Reumatología Clínica
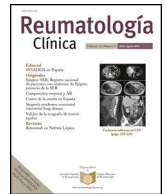
Original Article

Prevalence of Musculoskeletal Manifestations and Related Disabilities in a Peruvian Urban Population Living at High Altitude. COPCORD Study. Stage I[☆]

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ABSTRACT

Objective: Estimate the prevalence of musculoskeletal manifestations and related disabilities of an urban population living at high altitude in Juliaca, Puno, Peru, using the Community Oriented Program for Control of Rheumatic Diseases (COPCORD) questionnaire and Health Assessment Questionnaire (HAQ) Disability Index.

Methods: A cross-sectional study was performed in a sample of 1095 people. In each interview, the COPCORD methodology and the HAQ were applied. The city was divided into 8 sectors.

Results: In all, 614 (56.1%) women were evaluated; 44% were from the Quechua community and 5.1% were Aymara. Before the final 7 days of the study, 132 people (12.05; 95% CI 9.99–14.11) reported musculoskeletal pain. During the final 7 days of the study, 347 people (31.69; 95% CI 28.36–35.02) who were predominately women (218; 35.5%; 95% CI 30.8–40.2) reported musculoskeletal pain. The most frequent rheumatic diseases were rheumatoid arthritis (1.27%), gout (0.64%), hand osteoarthritis (OA) (2.83%), knee OA (1.55%), hip OA (0.37%), fibromyalgia (1.09%), and soft tissue rheumatism (8.86%). The HAQ showed an incremental increase proportional to age. The HAQ average for the population was 0.18 (±0.36). Ten people (5.71%) of 175 with rheumatic disease received the services of a shaman.

Conclusion: It is the first COPCORD study in an urban native population living at high altitude in Peru. The population affected by chronic rheumatic disease preferred professional rather than traditional care; this population had access to limited medical services. Impaired functional capacity measured by HAQ was associated with advanced age.

Prevalencia de manifestaciones musculoesqueléticas y discapacidad asociada en una población peruana urbana habitante a gran altura. Estudio COPCORD. Estadio I

RESUMEN

Objetivo: Estimar la prevalencia de manifestaciones musculoesqueléticas y discapacidad en la población urbana habitante a gran altura de Juliaca, Puno, Perú; utilizando el cuestionario COPCORD y HAQ-DI.

Métodos: Se realizó un estudio transversal en muestra de 1.095 personas. En cada entrevista se desarrolló la metodología COPCORD y el Health Assessment Questionnaire (HAQ) Disability Index (DI). El plano urbano fue dividido en ocho sectores.

Resultados: Fueron evaluadas 614 (56,1%) mujeres; 44% pertenecieron a la raza quechua y 5,1% a aymara. Reportaron dolor ME en los últimos 7 días 347 personas (31,69; IC 95% 28,36–35,02), con predominio en mujeres (218; 35,5%; IC 95% 30,8–40,2); y 132 personas, antes de los 7 días (12,05%; IC 95% 9,99–14,11). Las patologías reumáticas más frecuentes fueron AR: 1,27%, gota de 0,64%, OA de manos: 2,83%, OA de rodillas: 1,55%, OA de cadera 0,37%, fibromialgia: 1,09%, reumatismo de partes blandas: 8,86%.

La evolución del HAQ-DI tuvo un incremento progresivo proporcional a la edad. El promedio de HAQ-DI de la población fue 0,18 (±0,36). De ciento setenta y cinco personas con una condición reumática, 10 (5,71%) acudían al servicio de un chamán.

Conclusión: Es el primer estudio COPCORD en una población originaria urbana habitante a gran altura en el Perú. La población afectada de una enfermedad reumática crónica, prefería la atención profesional en lugar a la tradicional; población que a su vez contaba con escasa oferta de servicios médicos. El deterioro de la capacidad funcional medida por HAQ-DI se asoció con el incremento de la edad.Align the copyright correctly

