study. The result of the study indicates a prevalence rate of 0.36% of type 1 diabetes in the population (McCarthy, 2015). The authors attribute this large value to the changes in feeding patterns across the United States. Majority of the children have poor feeding patterns and rely on junk food that is bought by their parents or themselves from fast food stores. The consistencies in the findings of Demmer, Zuk, Rosenbaum, and Desvarieux (2013) and that of Dabelea (2014) helped us in improving the significance level of the evidence from the two separate studies. Particularly, Dabelea (2014) points out that the current increase in the prevalence rates of diabetes in the pediatric population should be declared an epidemic. The findings of the study form a key platform for diabetic mobilization campaigns.

Al-Rubean. (2015) conducted a comprehensive epidemiological study that analyzed the population markers of type 1 and types 2 diabetes mellitus among Saudi Arabian children and adolescents. This study was essential in the target population due to the paucity of data about this disease in the targeted population. The scholar adopted the Saudi Abnormal Glucose Metabolism and Diabetes Impact Study (SAUDI-DM) tool to determine the prevalence of the two categories of the disease in the population. SAUDI-DM is a tool that has both intra-rater and extra-rater validity and reliability (Tamborlane, 2013). A cross-sectional study with a random selection of participants collected anthropometric, clinical data and sociodemographic information from 23,523 participants. The large sample size in this research is its greatest strength (Springer, 2013). However, not all the participants in the study had diabetes. Critics have therefore questioned the relevance of including non-diabetic populace in the study. Al-Rubeaan (2015) revealed that the prevalence of diabetes in the sample population was 10.84% (Slomski, 2014). Out of the total prevalence, 0.45% were identified as either type one or type 2 while the rest of the children and adolescents expressed a newly diagnosed form of diabetes not categorized in either class (Viner, 2017). The finding of this study consists with that of Esposito et al. (2015)

which attributed the high prevalence of diabetes in the Mediterranean region to poor feeding patterns. Evidently, from this study, there is high prevalence rate of diabetes amongst the study population. Al-Rubeaan (2015) recommended that the government should be actively involved in the education of people about diabetes.

Despite the knowledge of the high prevalence rates of type 2 diabetes in the pediatric population, there is poor management of the disease in this population (Constantine, 2013). Particularly, the amount of funds set aside in most hospitals and by several governments for diabetes care is limited and does not compare with the ever-increasing disease burden (Zwald, Elliott, Brownson, & Skala, 2015). In some centers, simple diagnostic instruments are lacking thereby leading to misdiagnosis and treatment of adolescents having this disease inappropriately (Constantine, 2013). Particularly, certain clinicians still depend on archaic materials that circulate information that diabetes is a rare disease in children. Most adolescents who are diagnosed with the present with diabetic keto-acidosis if the index of suspicion is low they could be managed for other forms of illnesses that have the same presentation during this age. The study by Constantine (2013) ends with a call for action for the adoption of systems that promote evidence-based practice which will ensure that the pediatric population receives the best care. Besides, Constantine (2013) sensitizes the population on the importance of knowing the early signs of diabetes and treating the disease appropriately. However, despite the strength of this study, it focuses on a narrow population thereby compromising the ability to extrapolate it to other regions that also experience the same disease burden. The researcher should have addressed the various social-economic dynamic in different populations that affect the management of the disease (Van Buren & Tibbs, 2014). This implies that a multi-center approach of study could have produced better results if the centers were located in different continents and regions that are depended on dissimilar treatment protocols.

Just like Constantine (2013), Copeland et al. (2013) focused on the management of type 2 diabetes. However, the study by Copeland et al. (2013) is more specific to the management of a newly diagnosed disease. Copeland et al. (2013) begin by outlining detailed diagnostic criteria that are used for this disease in the pediatric population. The differences in the diagnostic markers are the level of expression of various hormones and the fasting modality used in the pediatrics compared to the elderly individuals. However, there is a generalized basic similarity of diabetes in children and that in adults. The onset of the management of diabetes in children is the appropriate diagnosis (Esposito et al., 2015). Failure to diagnose the disease in good time can lead to excercabetion of the symptoms and eventual poor outcome. Constantine (2013) examines some guidelines to determine their appropriateness for the current population dynamics. Notably, the other recommends observation of the guidelines stipulated by the American Association of Physicians (AAP). This is a multidisciplinary approach that encompasses behavioral change and pharmacotherapy (Demmer, Zuk, Rosenbaum, & Desvarieux, 2013). However, the author emphasizes the importance of dietary education to the families of children who are at risk. Analysis of this study shows a research gap that can be exploited in the future to determine the sporadic pattern of diabetes in adolescence.

The support system of adolescents with diabetes determines the outcome of treatment (Amirniroumand, 2017). Majority of the adolescents who have this disease have an immature mind that cannot cope with the psychological trauma associated with the illness. It is thus essential to include proficient psychological counselors in the management of patients who present with symptoms of the disease (Gann, 2015). However, in most cases, people with diabetes are managed from home. This implies that the parents and the people who live with the affected children have a great role to play in the management of the disease (Amirniroumand, 2017). Issues of drug adherence and compliance are best taught to the children by their immediate caregivers whom they trust the most (Lukács, 2018). The compliance rates to medications that are achieved through the incorporation of psychological counseling and parents of the adolescents are better than the rates observed if the parents are not included in this management system. Amirniroumand (2017) is a study that finds a lot of strength in its psychological approach to diabetes. One research gap that is evident in the study is the identification of the best counseling modality that should be adopted by in the psychological approach to diabetes in children.

The findings and recommendations of Amirniroumand (2017) are similar to that of Borji, Otaghi, and Kazembeigi (2017) who conducted an extensive study to determine the appropriateness of the use of Orem's self-care model on the quality of life in patients with type 2 diabetes. The researchers used a cross-sectional study approach wherein a total of 80 patients were divided into an experimental and a control group. In the experimental group, the Orem's model was used in the diagnostic and treatment process. However, in the control group, the Orem's approach to diabetes was disregarded. The evidence from this study shows a higher score scales in the patients who used the Orem's model compared to the control population (Gow, Garnett, Baur, & Lister, 2016). Particularly, the issues of adherence and compliance with medication were observed by the experimental group of patients. It is therefore essential that clinicians and all the healthcare practitioners

understand the approach that the use in the management of people with diabetes (Lee, 2014). Despite the success of the study, the ethical implication of putting diabetic patients on study models has been questioned. It is vital that all the participants benefit from the process of the study without endangering their lives. Indeed, any disease has psychological trauma, and this should be appropriately treated to improve the general outcome of the illness.

