Promotion of a healthy lifestyle in individuals with type 2 diabetes mellitus in rural communities

Promoción de un estilo de vida saludable en individuos con diabetes mellitus tipo 2 en comunidades rurales

Promoção de uma vida saudável em indivíduos com o tipo 2 de diabetes mellitus em comunidades rurais

Promotion d'un mode de vie sain chez des personnes atteintes de diabète mellitus de type 2 en communautés rurales

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Abstract

Objective: To determine the lifestyle of individuals with type 2 diabetes mellitus (DM2) in rural communities.

Materials and methods: A sample population of 126 subjects with DM2 were evaluated to determine their body mass index (BMI), glycosylated hemoglobin (GH) and a two-phase questionnaire was applied to determine changes in their lifestyle before and after the study.

Results: Initial and final BMI was 26.67 and 26.36 respectively, and GH was 7.74 and 7.33 respectively without a significant difference. The survey showed that 69.3% of the population has a low self-esteem as consequence of their status of life; 56.5% do not go with their physician; 30.2% do not have interest in their health status; 39% do not know about their diseases; 34% do not practice any type of exercise; 56.6% is not or just some times are interested to get a good nutrition, and only 16.2% are conscious of doing exercise frequently.

Conclusions: Cultural factors, sociodemographic status, and knowledge about health, have an impact in the lifestyle of this DM2 population. Is necessary to develop programs to improve health and lifestyle in patients with diabetes in rural communities.

Keywords: Diabetes; Lifestyle; Health Promotion; Rural Community.

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Resumen

Objetivo: Determinar el estilo de vida en sujetos con diabetes mellitus tipo 2 (DM2) en comunidades rurales.
Materiales y métodos: Una muestra poblacional de 126 sujetos con DM2 fueron evaluados para determinar su índice de masa corporal (IMC), hemoglobina glicosilada (HG) y se les aplicó un cuestionario de dos fases para determinar cambios en su estilo de vida antes y después del estudio.
Resultados: El IMC inicial y final fue de 26.67 y 26.36 respectivamente, y la HG fue de 7.74 y 7.33 respectivamente, sin diferencias significativas en ambos casos. La encuesta demostró que el 69.3% de la población tiene una baja autoestima como consecuencia de su estilo de vida; 56.5% no acuden con su médico; 30.2% no tienen interés en su estado de salud; 39% no tienen conocimiento de su enfermedad; 34% no practican ningún tipo de ejercicio; 56.6% no están interesados en mantener una buena nutrición, y solo el 16.2% están concientes de hacer ejercicio frecuentemente para mejorar su salud
Conclusiones: Los factores culturales, el estado sociodemográfico y el grado de conocimiento sobre la salud, tienen un impacto en el estilo de vida de los sujetos con DM2. Es necesario desarrollar programas para mejor el estado de salud y el estilo de vida de la población con diabetes en las comunidades rurales.

Palabras clave: Diabetes; Estilo de Vida; Promoción de la Salud; Comunidad Rural.

Resumo

Objetivo: Determinar o estilo de vida em indivíduos com o tipo 2 de diabetes mellitus (DM2) em comunidades rurais.
Materiais e métodos: Foi usada uma amostra de 126 indivíduos com DM2 que foram avaliados para determinar o seu índice de massa corporal (IMC), a hemoglobina glicosilada (HG) e foi-lhes aplicado um questionário em duas fases para determinar as alterações no seu estilo de vida operadas antes e depois do estudo.
Resultados: O IMC inicial e final foi de 26.67 e de 26.36, respetivamente, e a HG foi de 7.74 e de 7.33, respetivamente, sem diferenças significativas em ambos os casos. A amostra demonstrou que 69.3% da população possui uma baixa auto-estima como consequência do seu estilo de vida; 56.5% não vai a consultas ao seu médico; 30.2% não demonstra interesse pelo seu estado de saúde; 39% não tem conhecimento da sua doença; 34% não pratica exercício físico; 56.6% não está interesado em manter uma boa alimentação e só 16.2% está consciente que deve fazer exercício físico frequentemente para manter a sua saúde.
Conclusões: Os fatores culturais, as características sociodemográficas e o grau de conhecimento sobre a saúde têm um impacte no estilo de vida dos indivíduos com DM2. Torna-se necessário desenvolver programas para melhorar o estado de saúde e o estilo de vida da população com diabtes nas comunidades rurais.