Introduction

Rheumatic diseases are a heterogeneous group of conditions whose management demands a high social cost[1] because of the potential outcome of partial or permanent disability. Epidemiology enables us to recognize the frequencies, distribution and determining factors of diseases; this is key information for undertaking their control. A methodology that identifies the epidemiological reality of rheumatic diseases is the Community Oriented Program for Control of Rheumatic Diseases (COPCORD) created in 1981, with the collaboration of the World Health Organization and the International League of Associations for Rheumatology (ILAR). Its purpose is to recognize, prevent and control the burden of rheumatic diseases in developing countries. This methodology is divided into 3 stages: stage 1 is composed of 3 phases that evaluate the population in epidemiological terms; stage 2 involves the education of primary health care professionals in the optimal management of common rheumatic diseases; and stage 3 is dedicated to the search for improving care and quality of life, and investigation of the environmental and even the genetic etiology of rheumatic diseases.[2]

A collaborative investigation in Brazil, Chile and Mexico initiated the process of the cultural adaptation of the COPCORD questionnaire in Spanish and Portuguese.[3] The prevalence of pain and musculoskeletal (MS) symptoms showed notable regional variations, due to ethnic and environmental factors.[4]

The objective of the study was to estimate the prevalence of MS manifestations and associated disability in a population living at high altitude in southern Peru.

Material and Methods

The study was conducted in Juliaca, Provincia de San Román, Puno Region; located 3824 m above sea level and 46 km from Lake Titicaca, in southern Peru, from January to June 2010. The sampling design was taken from the Eleventh National Population Census of Peru (2007)[5] that established a population of 240,776 inhabitants (49.1% men). From this, we calculated a representative sample according to the methodology of Arkin and Colton, with an error of 3% and a 95% confidence interval (CI).

The inclusion criteria were: (1) informed individuals who agreed to the interview, preferential physical examination and eventual examinations as an aid to the diagnosis; (2) both sexes over 18 years of age; (3) people who had been born in the region and had lived there for more than a year. Exclusion criteria were: (1) non-residents; (2) those who did not complete the evaluations; (3) those confined to bed for an injury or other unknown cause.

The selection of those surveyed was probabilistic, stratified and by means of conglomerates. The urban streets of the city of Juliaca were divided into 12 sectors and 8 were chosen randomly.

As an evaluation tool, we employed the COPCORD questionnaire which was previously translated into Spanish, adapted and validated.[3] This questionnaire, in turn, underwent a cultural adaptation process using the method recommended by Wild et al.[6] We obtained the approval of the authors for the use of the instrument. In 2 discussion groups, 8 investigators defined the terms, accepted the literal usage or whether to rewrite the questions using a style to which the objective population would be familiarized. We administered a pilot test to 30 individuals in a neighborhood of the city of Juliaca; a third discussion group evaluated the problems concerned with the definition of the terminology.

Due to a low initial specificity (67%), we trained and standardized the survey takers with 2 pilot tests; in relation to the participants, we excluded those who were not bilingual: Spanish/Quechua or Spanish/Aymara, because of the confusion of the interpretation in relation to the temporality of pain. The final specificity was 76%, sensitivity was 92% and the internal validity measured by Cronbach's α was 0.8.

The questionnaire had 6 segments: (1) general data; (2) personal and family history of rheumatic diseases; (3) pain over the last 7 days, type of pain (traumatic and MS), visual analog scale for pain (VAS-pain), site of the pain; (4) pain prior to those 7 days; (5) behavior in terms of seeking medical care; (6) Health Assessment Questionnaire Disability Index (HAQ-DI), previously validated,[7] in accordance with the recommendations for its adaptation to epidemiological studies.[8] A positive responder was defined as a person who reported MS pain not provoked by traumatic injury during the preceding 7 days or prior to those 7 days; two rheumatologists applied the following phases the same day.

