ORIGINAL ARTICLE

2022 SONQO-CALCHAQUÍ Program: Evaluation of Cardiovascular Variables in a Mid- and High Mountain Calchaquí Population of Tucumán

Programa SONQO-CALCHAQUÍ 2022: Evaluación de variables cardiovasculares en una población Calchaquí de media y alta montaña de Tucumán

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ON BEHALF OF THE SONQO-CALCHAQUÍ 2022 PROGRAM*

ABSTRACT

Background: The community of Quilmes (Tucumán) encompasses 2400 mid- and high mountain inhabitants (1800 to 4000 meters above sea level). In 2018, a study was carried out on their cardiovascular health status (2018 SONQO-CALCHAQUÍ Program).
Objective: The aim of this study is to update and expand the survey carried out in 2018, to obtain a broader panorama of the cardiovascular health of this community.
Methods: A descriptive cross-sectional study was carried out in the Quilmes community, in people who voluntarily attended specially established clinics in September 2022. Questionnaires, laboratory tests, ECG, echocardiogram, anthropometric measurements, muscular resistance and strength tests were carried out.
Results: A total of 186 patients (119 women and 67 men) aged 45.0±1.3 years attended the study. The prevalence of cardiovascular risk factors (hypertension 17.8%, smoking 14.1%, diabetes 4.9% and dyslipidemia 30.6%) was acceptable, but a high proportion of cases had not been examined in the last year. The diet consisted mainly of flour products, with little fresh fruit and vegetables. The prevalence of overweight (34.3%) and obesity (35.4%) was high. Forty percent of respondents had secondary or higher education. Good quality of life (69.5±1.1% of the maximum possible value of satisfaction on the self-perception scale) was reported. The *Minimental* Test average was 15.7±0.2 points. Prehensile strength in 55.8% of cases was below the normal range.
Conclusions: The Quilmes population presents an acceptable physical condition, but with a high rate of overweight and obesity, due to the diet, a condition that should be considered in future health programs.

Key Words: Calchaquí Population - Epidemiology - Indigenous population - South America - Mid- and high mountains - Cardiovascular variables

RESUMEN

Introducción: La comunidad de Quilmes (Tucumán) consta de 2400 habitantes de media y alta montaña (1800 a 4000 metros sobre el nivel del mar). En el año 2018 se realizó un estudio sobre su estado de salud cardiovascular (Programa SONQO-CALCHAQUÍ 2018).
Objetivo: Actualizar y amplificar el relevamiento realizado en el año 2018, para obtener un panorama más completo de la salud cardiovascular de la comunidad.
Material y métodos: Se efectuó un estudio descriptivo transversal en la comunidad Quilmes, en personas que asistieron voluntariamente a consultorios especialmente establecidos, en el mes de septiembre de 2022. Se realizaron cuestionarios, dosajes de laboratorio, ECG, ecocardiograma, determinaciones antropométricas, y pruebas de resistencia y fuerza muscular.
Resultados: Concurrieron 186 pobladores (119 mujeres y 67 varones) con edad 45,0±1,3 años. La prevalencia referida de factores de riesgo cardiovascular (hipertensión 17,8%, tabaquismo 14,1%, diabetes 4,9%, dislipidemia 30,6%) fue aceptable, pero con alta proporción sin exámenes en el último año. La alimentación estaba constituida principalmente por derivados de harinas, con escasa fruta y verdura fresca. La prevalencia de sobrepeso (34,3%) y obesidad (35,4%) fue elevada. El 40% de los encuestados tenía edu-

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*ANNEX I

cación secundaria o superior. Se refirió buena calidad de vida (69,5±1,1% del valor máximo posible de satisfacción en la escala de autopercepción). El *Minimental* Test arrojó un valor promedio de 15,7±0,2 puntos. La fuerza prensil en el 55,8% de los casos estuvo por debajo del rango normal.