Palavras-chave: Diabetes; Estilo de Vida; Promoção da Saúde; Comunidade Rural.

Résumé

Objectif: Déterminer le mode de vie de sujets atteints de diabète mellitus de type 2 (DM2) dans des communautés rurales.
Matériaux et méthodes: Un échantillon de population de 126 sujets atteints de DM2 a été évalué pour déterminer l'indice de masse corporelle (IMC) et l'hémoglobine glycosylée (HG). Un questionnaire constitué de deux phases pour déterminer des changements de mode de vie avant et après l'étude a été appliqué.
Résultats: Les résultats ont indiqué un IMC initial de 26,67 et un IMC final et 26,36, ainsi qu'une HG initiale de 7,74 et finale de 7,33, sans différence significative dans les deux cas. L'enquête a montré que 69,3% des sujets ont une faible estime de soi en relation à leur mode de vie; 56,5% ne consultent pas de médecin; 30,2% ne s'intéressent pas à leur santé; 39% n'ont pas de connaissances sur leur maladie; 34% ne pratiquent aucune activité physique; 56,6% ne sont pas intéressés à maintenir une bonne nutrition, et seulement 16,2% se responsabilisent de faire de l'exercice régulièrement pour améliorer leur santé.
Conclusions: Les facteurs culturels, le statut socio-démographiques et le degré de connaissance sur la santé ont un impact sur le mode de vie des personnes atteintes de DM2. Des programmes devraient être développés pour améliorer la santé et le mode de vie des personnes atteintes de diabète dans les communautés rurales.

Mots clés: Diabète; Mode de vie; Promotion de la santé; Communauté rurale.

Introduction

Type 2 diabetes mellitus (DM2) is a chronic and degenerative metabolic syndrome with a multifactorial aetiology and genetic basis that induce an abnormal metabolic use of sugars, proteins and lipids by the cells, there is a loss of carbohydrates tolerance, hyperglycaemia, glycosuria, polydipsia, polyphagia, and polyuria[1]. Thus because an insulin resistance in peripheral tissues and alterations in insulin secretion by the pancreatic β cells. These rises the glucose levels in blood and produces a damage in tissues and organs of the body with several complications, increasing the morbidity and mortality of this disease in the human population The hyperglycaemia in DM2 is a marker of the severity of this metabolic disease, more than the disease *per se*[2-3].

In México since the year 2000, the federal health system reports that DM2 is the first cause of death among women, and the second among men[4-5]. The Mexican government invest 15% of their incomes for the treatment of DM2 patients; this is approximately 318 US million dollars per year[6]. The development of organic complications for this diseases, increase the economic costs in health services, and considering that most of the DM patients pay for most of theirs medical treatments such as the dialysis, haemodialysis, therapy with laser, drugs and surgical procedures such as the amputation of any extremity. Therefore, it is important to consider that the quality of life in these subjects became compromised with a decrease in many aspects of their life[5,7].

A risk factor to develop DM2 is the overweight and obesity. The World Health Organization (WHO), reports each year 2.8 millions of adults decease for this cause, 44% of this population has DM2, 23% ischaemic heart disease, and 41% developed some kind of cancer, among many other complications[8-10]. The Pan-American Health Organization (PHO) and the WHO calculated that approximately 30% of the Mexican population suffers obesity[11-13]. The National Survey of Health and Nutrition in Mexico[14-15], has showed that male population over 20 years old has higher risk factors, such as overweight and obesity, to develop DM2. The 50% of the population between 60 to 69 years old has overweight, 49% between 50 to 59 years old, and 45.1% between 40 to 49 years old. If overweight is not controlled it turns into obesity. In this population obesity is present in 34% of the persons in the range of 40 to 49 years old, 31.1% is in the range of 30 to 39 years old, and 28.7% is in the range of 50 to 59 years old. Therefore, they have a higher risk to develop DM2[7].