In cases of arthritis that had developed less than a year before, and to differentiate it from other diffuse connective tissue rheumatic diseases, tests to aid in the diagnosis were indicated: (1) posteroanterior radiograph of the hands and anteroposterior radiograph of the feet; (2) rheumatoid factor (nephelometry); (3) antinuclear antibodies using enzyme-linked immunosorbent assay (ELISA) and anti-Smith and anti-double-stranded (ds) DNA antibodies (ELISA). Osteoarthritis (OA) of the hand was classified in accordance with the clinical criteria of the American College of Rheumatology (ACR) of 1990[9]; the presence of Heberden's and Bouchard's nodes situated at 8 sites: distal and proximal interphalangeal joints of the second to fifth fingers of each hand; to classify knee OA, we used the clinical criteria of the American Rheumatism Association[9]; rheumatoid arthritis (RA) was classified in accordance with the 1987 criteria of the American Rheumatism Association.[9] To define soft tissue rheumatism, we used individual regional clinical criteria. Low back pain was defined when the interviewee reported pain in low back with no history of traumatic injury; our inquiries made it possible to clinically differentiate the mechanical characteristics: radiation to lower limbs, regional muscle involvement, changes due to alignment or degeneration, and individuals with inflammatory pain. Fibromyalgia was classified according to the 1990 ACR criteria.[9] To classify gout, we took into account convincing clinical data; in no case was the diagnosis confirmed with microscopic evidence.

Each individual was classified as native Quechua or Aymara if he or she met the following criteria: (1) local maternal language; (2) ancestors born in the region for up to 3 preceding generations;
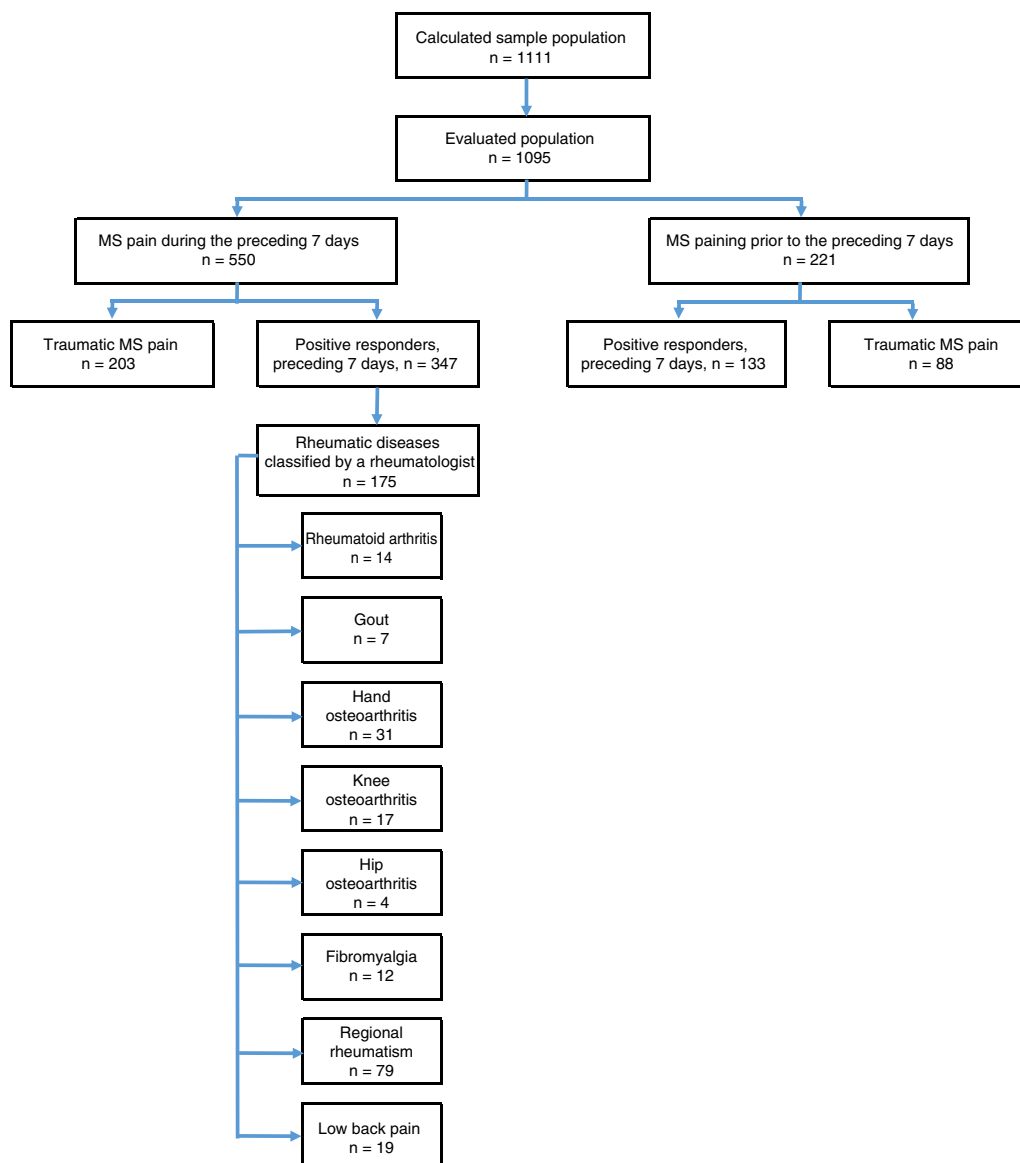
Fig. 1. Flow chart: phases of the study. MS, musculoskeletal.

