

**Relationship of the Self-perception of Lifestyle
with Level of Physical Activity in People with
and without Type 2 Diabetes**

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ABSTRACT

Objective: To determine the relationship of the perception of lifestyle with level of physical activity in people with type 2 diabetes and without type 2 diabetes.

Study design: Analytical cross-sectional observational study.

Study location: Celaya, Guanajuato, Mexico; Mutual Aid Group.

Methodology: Sample composed of 100 people with type 2 diabetes and 100 people without type 2 diabetes, the lifestyle questionnaire and IPAQ questionnaire was used. Descriptive statistics were used for sociodemographic variables, frequencies and percentages for categorical, mean and standard deviation for quantitative variables. To demonstrate statistical significance of results, the value of P was set at .05. Statistical analysis was performed in STATA 13.0 ®

Results: No relationship was found between lifestyle perception and level of physical activity in adults with type 2 diabetes ($X^2 = 0.0022$ gl 1 P = 0.96) and a significant relationship between lifestyle perception and level of physical activity in adults without type 2 diabetes ($X^2 = 5.23$ gl 1 P = 0.02 RM = 2.85 95% CI = 0.80 to 10.4)

Conclusion: There is no relationship between the perception of lifestyle and the level of physical activity in people with type 2 diabetes, but it was shown that there is a significant relationship between the perception of lifestyle and the level of physical activity in people without type 2 diabetes, this is because people without type 2 diabetes are more aware of their perception of lifestyle.

Keywords: *Physical activity; Diabetes; Self-perception of lifestyle.*

1. INTRODUCTION

17 Type 2 diabetes mellitus (T2D) is a chronic degenerative disease with a prolonged latency
18 period that represents a burden for health services, for the patient, the family, the community
19 and the country [1].

20 T2D is a metabolic alteration of carbohydrates, with deficit in the production or release of
21 insulin, increasing blood sugar levels [2].

22 This chronic disease and its complications are one of the main causes of death in Mexico,
23 only surpassed by cardiovascular diseases for 2017, with a total of 75,637 deaths [3] and
24 with more than 331.13 new cases per 100 thousand a year [4].

25 According to the Official Mexican Standard for the prevention, treatment and control of
26 diabetes, people at risk of developing diabetes are considered to be those who are
27 overweight / obese, sedentary, first-degree relatives with diabetes, age equal to or greater
28 than 65 years, women with a history of macrosomic products or with gestational diabetes [5].

29 The lifestyle is defined as the perception that an individual has of his place in existence, in
30 the context of the culture and the value system in which he lives and in relation to his
31 objectives, his expectations, his norms, his concerns [6].

32 Despite the benefits of a healthy lifestyle for both the control of T2D or to delay its
33 occurrence in those with risk factors such as family history OF T2D, many of them do not
34 maintain a healthy lifestyle [7].

35 Health can be affected by lifestyle and living conditions. The lifestyle includes attitudes and
36 values, which are expressed in the behaviour of the individual in different areas of life,
37 including physical activity, food, the use of alcoholic beverages, the use of cigarettes, the
38 excessive alcohol intake and the management of sexuality, as well as the social, physical,
39 cultural, and economic aspects that impact people's lives [8].

40 Currently, physical activity is considered to be any body movement produced by skeletal
41 muscles that requires energy expenditure [9].

42 The limited physical activity that exists in the lifestyles of society has manifested the
43 importance of performing some sport, becoming a social necessity to reduce risks of
44 presenting degenerative chronic diseases such as diabetes, thus having the opportunity to
45 maintain a healthy lifestyle. in people with T2D [8].

46 The main objective of the research was to determine the relationship of the perception of
47 lifestyle with level of physical activity in people with T2D and their offspring without T2D.

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49 **2. METHODOLOGY**

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51 **2.1 Study design**

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53 Cross-sectional, observational, analytic.

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55 **2.2 Place and Universe of the study**

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57 Mutual Assistance Group (MAG) of Celaya, Guanajuato, Mexico, with registered people with
58 T2D, and one of their offspring.

59 **2.3 Selection of participants**

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2.3.1 Inclusion criteria of subjects with T2D

All persons with T2D registered in the MAG of Celaya, Mexico, adults who voluntarily agree to participate in the study, signing the informed consent, whether male or female.