Conclusiones: La población Quilmes presenta un estado físico aceptable, pero con alto índice de sobrepeso y obesidad, debido al régimen alimentario. Esta situación debería ser contemplada en los programas de salud futuros.

Palabras Claves: Población Calchaquí - Población indígena - Sudamérica - Media y alta montaña - Variables cardiovasculares - Epidemiología

INTRODUCTION

The Tucumán district of the Argentine Society of Cardiology (SAC) through the SONQO-CALCHAQUÍ Program evaluated in 2018 the cardiovascular health status of the Quilmes native community (Valles Calchaquíes - Tucumán), (1) made up of scattered settlements with distinctive historical, geographic and sociocultural characteristics. (2)

In this first contact, it was observed that the inhabitants were overweight (1) and that the prevalence of cardiovascular risk factors was similar to that of urban centers. (3) This raised the hypothesis that there would be an increase in cardiovascular morbidity and mortality, as was observed in other indigenous populations. (4,5) Mandatory social isolation (quarantine) due to the COVID-19 pandemic led to a radical change in health strategies worldwide, (6) and this context not only postponed the second phase of the SONQO-CALCHAQUI program until 2022, but also further increased the historical isolation of this population. For this reason, the aim of the present study was to update and expand the survey conducted in the 2018 SONQO-CALCHAQUÍ Program, to obtain a more complete description of the cardiovascular health of the Quilmes community.

METHODS

A descriptive cross-sectional study was performed in inhabitants of the Quilmes community who voluntarily attended from September 29 to October 1, 2022, School No. 213 Cacique Martín Iquin, where 7 offices were implemented to carry out the following studies:

Office 1 (laboratory):

Assessment of thyroid-stimulating hormone (TSH; μU/mL), blood glucose (mg/dL), insulin (μU/mL), insulin resistance index (HOMA-IR), fibrinogen (mg/dL), Ultra –Sensitive C-Reactive Protein (US-CRP) (mg/L), total protein (g/L), albumin (g/L), sodium (mEq/L), potassium (mEq/L) and chloride (mEq/L).

Office 2 (surveys):

Targeted cardiovascular survey. (1)

Mini mental test, that evaluates cognitive impairment. Values up to 9 points: moderate to severe impairment; 10 to 24 points: mild to moderate impairment; 25 to 26 points: possible impairment and 27 to 30 points: no impairment. (7)

Twenty-four-hour. intake recall test. (8)

Food consumption frequency test: semi-quantitative questionnaire that includes 19 foods where the frequency (daily, weekly or monthly) with which they were consumed in the last year is indicated.

SF-12 Questionnaire: which assesses the self-perceived health status. (9)

Rosenberg 10-question self-esteem scale (Total value: 10 to 40 points) (10)

Pittsburgh Sleep Quality Index, in its Spanish version. (11)

Ten-question Frailty Test (Edmonton Scale): maximum value 20 points (not frail: 0 to 4 points; apparent vulnerability: 5 to 6 points; mild frailty: 7 to 8 points; moderate frailty: 9 to 10 points; severe frailty: 11 to 20 points). (12)

Office 3 (anthropometry, blood pressure and oximetry):

Recording of anthropometric parameters. A waist and abdominal circumference of up to 88 cm in women and 102 cm in men and a neck circumference of up to 43 cm in both sexes were considered normal.

Body mass index (BMI), expressed in kg/m2, was calculated. where participants were classified as undernourished (BMI <18.5); normo-nourished (BMI 18.5 to 24.9); overweight (BMI 25.0 to 29.9) and obese (BMI >29.9).

Blood pressure (BP) was measured with a digital sphygmomanometer (Omron ® 7120) according to the guidelines of the Argentine Consensus on Arterial Hypertension. (13)

Oxygen saturation (%) and heart rate (bpm) were measured by plethysmography with a digital saturation meter (Contec® CMS50N).