Poor response to the adolescent diabetic epidemic can be blamed on poor prevention and control programs and policies in various regions of the world. From this observation, Zwald, Elliott, Brownson, and Skala (2015) conducted an investigation that aimed at assessing the implementation of evidence-based programs and policies (EBPPs) in the management of diabetes. Also, the other objectives of these researchers were to accesses the feasibility of non-implemented EBPPs and to examine organization level and individual factors that affect the implementation of the EBPPs (Dabelea, 2014). All the healthcare practitioners in Missouri were conducted as participants in this study. The selection of all the healthcare personnel generated a large amount of data that improved the quality of the research. However, some of the included participants were not specialist in diabetes thus leading to the collection of erroneous data. Despite this challenge, the study was instrumental in the poor implementation of evidence-based practice in the management of diabetes (Crump et al., 2016). Notably, the lean finances that are allocated to support diabetic programs are the main reasons that lead to poor outcome. Consequently, the scholars recommended the development of a strong support system and policies that guide the allocation of funds for diabetic care. Similarly, this study encouraged physicians to improve interactions with their clients to increase good outcome.

Strengths of Knowledge Base

Adolescents with type 2 diabetes should eliminate regular consumption of high simple carbohydrate and fatty foods from their diet by eliminating or reducing fast food consumption. It is the purpose of this project. The main objects that are needed to complete the project are the patients who are willing to conduct the experiment. This study will not harm anyone, because useful and rational nutrition and proper physical exercise does not cause harm.

Physical activity is one of the most important components of the successful treatment of diabetes. It helps improve the carbohydrate metabolism, accelerate the absorption of glucose, and thereby significantly reduce the level of sugar in the blood. It is useful for teens to know about it. In addition, regular and intensive physical activity provides an increase in muscle mass and weight loss, increased vital energy and stress relief. Adolescents with (type-2 diabetes) should eliminate the regular consumption of high simple carbohydrate and fatty food diet by removing or reducing fast food consumption and add more active daily exercise by decreasing the amount of sedentary activities such as use of computers and other electronic devises. All this should be done because a high simple carbohydrate diet and lack of daily exercise leads to preventable and expensive health issues associated with a diagnosis of (type-2 diabetes) during adolescents.

Weaknesses/Gaps in Knowledge Base

The weakness and gaps in knowledge based were obvious based on literature reviewed. There is no doubt that majority of the reviewed literature somehow looked into the implications, complexities, and complications associated with diabetics in general, they also fell short in the areas of teens. The reviewed literature further fell short in the areas about how to effectively, efficiently, and proficiently manage (type-2 diabetics) in teens in general. For example, Borji, Otaghi, and Kazembeigi (2017) assessed the effectiveness of Orem's self-care model in improving the life quality in people suffering from type II diabetes. The major strength of the article lies in its identification of appropriate self-care activities that can be used in controlling diabetes under the Orem's Self Care Model. The article also identifies the role that nurses should play in inculcating a self-care culture in type II diabetes patients, including educating them on aspects such as self-medication. The main weakness in Borji et al.'s (2017) article is that it does not describe measures that can be used to ensure that the patient complies with self-care practices. Another weakness is that the article does not take into consideration the need to improve the emotional well-being of a type II diabetes patient.

Additionally, Locke and Latham (2013) focused on the setting of goals in the performance of tasks. The article is informative as it discusses the importance of setting goals, citing that it enhances performance and directs attention towards a given activity. Furthermore, the theory informs the reader on the need for setting goals, which match the ability of the person who is supposed to achieve the goal. However, the article has a weakness in that even if it discusses factors that may hinder goal achievement in older people, it does not comment on whether the factors apply for young people. The results are represented descriptively and they show that as one gets old, there is a systematic shift in goal setting whereby goals, which enhance cognition, are preferred. It should be noted that as pinpointed by Locke and Lathan in 2013 Theory as well as the summation

of Borji et al. in 2017, the reviewed literature did not holistically address these critical concerns; hence this project proposal should be conducted.

Midway Study's Results and Findings Discussion and Conclusion

It is clear that T2DM in adolescents is an epidemic that needs measures evaluated and found effective to control and eventually prevent the disease in adolescents. More evidence is needed to formulate policies, create awareness among the citizens of the USA on the prevalence of this deadly disease. Also needed are interventions that are effective to help adolescents control HgA1c levels. A high simple carbohydrate diet and lack of daily exercise leads to preventable and expensive health issues associated with a diagnosis of Type 2 diabetes during adolescents. Adolescents with glucose metabolism disturbances should be under medical observation and learn to follow evidence-based clinical practice guidelines. Diabetes is a considerable threat to population health, spares no segment of society, and disproportionately affects the poor, the aged, and racial and ethnic minorities. Given the staggering statistics in the US and internationally, effective primary prevention interventions are necessary to reduce the future population burden of diabetes starting early on before they become adults. It is therefore important that this issue is addressed by DNP providers and is the basis for this DNP project to determine if is a reduction in A1C levels of the adolescents who attend a self-care diabetes management education program with their parents.

In conclusion, the literature that has been synthesized above provides crucial information in diabetes among adolescents. Several consistencies exist in various literatures. The consistencies are important in consolidating the arguments of the different author. Generally, a majority of the documents in the above review shows poor adherence to guidelines by the stakeholders involved in the management of diabetic patients (Locke, & Latham, 2013). Also, there is an overwhelming consensus that a majority of diabetic programs have secluded the adolescence. Those that cater for adolescent needs are poorly funded. It is, therefore, necessary that programs that are evidence-based are developed and adhered to improve treatment outcome among the adolescents. These were the articles used this research study's project. We chose these articles because they give evidence based of what worked and what did not, so we can best apply the effective ones to my project. The full list of articles is in appendix A. However, due to the limited collected data in this study, additional 20 participants was requested and additional 2 months was requested as to analyze altogether 60 participants who were expose to treatments in 6 months instead of 4 months as to make the study more robust. The final collected data statistics will be addressed in the finale of this research study project which will be entitled as **Application and Analyses of Intervention of Type 2 Diabetes in Adolescent Population (Two) Finale** (see Atatah et al., 2024 pp 1-10 for more details).

