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## ORIGINAL

# ROLE OF PHYSICAL ACTIVITY IN THE MANAGEMENT AND PREVENTION OF TYPE 2 DIABETES

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### ABSTRACT

The research study aims to determine the role of physical activity related to management and prevention. Physical activity plays an important role in reducing and limiting the impact of T2D on the body as physical activity (PA) helps uptake glucose into skeletal muscles through an insulin-independent activity. The research based on primary data analysis to determine the result used smart PLS software and described the correlation analysis as descriptive statistical analysis and smart PLS Algorithm model between them. Normally, blood glucose levels in the body are balanced through regulatory hormones, which increase glucose development and free fatty acid mobilization, and the resistance of insulin or T2D might impair this. Research studies have confirmed that physical activity (PA) improves insulin resistance, hepatic and systematic functions, and the reduction of blood glucose levels, which is linked with glucose intensity and duration in the body. The results last from 7 to 72 hours. Moreover, following the PA regularly improves the functions of  $\beta$ -cells, insulin resistance, gut microbiota and micro-vascular functions. These factors lead to a reduction of diabetes effects and improve patients' health. According to the overall research, it's found a direct link between the management and prevention of type 2 diabetes.

**KEYWORDS:** Physical Activity (PA); Management (MM); Prevention (PP); Diabetes (DD)

### 1. INTRODUCTION

The human body regulates its body sugar by managing the regulatory release of insulin from the pancreas. Insulin is an important hormone that is necessary for the regular metabolism of fats and carbohydrates in the body.

Insulin works by ensuring that the cells uptake glucose to fulfill their energy requirements as demanded by the respective living body. But sometimes, the body becomes resistant to insulin or the pancreas becomes unable to produce enough insulin, due to which, the glucose remains unused in the bloodstream, and as a result, the blood sugar level shoots up (Burr et al., 2010). This chronic condition is termed Type 2 Diabetes Mellitus, in which the body shows high sugar levels due to insulin deficiency or resistance. Similarly, there is a condition that can be named as prediabetes, in which the blood sugar levels are higher than usual but not yet high enough to be declared as diabetes. This condition depicts impaired fasting and tolerance of glucose by the body cells. Those individuals who show such a condition of prediabetes are more likely to develop diabetes of type-2 and can further develop cardiovascular issues and abnormalities like dyslipidemia (Hayes & Kriska, 2008). Physical activity is therefore declared to be highly efficient in preventing the development of type 2 diabetes from the pre-diabetic condition. Studies have shown that those individuals who are physically active in their daily lives are supposed to have the same effect as that of medicines in prohibiting the progression of type 2 diabetes in people with impaired glucose tolerance. Physical activity works by promoting insulin sensitivity and helping the body produce insulin more efficiently, which is necessary for maintaining blood glucose levels in the normal and acceptable range. Physical activity helps in the management of type 2 diabetes by following different mechanisms of action (Laaksonen et al., 2005). Physical activity daily helps increase the body's sensitivity to insulin. For this purpose, the body's muscles start using glucose more during and after exercise, which causes the blood glucose levels to start lowering. This usage of glucose by muscles then results in an overall reduction of body glucose level, thereby lessening the stress on the pancreas's beta cells to produce insulin. Similarly, weight management is also necessary for insulin regulation. Physical activity helps in weight management because the increased body weight is the main reason for the development of type 2 diabetes, as visceral fat is the major reason for weight gain (Tudor-Locke et al., 2000). By encouraging weight loss and lowering visceral fat, physical activity helps reduce resistance to insulin, and the overall metabolic condition of the body can be maintained. Systematic inflammation is another reason for the development of type 2 diabetes because increased adiposity leads to a pro-inflammatory response in the body which induces insulin resistance (McGavock et al., 2007). By performing physical activity, this inflammation of the body can be reduced, escalating metabolic function, which contributes to the reduction of risk factors for type 2 diabetes. Another benefit of physical activity in the prevention of type 2 diabetes is the reduction in fat of a visceral nature. Visceral fat is a type of fat that develops and accumulates around internal organs and, therefore, works in developing insulin resistance in the body. Physical activity helps reduce visceral fat more efficiently than dieting and thus reduces the chances of type 2 diabetes (Kriska, 2000). Excessive fat causes the malfunctioning of the beta cells that causes the

