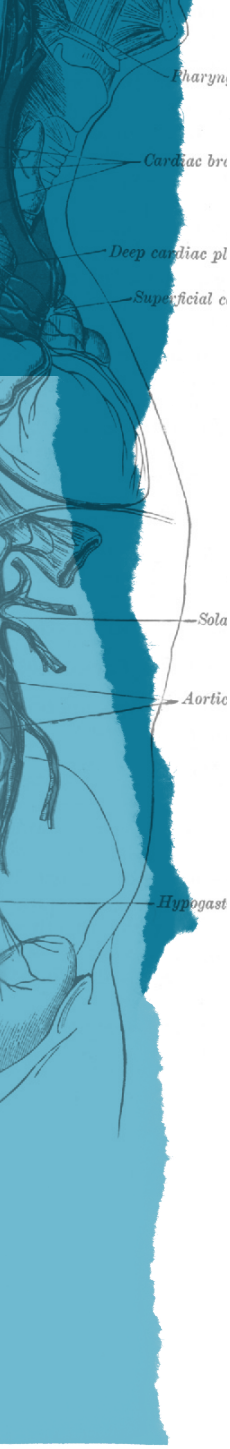

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Factors Associated with Noncommunicable Diseases in an Indigenous population of Colombia

Factores asociados a enfermedades no trasmisibles en una población indígena en Colombia

Omar Ramos-Valencia[1], Sandra Jácome-Velasco[2], Andrés Villaquiran-Hurtado[3], Lizet Bedoya-Luligo[4], Ana Omen-Tintinago[5]

[1] MSc in Public Health- Universidad del Valle, Universidad del Cauca. Orcid: https://orcid.org/0000-0002-1500-0973, Carrera 6 N.º 13N-50 de Popayán, sector de La Estancia, Popayán, Colombia. omaramos@unicauca.edu.co

[2] PhD in Education- Universidad del Cauca, Universidad del Cauca. https://orcid.org/0000-0001-6605-8377, Carrera 6 N.º 13N-50 de Popayán, La Estancia, Popayán, Colombia. sjacome@unicauca.edu.co

[3] MSc in Comprehensive Sports Intervention, Universidad del Cauca. Orcid: https://orcid.org/0000-0002-6156-6425, 3246807670, Carrera 6 N.º 13N-50 de Popayán, sector de La Estancia, Popayán, Colombia. avillaquiran@unicauca.edu.co

[4] Physical Therapist- Universidad del Cauca, Hospital Universitario del Valle. Orcid: https:// orcid.org/0000-0002-9683-483X, 3226365263, calle 34#2n-26 barrio Bolivariano, Cali Valle del Cauca, Colombia. lizeth.bedoya@correounivalle.edu.co

[5] Physical Therapist- Universidad del Cauca, AIC Salud. Orcid: https://orcid.org/0000-0001-6094-1687, 3113179848, Carrera 8E #17-46, Popayán, Cauca, Colombia. auditoria8@aicsalud.org.co

Corresponding autor: Andres Felipe Villaquiran, teacher, Universidad del Cauca, avillaquiran@unicauca.edu.co, https://orcid.org/0000-0002-6156-6425

ABSTRACT

Descriptive, cross-sectional study of 76 people belonging to the Yanaconas Indigenous Resguardos of Rioblanco - Colombia. An instrument based on the STEPS -OMS protocol was used to determine the factors associated with noncommunicable diseases in the population. The participants were between the ages of 29 to 59 (60.5%) years old; most were physically active, with the most used means of transportation being non-motorized "walking" (46.1%). The indigenous community was found to have risk factors such as low educational level and bad eating habits; exposure to wood smoke in this population was high, at 57.9%; however, tobacco use was lower, at 3.9%, with alcohol use at 34.2%.

Keywords: Risk factors, Indigenous population, Chronic diseases, public health- Colombia*

RESUMEN

Estudio descriptivo, transversal con 76 personas pertenecientes a los Resguardos Indígenas Yanaconas de Rioblanco - Colombia. Se utilizó un instrumento basado en el protocolo STEPS -OMS, para determinar los factores asociados a las enfermedades no transmisibles en la población. Los participantes tuvieron entre 29 y 59 años (60,5%); En cuanto a conductas / exposiciones a la salud, la mayoría de la población es físicamente activa ya que el medio de transporte más utilizado es el "caminar" no motorizado (46,1%). Se encontró que la comunidad indígena presenta factores de riesgo como bajo nivel educativo y malos hábitos alimenticios; la exposición al humo de leña en esta población es alta en 57,9%; sin embargo, el consumo de tabaco fue menor al 3,9% y el consumo de alcohol al 34,2%.