and (3) self-designation as native[10]; people who did not meet those criteria were classified as mestizos. Finally, they were considered "other races" if they did not meet any criterion or spoke a foreign language. "High altitude" was arbitrarily defined for the population that lived at an altitude of more than 3000 m above sea level.

The statistical analysis was carried out with measurements of central tendency and of dispersion in the case of continuous variables; for the analysis of categorical variables, we employed the chi-squared test and Fisher's exact test. In every case, an α value lower than .05 was considered to indicate significance.

This study was evaluated and approved by the ethics and research committees of Hospital III, Juliaca Health Care Network and Human Development Central Agency, EsSalud, Lima, Peru. Each interviewee was given an informed consent form.

Results

We ultimately evaluated 1095 individuals, 614 (56.1%) women and 481 (43.9%) men ($P < .000$). In all, 16 persons were excluded

from the analysis because they failed to meet the requirements of the study (Fig. 1). The groups were formed by 50.6% mestizos, 44% Quechua and 5.1% Aymara (Table 1). In terms of harmful habits of the population: the rate of smoking was 0.18% (95% CI, −0.07 to 0.43) and that of alcoholism was 34.98% (95% CI, 31.74–38.48).

Pain over the preceding 7 days: 550 individuals were estimated to have had pain within the preceding 7 days (50.23%; 95% CI, 46.03–54.43), 347 of them (31.69%; 95% CI, 28.35–35.02) reported MS pain. Women complained of pain more frequently than men: 19.9%; 95% CI, 17.27–22.55 vs 11.8%; 95% CI, 9.75–13.8; $P = .01$. The anatomical region most frequently affected was that referred to as the low back, estimated in 6.76% (95% CI, 5.2–8.3), followed by the wrist and/or hand in 5.57% (95% CI, 4.17–6.97) (Table 2). Severe disability was detected in 7 individuals (0.64%; 95% CI, 0.16–1.11), 2 of them had RA. Persons devoted to housework or other domestic chores were those most affected: 85 women (7.8%) and 56 men (5.1%); whereas the group of blue-collar workers represented 5%. The mean VAS-pain score was 4.25 ± 2.3 cm.

Pain prior to the 7 day interval. A total of 211 individuals (19.27%; 95% CI, 16.67–21.87) reported pain prior to the 7 days;

Table 1
Main Demographic Characteristics, n = 1095.

Sex	Men	Women
n (%)	481 (43.9)	614 (56.1)
Mean age, years (SD)	40.3 (±16.3)	38.5 (±15)
Age bracket, n (%)		
18–29	158 (14.4)	205 (18.7)
30–49	182 (16.6)	267 (24.4)
50–69	117 (10.7)	116 (10.6)
70–98	24 (2.2)	26 (2.4)
Mean (range), years	40.3 (18–98)	38.51 (18–90)
Formal education, mean, in years (SD)	12.8 (±3.57)	11.82 (±4.3)
Frequency of school attendance, n (%)		
Illiterate	11 (1.0)	45 (4.1)
Primary	30 (2.7)	62 (5.7)
Secondary	151 (13.8)	208 (19.0)
University	283 (25.8)	290 (26.5)
Postgraduate	6 (0.5)	9 (0.8)
Marital status, n (%)		
Single	171 (15.6)	194 (17.7)
Married	196 (17.9)	220 (20.1)
Divorced	3 (0.3)	8 (0.7)
Widow or widower	8 (0.7)	31 (2.8)
Cohabitant	103 (9.4)	161 (14.7)
Race, n (%)		
Mestizo	258 (23.6)	296 (27%)
Quechua	196 (17.9)	286 (26.1)
Aymara	24 (2.2)	32 (2.9)
Caucasian	3 (0.3)	0
Occupation, n(%)		
Students	82 (7.5)	98 (8.9)
Employees	64 (5.8)	49 (4.5)
Blue-collar workers	103 (9.4)	13 (1.2)
Housewife	5 (0.5)	214 (19.5)
Storekeeper	74 (6.8)	114 (10.4)
Unemployed	39 (3.6)	24 (2.2)
Independent activity	114 (10.4)	102 (9.3)

