

<http://dx.doi.org/10.4314/ajtcam.v11i4.20>

IS INGESTION OF *THASUS GIGAS* (XAMUES) AN ALIMENTARY CULTURE OR AN AUXILIARY TREATMENT FOR TYPE II DIABETES?

Monroy Moncayo Nallely, Valdez Vargas Esmeralda, Amador Chávez Majli Merari, García Frago Dulce Gisela, Reynoso Vázquez Josefina, De la O Arciniega Minarda and *Ruvalcaba Ledezma Jesús Carlos

Institute of Health Sciences. Hidalgo State University, Pachuca City, Hidalgo State, Mexico.

*Corresponding author: E-mail. dcsjcarlos@gmail.com

Abstract

Background: Diabetes is a disease characterized by high blood glucose levels that result from the body's inability to produce and/or use insulin. Among different types of diabetes, type II diabetes is the most common. This work studied the causes and effects of *Thasus gigas* on the population of Actopan, Hidalgo regarding its ingestion and utility in the treatment of type II diabetes.

Material and Methods: An exploratory study was carried out based on a survey conducted among the residents of Actopan, Hidalgo suffering from diabetes mellitus (type II). In order to investigate the effect of the ingestion of insects "xohues" or "shamues", a study was conducted on 100 adults among the population of Actopan, Hidalgo in order to get information on *Thasus gigas* consumption. The study was designed to identify the relationships between its usage, effects on human health, the reasons for its consumption by the Actopan community; either for cultural matters or as an alternative treatment to manage type II diabetes.

Results: Of the 100 persons surveyed, 39 were diabetic, 29 made medical outpatient visits. Among these, 21 had eaten Xamues to manage their diabetes while 21.5% replaced their medical treatment with Xamues. Of the 53% of the people who ingested Xamues as an alternative for their disease, 13% abandoned their medical treatment while 33% consumed them for alimentary culture.

Conclusion: People who have stopped attending medical checkups are at risk, because there is no evidence that ingestion of these insects can regulate blood glucose levels.

Key words: Alimentary culture, medical treatment, *Thasus gigas*, type II diabetes.

Introduction

Diabetes is a disease characterized by high blood glucose levels that result from the body's inability to produce and/or use insulin. Type I diabetes is usually diagnosed in children and young adults, and was previously known as juvenile diabetes. In type I diabetes, the body does not produce insulin. Insulin is a hormone that is needed to convert sugar, starches and other food into energy needed for daily life. Only 5% of people with diabetes have this form of the disease. With the help of insulin therapy and other treatments, even young children with type I diabetes can learn to manage their condition and live long, healthy, happy lives (Laguna et al, 2009; ADA, 2013).

Type II diabetes is the most common form of diabetes. With type II diabetes the body doesn't produce enough insulin or the cells do not use them. Insulin is necessary so the body can use glucose as a source of energy. When you eat, the body processes all the starches and sugars and converts them into glucose, which is the basic energy source of the body's cells. Insulin takes glucose to the cells. When glucose accumulates in the blood stream instead of going into the cells, it can produce diabetic complications (The Expert Committee on Diagnosis and Classification of Diabetes Mellitus, 1997; Laguna et al, 2009).

Some of the treatments that are used for diabetes consist in taking insulin and/or medications. Insulin is a natural hormone that is produced in the pancreas. Insulin is prescribed to many people with diabetes either because their body doesn't produce insulin (type I diabetes) or the body doesn't use the insulin adequately (type II diabetes). With frequency, the first treatment recommended for type II diabetes is the planning of foods to control their levels of sugar in their blood stream, the loss of weight and physical activity. In occasions, these measures can be inefficient to reduce the levels of sugar in the blood stream and maintain them in the normal parameters. When this happens, oral medications are resorted to pills (Laguna et al, 2009; ADA, 2013; OPS-OMS, 2013; IDF, 2013).

Prevalence of diabetes in Mexico

Type II diabetes has turned into a serious public health problem on a global scale representing 90 % of the cases of diabetes, type II diabetes is an important cause of mortality and premature morbidity on a global scale. From 1998 to 2012 4.7 % has increased going from 342.1 to 358.2 cases for every 100 thousand habitants as for the rate of morbidity. (WHO, 1985 and 1994; FMD, 2012 and 2013; ENSANUT, 2012).