Palabras clave: Factores de riesgo, Población Indígena, Enfermedades crónicas, salud pública- Colombia*

* BIREME / OPS / OMS. (2017) .Descriptores en Ciencias de la Salud: DeCS [Internet]. ed. 2017. Sao Paulo (SP). [actualizado 2017 May 18]. http://decs.bvsalud.org/E/homepagee.htm

INTRODUCTION

The World Health Organization (WHO) defines noncommunicable diseases (NCDs), also known as chronic diseases, as those with a long duration and a slow evolution[1]. Among them, we find cardiovascular diseases, chronic lung diseases, diabetes, and cancer[2]. NCDs have biological risk factors, including some modifiable ones, such as excess weight and obesity, high cholesterol levels, hyperglycemia, and high blood pressure[3], in addition to behavioral risk factors such as alcohol and tobacco consumption, physical inactivity, and unhealthy diets[4]. Additionally, there are non-modifiable risk factors including: age, sex, genetic factors, and race[5].

The majority of deaths caused by NCDs are occurring in low and middle income countries[6], and a large proportion of NCD deaths occur before age 70 (i.e., during productive years)[7]. NCDs are the leading cause of mortality, worldwide, to the point that they claim more lives than all other causes, combined. To illustrate this, NCDs are responsible for the death of 41 million people each year, which corresponds to 71% of the total global deaths[8].

In Colombia, cardiovascular diseases represent the first cause of mortality[9], followed by deaths caused by other chronic diseases, such as chronic respiratory illness, diabetes mellitus, nutritional deficiencies and nutritional anemias, among others[10].

It is important to note that Colombia has a rich population in terms of diversity and culture, which generates a variety of different habits and lifestyles that can lead to behavioral risk factors related to chronic diseases. One of the most noteworthy groups in Colombia is its indigenous population. According to the Colombian Institute of Rural Development- INCODER, there were 733 legally constituted indigenous Resguardos[11] in 2015. According to the Colombian Ministry of Health and Protection, ¨in Colombia, the situation of indigenous peoples is framed in a complex and dynamic process of historical, social, economic, and environmental change, linked to the expansion and consolidation of demographic and economic groups in the different regions of the country"[11].

Reports by the National Administrative Department of Statistics (DANE) mention that the Department of Cauca contains the second largest concentration of indigenous people[12] in Colombia, with around 190,069 people settled in 26 of its 39 municipalities. There are 8 officially recognized ethnic groups, including the Paez community, with more than 120,000 residents; Totoro, with nearly 5,000 individuals; the Guambianos, in the Municipality of Silvia, with more than 16,000

people; the Kokonuko, in the municipality of Puracé, made up of approximately 7,000 individuals; and the indigenous Yanacona people, located in the southern area of the department, on the Colombian massif, with a population of over 25,000[13].

Despite these figures, research reports on health conditions, and the identification of factors associated with NCDs for indigenous populations in Cauca, are scarce. However, the Ministry of Health and Social Protection in Colombia reported that for the 2008 to 2013 period, ischemic heart diseases, cerebrovascular diseases, chronic respiratory diseases, and hypertensive diseases were among the 10 leading causes of mortality in the indigenous population. Notably, 52.81% of the healthcare visits for indigenous patients in Colombia were related to NCDs[14].

One significant contributor to inequity for this population comes from the fact that the indigenous populations largely live in rural areas. These areas can be difficult to access, making it difficult to provide timely, interdisciplinary healthcare. This barrier does not only contribute to inequities in health services, but it also increases the risk of NCDs in the indigenous population[15].

This study was conducted with the Yanacona indigenous population, located in the Rioblanco Reservation, Sotara, Cauca, in the central mountain range near the Sotará volcano. Primary care for this population is available only in urban areas, which means that individuals must travel a large distance to make use of these services. Higher complexity care is even less available, as patients requiring these services must be referred to the city of Popayán. The objective of this study was to determine the factors associated with noncommunicable diseases in this population.