SD, standard diviation.

132 of them (12.05%; 95% CI, 9.99–14.11) mentioned MS pain. The proportion of women vs men was 2:1. The regions most affected were hand and/or wrist (3.29%; 95% CI, 2.21–4.36) and low back (2.65%; 95% CI, 1.68–3.61) (Table 3). The mean VAS-pain score was 4.11 ± 1.91 cm.

Rheumatoid arthritis: 2 cases of RA were diagnosed in men and 12 in women, for a ratio of 1:6, with an estimation of prevalence of 1.27% (95% CI, 0.61–1.94). The mean VAS-pain score was 7.64 ± 4.8 cm. Only 7 of them (53.8%) had access to health services and only 1 patient received treatment that could achieve remission. The mean HAQ-DI score was 1.07 ± 0.9; 2 of them had total disability, depending on others to accomplish basic activities. Three of these patients were classified as early arthritis (less than a year), 0.27% (95% CI −0.03 to 0.58).

Gout: 7 individuals had clinical data associated with gout (0.64%; 95% CI, 0.17–1.11). One patient had tophaceous gout and was receiving treatment. One patient had developed severe disability. His mean HAQ-DI score was 0.437 ± 0.8 and his VAS-pain score was 4.33 ± 2.3 cm.

Osteoarthritis: in all, 52 individuals had osteoarthritis in hip, hands and knees (4.75%; 95% CI, 3.46–6.04).

Hand OA: thirty-one patients were found to have OA of the hands (2.83%; 95% CI, 1.83–3.83). The mean VAS-pain score over the preceding 7 days was 4.77 ± 3.08 cm and that of the HAQ-DI was 0.69 ± 0.66; 3 of them had inflammatory pain and in one patient it was overlapped by RA. The presence of nodulosis, that is, nodes that did not meet the 1990 ACR classification criteria, was reported in 50 men (4.53%; 95% CI, 3.3–5.8) and in 61 women (5.6%; 95% CI, 4.2–6.9); in both groups (OA of the hands and nodulosis alone),

we counted 442 Heberden's nodes and 344 Bouchard's nodes. The mean age was 59.7 ± 14.12 years, the mean duration of pain was 58.04 ± 76.5 months; there was no significant difference in the frequency in the 2 sexes; the sites with the highest prevalence were the fifth interphalangeal joints: 6.5% in women and 6.9% in men. The mean HAQ-DI score was 0.6 ± 0.66.

Knee OA: there were 17 patients (1.55%; 95% CI, 0.81–2.29) with symptomatic OA of one or both knees, with a VAS-pain score during the last week of 4.31 ± 1.9 cm and HAQ-DI of 0.76 ± 0.76.

Hip OA: there were 4 cases of symptomatic OA of one or both hips, with a VAS-pain score during the last week of 5.5 ± 1 cm and a HAQ-DI of 0.84 ± 0.9.

Fibromyalgia: was diagnosed in 12 patients (1.09%; 95% CI, 0.48–1.71), with a mean VAS-pain score of 6.22 ± 2.5 cm and a HAQ-DI of 0.55 ± 0.6. Only 1 individual received medical treatment. One of the women was being treated with chemotherapy for breast cancer.