According to the general direction of epidemiology in 2012, 418,797 patients were diagnosed with diabetes, 0.4 % of these patients are from the Mexican population, 59 % of the cases of the feminine sex. If the tendency remains, in the year 2030 there would be estimated increase of 37.8 % of cases and 23.9 % in the rate of morbidity. In the year 2012 the diabetes mellitus constituted the second cause of mortality in the Mexican population, presenting a valuation of mortality of 75 persons for every 100 thousand inhabitants. In fact this illness has presented a fast increase since 1998 in which the mortality rate was 42.5 deaths for every 100 thousand inhabitant (Laguna et al, 2009; ADA, 2013). The metabolic syndrome and obesity in general represent the precursor to type II diabetes, a situation that causes increment in this health problem globally and locally (Villalaz and Ruvalcaba, 2013). The prevalence of diabetes in Hidalgo, in medical previous diagnosis, adults twenty years or older were increasing from 7.1 % up to 19.1 % after sixty years. Hidalgo occupies the third place of hospitalized cases with diagnosis of type II diabetes in the trimester of January - March, 2013. It is important to mention that 3.5 % of the hospitalized were men and 4.3 % of the hospitalized were women. (Laguna et al, 2009).

The prevalence of diabetes was ascertained by diagnosis according to their gender; in men 59% and women 41% , diabetes in adults for diagnosis previous as federative entity. Quintana Roo, Chiapas, Oaxaca, Michoacán, Querétaro, Aguascalientes, Chihuahua Between 5.6 and 7.6, in Guerrero, Guanajuato, Jalisco, Nayarit, Tlaxcala, Sonora Between 7.7 and 8.1, Yucatán, Campeche, Puebla, Hidalgo, Morelos, Sinaloa, BCS between 8.2 and 9.2, Tabasco, Colima, Sn. Luis Potosí, Zacatecas, Coahuila, BC Between 9.3 and 10.1 and Veracruz, Edo. México, D.F, Tamaulipas, Nvo.

<http://dx.doi.org/10.4314/ajtcam.v11i4.20>

León, Durango between 10.2 and 12.3. By age group of 20 to 70 years of age, the highest prevalence occurs in 40 to 70 years of data from 9.4 in 40-49 years of age, 19.4 in 50-59 years of age, 26.3 in 60-69 years of age and the percentage of Patients Hospitalized by Diabetes Mellitus Type II by gender in women 4.30% and men of 3.50% (ENSANUT, 2012).

What are *Thasus gigas*?

They are a species of insects that can be found within semiarid zones as it is the Valley of the Mezquital, where they mature in the mesquites feeding of the tenderest leaves and green stems. It belongs to the *Coreidae* which are the most abundant and with major geographical distribution (Table 1a). The first adults appear in June and August; the percentage of adults is mostly from May until September. These insects can be consumed in a big diversity of typical foods, among them are the sauces, and one of so many types of sauce is the traditional one of the Valley of the Mezquital where the principal ingredient is the insect of the *Prosopis spp* "Xamues" (*Thasus gigas*) in combination with the chili. (Collin, L Miller, 2009).



Ruvalcaba et al., 2013

Figure 1: Photograph of bedbug *Thasus gigas* in different anatomic position. (Echavarría et al, 2013).

To use the bug *Thasus gigas* for the development and conservation of a traditional sauce, the Valley and the Mezquital chemical analysis was made proximal to the bugs, an important source of animal protein (Mendoza et al, 2009 and 2010). It is a common knowledge that consuming the insects ameliorates diabetes, but there is no known study. There have been few studies on the importance of this type of insects, but in other aspects it has only considered the nutritional and anatomical facts (Braylovsky et al 1995; Mendoza et al, 2009 and 2010).

Table 1a: Taxonomy of the Insects Xamues (Mendoza et al, 2010).

