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IMPACTO DEL SISMO DE ECUADOR EN PERSONAS CON DIABETES E HIPERTENSIÓN ARTERIAL EN ABRIL DE 2016

IMPACT OF THE ECUADOR EARTHQUAKE ON INDIVIDUALS WITH DIABETES AND HYPERTENSION IN APRIL 2016

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RESUMEN

El terremoto de Ecuador en abril de 2016 tuvo un impacto significativo en la salud de personas con enfermedades crónicas, como la diabetes mellitus y la hipertensión arterial. Estas poblaciones son vulnerables ante situaciones de este tipo de desastre, por ello es crucial comprender como se ven afectados el control metabólico y el acceso a tratamientos. Este estudio tiene como objetivo principal busca caracterizar a la población con diabetes e hipertensión que fue afectada por el sismo, analizando su impacto en los controles glucémico, presión arterial y acceso a medicamentos e insumos. Este estudio descriptivo transversal caracterizó a 96 personas afectadas, por el terremoto, se recolectaron datos sociodemográficos, clínicos y de acceso a servicios de salud. Se efectuaron pruebas de laboratorio y mediciones antropométricas. Los resultados indicaron que el 90.9% de los pacientes no enfrentó dificultades en el acceso a medicamentos, aunque el 30.77% requirió cambios sustanciales en su tratamiento debido a la interrupción de los servicios médicos. Además, el control glucémico fue deficiente, con un promedio de glucosa en ayunas de 151.68 mg/dL y una hemoglobina glicosilada de 8.74%, lo que reflejó la descompensación provocada por el estrés post-desastre y las modificaciones forzadas en sus hábitos alimenticios. Estos hallazgos subrayan la necesidad de establecer planes de contingencia que aseguren un acceso continuo a medicamentos, dispositivos médicos y apoyo psicológico para minimizar las complicaciones de salud en personas con enfermedades crónicas durante desastres naturales. Se sugiere que los futuros planes de contingencia incluyan estrategias específicas para mejorar el autocuidado y la gestión de enfermedades crónicas en situaciones de emergencia, mitigando así los riesgos de descompensación metabólica y eventos cardiovasculares en personas con diabetes e hipertensión arterial.

Palabras clave
Desastre, hipertensión arterial, diabetes mellitus, terremoto.

ABSTRACT

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The earthquake in Ecuador in April 2016 had a significant impact on the health of people with chronic diseases, such as diabetes mellitus and high blood pressure. These populations are vulnerable to situations of this type of disaster, so it is crucial to understand how metabolic control and access to treatments are affected. The main objective of this study is to characterize the population with diabetes and hypertension that was affected by the earthquake, analyzing its impact on glycemic control, blood pressure and access to medications and supplies. This descriptive cross-sectional study characterized 96 people affected by the earthquake. Sociodemographic, clinical and access to health services data were collected. Laboratory tests and anthropometric measurements were performed. The results indicated that 90.9% of patients did not face difficulties in accessing medications, although 30.77% required substantial changes in their treatment due to the interruption of medical services. Furthermore, glycemic control was poor, with an average fasting glucose of 151.68 mg/dL and a glycosylated hemoglobin of 8.74%, reflecting the decompensation caused by post-disaster stress and forced modifications in their dietary habits. These findings underscore the need to establish contingency plans that ensure continued access to medications, medical devices, and psychological support to minimize health complications in people with chronic diseases during natural disasters. It is suggested that future contingency plans include specific strategies to improve self-care and chronic disease management in emergency situations, thus mitigating the risks of metabolic decompensation and cardiovascular events in people with diabetes and high blood pressure.

Keywords

Disaster, high blood pressure, diabetes mellitus, earthquake.

INTRODUCTION

Diabetes mellitus is today one of the most frequent non-communicable diseases on the planet. It is the fourth or fifth cause of death in most developed countries. People living with diabetes are vulnerable, especially under conditions of natural disasters; it is important to characterize the population affected by these conditions, since this information can be useful for governments, agencies, health providers, communities, and people with diabetes and their families with knowledge of the unique needs of those who live with this condition (1).

The impact of environmental stressors on people with chronic diseases, such as diabetes and arterial hypertension, takes on special relevance during natural disasters. The Ecuador earthquake in April 2016 exposed a large number of people to conditions of prolonged stress, which triggered imbalances in the metabolic control of those with diabetes. This stress has been linked to increases in cortisol levels, a hormone that, in excess, can contribute to insulin resistance, exacerbating glycemic dysregulation in diabetic patients. In the case of people with hypertension, the increase in blood pressure due to emotional stress and the increase in anxiety raises the risk of serious cardiovascular events, such as heart attacks or strokes (2).