MATERIALS AND METHOD

This descriptive, observational, cross-sectional study was conducted with 76 people belonging to the Yanacona Indigenous Reservation of Rioblanco, located in the Sotará municipality of the department of Cauca, which has a total population of 6,159 inhabitants. The sample size was calculated with the Epidat 3.1 program, with an expected proportion of 11.9%, confidence level of 93%, and an absolute precision of 7%. Convenience sampling was done with individuals attending a health day organized by the research team to promote healthy habits and disease prevention. The program was run out of the reservation's health center. Inclusion criteria: belonging and residing in the community, being over 15 years of age, voluntarily participating in the project, and signing the informed consent format.

A survey based on the World Health Organization-WHO "STEPwise approach to chronic disease risk factor surveillance"[16] was used to collect basic information, including socio-demographics and economic variables; personal and family histories; measurements of anthropometric and biomedical variables; and questions regarding eating habits, physical activity, alcohol consumption, exposure to tobacco, and preventive habits.

In regards to ethics, the project followed the international standards established in the Helsinki Declaration, as well as the national standards, stipulated by the Ministry of Health in Resolution 03480 of 1993, on Health Sciences research. Respect for the rights and privacy of the participants was followed. Informed consent was obtained after explaining the purpose, risks, and benefits of the study. In addition, the study had the support of indigenous leadership.

Variables were assessed using the statistical program R Wizard and PSPP (free software), which calculated frequencies to determine the sociodemographic, biomedical, and life-style characteristics. Using a 95% confidence interval, a maximum error of 5%, and two-tailed statistical significance set at $p<0.05$, the following analyses were included: Correlation analysis, Chi ^{2} test, OR analysis, and non-parametric tests with Mann Whitney U.

RESULTS

Information on 76 individuals who met the inclusion criteria was collected.

Regarding the sociodemographic characteristics, the most frequent age category was 27 to 59 years, at 43.4% (n = 33); 52.6% identified as female (n = 40); common-law was the most frequently reported marital status, at 38.2% (n = 29). In terms of occupation, 32.9% (n=25) characterized themselves as farmers, and 34.2% (n=26) as homemakers. 56.6 % (n=43) reported a primary level of educational attainment, and 44.7% (n=34) reported having between 1 to 3 children. Finally, 55.3% (n=42) stated that their income was below the legal minimum wage (SMVL).

Biomedical findings included a family history of cancer in 10.5% (n = 8) of respondents, lung diseases in 10.5% (n = 8), hypercholesterolemia at 10.5% (n = 8), heart disease in 13.2% (n = 10), and arterial hypertension in 18.4% (n = 14) of respondents.

Body mass index (BMI) findings showed a normal BMI in 42.1% of respondents (n = 32), while 43.4% were overweight (n = 33). 60.5% (n=46) of participants were found to have normal blood

pressure, and 85.5% (n=65) were observed to have a hip waist index that corresponds to an increased risk of cardiovascular disease (Table 1).

Table 1. Sociodemographic characteristics of the Yanacona indigenous community

Variable	Frequency	%	Variable	Frequency	%
Age					
Children	6	7.9	Body mass index		
Youth	9	11.8	Underweight	1	1.3
Adult	46	60.5	Normal	32	42.1
Elderly	15	19.7	Overweight	33	43.4
			Obese	10	13.2
Gender					
Female	40	52.6	Waist-hip index		
Male	36	47.4	Normal	11	14.5
			Cardiovascular risk	65	85.5
Marital status					
Single	25	32.9	Respiratory Rate		
Common-law	29	38.2	Normal	45	59.2
Married	17	22.4	Tachypnea	31	40.8
Widowed	5	6.6			
			Blood pressure		
Occupation			Normal	46	60.5
Farmer	25	32.9	Pre HTN	27	35.5
Homemaker	26	34.2	Hypertension	3	3.9
Employee	8	10.5			

Continúa...

