

# Modes of Living and Lifestyles of Workers with Hypertension in the City of Popayán

## Modos y Estilos de Vida en Trabajadores con Hipertensión Arterial de la Ciudad de Popayán

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### Abstract

**Introduction:** Hypertension is a chronic disease of multifactorial origin characterized by blood pressure levels equal to or greater than 140/90 mmHg. Its increasing prevalence as a public health problem highlights the need to strengthen prevention and control strategies from a perspective that goes beyond the clinical approach, for which the Social Determination of Health is proposed. **Objective:** To comprehensively and contextually analyze the lifestyles that determine the presence of hypertension among participating workers. **Methodology:** A sequential explanatory mixed-methods study on hypertension conducted among formal and informal workers in Popayán. A total of 285 people were selected by convenience sampling. The study comprised three phases: a descriptive cross-sectional phase, a case series phase, and a theoretical and methodological triangulation phase. Quantitative data were analyzed using SPSS version 26, and qualitative data using Atlas.ti. **Results:** The prevalence of hypertension was 13.33%. The findings showed a higher prevalence among formal workers, individuals older than 45 years, and those with a high level of education. From the proposed approach, the following were identified as protective processes: job stability, enrollment in the social security system, and adherence to self-care practices; harmful processes included continuous exposure to occupational hazards, stress, insufficient physical activity, low socioeconomic conditions, among others. Qualitative analysis identified four categories that contributed to the understanding of hypertension in the occupational and social context: working conditions; time, stress, and everyday life; body, illness, and self-care; and gender, family, and economic responsibility. **Conclusions:** Hypertension was identified not only as a biological problem but also as an expression of a social process of bodily wear and tear, highlighting the need to reorient health promotion and disease prevention strategies toward actions that recognize care as an essential practice for workers' health and well-being.

**Keywords:** Prevalence; Workers; Hypertension; Social Determination of Health.

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## Resumen

**Introducción:** La hipertensión arterial, es una enfermedad crónica de origen multifactorial que produce presiones arteriales iguales o superiores a 140/90 mmHg. Su creciente prevalencia como problema de salud pública, evidencia la necesidad de fortalecer estrategias de prevención y control desde una mirada que trascienda el abordaje clínico para lo cual se propone la Determinación Social de la Salud. **Objetivo:** Analizar integralmente y en contexto los modos y estilos de vida que determinan la presencia de hipertensión arterial en trabajadores participantes. **Metodología:** Se realizó un estudio mixto explicativo secuencial sobre hipertensión arterial en trabajadores formales e informales de Popayán. Participaron 285 personas seleccionadas por conveniencia. El estudio incluyó tres fases: descriptiva transversal, serie de casos y triangulación teórica y metodológica. Los datos cuantitativos se analizaron con SPSS v.26 y los cualitativos con Atlas.ti. **Resultados:** La prevalencia de hipertensión arterial fue del 13,33%, los hallazgos muestran una mayor prevalencia en trabajadores formales, mayores de 45 años y con alto nivel educativo. Desde el enfoque propuesto se identificaron como procesos protectores: la estabilidad laboral, la afiliación a seguridad social y la adherencia a prácticas de autocuidado; como procesos nocivos: la exposición continua a riesgos laborales, estrés, actividad física insuficiente, condiciones socioeconómicas bajas, entre otros. El análisis cualitativo, permitió reconocer cuatro categorías que aportaron a la comprensión de la hipertensión arterial en el contexto laboral y social: condiciones laborales; tiempo, estrés y vida cotidiana; cuerpo, enfermedad y autocuidado; género, responsabilidad familiar y económica. **Conclusiones:** La hipertensión arterial se identificó no sólo como un problema biológico sino como una expresión de un proceso social de desgaste corporal, lo cual evidencia la necesidad de reorientar las estrategias de promoción de la salud y prevención de la enfermedad hacia acciones que reconozcan el cuidado como una práctica esencial para la salud y el buen vivir del trabajador.

**Palabras clave:** Prevalencia; Trabajadores; Hipertensión Arterial; Determinación Social de la Salud.

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## Introduction

Hypertension (HTN) is the leading preventable risk factor for cardiovascular disease (CVD)<sup>1,2</sup>. It is defined as a chronic condition characterized by a sustained increase in systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg<sup>1</sup>.