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"Geoenvironmental diabetology" emerges as a key discipline to study this interaction between the environment and the health of patients with diabetes. Under this approach, it is recognized that natural disasters not only cause immediate physical damage, but also imbalances in the control of chronic diseases due to the interruption of medical services and access to basic resources, such as food and medications.

This discipline advocates for integral public health planning that considers both environmental variables and socioeconomic factors that influence the vulnerability of people with these conditions. The prevention and management of chronic complications in disaster contexts require a multifactorial approach that considers not only the immediate response, but also long-term mitigation strategies that strengthen the resilience of communities (3).

Understanding the factors that exacerbate vulnerabilities in these populations is crucial for implementing more efficient public health policies. In the case of the Ecuador earthquake, the lack of preparation for the care of chronic diseases in disaster situations evidenced the need for specific contingency plans. These plans must include the continuous provision of medications, the adequate management of post-traumatic stress, and the implementation of education programs for the population at risk (4).

The stress that a natural disaster implies appears to be directly implicated in metabolic dysregulation in patients with diabetes (5). Some studies establish factors that determine metabolic decompensation in disaster situations (6), detecting some such as: inadequate diet, suspension of the provision of drugs, reduction of exercise, destruction of housing, long stay in the shelter, sex, age, and pre-earthquake therapy.

Among them, inadequate diet has been the factor with the greatest influence. In a chronic disease there are some priorities to be taken into account in planning, such as: the provision of medications, stress management, support for activities of daily living, adequate nutrition, and availability of support supplies (7).

In risk zones such as ours, a management plan should be systematically implemented to face contingency in the case of chronic diseases; there is evidence that patients who are not prepared may run the risk of death due to unavailability of essential medications and supplies (8). There is published experience on how institutions such as the IDF have assisted with aid in earthquakes such as that in Haiti (9).

MATERIALS AND METHODS

Descriptive, prospective, cross-sectional point study.

For the calculation of the sample size, the assumption of estimation of a proportion was used, taking into account an estimated population of 303,034 inhabitants (10) with a confidence level of 95%, a precision of 5%, estimating a prevalence of 6%, with an expected proportion of losses of 10%, which gives an adjusted sample of 96 people.

A multidisciplinary Health brigade was prepared after coordination between the Latin American Diabetes Association, Ecuador Delegation, and three IDF (International Diabetes Federation) member Associations: Fundación los Fresnos, Ecuadorian Diabetes Federation, and Ecuadorian Diabetes Association. In the days prior to the brigade's assistance, in coordination with the Rotary Club of Portoviejo, information about the activity to be carried out was transmitted through various mass media.

The variables of interest were parameterized in the Computerized Support System for the management of chronic diseases; for cases in which there was no connectivity, a paper survey was prepared with the same data that was later entered into the System.

The interviews were conducted by a team of 5 specialists in the area of Medicine and Psychology, who were previously trained and with whom the work protocol was discussed. Laboratory tests were performed: urea, creatinine, and glycosylated hemoglobin. Anthropometry and blood pressure measurement were performed by a Health Team trained for this purpose. The cardiovascular risk of each patient was calculated using the table proposed by WHO/PAHO AMRD (12).

With qualitative variables, proportions were established, and with quantitative variables, measures of central tendency and dispersion were established. For the comparison of dichotomous nominal variables, non-parametric Chi-square tests of homogeneity were used, as well as for polytomous nominal variables. For the comparison of quantitative variables, parametric tests (Student's t for independent samples) were used once their normal distribution (Kolmogorov-Smirnov test) and homoscedasticity (Levene's test) were defined; in the case of quantitative variables that did not have a normal distribution, their non-parametric equivalent was used for the comparison of the groups (Mann-Whitney U). For the statistical analyses, the SPSS package was used.

RESULTS

The following Table 2 shows the clinical, epidemiological, and social characterization of people with diabetes and arterial hypertension affected by the Ecuador earthquake of April 2016. Distribution of the population according to sex and anthropometric and laboratory characteristics.