Office 4 (electrocardiogram):

A digital recording of 12 simultaneous leads was performed for 3 minutes (Jotatec® TaurusTouch). The following data were evaluated: rhythm, heart rate, duration and axis of QRS complexes and heart rate variability.

Ofiice 5: (echocardiography):

A recording of dimensions (mm) and areas (cm2) of cardiac structures (Esaote® MyLab 30 Gold) was carried out, with calculation of the left ventricular ejection fraction (LVEF) using the Simpson Biplane method. (14) Cardiac and tissue color Doppler measurements were performed.

Office 6 (peripheral vascular ultrasound):

The Doppler technique was used for neck vessels (Esaote® MyLab 30 Gold). The number of atherosclerotic plaques and the presence of significant hemodynamic obstructions were recorded.

Office 7 (muscular strength and endurance test):

Resistance to stress was assessed with the Ruffier-Dickson test. (15) The Ruffier index was calculated, considering the following scale: 0: very good; 0.1 to 5: good; 5.1 to 10: average; 10.1 to 15: insufficient and 15.1 to 20: poor. (15)

The maximum prehensile strength was measured by means of a hydraulic dynamometer (Jamar®) in the dominant hand with average calculation of 3 effort trials. Values greater than or equal to those indicated in the literature were considered normal (16).

People who were not from the Quilmes community or people with sensory, cognitive or motor disabilities were excluded from the study.

Statistical analysis

Results are expressed as mean ± standard error. In each case, the range of values obtained is presented. The Chi-square test ($\chi 2$) or Student's t-test for grouped data was performed as appropriate. Statistical analysis was carried out using Prism 5.0 software.

Ethical considerations

The study was approved by the Research Ethics Committee (CEI) of the SI.PRO.SA Research Department (Opinion 34/2022). All participants granted the corresponding Informed Consent to participate.

RESULTS

A total of 186 patients attended the clinics, 119 women (63.9%) and 67 men (36.1%) with a mean age of 45.0±1.3 years (range 18 to 90 years).

Office 1

The blood sample could not be processed in 29 patients. In the 157 inhabitants in whom it was processed, the values obtained were: TSH: 2.2±0.2 μU/mL; blood glucose 63.4±2.8 mg/dL; insulin: 9.2±0.8 μU/mL; HOMA index: 2.1±0.3; fibrinogen: 267.0±11.4 mg/dL; US-CRP: 2.2±0.3 mg/L; total protein: 6.8±0.1g/L; albumin: 4.1±0.1 g/L; sodium: 127.6±1.5 mEq/L; potassium: 5.5±0.1 mEq/L and chloride: 90.8±1.1 mEq/L.

Office 2

Socioeconomic and educational data

Educational level: illiteracy was found in 9.1% of the population; 48.9% had primary education; 27.4% secondary education; 8.1% tertiary education; and 4.8% university education. A total of 1.9% participants did not answer this question.

Occupation: 23.1% answered housewife; 12.4%: unemployed; 41.5% active worker; 14.0% retired and 9.1% did not answer this question.

Mobile telephone: 83.98% owned a cell phone. Among them communication is through phone calls in 6.5% of cases, with text messages in 1.9% and through the WhatsApp application in 91.6% of cases. Regarding time of use, 9.2% use it less than one hour per day; 34.0% from 1 to 3 hours; 26.3% from 3 to 6 hours, 19.2% for more than 6 hours and 1.3% did not answer this item.

Targeted cardiovascular survey:

BP: 16.7% of respondents had not undergone a BP control in the last year; 17.8% reported hypertension (HT), of whom 12.1% were not receiving pharmacological treatment; 61.1% reported not having HT and 21.1% did not know.

Smoking: 75.7% were non-smokers; 14.1% were current smokers (with 6.6±1.5 cigarettes/day) and 10.3% were defined as former smokers. Smoking onset was at the age of 21.8±1.5 years.

Diabetes: 43.5% had not undergone blood glucose controls in the last year; 4.9% reported diabetes (among whom 66.7% were treated); 68.1% defined themselves as non-diabetic and 27.0% did not know.