III. Secondary Data Collection

Pre-Tests Collected Secondary Data

Secondary data were collected from a confidential clinic in **Southwest Houston** in **Houston, Texas** for this study and to protect the clinic, the data were coded without any participants' demographics such dates of births (DOBs), Social Security Numbers (SSN), Names, home addresses, and academics grades, just to mentions a few. Altogether, 40 teens and adolescents were selected to participate in this research study, between the age of 12 and 19 years. **There were 37 girls and 28 boys to begin this study; 25 were Black, 15 were Hispanics, 11 were White, 9 were Asians, and 5 were Pacific Islander. It should be noted that all participants were scheduled to come to the clinic every two weeks for the measurements of the levels of their A1C for six months.**

Pre-Test Totality was 65 participants; it should be noted that 25 new participants were added to the study which was 5 participants more than the 20 additional requested pre-tests secondary data.

Post-Tests Collected Secondary Data

Original collected pre-test data was 65 participants but for some unknown reasons 5 participants dropped out of the study; **There were 34 girls and 26 boys to begin this study were Black, 23 were Hispanics, 12 were White, 11 were Asians, 9, and 5 was Pacific Islander.** It should be noted that all participants were scheduled to come to the clinic once every two weeks for the measurements of the levels of their A1C for six months. **As such, the totalities of post-tests collected secondary data was 60 participants and the A1C measurements' time was scheduled for 6 months with one measurement every 2 weeks additional added participants who were already in the program in 2 months and collected average results was analyzed.**

Intervention or Issue of interest

PICOT Items

Population: Adolescents

Intervention: Participants were provided diet education and cardiovascular exercise program to both parents and Adolescent diagnose with T2DM teaching them about eliminating the regular consumption of high simple carbohydrate and fatty food diet, and add more active daily exercise by decreasing the amount of sedentary activities such as use of computers and other electronic devises. **They were also educated about a complete systematic and symmetric change of their LIFESTYLES.** It should be noted that no medications' prescriptions were needed or used in the implementations of intervention (**Absolutely no medications such as INSULINS of any kind, made, or type**)

Comparison: No diet education, no cardiovascular exercise, and sedentary activities

Outcomes: Reduction in A1C levels back to near normal range or normal range

Time Frame: Within 6 months

Collected Secondary Data's Measurement Software

The collected secondary data from a confidential **Southwest Clinic in Houston, Texas** to protect the privacy of all participants were cleaned up as to prevent repeated inconsistencies' data and fed into **Statistical Package for Social Sciences (SPSS) Version 27** and Confidence Interval of the Differences' level was set at **0.05 or 95%** for data statistical differences' accuracy between the dependent and independent variables.

Pre-Tests Results and Findings

Table 1. Statistics Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

Statistics

Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

N	Valid	65
	Missing	0
Mean		3.1692
Std. Error of Mean		.13077
Median		4.0000
Mode		4.00
Std. Deviation		1.05430
Variance		1.112
Skewness		-.928
Std. Error of Skewness		.297
Kurtosis		-.502
Std. Error of Kurtosis		.586
Range		3.00
Minimum		1.00
Maximum		4.00
Sum		206.00

Table 1. Showed the Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a Std. deviation of 1.054, variance of 1.11, median of 4.0 and mean of 3.17 (see Table 1 above for more information).

Table 2. Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements Frequencies' distributions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A1C Below 5.7% Normal Range	7	10.8	10.8	10.8
	A1C Between 5.7 to 6.4% Prediabetes Range	10	15.4	15.4	26.2
	A1C Above 6.4 Diabetes Range	13	20.0	20.0	46.2
	Above 6.5% Diabetes & Needs Immediate Interventions	35	53.8	53.8	100.0
	Total	65	100.0	100.0	

Table 2. Pre-Tests showed 65 out of 65 or 100% cumulative frequencies with no missing numbers (see Table 2 above for more).

Figure 1. Pre-Tests Color Coded of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

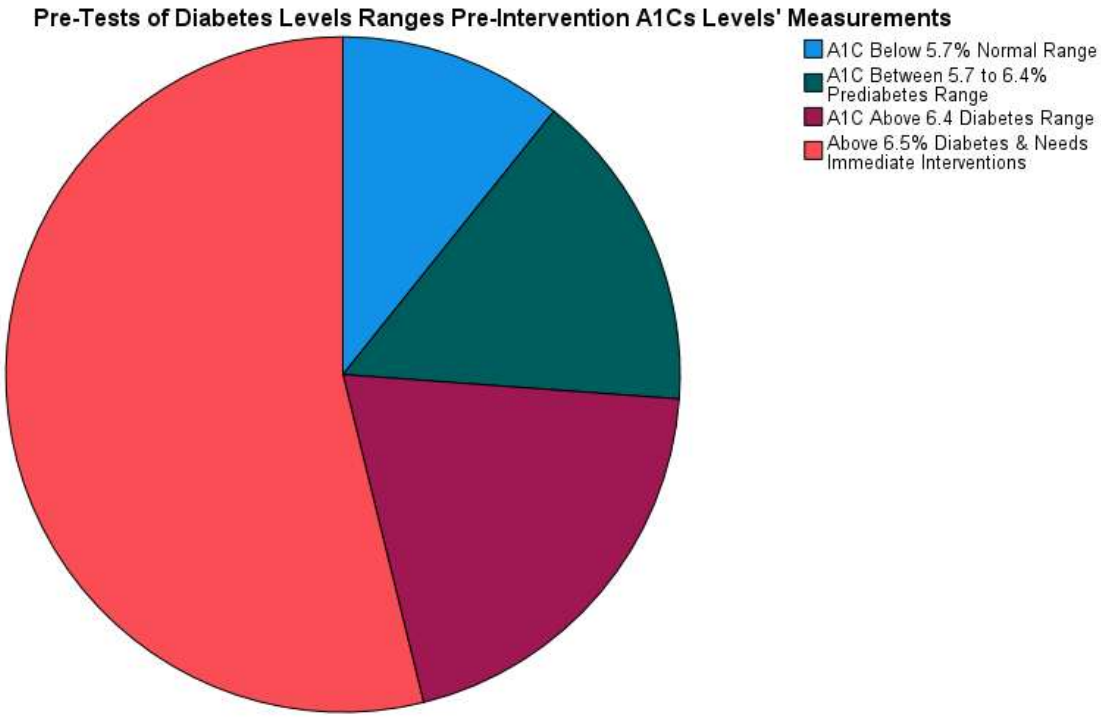

Figure 1. Showed a Color Coded Pie Chart of Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements blue was significant and red were insignificant changes (see Figure 1 above for more).