deficiency of insulin production, which can be prevented by using a non-drug approach in reducing the fat by either low-calorie intake or by a combination of physical activity it. Moreover, physical activity helps enhance the lean muscle mass in the body. Since the muscles are major sites for the disposal of excess glucose, therefore it leads to better uptake of glucose from the body and increases insulin sensitivity (Sanz et al., 2010). Besides these benefits, physical activity also helps manage other body issues involving cardiorespiratory fitness, which can be managed d by performing aerobic exercises like running, swimming, and walking, which regulate the lungs and heart activity and contribute to the body's health. Furthermore, mental health and long-term health benefits can be achieved by physical activity regularly in turn impacts the management of blood glucose levels as well (Bermejo et al., 2021).

For the proper management of type 2 diabetes, a suitable and tailored physical activity program should involve both aerobic and resistance activities and training sessions. Resistance training involved in daily exercises can help build muscle mass, which in turn helps efficiently dispose of glucose. On the other hand, aerobic exercise, if performed for a minimum of 150 meters every week, can help manage cardiovascular issues and regulate insulin sensitivity (Lambert & Bull, 2014). Additionally, balance and flexibility exercises help promote physical health, especially in older people, and prevent them from losing mobility, ultimately adding up to their insulin production and regulation according to the needs of the body. The management of insulin can also be done by lowering the glycated hemoglobin levels of the body which further helps in having control over blood glucose levels in the longer run (Ghaderpanahi et al., 2011). Improvement in the lipid profile can also be achieved by physical activity as it helps in lowering the bad cholesterol and promotes the regulation of good cholesterol, in the end managing both diabetes and cardiovascular fitness (Colberg, 2012). Insulin sensitivity is regulated by the complex connection of the pancreas, liver, muscles, fat, and other tissues. Numerous factors help in making these organs sensitive to insulin including the blood vessels system, endothelial linings, muscle fiber and strength levels, fat composition, and how well the tissues can avail oxygen. All of these factors are collectively responsible for the regulation of insulin; therefore, physical activity aims to target these factors and the regulation achieved by it can, later on, be taken as a preventive measure against type 2 diabetes (Kriska, 2000). By using a proper physical activity strategy, according to the requirements of individual body features, major health issues like diabetes type 2 can be prohibited and overall experience of health can be upgraded (Wang & Zhu, 2023). The research describes Role of Physical Activity in the Management and Prevention of Type 2 Diabetes. The research paper divided into five specific chapters first portion describe the introduction included objective of research. The second section represent literature review the third portion represent methods. The fourth section describe result and its description also that last portion

summarized overall research study.

## 2. Literature Review

Studies suggest that actual work is perceived to create numerous general and diabetes-explicit medical advantages. The reason for this study is to survey the active work/practice research in diabetes and sum up the flow practice proposals. This data can be involved by physician to make protected and viable proposals for incorporating active work/practice into self-administration plans for people with diabetes or in danger for its turn of events (Hayes & Kriska, 2008). Researchers reveal that the way of life changes that incorporate a healthfully adjusted diet and expanded actual work are successful mediation choices for people with borderline diabetes who need to forestall movement to type two diabetes. Scholars also features late discoveries on the advantageous job of normal actual work for improving or potentially keeping up with insulin responsiveness in people with borderline diabetes. Researchers likewise give a proof informed remedy to the kind, power, and length of the two obstruction and high-impact actual work in people with borderline diabetes(Burr et al., 2010). Scholars suggest that gigantic potential for enhancing GC, insulin awareness, & cardio gamble components by way of expanded active work in people with type two diabetes. The impacts of opposition preparing on cardio gamble elements to date probably restrict its petition as an accessory treatment for people with type two diabetes (Tudor-Locke et al., 2000). Scholars recommend that truly dynamic people have a thirty-half minor hazard of creating type two diabetes than do stationary people & that active work gives a comparative gamble decrease for coronary illness. Uncertainty decreases are seen with just thirty minutes of balanced-power action each day. General wellbeing drives advancing limited expansions in actual work might provide the best harmony among adequacy and practicality to work on digestion & cardio wellbeing in to a great extent stationary populaces(Bassuk & Manson, 2005). This study's purpose is to assess the viability of active work in individuals with type two diabetes & Coronavirus. Fundamental outcome demonstrates that locally established exercise might be a fundamental part in subsequent actual work suggestions given the ongoing Coronavirus universal & the requirement for social removing. This locally established actual activity can be effortlessly controlled and observed utilizing empowering people to oversee medical problems that advantage from actual activity (Seidu et al., 2021). Researchers target to survey the impacts of activity on the anticipation of category two diabetes in greater serious people & on glycaemia manage in category two diabetes sufferer. In this way, actual activity ought to be essential for any remedial system to lagging the advancement of category two diabetes in greater serious people & to further develop glucose manage in category two diabetes(Sanz et al., 2010). Studies elaborate that category two diabetes has arrived at pandemic extents overall & is related with expanded danger for cardio