Dyslipidemia: 53.2% had no cholesterol control in the last year; 30.6% had dyslipidemia (among whom 35.7% were treated); 29.2% reported not having dyslipidemia and 39.9% did not know.

Alcohol: 29.0% reported regular consumption (1.9±0.7 times per week).

Physical activity: 54.3% responded that they routinely performed physical activity (3.8±0.2 days/week).

Minimental Test

Mean impairment was 15.7±0.2 points (population with mild to moderate cognitive impairment), 91.4% knew what day and month it was and 93.1% knew the year. As for remembering 3 objects, 96% were able to do so, 1.2±0.1 repetitions being necessary; and when asked again 80.8% remembered all 3 objects. Out of 5 numbers to be retained, 3.2±0.2 numbers were remembered on average. In the activity with the paper, 89.7% took it correctly, 97.1% folded it correctly and 96.0% placed it as indicated. The drawing of pentagons was correctly done by 60.6%.

Diet

a) Twenty-four-hour reminder:

Breakfast: The most commonly consumed infusion (50.5%) was mate, followed by tea (28.5%) and milk (7.0%), in 26.3% of cases with tortillas and buns (bread made with fat) and in 7.0% with another type of bakery. The rest only took the infusion. Snack: 32.3% had drank herbal tea the previous day; 14.0% had bread made with fat and 11.8% had fruit.

Lunch: 34.9% ate some type of stew; 9.7% ate meat; 6.5% ate pasta; and 6.5% ate rice. Dessert (generally a seasonal fruit) was eaten by 36.0% of respondents.

Afternoon snack: 71.5% drank an infusion (52.5% yerba mate). 22.0% ate something between the afternoon snack and dinner (tea: 9.7%; bread: 7.5%; seasonal fruit: 5.4% and another food: 5.4%).

Dinner: 55.9% had dinner, generally the same meal as lunch, and 7% accompanied it with dessert.

b) Frequency of food consumption:

The number of servings consumed per month was: whole dairy: 10.5±1.3; semi-fat dairy: 3.9±0.8; eggs: 9.9±0.9 units; lean meats: 13.36±1.0; white meats: 8.5±0.8; white fish: 1.1±0.2; oily fish: 1.7±0.2; vegetables: 28.0±1.8; fruits: 21.1±1.6; nuts: 7.4±0.8; legumes: 5.6±1.1; olive oil: 10.3±1.1; other oils and fats: 8.6±1.3; refined cereals: 6.6±1.1; integrated cereals: 3.7±1.5; pastries: 4.5±0.6; sugars: 37.3±2.8; water: 107.7±4.7. Sixty-eight inhabitants consumed alcohol (7.3±1.7 times per month).

Quality of life, self-esteem, sleep, and frailty questionnaires.

a) Questionnaire SF-12:

The mean score was 29.2±0.5 points (69.5±1.1%

of the maximum value). Figure 1 shows responses to the questionnaire.

b) Rosenberg self-esteem scale:

The average was 30.6±0.3 points out of a maximum of 40 (maximum of 4 points for each of the 10 questions). The average score for each question was: Does he/she feel a worthy person: 3.4±0.0; believes he/she has good qualities: 3.4±0.0; is a failure: 3.1±0.1; can do things just like most people: 3.3±0.1; has no reason to feel proud: 2.7±0.1; has a positive attitude towards himself: 3.4±0.1; is satisfied with him/herself: 3.4±0.1; should value him/herself more: 1.7±0.1; sometimes feels useless: 2.9±0.1 and sometimes thinks he/she is useless: 3.2±0.1.

c) Sleep scale test:

During the last month, the average bedtime was 23:00±00:06 h and the average wake-up time was 06:56±00:05 h. They allocated 07:55±00:08 hours to sleep, of which they slept 06:23±00:06 h. Regarding the quality of sleep, 30.3% indicated that it was very good; 51.7% fairly good; 15.2% fairly bad and 2.8% very bad. In 90.6% of cases, respondents reported not taking sleeping medication; 2.8% took medication less than once a week; 2.2% 1 to 2 times a week; and 4.4% more than 2 times a week. A total of 48.6% respondents reported drowsiness at some time during daily activities and 28.7% reported having problems performing daily activities because of drowsiness. Some 36.4% of respondents slept alone in the room; 7.9% with someone in another room; 9.0% with someone in the same room, but in another bed; and 46.1% with someone in the same bed.

d) Frailty Test (Edmonton scale):

The value was 3.7±0.2 points (range considered not frail). Among the population, 15.9% were apparently vulnerable; 6.0% were mildly frail; 4.6% were moderately frail; and 0.7% were markedly frail.

Office 3

Table 1 presents the results of the parameters measured. The BMI was in the range of overweight (27.9±0.4 kg/m2). Malnutrition was present in 1.7% of the population; 28.7% had adequate weight; 34.3% were overweight and 35.4% were obese. Waist circumference was elevated in 75.8% of participants; abdominal circumference was elevated in 65.6% and neck circumference in 7.0% of cases. Systolic BP was elevated in 15.1% and diastolic BP in 8.1% of respondents.

Office 4

In the ECG the average heart rate was 67.1±0.8 bpm, QRS duration was 119±10.3 msec and its axis was 38.3±4.4°. The QT interval was 442.2±18.6 msec. HR variability was 23.0±2.7. ECG alterations were found in 27 inhabitants (14.5%): 2 presented atrial fibrillation; 2 left anterior hemiblock; 2 right bundle branch block; 3 left atrial overload; 1 high density of extrasystoles with bigeminy and 17 repolarization disorders.

Office 5

Table 2 presents the echocardiographic findings. Mitral regurgitation was observed in 43 subjects (23.1%), with mild regurgitation in 40 cases. No mitral stenosis was found. Twenty subjects (10.7 %) had aortic regurgitation, mild in 17 cases. No aortic stenosis was found. Tricuspid regurgitation was observed in 39 subjects (20.9%), mild in 36 cases. One subject had mild tricuspid stenosis, and 16 (8.6%) had mild pulmonary regurgitation; 1 subject had moderate pulmonary stenosis.

Office 6

In the ultrasound study of neck vessels, no aneurysms, tumors or malformations were found in any of the inhabitants studied. Atherosclerotic plaque was found in 22 subjects (11.8%), only in 1 greater than 50%.

Office 7

In the Ruffier-Dickson test, baseline heart rate was 69.4±0.9 bpm; during exercise 100.4±1.6 bpm (46.2±2.3% increase from baseline) and after exercise 85.5±1.3 bpm (14.1±0.8% decrease with respect to exercise). The Ruffier index was within the average range (5.7±0.3). It was considered very good in 9.9% of respondents; good in 36.6%; average in 43.0%; insufficient in 7.7% and poor in 2.8%. The prehensile strength recorded with dynamometer was 23.0±1.3 kg and in 55.8% of cases it was below the normal range.

It should be noted that, due to the findings obtained, 10 patients were referred to a higher complexity care center.

DISCUSSION

In this new stage of the Program, it was possible to perform a more complete analysis of cardiovascular health in the Quilmes population than in the previous stage (2018 SONQO- CALCHAQUI Program). (1) It was also possible to integrate other areas that have a direct impact on the cardiovascular sphere, such as the psychological, physical and social state, as well as the proinflammatory state of the population. The achievement of these goals indicates the importance of having conducted a study driven from a district of the Argentine Society of Cardiology, joined by other districts, local referents, the Provincial Health System (SIPROSA) and the National University of Tucumán UNT) that allowed the development of a complete cardiological evaluation of a population usually not considered in many registries and randomized studies.