Figure 2. Bar Chart of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

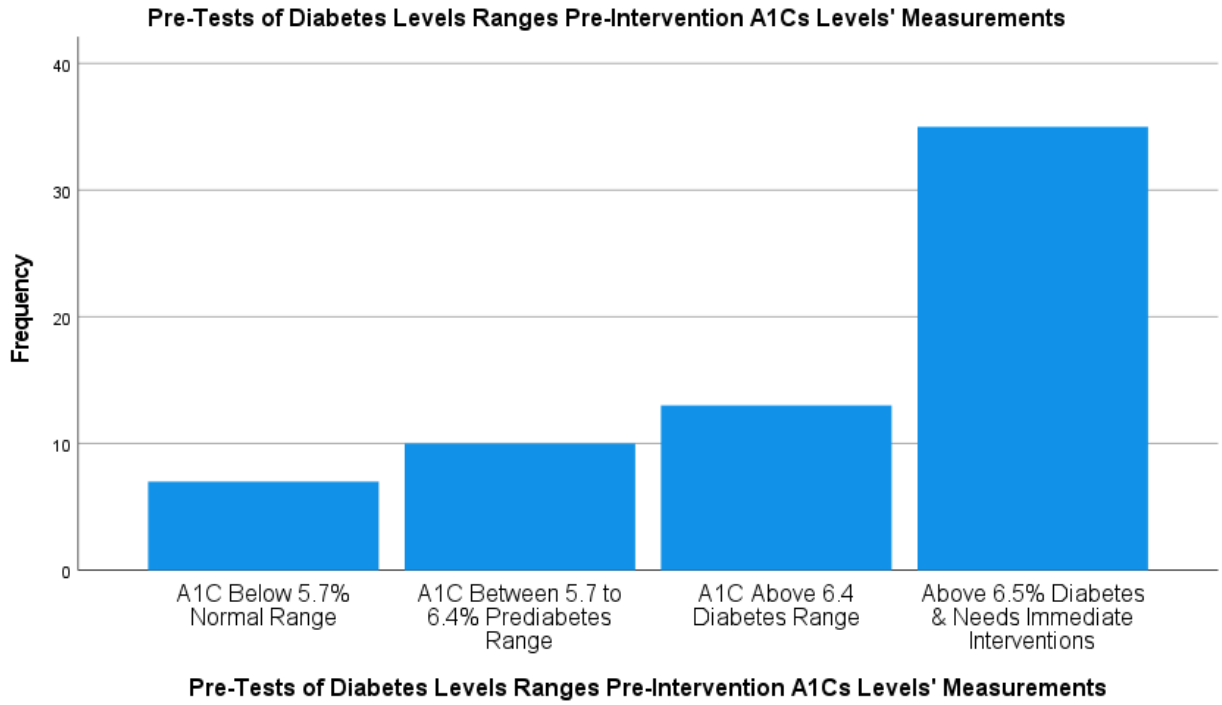

Figure 2. Showed a Bar Chart Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements approximately 7 out 65 or 11% indicated significant A1C normal range and 35 out of 65 or 54% indicated insignificant A1C which was above 6.5% and needed immediate additional interventions (see Figure 2 above for more).

Figure 3. Histogram of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

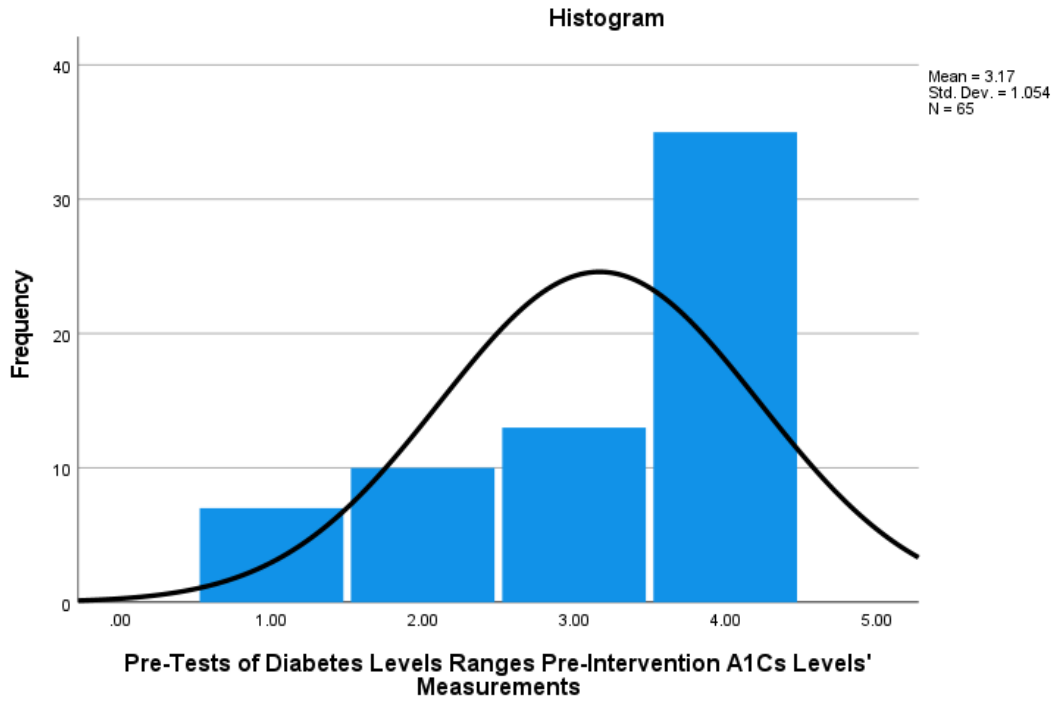

Figure 3. Showed the Histogram Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a mean of 3.2, standard deviation of 1.05 and N were 65 (see Figure 3 above for more).