illnesses and untimely destruction. Dietary and active work established way of life mediations have been displayed to forestall movement to category two diabetes in sufferer at greater gamble. A significant point is that corpulent people who are to some degree reasonably capable have a lesser extinction gamble than the individuals who are ordinary weight yet unsuitable. An enormous group of proof exhibits that the best upgrades are accomplished with joined oxygen consuming and obstruction preparing(Lavie et al., 2013). Studies claim that people who are as of now stationary, ill suited, or fat can advantage digestively from just enjoying reprieves from sitting. Hence evasion of stationary way of behaving seems to generally affect glycemic the executives, all people with category two diabetes ought to be urged to negligibly take part in more prominent everyday development to more readily deal with their diabetes and fat. When people have effectively carried out more everyday development into their way of life, they will be bound to take part in organized types of active work to acquire extra advantages (Colberg, 2012). Scholars explain that physical activity was contrarily connected with occurrence diabetes in the whole accomplice transversely the review, with partial anemometer outcomes encouraging these discoveries. Researchers features the significance of physical activity inside way of life intercession endeavors intended to forestall diabetes & pushes medical care suppliers to examine the two physical activity & weigh while guiding greater-gamble sufferer (Kriska et al., 2021). Studies show that the administration of category two diabetes incorporates capacity and strengthening of the sufferer to change way of life, keep a satisfactory eating routine and actual work, deal with the sickness, & obey a particular project of occasional clinical checks and schooling meetings. What's more, the sufferer ought to have the option to accurately distinguish and enough tackle issues connected with the infection and effectively team up with the medical services framework(Coppola et al., 2016). Studies explain that actual work has displayed to forestall category two diabetes. In any case, the sort, power and measure of compelling actual work as need might arise as per level of their gamble for category two diabetes have not been explained thoroughly. Moderate vigorous actual work was altogether connected with diminished chance of category two diabetes in no large individuals & might be an adequate activity objective for such people. Notwithstanding, stout individuals ought to be examined more to deliver a fitted activity rule to this populace at greater gamble of category two diabetes (Ghaderpanahi et al., 2011). Researchers focus on the job of actual work for the counteraction of type 2 diabetes mellitus in youngster & its related cardio entanglements. The initial segment portrays the commonness of cardio gamble elements that associate. The subsequent part centers around the job of active work in the counteraction and the executives of type 2 diabetes mellitus in youngster. Huge scope mediation surveys are expected to decide the best actual work systems for the counteraction and the board of type 2 diabetes mellitus in youngster (McGavock et al., 2007). Scholar studies reveal