Globally, in 2024, hypertension affected approximately 1.4 billion people aged 30-79 years; however, only 320 million had controlled blood pressure. If current trends continue, this figure is projected to exceed 1.5 billion people by 2030 if effective prevention and control measures are not implemented<sup>3</sup>. This increase is associated with demographic shifts, including population growth and aging, with a particularly marked impact in low- and middle-income countries<sup>4,5</sup>.

In Latin America, hypertension represents a growing challenge due to its high prevalence (44%) and structural limitations within the healthcare system, reflected in barriers to access and inequalities in medical care<sup>6</sup>. This situation is not unfamiliar in Colombia, where prevalence is 9.5%<sup>7</sup>, although marked regional disparities exist. In socioeconomically disadvantaged departments such as Cauca, prevalence has increased to 15.5% according to the 2023 report of Colombia's *Cuenta de Alto Costo* (High-Cost Diseases Fund)<sup>8</sup>. In Popayán, hypertension ranks as the third leading cause of death, with a prevalence of 8.5%<sup>9</sup>.

The health impact will be particularly pronounced in countries characterized by poor quality diets, high sodium intake, low potassium intake, tobacco use, overweight and obesity, low levels of physical activity, and substantial air and noise pollution<sup>10,3</sup>. These conditions, together with population aging and gaps in access to health services, contributed to substantial social and economic costs, reflected in increased healthcare expenditure, productivity losses, and premature mortality<sup>6,11,12</sup>. This highlights the need to strengthen prevention and control strategies from a broader perspective that goes beyond the clinical approach.

Although these figures reflect the magnitude of the problem, understanding HTN solely from a biomedical perspective is insufficient to address its structural causes and the inequalities that determine it. In this context, there is a need to reconsider HTN from a critical and integrative perspective, such as the Social Determination of Health (SDH) approach, which conceptualizes health as a socially determined process and introduces new analytical categories, such as modes of living and lifestyles. This contrasts with the traditional biomedical

perspective, which prioritizes the individual and the clinical factors and often obscures the social conditions that shape health trajectories<sup>13,15</sup>.

From the proposed approach, the following dimensions will be analyzed: general, particular, and singular. These dimensions are interrelated and determine health when situated within the worker's territory, as they reflect modes of living shaped by social class conditions such as wages, education, and social security; as well as lifestyle, linked to personal and family dynamics<sup>13,15,16</sup>. In each of these dimensions, the presence of protective processes (those that promote health and a dignified life) and harmful processes (those that generate wear and tear, risks, and inequality) is recognized, which may interact dynamically in the social construction of health and/or disease<sup>13,16</sup>.

In line with the above, this study aims to analyze how the conditions related to modes of living and lifestyles of formal and informal workers with HTN contribute to understanding the development of HTN from an SDH perspective, with the purpose of providing evidence to inform health promotion and disease prevention actions in diverse work settings.

## Methodology

### Study design

A sequential explanatory mixed-methods study (quantitative-qualitative) was conducted to analyze HTA among workers in the city of Popayán, Colombia. The study was conducted in three complementary phases: **Phase 1**, a descriptive cross-sectional study; **Phase 2**, a case series study; and **Phase 3**, theoretical and methodological triangulation, in which quantitative and qualitative results were integrated by linking statistical findings with emerging accounts, contributing to the understanding of the HTN under study.

### Population and sample

The sample size was calculated using the formula for finite populations<sup>17</sup>, assuming a 95% confidence level, a margin of error of 0,6%, and an expected prevalence of 10%, according to the 2023 ASIS (Health Situation Analysis) report for Popayán<sup>9</sup>.

Based on these parameters, a sample of 285 workers was included, selected through non-probability convenience purposive sampling due to the absence of a complete sampling frame of formal and informal workers in Popayán. Therefore, the results cannot be generalized to the entire population and should be interpreted as an exploratory characterization of the phenomenon in this context.

### Eligibility criteria

Individuals aged 18 years and older who agreed to participate and signed the informed consent form were included. Individuals with cognitive, physical, or psychiatric disabilities or a previous diagnosis of HTA were excluded to avoid reverse causality or the adoption of prior behavior in response to this condition, which could modify blood pressure levels and, consequently, improve internal validity for primary prevention assessment questions.