2.3.2 Exclusion criteria of subjects with T2D

Subjects with T2D, hospitalized or who do not agree to participate in the study.

2.3.3 Inclusion criteria of subjects without T2D

Offspring of subjects with T2D registered in the MAG of Celaya, Mexico, with 18 years of age or older, who voluntarily agree to participate in the study, signing the informed consent, whether male or female.

2.3.4 Exclusion criteria of subjects without T2D

Offspring of people with T2D who have not agreed to participate.

2.4 Variables

2.4.1 Sociodemographic

Age. Discrete quantitative variable; number of years from the date of birth; Its measurement scale is in years and is summarized with frequencies and percentages.

Gender. Dichotomous categorical variable; they are the phenotypic characteristics that differentiate men from women; Its measurement scale is male or female and is summarized with frequencies and percentages.

Civil status. Nominal categorical variable; it is the state of natural persons determined by their family relationships, originating from marriage, that establishes certain duties and rights; its measurement scale is single, married, divorced, widowed, separated, free union; It is summarized with frequencies and percentages.

Weight. Continuous quantitative variable; it is the body mass expressed in kilograms; It is measured on an altimeter scale, digital Medidata Series ®, without shoes with as little clothing as possible; Its measurement scale is in kilograms and is summarized with mean and standard deviation.

Height. Continuous quantitative variable; it is the measurement from the feet to the parietal region of the scalp, expressed in meters; it is measured on an altimeter scale, digital Medidata®, without shoes, in an upright position and facing forward; Its measurement scale is in meters and is summarized with mean and standard deviation.

Body Mass Index. Continuous quantitative variable; is the body mass expressed in Kg / m²; Its measurement scale is in Kg / m²; and is summarized with mean and standard deviation.

2.4.2 Independent

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111 Self-perception of lifestyle. Dichotomous categorical variable, which can be called habits in
112 terms of physical activity, food, smoking, alcohol consumption; its unhealthy measurement
113 scale is 0-39 points and healthy 40-78 points measured with the lifestyle perception
114 questionnaire [10]; It is summarized with frequencies and percentages.

115 116 **2.4.3 Dependent**

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118 Physical activity level. Ordinal categorical variable; It is defined as any body movement
119 produced by skeletal muscles that requires energy expenditure; it is measured with the
120 International Physical Activity Questionnaire (IPAQ) [11], with mild categories with 0 to 599
121 METS / min / week, moderate / vigorous with 600 or more METS / min / week; It is
122 summarized with frequencies and percentages.

123 124 **2.5 Questionnaires**

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126 The lifestyle perception questionnaire was used, which consists of 78 items with a
127 dichotomous answer of YES or No; it is dichotomized in unhealthy from 0 to 39 points and
128 healthy from 40 to 78 points; It has a reliability of 0.9 intraobserver and 0.89 interobserver.
129 For the physical activity the IPAQ short version in Spanish was used with questions of
130 vigorous, moderate activities and walking as well as sitting in the last seven days; the result
131 is transformed to METS / minute week; It has a Kappa reliability of 0.89 [12].

132 133 **2.6 Procedures**

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135 Participants were explained the objectives of the study, as well as the advantages and
136 disadvantages of participating. They were asked to sign the informed consent. After doing
137 so, we proceeded to apply the lifestyle perception and the IPAQ questionnaires, and
138 anthropometry.

139 140 **2.7 Sample size**

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142 Assuming that there is a ratio of 9 among those with an unhealthy and healthy lifestyle,
143 expecting 75% to be perceived with an unhealthy lifestyle and 50% with a healthy lifestyle,
144 the minimum sample size is 37 with a perception of Unhealthy lifestyle and 331 with
145 perception of healthy lifestyle, with 95% accuracy and 80% power (Epi Info, 7.1.3.0, 2013,
146 CDC, Atlanta, GA, USA).

147 148 **2.8 Statistical análisis**

149 Descriptive statistics were used for the sociodemographic variables frequencies and
150 percentages for the categorical, mean and standard deviation for the quantitative ones.