Table 3. One-Sample Statistics of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements	65	3.1692	1.05430	.13077

Table 3. Showed a One-Sample Statistics of Test of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with N=65, mean was 3.17 and Std. Deviation of 1.05 (see Table 3 above for more).

Table 4. One-Sample Test of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements	24.235	64	.000	3.16923	2.9080	3.4305

Table 4. Showed a One-Sample Test of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a mean difference of 3.17, upper level of confidence was 3.43 and Sig. (2-Tailed) of .000 or 100% statistical differences between dependent and independent variables (see Table 4 above for more).

Table 5. One-Sample Effect Sizes of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements

One-Sample Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements	Cohen's d	1.05430	3.006	2.430	3.577
	Hedges' correction	1.06685	2.971	2.401	3.535

a. The denominator used in estimating the effect sizes.

Cohen's d uses the sample standard deviation.

Hedges' correction uses the sample standard deviation, plus a correction factor.

Table. 5. Showed One-Sample Effect Sizes of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a Cohen's d of 1.054 and Hedges' corrections of 1.06 no corrections were needed (see Table 5 above for more).

Post-Tests Results and Findings

Table 6. Statistics Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

Statistics

Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

N	Valid	60
	Missing	0
Mean		1.9333
Std. Error of Mean		.14035
Median		2.0000
Mode		1.00
Std. Deviation		1.08716
Variance		1.182
Skewness		.873
Std. Error of Skewness		.309
Kurtosis		-.564
Std. Error of Kurtosis		.608
Range		3.00
Minimum		1.00
Maximum		4.00
Sum		116.00

Table 6. Showed the Statistics Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a Std. deviation of 1.09, variance of 1.18, median of 2.0 and mean of 1.93 (see Table 6 above for more information).

Table 7. Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements Frequencies' distributions

Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A1C Below 5.7% Normal Range	28	46.7	46.7	46.7
	A1C Between 5.7 to 6.4% Prediabetes Range	17	28.3	28.3	75.0
	A1C Above 6.4 Diabetes Range	6	10.0	10.0	85.0
	Above 6.5% Diabetes & Needs Immediate Interventions	9	15.0	15.0	100.0
	Total	60	100.0	100.0	

Table 7. Post-Tests showed 60 out of 60 or 100% cumulative frequencies with no missing numbers (see Table 2 above for more).

Figure 4. Color Coded Pie Chart of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

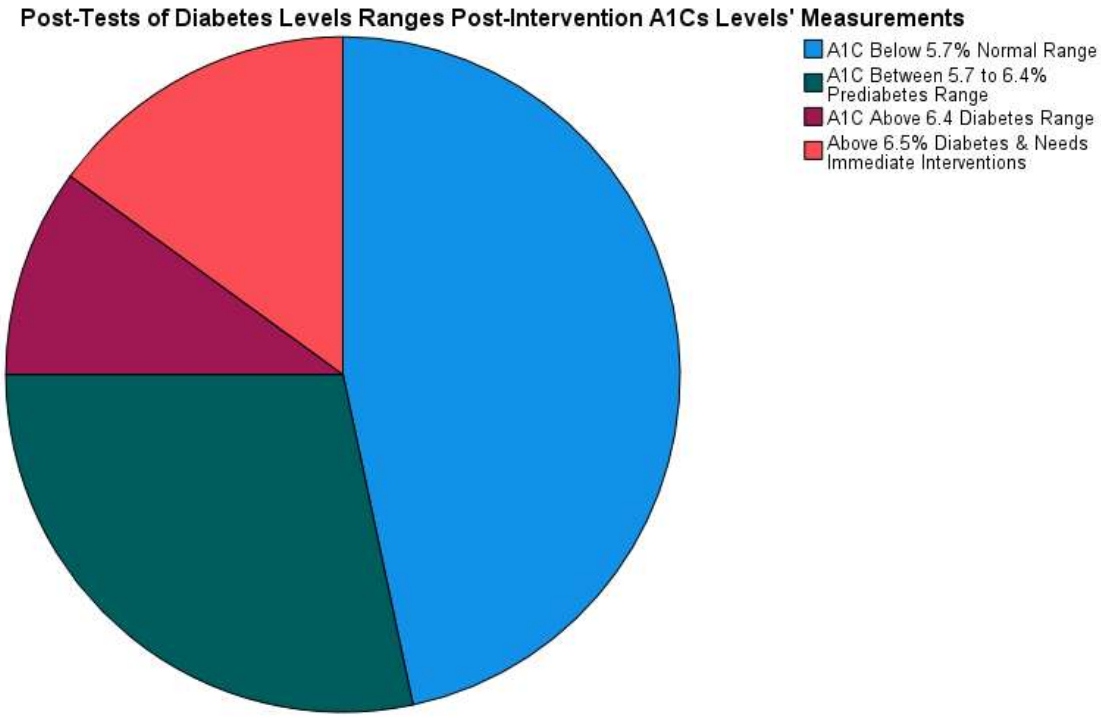

Figure 4. Showed a Color Coded Pie Chart of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements blue was significantly below 5.7% A1C's normal range and red were insignificantly above 6.5% A1C's range that was classified as diabetes status which needed immediate interventions (see Figure 4 above for more).