Because DM2 has increased dramatically around the world a team work of The International Diabetes Federation empathises the importance to identify the different life styles of the population to improve their health status, and to be a sensibiliser in the DM patients to become aware of the importance of their own health care in their own home setting. Therefore, the objective is to prevent clinical complication, and to lower the costs of this disease[3,16]. Previous studies with Hispanic[17], Puerto Rican[18] population in the United States and in Mexico[19], using different prediction models for diabetes management and diabetic self-care[20], have showed that health deterioration in DM2 patients are influenced by the lifestyle, health beliefs and level of acculturation. Pender[21] designed a model for the health promotion in nursing practice and behavioural sciences, which is currently used. This health promotion model (HPM) has been used in different sample population to predict the lifestyle and specific behaviour of an individual. It is sustained with the concept that a change or modification in the lifestyle depends on the combination of the characteristics, experiences, knowledge and specific effects in the behaviour of each one, in order to generate a plan to improve the personal health[22]. HPM evaluates three characteristics in the subject: a) The individual characteristics and experiences, b) Cognitions and specific effects of the behaviour, and c) The results gained by the changes of specific habits to promote benefices and changes in the lifestyle of a person to improve their health condition. In this context, the aims of the present work is to determine the lifestyle and habits in a representative rural population with DM2. A health care model to promote the health status of the population was applied based on a questionnaire, in order to know how the lifestyle could affect the control of DM2.

Materials and methods

Sample population

This is a descriptive and transversal study carried out in a sample population previously diagnosed with DM2 at least one year before the research. The study was structured and divided into six phases: 1) Capacitation and training of the work team, 2) Self-care orientation to DM2 patients, 3) Laboratory analysis, BMI and GH, 4) Questionnaire application and recognition of the lifestyle, 5) Six month later laboratory analysis, BMI and GH and, 6) Analysis of the results.

The study was carried out in six clinical settings of first level belonging to different hospitals of the Federal Health Services (SESA) in the State of Tlaxcala, Mexico, from May 11 to November 16, 2015. The clinics in Amaxac de Guerrero, San Nicolás Panotla, Santa María Nativitas, San Juan Totolac, Santa Inés Zacatelco and Contla de Juan Cuamatzi were selected by convenience because their high incidence of DM2 adult patients, representing the 8.5%

of all SESA hospitals in the State of Tlaxcala (Figure 1). A multidisciplinary team of health service professionals including nurses, physicians, and social service students participated in the study.

Figure 1. Clinics in the rural communities of Amaxac de Guerrero, San Nicolás Panotla, Santa María Nativitas, San Juan Totolac, Santa Inés Zacatelco and Contla de Juan Cuamatzi where the questionnaires were applied.
Source: Author´s original data: Tlaxcala, Tlax., 2015.
Map was retrieved from
https://www.siem.gob.mx/siem/portal/estadisticas/images2/29.gif

One hundred twenty six subjects of both sexes, with an age range of 26-61 years old, belonging to the health care system were invited and recruited on the visit day to the physician consultation on the indicated date. Only those who accepted to participate, were included in the study. Those patients with some type of neurological alteration, physically handicapped, with major DM2 complications or pathologic disorders others than DM2, and those not interested in participating were excluded of the study. The patient's clinical history included the body-mass index (BMI), height, weight, and glycosylated haemoglobin (GH) measurements. Laboratory analysis were obtained before the questionnaire application and six months later. A series of clinical orientation regarding the improvement of their lifestyle, nutritional advice, personal care, and regular exercise were given to all the patients after the first sample collection of blood.

Questionnaire application

The data for this study was collected in an individual semi-structured questionnaire using the Likert scale according to Pender[21-22]. This study was based on four sections of the questionnaire: a) sociodemographic (age, sex, education, sociodemographic status, social security, civil status, and number or accompanying persons living with the patient); b) a lifestyle and health practice; c) personal responsibility, and d) a lifestyle profile section[23]. It was divided into 43 items that were answered individually for each patient. The instrument was used in Spanish population and validated previously[19]. It was applied only once to each subject at the beginning of the study. Likert scale was elaborated according to the attitude regarding the style of life of the DM2 patients as follows: 0 - never, 1 - some times, 2 - frequently, 3 - routinely, 4 - no answer.

Statistical analysis

Percentages and frequencies were calculated from the total number of answers. The confidence of the questionnaire was determined with the alpha of Chronbach (.86). A statistical program (SPSS, v20) for social sciences was used for data analysis and to graphic the results.