Thumbtacks:	Thasus gigas
Family:	Coreidae
Gender:	Thasus
Specific epithet:	gigas
Common name:	Xamues

This study investigates the causes and effects of the ingestion of *Thasus gigas* on type II diabetes and their use in medical treatment on the population of Actopan, Hidalgo.

Materials and Methods

We conducted a cross sectional survey in 100 adults in the population of Actopan, Hidalgo in order to get information about *Thasus gigas* consumption, not only looking for a relationship between cause and effect, but allowing for an explanation on the reasons for their consumption of such insects, whether for culture matters or as an alternative to control blood glucose as a treatment for type II diabetes (Hernández et al, 2000; Ibáñez, 2008).

Results

The analysis of the survey indicated that 48 (48%) of the individuals surveyed were females and 52 (52%) males (Table 1). Regarding marital status, 58 (58%) were married, 24 (24%) single, 11 (11 %) widowed, 3 (3%) divorced and 4 (4%) (Table 2) were not married (Table 3). 39% suffered from type II diabetes (Table 4) and had between 1-15 years of being diagnosed, and of these 29 made medical outpatient visits (Table 5). Among these, 21 had eaten Xamues to manage their diabetes (Table 6). 21.5% had replaced their medical treatment with Xamues (Tables 7 and 8). We found that 53% of people have ingested the insect to manage their illness. 13% abandoned their medical treatment while 33% consumed them for cultural purposes. Overall, 68% of the people have knowledge of Xamues, while 56% consumed it for various reasons, including their health (Table 9).

Table 1: Frequency distribution by gender.

Gender	Frequency	percentage	Accumulated percentage
Female	52	52	52
Male	48	48	100
Total	100	100	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico, 2013

Table 2: Marital status of the study sample.

Marital status	Frequency	Percentage	Accumulated percentage
MARRIED	58	58.0	58.0
DIVORCED	3	3.0	61.0
SINGLE	24	24.0	85.0
UNION FREE	4	4.0	89.0
WIDOW	11	11.0	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico, 2013

Table 3: Level of education of people surveyed

Escolaridad.	Frequency	Percentage	Accumulated percentage
HIGH SCHOOL	23	23.0	23.0
DEGREE	25	25.0	48.0
NO STUDIES	1	1.0	49.0
PRIMARY	27	27.0	76.0
SECUNDARY	22	22.0	98.0
NO STUDIES	2	2.0	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico

Table 4: Frequency and percentage of diabetes in the study sample.

Has diabetes.	Frequency	Percentage	Accumulated percentage
NO	61	61.0	61.0
YES	39	39.0	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico

Table 5: Time of diagnosis of type II diabetes mellitus in the study sample.

Time in years	Frequency	Percentage	Accumulated percentage
1-5 YEARS	19	18.8	81.2
11-15 YEARS	4	3.0	84.2
16-20 YEARS	6	5.0	89.1
6-10 YEARS	11	10.9	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, México

Table 6 Intake *Thasus gigas* (Xamues) of people interviewed

	Frequency	Percentage	Accumulated Percentage
NO	10	10.0	71.0
YES	29	29.0	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico

Table 7: Consumption of *Thasus gigas* (Xamues) for glucose control

Consume Xamues for diabetes	Frequency	Percentage	Accumulated Percentage
NO	18	18.0	79.0
YES	21	21.0	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico

Table 8: Frequency of detachment to medical treatment for diabetes

Left medications	Frequency	Percentage	Accumulated Percentage
NO	34	34.0	95.0
YES	5	5.0	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico

Table 9: Main reasons people eat the Xamues.

Reasons why individuals eat Xamues	Frequency	Percentage	Accumulated Percentage
CURIOSITY	7	7.0	7.0
TASTE	9	9.0	16.0
DO NOT CONSUME	44	44.0	60.0
HEALTH	16	16.0	76.0
TRADITION	24	24.0	100.0
Total	100	100.0	

Source: Direct. Structured interview for adult people in Actopan, Hidalgo, Mexico

Discussion

Diabetes is a chronic disease that requires medical attention and among other things should be reliable and suitable. However, there is no doubt that in nature there are alternatives to treat not only diabetes, but also some other types of diseases, but it is recommended that the sooner research projects are conducted on how best to elucidate the effect of these insects on blood glucose levels, as practiced by the people, the better. People in this survey said that they felt healthier when they eat them, even though apparently in there is an aqueous - brownish substance (iodine) in the recipe that may be responsible the difference in the taste, for that reason some people say it is good to put them in water and salt to release the substance and then use them for the preparation of sauces, among other varied ways of consumption.