With respect to the new areas studied in this new stage of the Program, physically active people, with medium aerobic resistance to short-term effort (Ruffier Dickson Index of 5.7), were observed, but with a prehensile strength below the normal range in 55.8% of cases. These patients are poorly educated, with 10% illiteracy, not frail (according to the Edmonton Scale), but with mild to moderate cognitive impairment. They present good sleep quality and, in more than

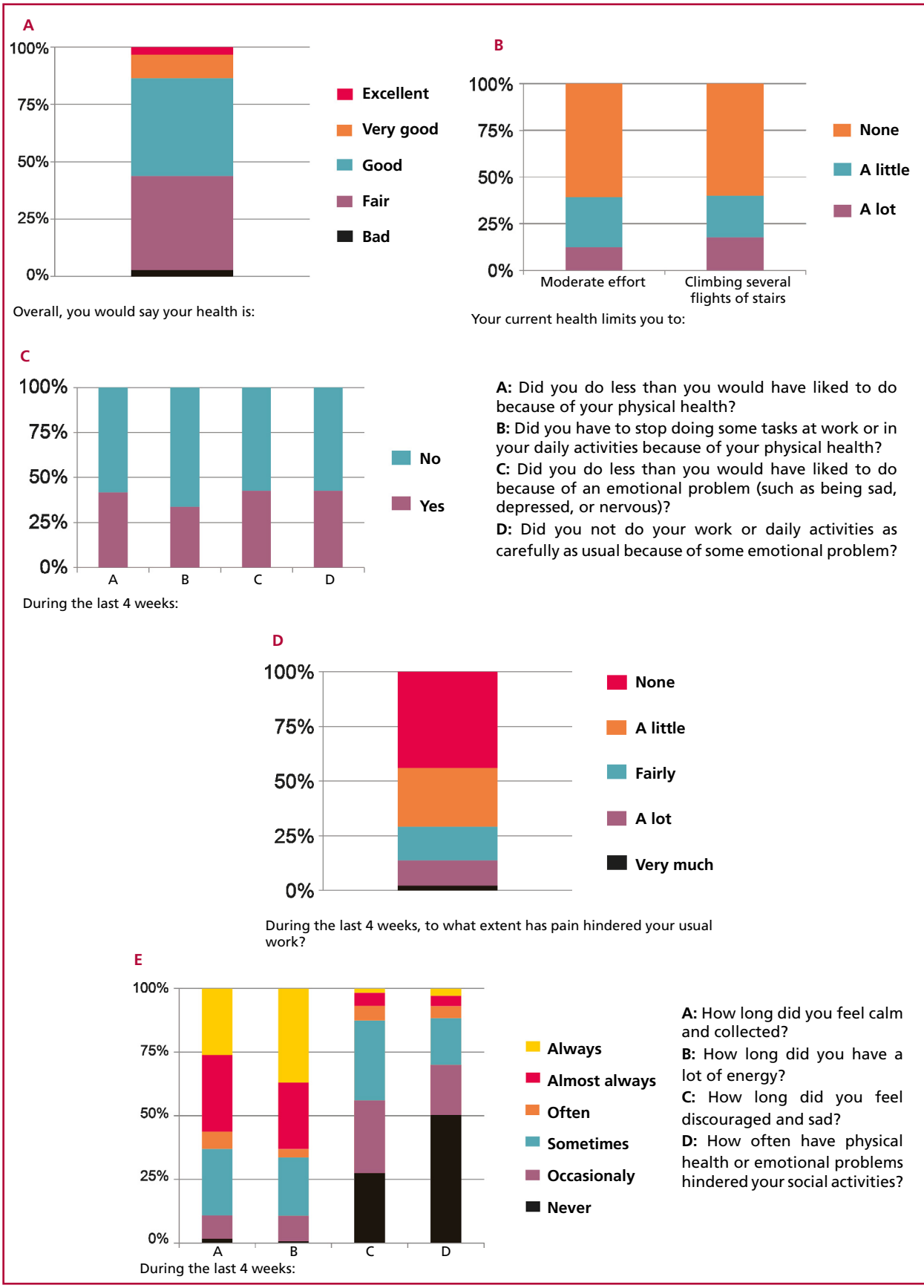

Fig. 1. Responses of the Quilmes population to the SF-12 Questionnaire (n=186).