Variable	Frequency	%
Unemployed	2	2.6
Independent	7	9.2
Student	8	10.5
Education		
Primary	43	56.6
Highschool	18	23.7
Technical	11	14.5
Technological	4	5.3
Number of children		
Zero	2	2,6
One to three	10	13,2
More than four	64	84,2
Economic income		
No income	4	5,3
Below minimum wage	14	18,4
Minimum wage	6	7,9
Above minimum wage	52	68,4

Variable	Frequency	%
Personal medical history		
Cardiac disease	2	2.6
Resp disease	5	6.6
Cancer	2	2.6
Elevated cholesterol	6	7.9
Hypertension	4	5.3
Family history		
Cardiac disease	10	13.2
Resp disease	8	10.5
Cancer	8	10.5
Elevated cholesterol	8	10.5
Hypertension	14	18.4
Personal and family medical history		
Hypertension	6	7.9
Lung disease	1	1.3
Cholesterol	2	2.6

Popayán- Cauca

In the lifestyle habits section, the study found that 98.7% (n = 75) of the population had concerns about their diet, and they frequently (every one to three days) consume fruits and vegetables 56.6% (n = 43), meat 69.7 % (n = 53), and grains 65.8% (n = 50). Starches, such as potatoes, cassava, and others are consumed daily by 76.6% (n=43) of respondents. Approximately half of respondents, 48.7% (n=37), indicated that their frequency and timing of food consumption is appropriate. Sugar rich foods are consumed frequently by 65.8% (n=50) of the population, and fried foods by 78.9% (n=60). The majority, 69.7% (n=53), consume one to three glasses of water per day.

Of the participants, 76.3% (n = 58) reported being active. 36.8% (n=28) stated that they performed physical activity two or three times a week. 23.7% of respondents indicated that they were not physically active, and 10.5% (n=8) cited lack of time as the main reason. The most common method of transportation for this population was walking, at 46.1% (n=35).

Finally, 65.8% (n = 50) of the population does not consume alcohol, and 96.1% (n = 73) does not use tobacco. However, 57.9% (n=44) report cooking with firewood. 87% of participants attend medical check-ups with a frequency of three times a year for 55.3% (n = 42). Breast or testicle self-examinations are not performed by 87% (n = 67), and only 40.8% (n=31) of women received cervical cytology in the last year. When asked if they have received training and health care education, 69.7% (n=53) answered yes. (Table 2)

Table 2. Biomedical characteristics, Yanacona Indigenous community of Rioblanco

Variable	Frequency	%	Variable	Frequency	%
Attention to nutrition			Most used means of transport		
Yes	75	98.7	Automotive	14	18.4
No	1	1.3	Bicycle	2	2.6
			Motorcycle	18	23.7
Weekly food consumption (times per week)			Horse	7	9.2
			Walking	35	46.1

Continúa...

Variable	Frequency	%
Fruits and vegetables		
One to three days	43	56.6
Four to six days	4	5.3
Everyday	29	38.2
Starch		
One to three days	12	15.8
Four to six days	5	6.6
Everyday	59	77.6
Meat		
Zero	5	6.6
One to three days	53	69.7
Four to six days	8	10.5
Everyday	10	13.2
Grain		
Zero	1	1.3
One to three days	50	65.8
Four to six days	5	6.6
Everyday	20	26.3
Timing of food Consumption		
Every hour	2	2.6
Consumption of alcoholic beverages		
Yes	26	34.2
No	50	65.8
Frequency of alcohol consumption		
Zero times	50	65.8
1 or 2 per year	17	22.4
1 or 2 per month	7	9.2
1 in week	2	2.6
Tobacco use		
Yes	3	3.9
No	73	96.1
Fuel source for household cooking		
Gas	15	19.7
Firewood	44	57.9
Both	17	22.4
Medical appointments		
Yes	66	86.8
No	10	13.2

Continúa...

Variable	Frequency	%
At an inconvenient time	31	40.8
When I can	6	7.6
At an appropriate time	37	48.7
Consumption of foods rich in sugar		
Never	23	30.3
Frequently	50	65.8
Always	3	3.9
Consumption of fried foods		
Never	3	3.9
Frequently	60	78.9
Always	13	17.1
Glasses of water per day		
Zero	13	17.1
From one to three	53	69.7
From four to six	8	10.5
More than six	2	2.6
Physical activity		
Yes	58	76.3
No	18	23.7
Medical appointments per year		
Does not attend	10	13.2
1 or 3 times	42	55.3
4 or 6 times	20	26.3
> 6 times	4	5.3
Breast or testicular self-exam		
Yes	16	21.1
No	60	78.9
Annual cytology		
Yes	31	40.8
No	45	59.2
Has received training and health talks		
Yes	53	69.7
No	23	30.3
Reason to not complete physical activity		
No time	8	10.5
Illness	5	6.6
Activities	2	2.6
Do not like	3	3.9

Continúa...