### Procedures

#### Phase 1. A descriptive cross-sectional study

Data were collected using a sociodemographic survey to obtain information on age, sex, educational level, marital status, personal and family medical history, occupation, and income level. Subsequently, blood pressure and anthropometric measurements (weight, height, and waist circumference) were obtained to calculate Body Mass Index (BMI) and abdominal circumference. The data were entered into a database created using IBM SPSS version 26.

## Phase 2. Case series study

Of the 285 workers evaluated, 38 were diagnosed with HTN and constituted the study case series. This group was assessed using a questionnaire on modes of living and lifestyle (INSOC)<sup>18</sup>. This instrument provided information on the occupational, community, and personal conditions that shape participants' modes of living and lifestyles.

Within this case series, a subsample of 10 participants was selected to participate in semi-structured interviews, using theoretical saturation as the sampling criterion; that is, interviews were conducted until no new relevant information emerged. The interviews were audio-recorded and transcribed manually. Data analysis involved open, axial, and selective coding. A total of 58 initial codes were grouped into 10 emerging categories, which were subsequently consolidated into four axial categories through the identification of conceptual relationships. Participants (P) were identified using an alphanumeric code indicating sex (M: Man; W: Woman) followed by a consecutive number (e.g., M1, F2).

## Phase 3. Triangulation

To integrate the results of the quantitative and qualitative phases, theoretical and methodological triangulation was applied, grounded in the SDH approach. From a theoretical perspective, quantitative findings related to sociodemographic and clinical profiles, as well as modes of living and lifestyles, were contrasted with qualitative interpretations derived from the accounts of workers diagnosed with HTN.

## Statistical analysis

Quantitative data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics were applied to summarize the variables studied, and associations between categorical variables were examined using chi-square tests, with a significance level set at 0.05. For the qualitative analysis, transcripts were textually processed and analyzed using Atlas.ti software, following an inductive coding approach based on grounded theory<sup>19</sup>. Open, axial, and selective coding were performed, allowing the identification of conceptual relationships between participants' modes of living and lifestyles. Subsequently, a central category was identified that articulated the emerging dimensions, facilitating interpretation within the SDH approach.

## Results

A total of 285 workers were evaluated (58.59% men and 41.40% women), with an overall prevalence of HTN of 13.33% (38 cases). **Table 1** shows the sociodemographic characteristics of the overall sample by sex. Most participants were older than 50 years (34.03%), with no significant differences by sex ( $p=0.98$ ).

Overall, 56.84% of participants had a partner. Regarding educational level, 60% of workers had university or postgraduate studies, the majority of whom were women (82.20%), whereas basic education predominated among men (55.69%). A total of 93.68% self-identified as mestizo. Additionally, 78.95% of participants worked in the formal sector, while 21.05% worked in the informal sector.

**Table 1.** Sociodemographic characteristics of the overall sample by sex

| Variables | Total<br>n= 100 (285) | Men<br>n= 58.59 (167) | Women<br>n= 41.40 (118) | p-value* |
|-----------|-----------------------|-----------------------|-------------------------|----------|
| Age       |                       |                       |                         | 0.98     |
| < 30      | 18.25 (52)            | 17.96 (30)            | 18.64 (22)              |          |
| 31 – 40   | 23.86 (68)            | 24.55 (41)            | 22.88 (27)              |          |
| 41 – 50   | 23.86 (68)            | 23.35 (39)            | 24.57 (29)              |          |
| > 50      | 34.03 (97)            | 34.13 (57)            | 33.90 (40)              |          |

|                                  |             |             |             |       |
|----------------------------------|-------------|-------------|-------------|-------|
| Marital status                   |             |             |             | 0.08  |
| With a partner                   | 56.84 (162) | 61.08 (102) | 50.85 (60)  |       |
| Without a partner                | 43.16 (123) | 38.92 (65)  | 49.15 (58)  |       |
| Educational level                |             |             |             | 0.001 |
| Basic (Elementary/Middle School) | 40.00 (114) | 55.69 (93)  | 17.80 (21)  |       |
| Higher (University/Postgraduate) | 60.00 (171) | 44.31 (74)  | 82.20 (97)  |       |
| Ethnicity                        |             |             |             | 0.79  |
| Mestizo                          | 93.68 (267) | 94.01 (157) | 93.22 (110) |       |
| Other                            | 6.32 (18)   | 5.99 (10)   | 6.78 (8)    |       |
| Type of work                     |             |             |             | 0.35  |
| Formal                           | 78.95 (225) | 80.84 (135) | 76.27 (90)  |       |
| Informal                         | 21.05 (60)  | 19.16 (32)  | 23.73 (28)  |       |

\*  $p$ -value calculated using Pearson's chi-square test.