Table 1. Anthropometric and hemodynamic variables of the population (n=186).

VARIABLE			VALUE	RANGE
Anthropometric variables	Weight (Kg)		70.3±1.1	31.0 to 104.0
	Height (cm)		159.5±0.7	13.01 to 182.0
	BMI (kg/m²)		27.9±0.4	11.1 to 43.3
	Waist circumference (cm)		103.1±0.8	76.0 to 157.0
	Abdomen circumference (cm)		95.2±1.1	35.0 to 129.5
	Neck circumference (cm)		38.0±0.4	26.0 to 69.5
	Wingspan (cm)		160.7±0.4	106.0 to 158.0
	Brachial circumference (cm)	Right	30.4±0.3	22.0 to 43.0
		Left	30.4±0.3	20.0 to 43.0
	Calf circumference (cm)	Right	36.1±0.3	28.5 to 45.5
		Left	36.0±0.3	28.0 to 47.0
Hemodynamic variables	Blood pressure (mmHg)	Systolic	122.4±1.4	83.0 to 189.0
		Diastolic	75.7±0.8	56.0 to 133.0
		Differential	46.8±1.0	16.0 to 96.0
		Mean	91.3±0.9	65.7 to 139.3
	Oxygen saturation (%)		95.9±0.2	86 to 99

Variables are expressed as mean ± standard error
BMI: body mass index

Table 2. Quantifiable echocardiogram findings.

VARIABLE			VALUE	RANGE
Parasternal long axis dimensions	LVDD (mm)		43.7±0.5	5.5 to 59.0
	LVSD (mm)		25.7±0.5	2.42 to 44.0
	LVEF (%)		55.2±0.4	42.0 to 75.0
	LVSF (%)		41.4±1.4	10.0 to 150.0
	IVS thickness (mm)		9.1±0.2	4.0 to 20.0
	PWT (mm)		8.4±0.2	4.0 to 13.0
	LVOT (mm)		19.7±0.2	4.0 to 26.0
	Ao Root (mm)		26.2±0.4	10.0 to 36.0
	Ao OD (mm)		20.8±0.5	13.0 to 37.0
	LAAPD (mm)		33.7±0.9	20,0 to 157,0
	LVM (g)		134.1±6.8	43.0 to 294.0
	LVMI (g/m)²		73.6±5.9	23.0 to 155.0
Doppler	PAAT (msec)		127.6±2.5	54.0 to 243.0
	Transmitral flow	E-wave (msec)	0.8±0.0	0.1 to 1.4
		A-Wave (msec)	0.7±0.0	0.1 to 2.4
	LVOT VTI (cm)		20.2±0.5	5.0 to 41.0
	Ao Vmax (m/sec)		1.2±0.0	0.2 to 1.8
	TR Vmax (m/sec)		2.1±0.1	0.2 to 3.0
Tissue Doppler	S-wave(cm/sec)		1.8±0.1	0.1 to 4.6
LV	e' wave (cm/sec)		1.5±0.1	0.1 to 4.4
	a' wave (cm/sec)		1.2±0.1	0.1 to 4.0
IVS	S-wave(cm/sec)		1.1±0.1	0.1 to 4.8
	e' wave (cm/sec)		1.4±0.1	0.2 to 5.0
	a' wave (cm/sec)		1.1±0.1	0.1 to 4.3

Ao: Aorta; Ao root: Ao root diameter; Ao OD: Ao opening diameter; Ao Vmax: peak aortic valve velocity; IVS: interventricular septum; LAAPD: left atrium anteroposterior diameter; LV: left ventricle; LVDD: LV diastolic diameter; LVEF: LV ejection fraction; LVM: LV mass; LVMI: LVM indexed to body surface area; LVOT: LV outflow tract diameter; LVOT VTI: LV outflow tract velocity/time integral;LVSD: LV systolic diameter; LVSF: LV shortening fraction; PAAT: pulmonary artery acceleration time; PWT: posterior wall thickness; TR Vmax: tricuspid regurgitation Vmax.
Variables are expressed as mean ± standard error.