that strolling was related with a decrease in fatality. Conversely, proof was very restricted in regards to other day to day proactive tasks like cultivating and housework in sufferer with type two diabetes. Ongoing investigations have proposed day to day actual work, along with non-practice action combustion, to be well connected with metabolas dangers and lethality. Nonetheless, very much planned long-term investigations are justified to clarify its impacts on generally speaking wellbeing(Hamasaki, 2016). Researchers investigated that active work and practice preparing have been perceived as therapy choices for sufferer with T2D. In any case, additional exploration is expected to lay out the capacity, power and kind of activity that are expected to decrease cardio weight and especially to characterize the best procedure for advancing long haul consistence and strong way of life variations in people with T2D (Balducci et al., 2009). Scholars examined that very much as medication, practice can be dose in view of the qualities of the person to build its advantages and diminish secondary belongings. Here, the components hidden the impacts of physical exercise on dextrose digestion in muscle are delineated, & the impacts of adjustment of the boundaries portraying this abnormal "drug" on dextrose balance are depicted(Sgro et al., 2021). Studies access the scourge of DM has proactively turned into a critical worldwide wellbeing danger. In the beyond thirty years, the quantity of individuals with DM has fourfold universally, & DM is recognized as the 10th significant reason for death on the planet these days. Practice preparing can well influence glycemia boundaries, the level of cholesterol, pulse, & great-awareness c receptive albumen. Practice further develops blood sugar manage in T2D, lessens cardio gamble elements, and directs body burden by diminishing muscle to weight ratio & upgrading slender pile (Amanat et al., 2020). Scholars summarize that joined nutriment & active work advancement schedules are compelling at diminishing diabetes frequency & enhancing cardio gamble elements in people at expanded danger. Additional concentrated schemes are more viable(Balk et al., 2015). Researchers described that actual work & cardio wellness are additionally connected with diminished death ratio amidst people with cardiovascular disease, category two diabetes, & metabolous disorder. Practice affects various gamble indicators for cardiovascular disease & category two diabetes, notwithstanding furthermore significant advantages with ongoing preparation. The two oxygen consuming and opposition practice have helpful worth, to a great extent free of weight reduction, & ought to be remembered for practice projects(Gaesser, 2007). Researchers concluded that the significance of co activity amidst overall areas of community, residents' familiarity with solid ways of life & the public disparities in wellbeing should be underlined on the grounds that the gland pandemic can't be tackled simply by focusing on protective activities did by medical services frameworks(Lindström et al., 2010). Scholars reveal that practice is a front-line treatment suggested for sufferer with category two-diabetes. Curiously, acting evening contrasted and morning as well as since-dinner opposed to before-

feast practice might return somewhat superior glycemic advantage. Notwithstanding such effective advantages of activity for type two diabetes concern, ideal activity proposals stay muddled while regarding, dietetic, medicine, or potentially different ways of behaving (Syeda et al., 2023). Scholars elaborate that actual work can successfully decrease the seriousness of burdensome side effects, in any case, apparently actual work isn't altogether compelling in enhancing glycemic manage in grown-ups who have the two T2DM and burdensome side effects (Arsh et al., 2023). Researchers explain that actual activity might further develop rest quality in more established grown-ups with type 2 diabetes mellitus, easing sadness and deferring the advancement of mental disability. Actual activity can improve sufferer' capacity to oppose gloom and mental disability, and establishing agreeable rest conditions can likewise build up the impacts of this interaction. These discoveries have significant ramifications for advancing sound maturing in more established grown-ups with type 2 diabetes mellitus(Zhang et al., 2023). Researcher studies reveal that the results of advanced age is mental and actual downfall, which can cause many issues. Such entanglements are extra articulated that over there with category two diabetes. Consolidated practice worked on some actual wellness & diabetes associated proxy elements, along with elect mental capabilities, yet affected comprehension related biochemical elements in ladies with type two diabetes (Ghodrati et al., 2023). Studies expected to analyze insights and exercises nearly active work support during pregnancy among forty-four racial Chinese transients & thirty-nine Australian conceived European ladies with GDM. Various techniques are recommended by Chinese and European members to further develop active work cooperation to oversee GDM between racial Chinese and European populaces, which is going to be assessed in later mediations(Wan et al., 2024). Scholars claim that weight has turn a certain one worldwide scourges, adding to the weight of illness in the public eye, expanding the gamble of diabetes, cardio & liver sicknesses. Therapy choices for corpulence incorporate way of life alterations, medication & bariatric medical procedure, with the last option being the best therapy. Deliberate physical activity is related with superior personal satisfaction, further develops insulin awareness, prompts extra obesity reduction, decreases its antagonistic consequences for bone mass & outcomes in best body arrangement (Chomiuk et al., 2024).