Among workers with HTN ( $n=38$ ) (**Table 2**), those older than 45 years predominated (68.42%). Overall, 68.42% had higher education (university and/or postgraduate studies), with a significantly higher proportion among women (93.75%), and a statistically significant difference between sexes ( $p=0.004$ ). A total of 89.47% had formal employment, with a higher proportion among women (93.75%), whereas informal employment was more frequent among men (13.64%); no statistically significant difference by sex was observed ( $p=0.47$ ).

Overall, 65.79% of workers were financially responsible for their household, and 52.63% reported monthly incomes between one and less than three times the current legal minimum wage in Colombia. No statistically significant differences were observed ( $p=0.11$ ).

**Table 2.** Sociodemographic characteristics of workers with HTN by sex

| Variables                          | Total<br>$n=100$ (38) | Men<br>$n=57.89$ (22) | Women<br>$n=42.11$ (16) | $p$ -value* |
|------------------------------------|-----------------------|-----------------------|-------------------------|-------------|
| Age                                |                       |                       |                         | 0.46        |
| < 45                               | 31.58 (12)            | 36.36 (8)             | 25.00 (4)               |             |
| $\geq 45$                          | 68.42 (26)            | 63.64 (14)            | 75.00 (12)              |             |
| Educational level                  |                       |                       |                         | 0.004       |
| Basic (Elementary/Middle School)   | 31.58 (12)            | 50.00 (11)            | 6.25 (1)                |             |
| Higher (University/Postgraduate)   | 68.42 (26)            | 50.00 (11)            | 93.75 (15)              |             |
| Type of work                       |                       |                       |                         | 0.47        |
| Formal                             | 89.47 (34)            | 86.36 (19)            | 93.75 (15)              |             |
| Informal                           | 10.53 (4)             | 13.64 (3)             | 6.25 (1)                |             |
| Household financial responsibility |                       |                       |                         | 0.29        |
| Yes                                | 65.79 (25)            | 72.73 (16)            | 56.25 (9)               |             |
| No                                 | 34.21 (13)            | 27.27 (6)             | 43.75 (7)               |             |
| Monthly income (SMLV)              |                       |                       |                         | 0.11        |
| < 1                                | 15.79 (6)             | 18.18 (4)             | 12.50 (2)               |             |
| Between 1 and < 3                  | 52.63 (20)            | 63.64 (14)            | 37.50 (6)               |             |
| > 3                                | 31.58 (12)            | 18.18 (4)             | 50.00 (8)               |             |

SMLV: Current Legal Monthly Minimum Wage (Colombia). \*  $p$ -value calculated using Pearson's chi-square test.

From the SDH perspective, the following were identified as protective processes (**Table 3**): job stability (55.26%), enrollment in social security system (92.11%), occupational risk coverage (89.47%), pension contributions (89.47%), union membership (57.89%), adherence to active breaks (55.26%), healthy eating at work (60.53%), availability of parks and/or recreational facilities (84.21%), and availability of healthy food in the neighborhood (81.58%).