50% of respondents, a good to excellent self-perception of their quality of life. Further studies should be carried out to assess the real weight of different variables not studied in depth in this study, such as sociocultural factors and the validation of the instruments used in an aboriginal and/or mountain population, on the results obtained. The laboratory results indicate the absence of prothrombotic and/or proinflammatory status.

A limitation that should be pointed out is that a population sampling was not carried out: the data were collected from the population that volunteered to participate, which could have influenced the number of people studied, and could have biased the responses.

Compared with the 2018 SONQO-CALCHAQUI data, (1) no significant differences are observed in the variables that were recorded in both opportunities (cardiovascular risk factors, anthropometric parameters, electrocardiogram, color Doppler echocardiogram and neck vessels and iliofemoral Doppler ultrasound). In this new stage of the SONQO-CALCHAQUI Program, new study domains were added: nutrition, cognitive status, self-perception of health status, sleep quality, frailty, endurance and muscular strength.

One of the main findings of this work is that the Quilmes community presents overweight values similar to those observed in urban centers in Argentina (3) and other parts of the world, such as the Middle East or Europe. (17,18) This data is reinforced by the fact that in a substudy of the 2018 SONQO-CALCHAQUI Program we were able to demonstrate that the prevalence of overweight in women was similar in different settings of Tucumán. (19) This could be considered as a negative finding, as no improvement in cardiovascular health was found in 4 years. One can mention, for example, the presence of obesity (36% in 2018 vs. 35.4% in 2022, p NS); BMI values (28.0±0.4 in 2018 vs. 27.9±0.4 in 2022, p NS); systolic BP (124.3±1.4 mmHg in 2018 vs. 122.4±1.4 mm Hg in 2022, p NS) and diastolic BP (77.0±0.7 mmHg in 2018 vs. 75.7±0.8 in 2022 (p NS). However, this period includes the COVID-19 pandemic, which led to a generalized increase in sedentary lifestyles and obesity, (20,21) so a more positive view might be that, despite the mandatory quarantine, there was no worsening of cardiovascular health in the Quilmes population.

The Ruffier index showed that aerobic endurance was in the average range considered despite the prevalence of overweight. However, the prehensile strength test indicated decreased muscle mass in at least half of the population. In this sense, further studies on physical fitness are needed.

Since there were still unresolved doubts in the 2018 SONQO-CALCHAQUI Program, referring to the possible westernization of the diet, already described in other aboriginal populations worldwide, (22,23) in this new stage with the 24-hour reminder and the food consumption frequency test, it could be seen that the main source of calories consists of flours and meats, with scarce consumption of vegetables and fruits. This could be due to the lack of geographical accessibility of both products, a hypothesis supported by the low consumption of ultra-processed foods and fish. The infusion mostly consumed at breakfast and at the afternoon snack is mate. It could be said, therefore, that there is a partial westernization of the diet, since they mix farinaceous products with traditional beverages.

CONCLUSIONS

Thanks to the coordinated effort of various national and provincial sectors, it was possible to obtain very valuable information on the cardiovascular health of an aboriginal population that is not usually well represented in registries and intervention studies. The Quilmes population presents an acceptable physical condition but with a high rate of overweight and obesity, which remains constant after the COVID 19 pandemic. This could be due to the diet, whose determinants and possible corrections should be considered in future health programs. No significant differences were verified with the data collected in 2018.

Conflicts of interest

None declared.

(See authors' conflict of interests forms on the web).

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To the Quilmes community in general

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ANNEX I

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