Despite all the advancements in medicine a cure for diabetes has not yet been discovered. The data collected through the interviews showed that home remedies are popular among communities such as those in Actopan. One of the reasons that alternate natural medical remedies are commonly used is due to the lack of access to a health insurance services/scheme and because they cannot afford allopathic medicine. Moreover, the main reason for these insects been highly consumed by the inhabitants of the communities is because the feeling that it reduced the symptoms of diabetes and and feeling of wellbeing (Echavarría, et al, 2014).

Finally, it was verified that if the population claims to efficacy of consuming chahuis is confirmed with its with diabetes and other diseases, then it opens the door for the conduct of various research projects, whose findings may be used for therapeutic purposes. Its use in the preparation of sauces or other typical dishes of this region could represent a delicious option for chronic disease control, such as type II diabetes mellitus (Zamora et al., 2014). 7% of people with type II diabetes mellitus reported to have discontinued their allopathic medical treatment for controlling this disease, which represents a huge need for conducting glucose measurements in people who consume the Chahuis bedbug and who are not following a formal medical treatment. The surveys conducted denote that people consume the insects as part of their diet, and with therapeutics objectives, therefore, it is necessary to conduct biochemical studies to elucidate the effect on the levels of glucose and determine if in reality they represent an alternative for its control. There is a possibility that given the inadequate preparation technique used when consumed as food as well as eating them raw could be related

<http://dx.doi.org/10.4314/ajtcam.v11i4.20>

to hyperthermia mentioned by a few people derived from the ingestion of the biological agent (Calderón et al., 2014). Therefore, more funded work is required to authenticate the claims on the insect.

Conclusion

The local populations eat the insect for cultural purposes, food and for the management of type II diabetes. The medical claims on blood glucose levels needs further investigation in a well funded project. The results of well funded research must be backed with health education because inappropriate management of type II diabetes is very risky to the population.

Acknowledgements

The authors of the present research article would like to acknowledge and truly thank the collaboration of Yesenia Elizabeth Ruvalcaba Cobián who has a B.A in Teaching English as a Foreign Language, for her contributions on the revision and translation of the article; a situation which allows the possibility to increase the transferring and modification of scientific knowledge. The authors declare that there is no conflict of interests for the publication of this research paper.