Variable	Frequency	%	Variable	Frequency	%
			No response	58	76.3
Number of days physical activity per week					
None	18	23.7			
One to three days	28	36.8			
Four to six days	3	3.9			
Everyday	27	35.5			

When analyzing the bivariate correlations, a significant relationship was found between age and the following variables: participation in physical activity (p = 0.032), alcohol consumption (p = 0.033), and attendance at health talks and training sessions (p = 0.001). Education level showed a significant relationship with attendance at medical check-ups (p = 0.037) and with alcohol consumption (p = 0.006). Gender was found to have a significant relationship with the frequency of alcohol consumption (p = 0.007), and number of children demonstrated a significant linear relationship with physical activity (p = 0.006), alcohol consumption (p = 0.001), and receiving cervical cytology (p = 0.000). (Table 3)

Table 3. Correlation between sociodemographic characteristics with lifestyle and biomedical factors in the Yanacona indigenous community of Rioblanco

Sociodemographic characteristic	Lifestyle factors	P Value
Age		
	Physical activity	.032
	Alcohol consumption	.003
	Health talks and trainingstion	.001
Gender		
	Frequency of alcohol consumption	.007
Education		
	Medical appointments	.037
	Consumption of alcohol	.006
Number of children		
	Physical activity	.017
	Alcohol consumption	.001
	Cervical cytology	.000
Economic income		
	Household cooking fuel	.005
	Self-examination	.025
	Alcohol consumption	.046
	Physical activity	.036
History of cholesterol		
	Fruit/vegetable consumption	.020
History of hypertension		
	Meat consumption	.036
Hip waist ratio		
	Fruit/vegetable consumption	.003
Body mass index		
	Method of transportation	.033

The study also found that income had a significant linear relationship with the use of firewood for cooking (p = 0.005), with completing self-examinations (p = 0.025), with alcohol consumption (p = 0.046), and with physical activity (p = 0.036). Consumption of fruits and vegetables was significantly related to having a history of hypercholesterolemia (p = 0.020), as well as waist-hip ratio (p = 0.003). Having a history of hypertension (HTN) correlated to meat consumption (p = 0.036), and BMI demonstrated a relationship with method of transportation (p = 0.033). (Table 3)

Table 4. Relationship and OR between sociodemographic characteristics and lifestyle and biomedical factors in the Yanacona indigenous community of Rioblanco

	YES	NO	Total	P-value or Chi2	Risk
Sedentary					
Gender: Female	14	26	40		
Male	4	32	36	.014	OR 4.30 CI 1.26-14.6
Total	18	58	76		
Alcohol consumption					
Gender: Female	8	32	40		
Male	18	18	36	.006	OR 0.25 CI 0.0091-0.689
Total	26	50	76		
Absence of medical appointments					
Gender: Female	2	38	40		
Male	8	28	36	.027	OR 1.84 CI O.36-0.93
Total	10	66	76		
Absence of cervical cytology					
Marital status: Married	23	7	30		
Single	22	24	46	.012	OR 3,58 CI 1.28-9.98
Total	45	31	76		

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History of cancer					
No attendance for cytology:					
Yes	2	43	45	.007	OR 7.46
No	8	23	31		CI 1.36-38.1
Total	10	66	76		
History of hypertension					
Cooking with firewood:					
Yes	16	45	15	.043	OR 3.11
No	8	7	61		CI 0.097-0.996
Total	24	52	76		

Unrelated to gender, the study found a relationship between the use of firewood for cooking and a history of arterial hypertension (p = 0.043 OR 3.11, CI 0.097-0.996), where the use of firewood increased the odds of arterial hypertension 3.11 times (Table 4.)