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152 In order to show a relationship between perception of lifestyle and level of physical activity, a
153 Chi-square test and P value, Odds Ratio (**OR**) and 95% confidence intervals (95% CI) were
154 calculated. To demonstrate statistical significance of the results, the value of *P* was set at
155 .05. Statistical analysis was performed in STATA 13.0® (Stata Corp., College Station, TX,
156 USA).

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3. RESULTS AND DISCUSSION

The sample consisted of 100 individuals with type 2 diabetes (T2D) and 100 people without T2D, where they named female persons with T2D (70%) and men without T2D (74%), individuals with marital status married to T2D (67%) and single without T2D (45%), people with no schooling with T2D (28%) and high school-university without T2D (25%), adults with a body mass index (BMI) greater than 25 kg/m² with T2D (81 %) and greater than 25 kg/m² without T2D (75%) (Table 1).

Table 1. Distribution of categorical sociodemographic variables by group

Variables	Subjects with T2D		Subjects without T2D	
	f	%	f	%
Gender				
Female	70	70.00	26	26.00
Male	30	30.00	74	74.00
Civil Status				
Single	13	13.00	45	45.00
Married	67	67.00	38	38.00
Divorced	3	3.00	3	3.00
Separate	4	4.00	1	1.00
Widowed	9	9.00	12	12.00
Free Union	4	4.00	1	1.00
Schooling				
Nothing	28	28.00	16	16.00
Elementary	27	27.00	13	13.00
Secondary	19	19.00	18	18.00
High School	12	12.00	25	25.00
University	12	12.00	25	25.00
Postgrade	2	2.00	3	3.00
Body mass index				
>25 kg/m ²	81	81.00	75	75.00
<25 kg/m ²	19	19.00	25	25.00

T2D Type 2 Diabetes

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In the investigation, by Cantú Martínez, the population with T2D had a prevalence of female gender (72.3%), marital status, married (69.2%), with primary schooling completed (49.2); being similar to the sample data in the MAG Celaya [13].

Piñón et al., In their research with people without T2D obtained a prevalence of the female gender (71.9%), with a finished high school education (64.5%); being similar to the results obtained in the MAG Celaya [14].

It was found that people with T2D have a higher BMI with a range of 19.39-58.59 kg / m² and although the BMI range in people without T2D is lower, BMI is still high with a range of 17.44-47.63 kg / m² (Table 2).

Table 2. Distribution of quantitative sociodemographic variables by group

Variables		With T2D	Without T2D
Age (years)			
	Range	34-78	18-65
	Mean ± SD	56.12±10.26	34.94±12.60
Weight (kg)			
	Range	38-150	42-125
	Mean ± SD	74.70±16.60	71.87±16.10
High (m)			
	Range	140-1.86	1.34-1.90
	Mean ± SD	1.60±0.10	1.60±1.00
Body mass index (kg/m ²)			
	Range	19.39-58.59	17.44-47.63
	Mean ± SD	29.13±5.48	27.96±4.93

T2D Type 2 Diabetes

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Cantú Martínez mentions that in his research, overweight and obesity stand out, having a high BMI agreeing that in the data obtained in the MAG Celaya they have a lot of equality between the two population of people with T2D [13].

In the MAG the mild level of physical activity predominates in people with T2D (74.00%) and mild in people without T2D (60.00%) and the perception of healthy lifestyle in people with T2D is 96.00% and healthy in people without T2D is 85.00% (Table 3)

Table 3. Distribution of study variables

Variables		With T2D		Without T2D	
		f	%	f	%
Physical activity	Mild	74	74.00	60	60.00
	Moderate/Vigorous	26	26.00	40	40.00
Lifestyle perception	Non-healthy	4	4.00	15	15.00
	Healthy	96	96.00	85	85.00

T2D Type 2 Diabetes

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Piñón et al., agree with the data obtained in the MAG since in their study a low level of physical activity predominates with 48.8% in people without T2D [14].

In adults with T2D of MAG Celaya, there was no relationship between lifestyle perception and physical activity, P = 0.96 (Table 4).