### **3. Methodology**

The research study determines the role of physical activities related to the management and prevention. The research based on primary data analysis for determine the research used smart PLS software and generate result included descriptive statistic, correlation coefficient and smart PLS Algorithm model between them. according to the research Presently, the prevalence of the diabetes in United States is 10.5% and globally it affects 463 billion

populations. Type 2 Diabetes T2D comprises 90-95 of all types of diabetes cases. The main objective for treating T2D is to enable them to get educated about the disease, glycemic index management, reducing the risk of cardiovascular (CVD) diseases, screening of microvascular difficulties, maintaining the blood glucose level, level of blood pressure and lipid balance to prevent complications. Many types of medications and inventions are prescribed for T2D treatment. New treatment includes bariatric surgery to get rid of T2D (Xu et al., 2022). It was also demonstrated that the link between obesity and having T2D is not clear yet but, excessive fat in the body increases the chances of insulin resistance and metabolic changes in the body before the diagnosis of T2D. For instance, fatty acid increases in blood circulation when obesity increases which causes the sensitivity of insulin, adipose tissue and the liver including some other organs also (skeletal muscles and pancreas). These types of metabolic changes happen even earlier than are evident in glucose homeostasis. The primary history of T2D demonstrates that earlier increases in the accumulation of fat contributed towards fasting and hyperglycemia that aid in masking insulin resistance and balance the normal glycaemia level in the body. After that the activity of  $\beta$  cells fails to release the insulin and balance the glucose level in blood sugar it contributes to fasting and glucose concentration in the body increases and T2D is diagnosed (Tabák et al., 2009).

### 3.1 Smart PLS Algorithm

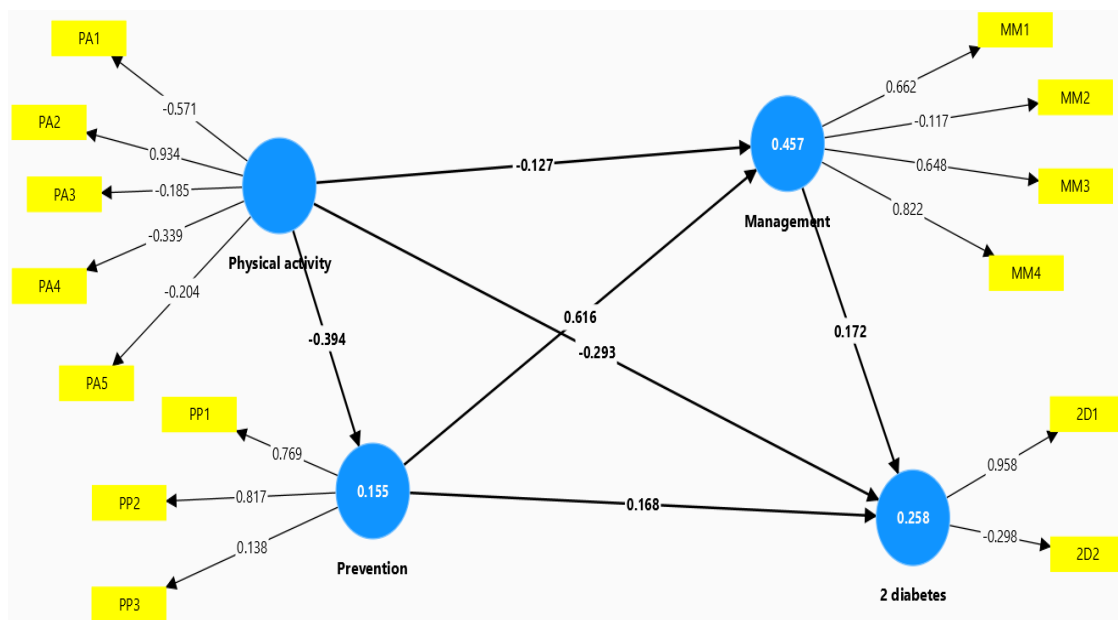


Figure 1: Smart PLS Algorithm

The above model represents that smart PLS Algorithm model in between physical activity, preventions, the management also that 2 diabetes. The model shows that physical activity is -0.571, 0.934, -0.185, -0.339 and -0.204 shows that negative values related to physical activity with PA1,2,3,4 and 5.



The prevention shows that 76%, 81% and 13% significantly level between them. the result also describe that management shows 82%, 64%, 11% and 66% significantly relation between the management. The 2 diabetes shows that 95% and 29% positive and negative link with them. according to the above model the prevention shows 16% positive and significant relation with 2 diabetes. Management factor also shows 17% positive and significant relation with 2 diabetes (as shown in figure 1).