Ethical Considerations

The study was performed in accordance to the Declaration of Helsinki[24], and authorized by the ethical committee review board in the Faculty of Health Sciences and Nursing, belonging to the Universidad Autónoma de Tlaxcala, México. All participants got detailed information about the study to give their authorized consent to participate. The information collected was kept completely confidential.

Results

Sociodemographic characteristics of the studied population

The study showed that 78.6% of the population are female and 21.4% male. Most of the subjects are in the range of 46 to 55 (41.2%) years old. The 77.4% are married or live together. The level of studies of most of the participants (50%) is up to primary, incomplete in the majority of the cases. The monthly income is in the range of one to three minimal salary in 74% of the population. Most of the population have access to health services by the government through the SESA (80.2%), IMSS (6.3%), ISSSTE (3.2%) and a popular community security service (5.6%); only the 4.8% of the population has access to private security health services. Most of the DM2 patients (39.7%) live with 3 or 4 members of the family, but none lives alone (Table 1).

Laboratory analysis

The BMI at the first time had a mean of 26.67 (range from 19.53 to 38.29) and after six months of orientation the mean was 26.36 (range from 19.53 to 38.31) as compared with a normal range of 24 -25 respectively. GH at the first time had a mean of 7.74 (range from 4.40 to 16.36), and after six months of orientation it was 7.33 (range from 4.80 to 10.60) as compared with a normal range from 4.00 to 6.00 respectively. No statistical differences before and after clinical orientation was determined in these subjects.

Lifestyle analysis

To identify the several aspects that can affect the lifestyle

of DM2 patients, the questionnaire was divided in order to analyse the answers that are related to changes in habits of personal health care, nutrition, lifestyle, and exercise.

According to the questions and the percentages of the answers stratified by the Likert scale, the results were as follow: never (16.3%), sometimes (22.8%), frequently (23.3%), routinely (16.4%), and finally no answer (21.0%) (Table 2).

Table 1. Frequency distribution of the sociodemographic characteristics of the studied population. Source: Author´s original data: Tlaxcala, Tlax., 2015.

		N	%
Gender	Male	27	21.4
	Female	99	78.6
Age	26-30	4	3.2
	31-35	7	5.6
	36-40	9	7.1
	41-45	18	14.3
	46-50	27	21.4
	51-55	25	19.8
	56-60	18	14.3
	>61	18	14.3
Education	None	27	21.4
	Primary	63	50
	Secondary	27	21.4
	High school	7	5.6
	University	2	1.6
Monthly income*	0	7	5.7
	1	32	26.0
	2	22	17.9
	3	30	24.4
	4	13	10.6
	5	12	9.8
	6	5	4.1
	8	2	1.6
Social health security	IMSS	8	6.3
	ISSSTE	4	3.2
	SESA	101	80.2
	Other	6	4.8
	Popular Security	7	5.6
Civil status	Married	79	62.7
	Divorced	3	2.4
	Separated	4	3.2
	Single	11	8.7
	Live together	18	14.3
	Widow	11	8.7
Number of persons living in the same home			
	1-2	21	16.7
	3-4	50	39.7
	5-6	33	26.2
	7-8	14	11.1
	>9	8	6.3

*Daily income salary in 2016 = $74.00 Mexican pesos (1 US dollar = 18.80 Mexican pesos)

The questionnaire showed that 69.3% of the population is not aware of their status of life; 56.5% do not go with the doctor; 30.2% do not have interest in their health status; 39% do not know about their diseases; 34% do not practice any type of exercise; 56.6% is not or very few interested to get a good nutrition, and only 16.2% are conscious of doing exercise frequently. According to the significance of the lifestyle of DM2 patients the questions were grouped in 10 subscale items related to the health promotor model, and the total percentage of the answers were analysed and graphed (Table 3, Figure 2). The data indicate how the life style should affect the satisfying mode of life of the DM2 patients. More of DM2 patients answered that: just some time (1) or frequently (2) -in the Likert scale- are satisfied with their life style. A less number of DM2 patients answered that they routinely (3) take care of their own life style, and also they never (0) take care of their own health and life style (Figure 2a). Regarding questions 1 to 3, they showed that the feeling of the patients about their life, to get a mature behaviour and good feelings, and to get a vision of the future, are not so important or are not conscious that affect their life style (Figure 2b). The percentage of answers in questions 4 to 6, showed that the patients want to know more about the disease and how to get control of the DM2 (Figure 2c). The importance of a good life style in the DM2 patients related to the time that they dedicate to themselves, to do exercise, to enjoy their life style, to have a good nutrition and the importance of their own life, still have a lack of dedication among this population (Figure 2d).