Table 4. Distribution of lifestyle perception and level of physical activity in people with type 2 diabetes

Variables	Physical activity level			
	Mild		Moderate/Vigorous	
Lifestyle perception	f	%	f	%

Non-healthy	3	75.00	1	25.00
Healthy	71	73.96	25	26.04

$$X^2= 0.0022 \text{ df } 1 \text{ P}=.96$$

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209 According to Cantú Martínez, in his study conducted in 2015 in various Urban Health
 210 Centers of the Metropolitan Area of Monterrey, with a sample of 65 people with T2D, he tells
 211 us that 29.23% considered having a "good lifestyle", percentage which corresponded to a
 212 "healthy" classification, while the highest concentration has an inadequate lifestyle (70.77%),
 213 with two classifications of the participants; then, 56.92% is characterized by "moderately
 214 healthy" behaviour and only 13.85% of these were classified as "unhealthy". A significant
 215 correlation was detected between the evaluated lifestyle and the dimensions considered,
 216 except with the emotional state [13].

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218 Regarding the physical activity carried out by the patients in the study, the inquiries showed
 219 that 20% have a "good lifestyle" and a "healthy" classification, however, 80% show an
 220 "inappropriate lifestyle" ", Which is reflected in 47.6%, "moderately healthy"; 20% is
 221 "unhealthy" and 12.3% "unhealthy". There is an average of 53 and a variation of 25, in the
 222 average lifestyle considered "moderately healthy" for this population [13]. Considering
 223 different results with the research in Celaya, Mexico, since there is no relationship between
 224 perception of lifestyle and level of physical activity in adults with T2D.

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226 In the MAG there is a significant relationship between, the relationship between the
 227 perception of lifestyle and level of physical activity in adults without T2D throwing a value of
 228 *P* less than 0.05, marking that people who have a level of mild physical activity, have 2.85
 229 times more likely to have non-healthy lifestyle (OR = 2.85) (Table 5).

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231 **Table 5. Distribution of lifestyle perception and level of physical activity in people**
 232 **without type 2 diabetes**

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Variables	Physical activity level			
	Mild		Moderate/Vigorous	
Lifestyle perception	<i>f</i>	%	<i>f</i>	%
Non-healthy	13	86.67	5	13.33
Healthy	47	55.29	38	44.71

$$X^2= 5.23 \text{ df } 1 \text{ P}=.02 \text{ OR}= 2.85 \text{ 95\%IC} = 0.80 \text{ a } 10.4$$

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236 Piñón et al., In their study conducted in 2015 with participants of a program of healthy habits
 237 and lifestyles in the municipality of Popayán Colombia, with a sample of 217 participants
 238 without T2D, with respect to the level of physical activity measured with IPAQ , the study
 239 reports a general prevalence of 3.22% around the performance of vigorous physical activity;
 240 with an average of 181 minutes / week, in terms of moderate physical activity the prevalence

241 was 15.1%, 223 minutes / week; the general prevalence of low physical activity was 70.3%
242 in which subjects who performed less than three days of moderate activity were classified,
243 having a significant relationship between the perception of lifestyle and level of physical
244 activity [14]

245 Therefore, this study yielded the same results to this research, marking a relationship
246 between lifestyle perception and level of physical activity in adults without T2D

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248 **4. CONCLUSION**

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250 In the study carried out it was found that there is no relationship between the perception of
251 lifestyle and the level of physical activity in people with T2D, but it was demonstrated,
252 however, that there is a significant relationship between the perception of lifestyle and level
253 of physical activity in people without T2D, this is because people without T2D (offspring of
254 people with T2D) are more aware of their perception of lifestyle, thus throwing such a
255 relationship between the variables.

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258 **COMPETING INTERESTS**

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260 Authors have declared that no competing interests exist.

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263 **CONSENT**

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265 All authors declare that 'written informed consent was obtained from of the study
266 participants for publication of this investigation. A copy of the written consent is available for
267 review by the Editorial office/Chief Editor/Editorial Board members of this journal.

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269 **ETHICAL APPROVAL**

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271 The protocol was reviewed and approved by the Bioethics Committee of the Division of
272 Health Sciences and Engineering of the Celaya-Salvatierra Campus of the University of
273 Guanajuato, with registration number CIBCSIC-1381310

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