Extra-articular rheumatism: in all, 79 individuals (6.3%; 95% CI, 4.8–7.8) were classified with some type of soft tissue rheumatism. They included 18 patients (26.09%; 95% CI, 14–38.1) who had tendinopathy in one or more regions and 17 individuals (24.6%; 95% CI, 12.9–36.3) who had myofascial pain syndrome in one or several regions. The overall mean age for this group was 37.7 ± 14.6 years; the mean VAS-pain score was 4.2 ± 2.1 and the mean HAQ-DI score was 0.16 ± 0.24.

Mechanical low back pain was detected in 19 individuals (1.7%; 95% CI, 0.9–2.5); the mean age was 39.32 ± 11.14 years, the mean VAS-pain score was 3.75 ± 1.9 cm and the HAQ-DI score was 0.2 ± 19.26. We found no case of low back pain with inflammatory characteristics.

Disability: in all, 409 individuals scored in the HAQ-DI (37.35%; 95% CI, 33.73–40.97). The mean HAQ-DI score in patients with pain during the preceding 7 days was 0.18 ± 0.36. Seven (0.63%; 95% CI, 0.17–1.11) were estimated to have total dependence for carrying out activities of daily living. Those effected with nodulosis due to the presence of Heberden's or Bouchard's nodes had higher HAQ-DI scores (P < .000). There was a positive correlation between the progressive increase in the HAQ-DI score and age (Fig. 2). The disability measured by HAQ-DI of the 175 individuals with some rheumatic disease was higher than in the rest of the population: 0.4 ± 0.56 vs 0.1 ± 0.3; P < .000.

Behavior in the search for care: of 175 patients with an identified chronic rheumatic disease, 47 (26.86%; 95% CI, 19.2–34.5) visited a physician regularly; 55 (31.4%; 95% CI, 23.1–39.7) were self-medicated; 63 (36%; 95% CI, 27.1–44.9) saw another non-physician health professional; and 10 (5.7%; 95% CI, 2.2–9.3) visited a shaman. Of the 128 individuals who did not seek medical attention, 67 (52.3%; 95% CI, 39.8–64.9) affirmed that "they knew how to treat" their rheumatic condition; 25 (19.5%; 95% CI, 11.9–27.2) mentioned that they did not trust drugs; 22 (17.2%; 95% CI, 10–24.4) stated that medical services and medications were costly; and, finally, 14 (10.1%; 95% CI, 5.2–16.7) explained that they did not visit medical services because there were no health care centers in the area where they lived.

Discussion

Like other developing countries in Latin America, Peru has an ample natural and cultural wealth and enormous contrasts, with limited health care services. This report is the second effort in our country in the attempt to quantify the presence of rheumatic disorders in a population living at a high altitude, with an ethnic predominance of Quechua and mestizos.[11]

Juliaca is a city with a high rate of migration, lack of urban organization and few professionals and infrastructures dedicated

Table 2
Site and Level of Pain During the Preceding 7 Days, by Sex. *N* = 1095 (%).

Site	Women			Men			Total		
	n	(%)*	95%, CI	*n*	(%)*	95%, CI	*n*	(%)*	95%, CI
Head	6	0.5	0.1–0.98	1	0.1	−0.09–0.27	7	0.64	1.17–1.11
Neck	5	0.5	0.06–0.86	5	0.5	0.06–0.86	10	0.91	0.35–1.48
Shoulder	20	1.8	1.02–2.63	19	1.7	0.96–2.52	39	3.56	2.44–4.68
Upper back	20	1.8	1.02–2.63	8	0.7	0.22–1.24	28	2.56	1.6–3.5
Elbows	20	1.8	1.02–2.63	7	0.6	1.17–1.11	27	2.47	1.54–3.4
Low back	45	4.1	2.9–5.31	29	2.6	1.68–3.61	74	6.76	5.22–8.29
Wrist and hand	42	3.8	2.68–4.9	19	1.7	0.96–2.52	61	5.57	4.17–6.97
Hip and thigh	10	0.9	0.35–1.48	7	0.6	0.17–1.11	17	1.55	0.81–2.29
Knees	30	2.7	1.76–3.72	28	2.6	1.6–3.5	58	5.30	3.93–6.66
Ankles and foot	20	1.8	1.02–2.63	6	0.5	0.1–0.98	26	2.37	1.46–3.29
Total	218	19.9	17.27–22.55	129	11.8	9.75–13.8	347	31.69	28.35–35.02

* Rate adjusted by 100. CI, confidence interval.