Discusión

The sociodemographic characteristics of the studied population is an important factor in the life style of any DM2 patients. Most of the population is female with incomplete studies, and with an income that make difficult to get a good life style. It is also important to considerer that in these rural communities, men are more resistant to follow self-care instructions or accepting a physician treatment, and do not go to clinical settings. They are committed to labour work in the crops and settling animals mainly during the morning, being a cultural style of life difficult to remove from their believes. Women spend more time with their family at home, taking care of the young; they have the responsibility to prepare the food and to attend all the necessities of the family, including those related to the health. This is the main reason why the woman goes more frequently to the clinics and hospitals. These characteristics are similar among rural communities in México and has been reported previously by others researchers[19,25]. A fact is that most of the population have access to health services, however, the DM2 patients do not follow carefully the physician recommendations, probably because of a safe feeling of living with one or more of the family members that can take care of their main necessities.

Most of the population have DM2 after the 41 years old related to bad habits of nutrition, the time they dedicate to work, and eating fast food or non-nutritional food. Thus, the DM2 patient has to prepare their own food following home traditions without an appropriate healthy orientation. The lack of studies, low income to buy and prepare healthy meals have a relation to poverty, and furthermore, they do

Table 2. Frequency distribution of habits and related situations in the lifestyle in DM2 patients. Source: Author´s original data: Tlaxcala, Tlax., 2015.

	0*	1†	2₮	%	3§	%	4¶
1. I eat at wakeup time in the morning	47	17	13	10.3	23	18.2	26
2. I Tell my physician any abnormal symptom	14	44	23	18.2	19	15.0	26
3. I love myself	8	13	35	27.7	43	34.1	27
4. I do exercise	26	29	21	16.6	24	19.0	26
5. I eat food without artificial or chemical conservatives	36	35	17	13.4	13	10.3	25
6. I take a daily time for relaxation	21	39	24	19.0	17	13.4	25
7. I know about the cholesterol level in my blood	49	26	17	13.4	8	6.3	26
8. I feel enthusiastic and optimist	4	28	35	27.7	33	26.1	25
9. I believe that I am maturing and changing positively	9	25	35	27.7	30	23.8	27
10. I talk about my problems and fears with close persons	23	32	29	23.0	16	12.6	26
11. I am conscious of the situations that make me stressed	9	29	43	34.1	19	15.0	26
12. I feel happy and comfortable	5	32	35	27.7	27	21.4	27
13. I do exercise for 20-30 minutes at least three times a week	26	29	20	15.8	25	19.8	26
14. I eat 3 good meals a day	17	36	26	20.6	2	1.5	26
15. I read books with a content that promote the good health	41	32	18	14.2	8	6.3	27
16. I am conscious of my weakness and strengths	7	29	40	31.7	24	19.0	26
17. I work to reach long life achievements	11	25	33	26.1	31	24.6	26
18. I am proud of the achievements of other persons	12	31	32	25.3	25	19.8	26
19. I read the labels on the packed food	32	31	20	15.8	15	11.9	28
20. I look for a second opinion about recommendations of my physician	41	32	18	14.2	8	6.3	27
21. Look for a future	9	23	36	28.5	30	23.8	28
22. Participation in programs or physical activity under supervision	48	9	22	17.4	21	16.6	26
23. Enjoy touching and being touched for my friends	14	21	29	23.0	36	28.5	26
24. Keep close to one friend that make me happy	17	28	36	28.5	17	13.4	27
25. Include fibber in the diet	9	36	36	28.5	19	15.0	26
26. Take 15 to 20 min for meditation and relaxation	26	36	25	19.8	12	9.5	27
27. Talk to professionals about my health care	18	34	36	28.5	10	7.9	28
28. Respect the own achievements	13	21	44	34.9	21	16.6	28
29. Take care of the arterial pressure during exercise	56	20	14	11.1	9	7.1	27
30. Evaluate the Arterial pressure and know the result	29	32	27	21.4	11	8.7	27
31. Attend programs related to the improvement of global environment	29	33	25	19.8	11	8.7	28
32. Every day is a challenge	9	32	34	26.9	24	19.0	27
33. My food includes the four basic meals every day	23	32	28	22.2	17	13.4	26
34. I practice physical activity like walking and swimming	17	28	27	21.4	26	20.6	28
35. I express my affect to others regarding to love and care	10	23	35	27.7	31	24.6	27
36. I have positive ways to express my feelings	10	29	43	34.1	17	13.4	27
37. I ask to professionals about how to take good care of myself	14	29	40	31.7	17	13.4	26
38. I have good thoughts at bed time	9	31	39	30.9	21	16.6	26
39. I check up my body for changes or signs at least once a month	13	33	33	26.1	21	16.6	26
40. I am realistic about my own goals	11	32	35	27.7	22	17.4	26
41. I use specific methods to control the stress	37	24	27	21.4	12	9.5	26
42. I go to educative health programs about my personal health care	22	31	32	25.3	15	11.9	26
43. I believe that my life has a porpoise	6	25	30	23.8	39	30.9	26
Total (%)	16.3	22.8	23.3	-	16.4	-	21.0