Figure 5. Bar Chart of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

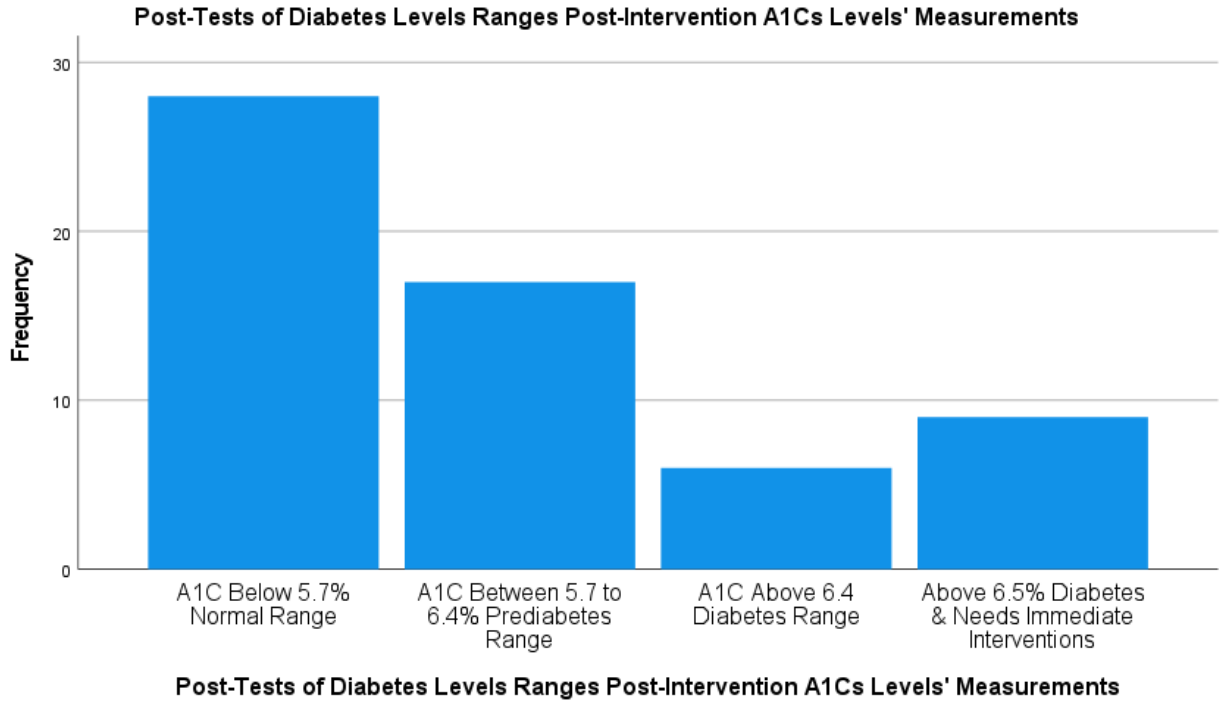

Figure 5. Showed a Bar Chart of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements approximately 28 out 60 or 46.7% indicated significant A1C's normal range, 17 out of 60 or 28.3% indicated pre-diabetes, and 6 out 60 or 10% A1C which was above 6.4% diabetes status, and 9 out of 60 or 15% was above 6.5 A1C's level range, which needed immediate additional interventions (see Figure 5 above for more).

Figure 6. Histogram of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

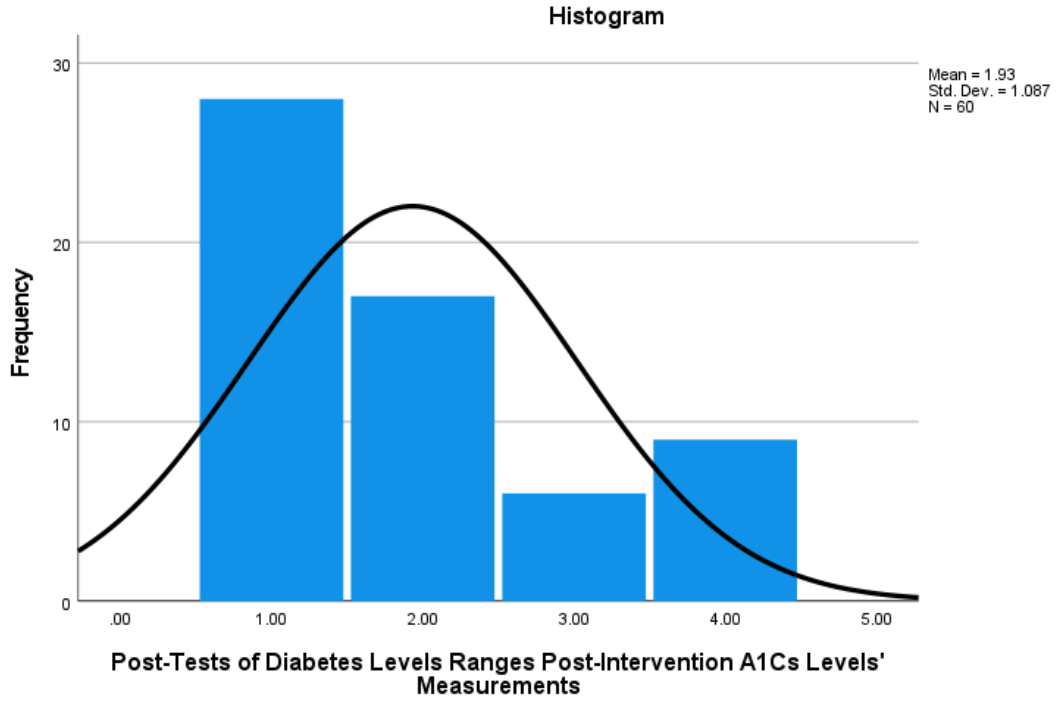

Figure 6. Showed the Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a mean of 1.93, standard deviation of 1.09 and N were 60 (see Figure 6 above for more).

Table 8. One-Sample Statistics of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements	60	1.9333	1.08716	.14035

Table 8. Showed a One-Sample Statistics of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with N=60, mean was 1.93, and Std. Deviation of 1.09 (see Table 8 above for more).

Table 9. One-Sample Test of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements	13.775	59	.000	1.93333	1.6525	2.2142

Table 9. Showed a One-Sample Test of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a mean difference of 1.93, upper level of confidence was 2.21and Sig. (2-Tailed) of .000 or 100% statistical differences between dependent and independent variables (see Table 9 above for more).

Table 10. One Sample Effect Sizes of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements

One-Sample Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements	Cohen's d	1.08716	1.778	1.367	2.183
	Hedges' correction	1.10123	1.756	1.350	2.155

a. The denominator used in estimating the effect sizes.

Cohen's d uses the sample standard deviation.

Hedges' correction uses the sample standard deviation, plus a correction factor.

Table 10. Showed One Sample Effect Sizes of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a Cohen's d of 1.87 and Hedges' corrections of 1.10 no corrections were needed (see Table 10 above for more).

Answers to the Research Questions

This study hypothesized one critical major hypothesis

Alternative Hypothesis *H1:*

There were significant effects of adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project.