Table 3
Site and Level of Pain Prior to the Preceding 7 Days, by Sex. *N* = 1095 (%).

Site	Men			Women			Total		
	n	(%)*	95%, CI	*n*	(%)*	95%, CI	*n*	(%)*	95%, CI
Head	0l;	0.0	0.1–0.98	2	0.2	1.02–2.63	2	0.18	1.02–2.63
Neck	1	0.1	0.06–0.85	0	0.0	–	1	0.09	0.06–0.85
Shoulder	2	0.2	1.02–2.63	4	0.4	0.01–0.72	6	0.55	0.11–0.98
Upper back	2	0.2	1.02–2.63	7	0.6	0.16–1.11	9	0.82	0.28–1.36
Elbows	1	0.1	1.02–2.63	6	0.5	0.11–0.99	7	0.64	0.16–1.11
Low back	8	0.7	2.9–5.31	21	1.9	1.09–2.74	29	2.65	1.68–3.61
Wrist and hand	9	0.8	2.68–4.9	27	2.5	1.54–3.39	36	3.29	2.21–4.36
Hip and thigh	2	0.2	0.35–1.48	4	0.4	0.01–0.72	6	0.55	0.11–0.98
Knees	8	0.7	1.76–3.72	19	1.7	0.96–2.51	27	2.47	1.53–3.4
Ankles and foot	7	0.6	1.02–2.63	2	0.2	1.02–2.63	9	0.82	0.28–1.36
Total	40	3.7	17.18–22.45	92	8.4	6.68–10.12	132	12.05	9.99–14.11

* Rate adjusted by 100. CI, confidence interval.

to health care.[12] It is one of the regions with the highest rates of maternal and infant mortality, it is endemic to echinococcosis and has to contend with contamination by mercury and other derivatives from mine tailings that reach the rivers of the Lake Titicaca basin.[13]

We used the COPCORD questionnaire translated into Spanish by Bennet et al.,[3] as it is a key tool for the development of this methodology in Latin America. In contrast to the conformation including a proportion of women of 50.4% in accordance with the census distribution of 2007, the group of women represented 56.1%. The absence of men was principally reported due to occupational motives, low rate of formal work for women and broken families.

In relation to a previous report on Peru,[14] this study differs in 2 relevant aspects: it was performed in an urban area and the ethnic predominance of mestizo and Quechua. The low proportion of Aymara was mainly due to the fact that that population prefers living in the southern provinces of the region.

The presence of overall MS pain during the preceding 7 days was greater than that reported by Peláez et al.[15]: 50.2% vs 38.8%, respectively; 63% of our interviewees carried out ancestral farm work in rural areas once or twice a month; however, the report of traumatic injury in the group of persons who had had pain over the preceding 7 days was similar: 36.9% and 36.2%, respectively. In contrast, the frequency was notably lower than that estimated in the Qom population in Rosario, Argentina[16]: 63.1% vs 79.8%; in turn, the mean age in this population is relatively younger: 35.3% vs 39.4%.

Our estimation for RA (1.27%) was greater than the findings on the Peruvian coast (0.5%). These differences were also observed in other geographic regions of South America like Venezuela,[17] with 0.4%, and Argentina, with 2.4%. With respect to the Mexican Maya-Yucateco population,[15] the prevalence was approximate (1.1% vs 1.27%); however, there are different socioeconomic aspects, such as

the average years of formal education, which was greater than that of our interviewees (12.3 vs 4.5 years); in fact, the city of Juliaca has an extensive offer of predominantly private educational services; none of our interviewees mentioned depending on agriculture (0% vs 29.1%), and in terms of harmful habits such as smoking, the rate was lower in our population (0.18% vs 9.7%); the latter is a risk factor for RA.[18]