### 3.2 Descriptive Statistic Analysis

Table 1: Results of Descriptive Statistic Analysis

NAME	NO.	MEAN	MEDIAN	SCALE MIN	SCALE MAX	STANDARD DEVIATION	EXCESS KURTOSIS	SKEWNESS	CRAMÉR-VON MISES P VALUE
PA1	1	1.673	2.000	1.000	3.000	0.619	-0.607	0.364	0.000
PA2	2	1.714	2.000	1.000	3.000	0.606	-0.545	0.243	0.000
PA3	3	1.367	1.000	1.000	3.000	0.523	-0.086	1.005	0.000
PA4	4	1.449	1.000	1.000	3.000	0.574	-0.181	0.876	0.000
PA5	5	1.571	2.000	1.000	3.000	0.571	-0.734	0.387	0.000
MM1	6	1.653	2.000	1.000	3.000	0.624	-0.613	0.426	0.000
MM2	7	1.918	2.000	1.000	4.000	0.829	-0.894	0.380	0.000
MM3	8	1.755	2.000	1.000	4.000	0.743	0.249	0.749	0.000
MM4	9	1.796	2.000	1.000	4.000	0.808	0.418	0.879	0.000
PP1	10	1.837	2.000	1.000	4.000	0.865	-0.346	0.721	0.000
PP2	11	1.714	2.000	1.000	4.000	0.700	0.920	0.843	0.000
PP3	12	1.673	2.000	1.000	4.000	0.739	0.577	0.935	0.000
2D1	13	1.735	2.000	1.000	3.000	0.663	-0.734	0.366	0.000
2D2	14	1.673	2.000	1.000	4.000	0.739	0.577	0.935	0.000

The above mentioned result of table 1 demonstrate that descriptive statistical analysis result represent the mean values,

median rate, the standard deviation rate, also that explain the skewness value and probability value of each variable included dependent and independent. The PA stand for physical activity PA1 is main independent variable according to the result its mean value is 1.673 the standard deviation rate is 0.619 shows that 61% deviation from mean. The result also describes that skewness rates are 36%. The table-1 represent the overall probability value is 0.000 the minimum rate is 1.000 the maximum rate is 4.000 respectively. The PA2, PA3, PA4 and PA5 these factors consider as independent variable result describe its mean values 1.71, 1.36 and 1.449 its shows positive average rate. The MM1,2,3 and 4 consider as mediator variable according to the result its standard deviation rates are 62%, 82%, 74% and 80% deviate from mean. The PP1,2,3 its shows that positive average rates its values are 1.837, 1.714, 1.673 this value present that positive average rates between them. the 2D shows average rate is 1.673 the standard deviation rate is 73% also that skewness rate is 93% respectively. PA such as aerobic exercises requires energy from aerobic metabolism, for example, running, jogging, cycling and swimming. Resistance exercises including yoga, stretching lifting etc., require muscle power to accomplish. The duration 150 minutes/week of physical activity and 5-7% weight loss within 6 month reduce the effect of T2DM (Amanat et al., 2020). PA not only improves insulin resistance but also enhances mitochondrial functions and, the ability of muscles to utilization of glucose and maintain blood glucose levels (Stanford & Goodyear, 2014). Regular PA improves the VO2 max which is the ability to utilize and transport oxygen during drained activity as the patients having T2DM showed a lower level of VO2 max. Defects in VO2max are considered the earliest signs and risk factors for getting T2DM. Many studies confirmed that PA reduced the risk of T2DM. High-intensity exercises also improve the glucose muscle utilization, insulin resistance and blood glucose level in patients of T2DM (Foudi & Legeay, 2021).