Never*, Sometimes†, Frequently ₮, Routinely§, No answer¶. Percentage of each question is included only for Frequently and Routinely.

Table 3. Percentage distribution and determination of the lifestyle in DM2 patients according to the related grouped questions.

		% of answers				
	Question number	0*	1†	2₮	3§	4¶
1. Feelings of a DM2 patient related to his/her life	3, 8, 12	5.6	24.6	34.9	34.4	0.5
2. Mature behaviour and good feelings at bed time	9, 28, 32, 40	10.7	27.5	37	24.2	0.4
3. Look for long life achievements	17, 21, 43	8.4	24.3	33.3	33.3	0.5
4. Ask for help and professional information	2, 20, 27, 37	22	34.5	29.6	13.4	0.4
5. Self-interest for their own health	7, 30, 39	30.2	30.7	25.6	13.3	0.2
6. Look for information about DM2	15, 31, 42	31	32	25.1	11.3	0.5
7. Do exercise 20-30 minutes at least 3 times a week	4, 13, 22, 29, 34	34.8	22.9	20.8	21	0.6
8. Have a good nutrition	1, 5, 14, 19, 25, 33	26.1	30.5	23.1	19.6	0.6
9. Be aware of their capabilities and handicaps	10, 16, 18, 23, 24, 35	14	27.1	33.6	24.9	0.4
10. Have time for relaxing and to enjoy their lifestyle	6, 11, 26, 36, 38, 41	18.6	31.3	33.3	16.2	0.4

Never*, Sometimes†, Frequently ₮, Routinely§, No answer.
Source: Author´s original data: Tlaxcala, Tlax., 2015.