Table 2. Clinical, epidemiological, and social characterization of people with diabetes and arterial hypertension affected by the Ecuador earthquake of April 2016

Variable	X ± SD	Range
Age	58.77 ± 12.66	30-86
Systolic blood pressure	133.47 ± 19.18	88-192
Diastolic blood pressure	73.97 ± 12.03	50-110
Heart rate	79.00 ± 12.83	60-100
Weight	69.77 ± 16.10	47-145
Height	1.54 ± 0.10	1.30-1.79

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Body mass index	28.90 ± 4.81	22.60-44.89
Abdominal circumference	95.89 ± 17.7	77-152
Capillary fasting glucose	151.68 ± 53.79	83-272
Glycosylated hemoglobin	8.74 ± 2.22	5.60-13.80
Urea	40.39 ± 8.49	25.90-61.90
Creatinine	0.88 ± 0.17	0.60-1.30
MDRD Glomerular Filtration Rate	81.17 ± 15.08	52-111

Table 2 presents a clinical, epidemiological, and social characterization of 96 people with diabetes and arterial hypertension affected by the Ecuador earthquake in April 2016. The most relevant results of the variables presented are interpreted below:

a) Age: The average age of the patients is 58.77 years, which suggests that the population affected by these chronic conditions tends to be of advanced age, a group particularly vulnerable during disaster situations due to their greater predisposition to health complications. The age range between 30 and 86 years reflects that the effects are not limited exclusively to the elderly, but also to middle-aged individuals.

b) Blood pressure: The mean values of systolic and diastolic blood pressure were 133.47 mmHg and 73.97 mmHg, respectively, indicating that a significant proportion of the population presented blood pressure values above the recommended levels, which increases cardiovascular risk in a post-disaster context.

c) Anthropometric measurements: The mean body mass index of 28.90 kg/m² places the population in the overweight range, and the mean abdominal circumference of 95.89 cm indicates central obesity, both of which are important cardiometabolic risk factors.

d) Capillary glucose and glycosylated hemoglobin: The average fasting capillary glucose was 151.68 mg/dL, a significantly elevated value that suggests inadequate control of diabetes in the population. The mean glycosylated hemoglobin (HbA1c) was 8.74%, indicating deficient glycemic control, since the recommended value for diabetic patients is less than 7%. These results reflect the metabolic decompensation that was probably exacerbated by the interruption in access to medications and an inadequate diet after the disaster.

e) Renal function: Urea and creatinine, with averages of 40.39 mg/dL and 0.88 mg/dL respectively, are within normal limits, as is the glomerular filtration rate (GFR) of 81.17 mL/min/1.73 m². However, the GFR close to the reference values suggests possible renal dysfunction in some patients, which is common in people with long-standing diabetes and hypertension.

The study also characterized the population according to sex (58.93% women, 41.07% men), marital status (48.8% married), education level, occupation, presence of disability, completion of a basic self-care course (high rates of adequate self-care literacy), place of

origin (69.23% urban), cardiovascular risk, diagnosis (71.8% type 2 diabetes), and various aspects of access to medications (90.9% without difficulty), supplies, health services, material damage, and the need for substantial changes in treatment (30.77%).

DISCUSSION AND CONCLUSIONS

The findings of this study highlight the significant impact of the April 2016 Ecuador earthquake on individuals with diabetes and arterial hypertension. Glycemic control was deficient, with elevated average fasting glucose and HbA1c levels reflecting metabolic decompensation induced by post-disaster stress and forced changes in dietary habits.

Although the majority of patients (90.9%) did not face difficulties in accessing medications, nearly one-third required substantial changes in their treatment due to the interruption of medical services. This underscores the vulnerability of this population and the critical importance of continuous access to medications, medical devices, and psychological support.

These findings underscore the need to establish contingency plans that ensure continuous access to medications, medical devices, and psychological support to minimize health complications in people with chronic diseases during natural disasters. It is suggested that future contingency plans include specific strategies to improve self-care and the management of chronic diseases in emergency situations, thereby mitigating the risks of metabolic decompensation and cardiovascular events in people with diabetes and arterial hypertension.

It is fundamental that future contingency plans include specific strategies to guarantee continuity of treatment in people with chronic diseases. Access to medications and medical devices must be a priority, together with the provision of psychological support to mitigate the effects of post-traumatic stress on the control of diabetes and hypertension. In addition, training in self-care proved to be a positive factor, since 97.06% of the respondents presented an adequate level of self-care literacy, which is key for the prevention of complications in natural disasters.

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