The estimate of OA comes closer to the results in Argentina[16]: 4.74% and 4%, respectively, than to the frequencies in Venezuela (14.1%[19] and 15%[17]) or in Iran (20%[20]); however, this last study considered any joint without focusing on the criteria or on the three anatomical regions evaluated in our article. With respect to the different prevalences reported in Mexico, our findings are nearer to those of areas with less socioeconomic development. The frequency of knee OA was lower than the average in countries of the Asia-Pacific League[21]: 1.55% vs 7.9%. Nodulosis with Bouchard's and Heberden's nodes was encountered in 14.2% of the population; as was observed in Thailand, nodes were found in women more often than in men.[22]

Fibromyalgia with an incidence of 1.2% was different from other native population such as the Tarahumara in Mexico with 0.3%[23] or in Monagas, Venezuela, with 0.2%,[19] but closer to the rate reported in Lebanon (1%).[24]

The average rate of disability in the group of persons who reported some type of disorder was lower than that found in Brazil: 0.38 and 1.09, respectively. However, the proportion of individuals who referred to some condition was greater in our population (17.17% and 7.9%,[25] respectively); the reason for the inconsistency of the two proportions could be due to the fact that a group evaluated by Jennings et al. included persons with a history of traumatic injury and our population specifically excluded those individuals.

Most of the population preferred to visit a professional physician or non-physician than undergo ancestral medical practices.
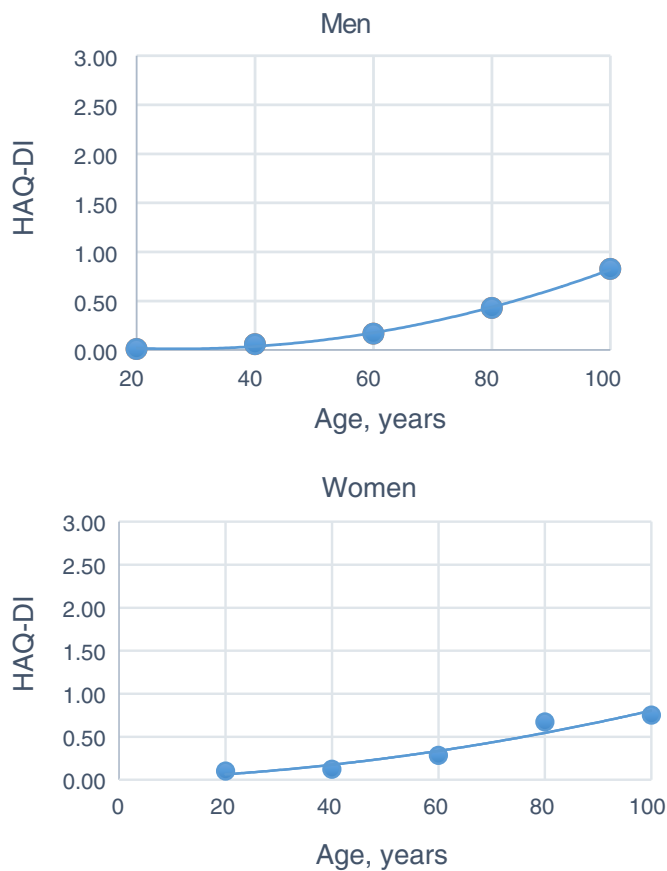
Men

Women

Fig. 2. Progression of the mean Health Assessment Questionnaire (HAQ) Disability Index (DI) in relation to age. The curves were adjusted on the basis of quadratic polynomial equations, on a scatter plot. 95% confidence interval.

The study did not identify any cases of systemic connective tissue disease or spondyloarthritis. At this time, the latter are considered emerging diseases[26] in this region.

Limitations of the study: the calculated sample of 1111 individuals ended up being 1095 participants, who complied with the requirements of the study; 1.4% were excluded for the following reasons: (1) the data obtained was insufficient; (2) missing information; and (3) the failure to complete the evaluations of phases 2 and 3. The questionnaire was not translated into the Quechume chka or Aymara languages.

Finally, we present the first COPCORD study focusing on the native population living at high altitude in Peru. The population preferred medical services, despite the limited offer. We found no diffuse diseases, like seronegative systemic lupus erythematosus or spondyloarthritis; some degree of disability was observed in a third of the population; its development was directly related and proportional to advanced aging.

Ethical Disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors declare that the data were obtained with the consent of the participants.

Conflicts of Interest

The authors declare they have no conflicts of interest.

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