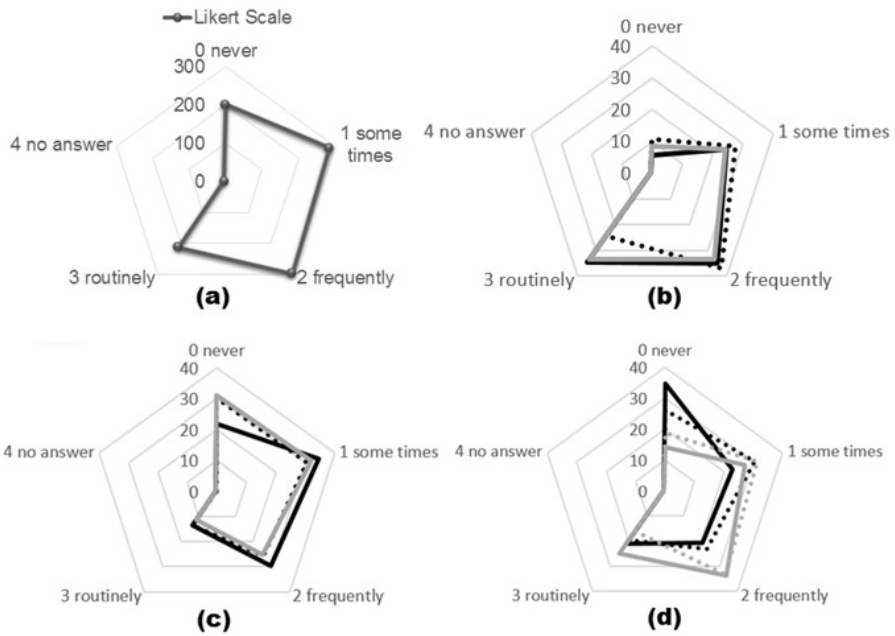

Figure 2. (a) Percent of total answers in the lifestyle in DM2 patients according to table 4 showing how the data related to better life and health fills the graph up to the periphery, according to the Likert scale. (b) Answers related to questions 1 to 3: — question 1, ···· question 2, — question 3. (c) Answers related to questions 4 to 6: — question 4, ···· question 5, — question 6. (d) Answers related to questions 7 to 10: — question 7, ···· question 8, — question 9, ···· question 10.
Source: Author´s original data: Tlaxcala, Tlax, 2015.

not have access to information to improve their lifestyle.
The laboratory analysis showed no differences before and after clinical orientation that should reflect any change in the diet or lifestyle of the people, when the data is compare with the reference normal range. Our data was similar to the reported in others studies[19,26], where the GH has a higher level than the normal range. Considering that most of them are adults with non-regular and non-healthy habits, the data reflects that the DM2 patients do not follow the indications of their physician even when all of them have access to social security services, and do not change their regular dietetic and exercise habits in order to improve their health status. Thus, because of a tradition of bad familiar habits transmitted from generation to generation. A lack of personal interest and health education have a relation to a low income and scholar level in most of the rural communities in Mexico[6, 27]. Healthy programs should include clinical analysis more frequently in order to get control of the systemic health status of each individual, in order to improve the habits that can help to improve the lifestyle of the population.

We note that twenty-one percentage of questions were not answered, possibly because the patients feel ashamed of their own lifestyle, and they have the guilty feeling, as they note, that do not have a self-commitment in taking care of their own health. This is possible due cultural traditions focused in the people looking for cures rather than in the prevention of the disease or not having the self-commitment of looking after themselves. Thus, it is necessary that the personal of the health services should have a major influence in the cognitive development process to improve the behaviour related to the improvement of healthy habits among this population. However, counselling to improve the lifestyle given by a clinician to increase physical activity in these patients is not enough to improve their lifestyle[28]. Therefore, both the family of the patient and the nurse, play an important role in the improvement of the life of the DM2 patients, emphasizing that written counselling and instructions are better than only oral counselling. However, there is still some interest from the DM2 patients to cover all their necessities regarding their lifestyle but another important factor that can be considered is the lack of knowledge and education of the topic[19].

Conclusions

These results show the necessity to increase both well-trained human resources and better educational community-based diabetes programs developed and implemented by the government, with the active participation of the rural communities and the society, in order to improve the health status and lifestyle of patients with DM2. This programs have to be continuous and nursing play an important role for clinical and care orientation of the population with higher risks to prevent the development of DM2.

The relationship between the income and life style is an important factor that affects the way the patient get a better medical treatment and the support of at least one member of the family. The goals of improvement of the health status and changes in the life style in patients with chronic degenerative diseases is a long time work that should be applied in all healthy programs if we look for a difference in the life style of the population. This could be used to prevent clinical complications of DM2 and other chronic degenerative diseases and to maintain a good human health in the own home setting. Healthy programs should be considered more frequently in order to change the habits that can help improve the health of the population. More research need to be done to know the causes why people in rural communities are not committed or interested in their own health. The community based programs to chronic diseases, such diabetes mellitus, should be consider the self-efficacy and low costs of the programs, continuous social support to the community, physiological and psychological outcomes in the patient, health-related influences (religion and beliefs, among others). Continuous health orientation by nurses and physicians for easily implementable primary and secondary prevention approaches to delay disease progression, complications and deterioration in patients with diabetes.

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