### 3.3 Correlation Coefficient

**Table 2: (a)** Results of Correlation Coefficient

	PA1	PA2	PA3	PA4	PA5	MM1	MM2	MM3	MM4	PP1	PP2	PP3	2D1	2D2
PA1	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PA2	-0.303	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PA3	0.245	-0.120	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PA4	0.240	-0.101	-0.142	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PA5	0.181	-0.177	0.527	0.027	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 2: (b) Results of Correlation Coefficient

	PA1	PA2	PA3	PA4	PA5	MM1	MM2	MM3	MM4	PP1	PP2	PP3	2D1	2D2
MM1	-0.029	-0.154	0.015	-0.249	-0.074	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MM2	-0.291	-0.046	0.163	-0.266	-0.117	0.024	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MM3	0.137	-0.019	-0.346	0.306	-0.343	0.345	-0.165	1.000	0.000	0.000	0.000	0.000	0.000	0.000
MM4	0.152	-0.494	0.178	0.110	0.208	0.264	-0.025	0.257	1.000	0.000	0.000	0.000	0.000	0.000
PP1	0.205	-0.167	0.042	0.312	-0.183	0.311	-0.246	0.350	0.420	1.000	0.000	0.000	0.000	0.000
PP2	0.256	-0.337	-0.104	0.065	-0.153	0.334	-0.040	0.376	0.438	0.260	1.000	0.000	0.000	0.000
PP3	0.035	-0.026	-0.006	0.201	-0.090	-0.024	-0.210	0.003	-0.112	0.108	0.135	1.000	0.000	0.000
2D1	-0.062	-0.442	0.163	0.045	0.185	0.221	0.183	0.075	0.470	0.316	0.364	0.031	1.000	0.000
2D2	-0.055	0.338	0.046	0.201	0.055	-0.024	0.023	0.040	-0.077	0.012	0.056	0.104	-0.010	1.000

The above-mentioned result of table 2 represent that correlation coefficient analysis related to the physical activity and management also prevention of type 2 diabetes. The overall result shows that some positive and some negative link in between management and prevention. Physical activity like aerobic exercise progresses the resistance of insulin in people who have T2D and correspondingly progresses the functions of mitochondria. It also demonstrated that regular aerobic exercise for seven days improves the glucose level by increasing the insulin-stimulated factor and decreasing the hepatic glucose level. Aerobic exercise training improves the insulin activity in the body by taking the insulin in muscles and lessens peripheral insulin sensitivity.

This type of PA also improves muscle activity to utilize insulin effectively as compared to hepatic sensitivity. Many Meta-analyses and systematic reviews confirmed that regular aerobic exercise regulates the blood glucose level and it balances the glucose level over that day. Studies showed that it reduces the glycaemia level to 0.5-0.7%. Regularly followed aerobic PA improves insulin resistance, blood sugar level, blood pressure, lipid metabolism and other fitness parameters without losing weight (Kadoglou et al., 2007). Following the regular exercise for controlling the Type 2 Diabetes Miletus (T2DM) is important. Several studies revealed that there are many benefits of using PA (aerobic exercise and resistance training), these exercises can be done alone or can be combined with other types of training without alternation in diet.

These exercises maintain the blood glucose level in the body, reducing the fat in the body and around organs, improving muscles' ability to utilize the glucose, lowering the blood pressure and improving fat metabolism. All these benefits associated with the PA might be independent of losing weight. Moreover, the effects of PA also depend on the total number of training taken and are independent of the period and intensity of exercise. However, many studies also verified that exercise alone without the involvement of diet factors does not give satisfactory results in patients suffering from T2D (Balducci et al., 2009).

#### 4. Conclusion

The risk of getting T2D can be increased as the level of adiposity increases. For instance, with the increasing BMI the pervasiveness of T2D increases. However, this disease also affects people with normal body weight. The physiological functions and organs of the body can be affected by the accumulation of adipose tissue in the body, and the chances of cardiovascular diseases increase. Many studies revealed that the risk of T2D risk increases over time as the body weight increases. Furthermore, the highest value of BMI is 25 kg/m<sup>2</sup>, the lowest value is 30 kg/m<sup>2</sup> and the upsurge in BMI of 5 kg/m<sup>2</sup> from the normal range, doubles the risk of being affected by T2D mellitus. The risk of T2D increases as BMI increases, and it is evidenced clearly. Weight loss is important to achieve better results for the prevention of T2DM; roughly per week 0.5-1 kg weight loss is enough to achieve better outcomes. Patients suffering from T2DM are earlier diagnosed with the danger of cardiovascular diseases and stroke. T2DM also affect the functions of the kidneys, brain and many other health issues. This disease also collaborates with inflammation and insulin sensitivity.

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