**Table 3.** Variables analyzed in the modes of living of workers with HTN by sex

| Variables                                                | Type of process | Sex                  |                      |                        | p-value* |
|----------------------------------------------------------|-----------------|----------------------|----------------------|------------------------|----------|
|                                                          |                 | Total<br>n= 100 (38) | Men<br>n= 57.89 (22) | Women<br>n= 42.11 (16) |          |
| Working conditions                                       |                 |                      |                      |                        |          |
| Type of employment contract                              |                 |                      |                      |                        | 0.21     |
| Permanent contract                                       | Protective      | 55.26 (21)           | 40.91 (9)            | 75.00 (12)             |          |
| Fixed-term contract                                      |                 | 15.79 (6)            | 22.73 (5)            | 6.25 (1)               |          |
| Service provision contract                               |                 | 18.42 (7)            | 22.73 (5)            | 12.50 (2)              |          |
| Other                                                    |                 | 10.53 (4)            | 13.64 (3)            | 6.25 (1)               |          |
| Health insurance coverage                                |                 |                      |                      |                        | 0.75     |
| No                                                       | Protective      | 7.89 (3)             | 9.09 (2)             | 6.25 (1)               |          |
| Yes                                                      |                 | 92.11 (35)           | 90.91 (20)           | 93.75 (15)             |          |
| Occupational risk coverage                               |                 |                      |                      |                        | 0.46     |
| No                                                       | Protective      | 10.53 (4)            | 13.64 (3)            | 6.25 (1)               |          |
| Yes                                                      |                 | 89.47 (34)           | 86.36 (19)           | 93.75 (15)             |          |
| Pension contributions                                    |                 |                      |                      |                        | 0.46     |
| No                                                       | Protective      | 10.53 (4)            | 13.64 (3)            | 6.25 (1)               |          |
| Yes                                                      |                 | 89.47 (34)           | 86.36 (19)           | 93.75 (15)             |          |
| Union membership                                         |                 |                      |                      |                        | 0.01     |
| No                                                       | Protective      | 42.11 (16)           | 59.09 (13)           | 18.75 (3)              |          |
| Yes                                                      |                 | 57.89 (22)           | 40.91 (9)            | 81.25 (13)             |          |
| Frequency of work-related stress                         |                 |                      |                      |                        | 0.19     |
| Low                                                      | Harmful         | 34.21 (13)           | 45.45 (10)           | 18.75 (3)              |          |
| High                                                     |                 | 65.79 (25)           | 54.55 (12)           | 81.25 (13)             |          |
| Exposure to occupational hazards                         |                 |                      |                      |                        | 0.37     |
| No                                                       | Harmful         | 18.42 (7)            | 13.64 (3)            | 25.00 (4)              |          |
| Yes                                                      |                 | 81.58 (31)           | 86.36 (19)           | 75.00 (12)             |          |
| Physical activity at work                                |                 |                      |                      |                        | 0.09     |
| Light                                                    | Harmful         | 65.79 (25)           | 54.55 (12)           | 81.25 (13)             |          |
| Intense                                                  |                 | 34.21 (13)           | 45.45 (10)           | 18.75 (3)              |          |
| Work habits                                              |                 |                      |                      |                        |          |
| Taking active breaks during the workday                  |                 |                      |                      |                        | 0.15     |
| No                                                       | Protective      | 44.74 (17)           | 54.55 (12)           | 44.75 (7)              |          |
| Yes                                                      |                 | 55.26 (21)           | 45.45 (10)           | 55.25 (9)              |          |
| Healthy eating during the workday                        |                 |                      |                      |                        | 0.03     |
| No                                                       | Protective      | 39.47 (15)           | 54.55 (12)           | 39.75 (3)              |          |
| Yes                                                      |                 | 60.53 (23)           | 45.45 (10)           | 56.25 (9)              |          |
| Community conditions                                     |                 |                      |                      |                        |          |
| Availability of parks and/or recreational facilities     |                 |                      |                      |                        | 0.67     |
| No                                                       | Protective      | 15.79 (6)            | 13.64 (3)            | 18.75 (3)              |          |
| Yes                                                      |                 | 84.21 (32)           | 86.36 (19)           | 81.25 (13)             |          |
| Availability of healthy food outlets in the neighborhood |                 |                      |                      |                        | 0.01     |
| No                                                       | Protective      | 18.42 (7)            | 27.27 (6)            | 6.25 (1)               |          |
| Yes                                                      |                 | 81.58 (31)           | 72.73 (16)           | 93.75 (15)             |          |
| Socioeconomic stratum                                    |                 |                      |                      |                        | 0.74     |
| Low (1 and 2)                                            | Harmful         | 44.74 (17)           | 50.00 (11)           | 37.50 (6)              |          |
| Medium (3 and 4)                                         |                 | 50.00 (19)           | 45.45 (10)           | 56.25 (9)              |          |
| High (5 and 6)                                           |                 | 5.26 (2)             | 4.55 (1)             | 6.25 (1)               |          |

\* p-value calculated using Pearson's chi-square test.