Null Hypothesis *HO:*

There were insignificant effects of adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project.

PICOT Research Question

What were the effects of adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project?

This study found that there were **profound significant effects** on adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project (see Tables 1 to 10 & figures 1 to 6 for more). **As such, this research study accepted the ALTERNATIVE HYPOTHESIS and rejected the NULL HYPOTHESIS.**

This research study also accepted the educational effects of the **CENTRAL QUESTION** that there were yet other **profound significant effects** on adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project. These results and findings this research study clearly demonstrated that adolescents who were ready to change their "LIFESTYLES", with a moderate supports from their parents, could gradually lower their A1Cs' levels in 6 months or possibly less.

Interpretations of the Final Results and the Findings of the Research Study

The research study found that the Pre-Tests totality was 65 participants; it should be however noted that 25 new participants were added to the study which was 5 participants more than the 20 additional requested pre-tests secondary data. Participants showed Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a Std. deviation of 1.054, variance of 1.11, median of 4.0 and mean of 3.17. Pre-Tests showed 65 out of 65 or 100% cumulative frequencies with no missing numbers. Pre-Test showed a Color Coded Pie Chart of Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements blue was fundamentally significant and red showed profoundly insignificant changes. Pre-Tests further showed a Bar Chart Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements approximately 7 out 65 or 11% indicated significant A1C normal range and 35 out of 65 or 54% indicated insignificant A1C which was above 6.5% and needed immediate additional interventions. Pre-Tests showed the Histogram Pre-Tests of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a mean of 3.2, standard deviation of 1.05 and N was 65. Pre-Test showed a One-Sample Statistics of Test of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with N=65, mean was 3.17 and Std. Deviation of 1.05. Pre-Tests showed a One-Sample Test of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a mean difference of 3.17; upper level of confidence was 3.43 and Sig. (2-Tailed) of .000 or 100% internal statistical differences between dependent and independent variables. Pre-Tests showed One-Sample Effect Sizes of Diabetes Levels Ranges Pre-Intervention A1Cs Levels' Measurements with a Cohen's d of 1.054 versus Hedges' corrections of 1.06 no corrections were needed (see Tables 1 to 5 & Figures 1 to 3 for details).

Contrarily, Post-Test showed the Statistics Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a Std. deviation of 1.09, variance of 1.18, median of 2.0 and mean of 1.93. Post-Test showed 60 out of 60 or 100% cumulative frequencies with no missing numbers. Post-Tests showed a Color Coded Pie Chart of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements blue was significantly below 5.7% A1C's normal range and red were insignificantly above 6.5% A1C's range that was classified as diabetes status which needed immediate interventions. Post-Tests showed a Bar Chart of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements approximately 28 out 60 or 46.7% indicated significant A1C's normal range, 17 out of 60 or 28.3% indicated pre-diabetes, and 6 out 60 or 10% A1C which was above 6.4% diabetes status, and 9 out of 60 or 15% was above 6.5 A1C's level range, which needed immediate additional interventions. Post-Tests showed the Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a mean of 1.93, standard deviation of 1.09 and N were 60. Post-Tests showed a One-Sample Statistics of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with N=60, mean was 1.93, and Std. Deviation of 1.09. Post-Tests showed a One-Sample Test of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a mean difference of 1.93, upper level of confidence was 2.21and Sig. (2-Tailed) of .000 or 100% statistical differences between dependent and independent variables. Post-Teas showed One Sample Effect Sizes of Post-Tests of Diabetes Levels Ranges Post-Intervention A1Cs Levels' Measurements with a Cohen's d of 1.87 versus Hedges' corrections of 1.10 no corrections were needed (see Tables 6 to 10 & Figures 4 to 6 for details). **The comprehensive research study found that there were profound significant internal statistical differences between Pre-Tests and Post-Tests about those who participated in the interventions' methodologies approaches versus those who were recorded prior to or did not participate in the interventions' methodologies approaches. The research study also found that there were profound effects on adolescents' HgA1c levels over a 6 months' time frame with adolescents diagnosed with T2DM, who have not previously attended educational programs about healthy diet and exercise life-style changes after being exposed to treatment intervention project. In summary, the research study demonstrated that simple changes in ones' "LIFESTYLES" without any prescribed INSULINS' medications, has a profound significant positive effects in adolescents' A1Cs Levels' Measurements in 6 months or less.**

Confirmation or Disconfirmation of the Theoretical Framework

The Theoretical Framework one of many premises of Locke's premises emphasized, pinpointed, and stipulated that "Locke's Goal Setting Theory further postulates if those at risk of diabetes, or those who have diabetes set a goal, for example to reverse the impact of a diagnosed condition, the goal will prompt action. The delivery of this education will allow for individuals to set a goal, i.e. reversing the impact of diabetes or avoiding it. This will prompt lifestyle changes and the formation of new habits."

Based on the overwhelming results and findings between the internal and external statistical significant and insignificant differences between **PRE-TESTS versus POST-TESTS** in this comprehensive research study, the research study **DEMONSTRATED** and **COMFIRMED** "**Locke's Goal Setting Theory**" effectiveness in its' application. Those participants who changed their "**LIFESTYLES"** saw some significant drops in their A1Cs Diabetes measurements' levels as compared to those who did not comply **FULLY** with the interventions' methodologies and approaches.

Implications of the Research Study on Public Health Policy

This comprehensive research study shed some valuable lights, insights learned and lessons gained to all participants, especially to all public health providers who participated in this study based on the outcomes of the implemented.

1. The study showed that by implementing **"Locke's Goal Setting Theory**" Intervention's methodology and approaches, majority of the adolescents who participated showed some profound significant **A1Cs'** Diabetes measurements levels' improvements between 4 to 6 weeks of exposure to treatments, without using any medications.
2. The study showed that it is more than possible to reduce ones' A1Cs Diabetes measurements levels without using any prescribed "**INSULINS**" or other associated medications of any kind, type, or made.
3. The study showed that it is more than possible to reduce ones' A1Cs Diabetes measurements levels through simple changes in ones' LIFESTYLES.