When performing the correlation analysis, an inversely proportional relationship between age and alcohol consumption was found (p = 0.001, r = -0.345); as well as an inverse relationship between age and frequency of eating foods rich in sugar (p = 0.000, r = -0.409). There is a directly proportional relationship between education level and alcohol consumption (p = 0.003, r = 0.340); as well as the number of children and alcohol consumption (p = 0.000, r = 0.411).

The study found a significant relationship between gender and physical inactivity (p = 0.014; OR 4.30, CI 1.26 to 14.6), whereas women were shown to be at greater risk factor for being sedentary compared to men. However, in both alcohol consumption (p = 0.006; OR 0.25, CI 0.0091 to 0.689) and non-attendance at medical appointments (p = 0.27 OR 1.84, CI 0.36-0.93), female gender was found to be a protective factor.

Regarding non-attendance for cervical cytology, a relationship was found with marital status (p = 0.012 OR 3.58, CI 1.28-9.98), whereas married women were less likely to receive cytology on an annual basis (n = 23). Likewise, a relationship was found between lack of cytology and a history of cancer (p = 0.007 OR 7.46, CI 1.36-38.1), meaning that women who do not undergo cytology were found to have 7.46 times increased odds of presenting with a history of cancer.

DISCUSSION

Non-modifiable risk factors were found in this study to be more prevalent in middle aged (27-59) and older (over 60) populations, with children and youth making up much smaller proportions of those at risk for NCDs. According to WHO, 41 million deaths are attributed to NCDs each year[8].

At the health day where the survey took place, the majority of participants were women; however, the "Professionalism and Commitment for Sotará" development plan have discovered that the majority of the overall population is actually male[17]. This may be an example of the trend found by the Pan American Health Organization (PAHO): women have a greater involvement and participation in health services than men[18].

Low levels of education act as a risk factor in this community. Osorio comments that a high level of schooling amplifies the cognitive aspects of health and disease, protecting the subject from specific risks to their health, while supporting health promotion and disease prevention activities.[19].

The average income for the study population was found to be low. Rodriguez has stated that low income is a risk factor for developing NCD because it affects lifestyle, how families organize their lives, aging of the population, social relationships, and day-to-day behavior. Likewise, low income is related to educational attainment, because it is the gateway to employment opportunities that define an individual's economic conditions, including access to food, education, and housing[20].

The typical diet of this indigenous population is rich in carbohydrates, due to the large production and commercialization of potatoes and cassava. Carbohydrates, therefore, make up a large proportion of their daily food consumption, while the consumption of proteins is low. A study by Gomez shows that high carbohydrate consumption leads to increased triglycerides, visceral fat, blood pressure, and decreased HDL cholesterol. Both, individually and together, these changes increase the risk of cardiovascular disease[20]. Vallejo, in 2016, showed that nutritional status is dependent on the interaction between diet and the physical, social, cultural, and economic environment[22].

Regarding protein consumption, it is evident that consumption of red meats, poultry, and other proteins occurs only sporadically. This low-protein diet, according to studies, may lead to multiple clinical syndromes, such as poor growth, cardiovascular dysfunction, and high risk of infectious diseases, in addition to exacerbating the deficiency of other nutrients and a worsening metabolic profile[23].

While tobacco consumption is an uncommon risk factor for NCD in this population, it is important to mention that more than half of respondents reported exposure to wood smoke. Mainly women, because they use it to prepare meals. In a study by Guzman on indigenous women of the community of Pijiguay in the municipality of Tuchin Córdoba, Colombia, it was established that 100% of the surveyed population used firewood as the only heat source implement for cooking food. Generally, women from rural areas or from indigenous communities are exposed to wood smoke from the womb and throughout their lives, constituting a risk factor as important as tobacco smoke itself. Close to 9,000 women die each year from chronic obstructive pulmonary disease.[24].

Most of the population participates in physical activity and, correspondingly, walking is the most common means of transportation. Similar results have been found in other studies, such as in the one carried out by Reyes, where an indigenous population in Honduras indicated that they complete their physical activity by walking from home to work and back[25]. This is also supported by data from the National Administrative Department of Statistics of Colombia (DANE) showing that indigenous peoples are more likely to live in rural areas, particularly rural areas that are difficult to access with less developed transportation options. For this reason, these populations cannot rely on bus or taxi services, and only a small proportion have access to motorcycles[12].