References

1. American Diabetes Association. (s.f.). Retrieved on August 17, (2013). American Diabetes Association: <http://www.diabetes.org/espanol/todo-sobre-la-diabetes/diabetes-tipo-2/>
2. Braylovsky, H., Mayorga, C., Ortega L. G., and Barrera, E. (1995). Estadios ninfales de los coreidos del Valle de Tehuacan, Puebla, México (Hemiptera-Heteroptera) II. Especies asociadas a huizacheras (*Acacia* spp.) y Mezquiteras (*Prosopis* spp): *Mozena lunata*, *Pachylis hector*, *Savius jurgiosus* y *Thasus gigas*. *Annales Inst. Biol UNAM, Ser. Zool.* 66 (1), 57-80.
3. Calderón Nava Oscar Esaú, Pérez Hernández Itzetzl, Cruz Almaraz Daniel, Ruvalcaba Ledezma Jesús Carlos (2014). Insects *Thasus gigas* (Xamuis) to the problem of diabetes in Actopan Hidalgo, Mexico. *IOSR J. of Pharm.* 4(2): 39-42.
4. Collin, L. Miller, (2009). True Bugs: Leafhoppers Bugs: Giant Mesquite Bugs (*Thasus neocalifornicus*). Retrieved on november10, 2013. http://colinmiller.com/wildlife/hemiptera/hemiptera_mesquitebugs.htm.
5. Echavarría Flores, M., García Torres, M.E., Calderón Ordoñez, M.B., Olvera Luna, A.G., Ruvalcaba Ledezma, J.C. (2013). The bedbug "Xamuis" (*Thasus gigas*), a new treatment for diabetes or nutrimental culture. *Int. J. Res. Ayurveda Pharm* 4 suppl 6: 881-884.
6. ENSANUT, 2012, Instituto nacional de Salud Pública, Recuperated 2 de diciembre, 2013 disponible en línea: <http://ensanut.insp.mx/informes/ENSANUT2012ResultadosNacionales.pdf>.
7. FMD. Federación Mexicana de Diabetes. Diabetes asociada al Alzheimer (2013). Recuperado en noviembre 11, 2013 disponible en:
8. FMD. Federación Mexicana de Diabetes. Diabetes en Números/fmd. (2012). Recuperado en noviembre 11, 2013 disponible en:
9. Hernández-Ávila, M. Garrido-Latorre, López-Moreno, S. (2000). Diseño de estudios epidemiológicos. *Salud Pública de México / vol.42, no.2, 144-154*, <http://www.fmdiabetes.org/fmd/pag/medicina.php?id=MjYz>, http://www.madrimasd.org/blogs/salud_publica/2008/02/22/85165
10. Ibañis Marti C. (2008). Estudios epidemiológicos generalidades (2008). Recuperado 15 de noviembre de 2013 disponible en:
11. IDF, International Diabetes Federation. About diabetes. Retrieved on December 5, (2013). Available in: <http://www.idf.org/about-diabetes>
12. Laguna Pérez, I., García Meraz, M., Calva Ángeles, L., Del Castillo Arreola, A. (2009). Malestar emocional (distress) y su relación con Diabetes. *Revista Mexicana de Psicología*, 10. 4.
13. Mendoza M.N., Quintero L.A., Guemes V.N., Soto S. S., Lopez H.G., Reyes S., and Ma, I. (2009). Utilización de "xamui" (*Thasus gigas*) en la elaboración y conservación de una salsa tradicional en el Valle del Mezquital. VII Congreso Iberoamericano de Ingeniería de Alimentos CIBIA Bogotá Colombia. Preprinted
14. Mendoza, M.N. Quintero, L.A., Guemes, V.N., Soto, S. S., Lopez, H.G., Reyes, S., and Ma, I. (2010). Elaboración de una salsa tradicional del Valle del Mezquital utilizando la chinche del mezquite "xamui" (*Thasus gigas*) XII CONGRESO NACIONAL DE CIENCIA Y TECNOLOGIA DE ALIMENTOS, Universidad de Guanajuato. 971-976.
15. OPS-OMS. La diabetes muestra una tendencia ascendente en las Americas. Recuperado 5 de diciembre de (2013). Disponible en:http://www.paho.org/hq/index.php?option=com_content&view=article&id=7453%3Adiabetes-shows-upward-trend-in-the-americas&catid=740%3Anews-press-releases&Itemid=1926&lang=es
16. The Expert Committee on Diagnosis and Classification of Diabetes Mellitus. (1997). Report of the Expert committee on the Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*; 20: 1183:97.
17. Villalaz Ureña, I., Ruvalcaba Ledezma, J.C. (2013). Metabolic syndrome, a prelude to type II Diabetes Mellitus and other complications of Public Health in Mexico and Globally. *Int. J. of Adv. Res.* Vol. 1, Issue 8, 165-173.
18. WHO Study Group. (1985). Diabetes Mellitus Report of WHO Study Group, Geneva WHO, Technical Report Series, 727:1
19. WHO World Health Organization. (1994). Prevention of diabetes mellitus. Technical Report Series no. 844. WHO, Retrieved on December 5, 2013, Available in: http://whqlibdoc.who.int/trs/WHO_TRS_844.pdf.
20. Zamora López, M.C., Jiménez Pérez, A.J., Castillo Sandoval, A., García García, M.A., Canales Martínez, M.E., Ruvalcaba Ledezma, J.C. (2014). Intake of the "Chahuis" Bedbug *Thasus gigas* (Xamues) By Diabetic Patients for Glucose Control. *IOSR J. of Pharm.* 4(2); 44-45.