4. The study showed that while changing ones' LIFESTYLES may be challenging in the beginning but with time it comes a WAY of LIFE.
5. The study showed that changing one's LIFESTYLES in 4 to 6 months as to avoid the underlined guaranteed implications associated with **Diabetes** such as **DEAD LEGS, DEAD TOES, DEAD HANDS, DEAD FINGERS, and the Amputations of DEAD LIMBS, SEATING on WHEELCHAIRS, or SLOW PAINFULL DEATH** is a small PRICE to pay.
6. The study showed that parents with adolescents with diagnosed or showed some symptoms of Diabetes should and most encourage them to participate in such **"Locke's Goal Setting Theory**" Intervention's methodology and approaches as to prevent future preventable **IMPLICATIONS.**
7. The study showed that the parents should participate as well because sometimes Diabetes is passed from one generation to another; and there is nothing wrong for being FIT.
8. The parents should and must sign-up into **Affordable Care Act (ACA)** also known as **OBAMACARE** by visiting www.healthcare.gov it is not that expensive as many assumed.
9. Furthermore, the confidential Clinic/s in Southwest Houston, Texas should expand their effective interventions' methodology and approaches, as to assist more adolescents and parents in Southwest Houston, Texas. It should be noted that ACA will foot the applicable bills if the participants do not have any insurance but they were able to signed up into ACA insurance also known as OBAMACARE.
10. Finally, this study disconfirmed that the assumptions, presumptions, and preconceptions that Diabetes was/is classified as an **"UNDERLYING"** untreatable critical health condition among minorities, especially when dealing with Blacks/African Americans and Hispanics in the US is not true; it is not true because it can easily be treated with SIMPLE changes of ones' **LIFESTYLES.**

Conclusion and Discussions of the Research Study Finale

It is clear that T2DM in adolescents is an epidemic that needs measures evaluated and found effective to control and eventually prevent the disease in adolescents. More evidence is needed to formulate policies, create awareness among the citizens of the USA on the prevalence of this deadly disease. Also needed are interventions that are effective to help adolescents control HgA1c levels. A high simple carbohydrate diet and lack of daily exercise leads to preventable and expensive health issues associated with a diagnosis of Type 2 diabetes during adolescents. Adolescents with glucose metabolism disturbances should be under medical observation and learn to follow evidence-based clinical practice guidelines. Diabetes is a considerable threat to population health, spares no segment of society, and disproportionately affects the poor, the aged, and racial and ethnic minorities. Given the staggering statistics in the US and internationally, effective primary prevention interventions are necessary to reduce the future population burden of diabetes starting early on before they become adults. It is therefore important that this issue is addressed by DNP providers and is the basis for this DNP project to determine if is a reduction in A1C levels of the adolescents who attend a self-care diabetes management education program with their parents.

In conclusion, the literature that has been synthesized above provides crucial information in diabetes among adolescents. Several consistencies exist in various literatures. The consistencies are important in consolidating the arguments of the different author. Generally, a majority of the documents in the above review shows poor adherence to guidelines by the stakeholders involved in the management of diabetic patients (Locke, & Latham, 2013). Also, there is an overwhelming consensus that a majority of diabetic programs have secluded the adolescence. Those that cater for adolescent needs are poorly funded. It is, therefore, necessary that programs that are evidence-based are developed and adhered to improve treatment outcome among the adolescents. These were the articles used this research study's project. We chose these articles because they give evidence based of what worked and what does not, so we can best apply the effective ones to my project. The full list of articles is in appendix A. As requested in research study 1 of this research study 2 for additional 20 participants should be added and timeframe of exposure to treatments should be moved from 4 months to 6 months, additional 65 participants were **Pre-Tests** measured, 60 participants were **Post-Tests** measured, and the timeframe was for 6 months instead of 4 months in this final research study. *The study found some profound internal and external statistical significant differences between Pre-Tests and Post-Tests. The study demonstrated* ***that simple changes in ones' "LIFESTYLES" without any prescribed INSULINS' medications, has a profound significant positive effects in adolescents' A1Cs Levels' Measurements in 6 months or less. The research encouraged both parents and adolescents in the US should participate in such INTERVENTIONS which eventually bring some POSITIVE SOCIAL CHANGES to their families and possibly beyond.***

ACKNOWLEDGEMENTS

This study wants to give a special thanks to **the PVAMU the Division of Research & Innovation (R&I) in response to the Faculty and Staffs of the-Research & Innovation for Scholarly Excellence (RISE)** for their continued supports of such research studies. **This study wants to thank PVAMU College of Education and Los Angeles Pacific University faculty members for their contribution to this critical research study.** Also, this research study wants to thank **PVAMU School of Public & Allied Health the Division of Public Health & Health and Division of Public Allied faculty members, and the Counselor Faculty Member from Madison High School Tallulah, Louisiana USA** and staffs for their continued supports for all researches studies' obligations and commitments. **Special THANKS to the Confidential Medical Clinic Employees in Southwest Houston, Texas; please, note that this comprehensive research study would have been impossible, without your overwhelming selfless assistance.**

CONFLICT OF INTERESTS

This study shares no conflict of interests.

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Appendix A

PICOT

PICOT		
P	Population	Adolescent
I	Intervention or Issue of interest	Will providing diet education and cardiovascular exercise program to both parents and Adolescent diagnose with T2DM teaching them about eliminating the regular consumption of high simple carbohydrate and fatty food diet, and add more active daily exercise by decreasing the amount of sedentary activities such as use of computers and other electronic devises
C	Comparison	No diet education, no cardiovascular exercise, sedentary activities.
O	Outcome/s	Reduction in A1Cs' levels back to normal range.
T	Timeframe	Within 4 to 6 months

Type 2 Diabetes and Exercise

First Author (Year)	Conceptual Framework	Design/Method	Sample and Setting	Major Variables Studied (and their definitions)	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
McCarthy, M. (2015)	To promote dietary change and physical activity to prevent type 2 diabetes	Review of past studies	53 studies were sampled	Diabetes risk factors eg. Excess weight and high lipid levels	State of risk factors for the participants in the programs	Comparison of results	participants of the programs showed improvement in risk factors	Worth to practice
Pasieka, A. (2018)	To find out importance of physical exercise in control of diabetes	Review of articles	10 key articles sampled	• Level of physical activity • Glucose control in patients	Effectiveness of glucose control depending on a person's physical behavior	Descriptive analysis	High physical activity leads to better glucose control	Worth to practice