It can also be highlighted that according to the aforementioned socioeconomic study, physical activity in the reservation is mainly practiced by youth, as over the course of the year there is promotion and organization of sports for young people. This corresponds with what was found in the present study, which states that there is a relationship between age and physical activity and frequency of physical activity, as well as with gender, where men perform more physical activity than women. This also coincides with the Situation Analysis in Health in Colombia 2016 (ASIS), which states that the prevalence of physical activity in men is 37% higher than in women; and men meet the physical activity recommendations 17.4% more frequently than women[10].

Half of the study population does not regularly consume alcohol. In fact, the population asserts that their alcohol consumption is limited only to significant dates of community celebration, which are once or twice a year. Apart from December and January, when the community celebrates the festivities of the patron saints, there is a prohibition against the consumption of any type of alcoholic beverage; a culture maintained by reservation authorities and enforced by the indigenous guard[26]. The results of this study showed frequency of alcohol consumption decreased with age, which is

presumed to be related to the fact that youth are the most likely to participate in this behavior. This finding coincides with a study conducted in 13 to 18 years old adolescents from Valladolid, Spain, where the average age for first experience with alcohol consumption was between 13 and 14 years[27]. Consistent with studies with university students regarding physical activity, tobacco use, and alcohol consumption, this study found a significant relationship between alcohol consumption and gender, whereas men consumed more alcohol (62%) than women (57%)[28]. Alcohol consumption in the present study correlated to income level, where, as was found in the national strategy of comprehensive response to alcohol consumption in Colombia, people in the lower income levels (strata 1 and 2) were found to have a greater alcohol consumption[11]. In this study, the reservation is considered to be strata 1, as it is a rural area and, therefore, the economic income of its population is low.

Another risk factor for NCD was demonstrated in the relationship between the practice of cervical cytology and cancer history, in which 2 people who had a family history of cervical cancer had never undergone cytology. A similar result was also found in a 2009 Colombian study on the effectiveness of cervical cytology for the early detection of cervical cancer. In that study, they concluded that cytology is still effective in the setting of the Colombian healthcare system, but it also highlighted that said effectiveness may be mediated by factors beyond population coverage rates and inherent qualities of the test itself[29].

On the other hand, in terms of attending medical health checks, this study highlighted that women are more likely to attend for healthcare than men, in agreement with a study by Agudelo that linked gender equality and health services. Agudelo found differences between men and women who visited the healthcare system, where 81% of women had attended a healthcare visit that year. In that study, women felt they had more time available for health care and healthcare visits were shown to be a protective factor against NCDs[30].

Our study showed a relationship between low fruit/vegetable consumption and baseline cholesterol levels present in the population. Andreu emphasizes that consuming fruits and vegetables would probably lower cholesterol levels, since the absorption and blood concentration of cholesterol is reduced[31].

Finally, it is important to highlight that indigenous communities have legislation that allows them to make their own decisions on issues such as health and justice, among others, in order to

preserve their customs and design their own programs. The present study can serve as the basis for the design of programs and projects that seek to improve lifestyle activities and preserve the healthy ancestral customs of the community. Likewise, it is important to mention that, due to the geographical location of the population and its characteristic as rural dispersion, it was difficult to obtain a more representative sample, becoming a limitation of the study.

CONCLUSION

The Yanacona Indigenous population of the Rioblanco Reservation has several factors associated with chronic noncommunicable diseases, including gender, overweight, at risk waist-to-hip ratio, personal and family history related to cardiovascular diseases, low protein intake, high intake of sugars and starches, as well as such as exposure to wood smoke and lack of self-care in terms of self-examination. These risks are related especially to this population's living and cultural conditions, which could be improved through education and, especially, through the empowerment of this community. However, other aspects, such as low-income levels, the use of chemicals (fertilizers for agricultural production), and the low level of education, will require joint work with government entities and indigenous authorities.

At the same time, the community has an important protective factor, which is physical activity. When added to the controlled alcohol consumption and the low tobacco consumption, these factors contribute to a better quality of life for the community. It is important that authorities and institutional organizations strengthen these protective determinants and avoid the deterioration of such healthy habits, while promoting healthy habits built from the indigenous community's own worldview.

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