The harmful processes identified included high exposure to work-related stress (65.79%), exposure to occupational hazards (81.58%), light physical activity at work (65.79%), and low socioeconomic conditions (44.74%).

Regarding lifestyles (**Table 4**), high exposure to stressful situations at home (55.26%) and low adherence to regular physical activity (63.16%) were identified as harmful processes. The following were identified as protective processes: adherence to a healthy diet at home (52.63%), low alcohol consumption (13.16%), low cigarette smoking (21.05%), attendance at regular medical check-ups (73.68%), and self-perceived good health (55.26%).

**Table 4.** Lifestyles of workers with HTN by sex

| Variables                                 | Type of process | Sex                  |                      |                        | p-value* |
|-------------------------------------------|-----------------|----------------------|----------------------|------------------------|----------|
|                                           |                 | Total<br>n= 100 (38) | Men<br>n= 57.89 (22) | Women<br>n= 42.11 (16) |          |
| Frequency of stressful situations at home |                 |                      |                      |                        | 0.28     |
| Low                                       | Harmful         | 44.74 (17)           | 54.55 (12)           | 31.25 (5)              |          |
| High                                      |                 | 55.26 (21)           | 45.45 (10)           | 68.75 (11)             |          |
| Engages in regular physical activity      |                 |                      |                      |                        | 0.94     |
| No                                        | Harmful         | 63.16 (24)           | 63.64 (14)           | 62.50 (10)             |          |
| Yes                                       |                 | 36.84 (14)           | 36.36 (8)            | 37.50 (6)              |          |
| Type of diet at home                      |                 |                      |                      |                        | 0.09     |
| Healthy                                   | Protective      | 52.63 (20)           | 40.91 (9)            | 68.75 (11)             |          |
| Unhealthy                                 |                 | 47.37 (18)           | 59.09 (13)           | 31.25 (5)              |          |
| Alcohol consumption                       |                 |                      |                      |                        | 0.28     |
| Drinker                                   | Protective      | 13.16 (5)            | 18.18 (4)            | 6.25 (1)               |          |
| Non-drinker                               |                 | 86.84 (33)           | 81.82 (18)           | 93.75 (15)             |          |
| Cigarette smoking                         |                 |                      |                      |                        | 0.05     |
| Smoker                                    | Protective      | 21.05 (8)            | 31.82 (7)            | 6.25 (1)               |          |
| Non-smoker                                |                 | 78.95 (30)           | 68.18 (15)           | 93.75 (15)             |          |
| Current health status                     |                 |                      |                      |                        | 0.15     |
| Good                                      | Protective      | 55.26 (21)           | 45.45 (10)           | 68.75 (11)             |          |
| Fair                                      |                 | 44.74 (17)           | 54.55 (12)           | 31.25 (5)              |          |
| Frequency of medical check-ups            |                 |                      |                      |                        | 0.18     |
| Periodically                              | Protective      | 73.68 (28)           | 81.82 (18)           | 62.50 (10)             |          |
| Only when necessary                       |                 | 26.32 (10)           | 18.18 (4)            | 37.50 (6)              |          |

\* p-value calculated using Pearson's chi-square test

Based on the qualitative analysis, four analytical categories were identified, which enabled an understanding of the experiences of HTA from the workers' voices: working conditions; time, stress, and daily life; body, illness, and self-care; and gender, family, and economic responsibility. These categories were the result of the expressions of the SDH, based on the analysis of the socio-territorial context and the modes of living and lifestyles of the participating workers.

## I. Working conditions

Workers reported that the physical demands, long working hours, and stress associated with formal and informal work lead to physical exhaustion, which affects their blood pressure.

Work was described as a source of economic stability, but also as an activity that naturally generates generalized wear and tear on the body and mind.



*“Sometimes I go the whole day without stopping. My body gets tense, and you can feel your pressure going up from all the constant rushing around”. “Here, you live to work. Your body hurts, and you just keep going anyway; there’s no other option.”*  
(PM1)

## **2. Time, stress, and daily life**

Workers’ accounts consistently indicate that time is a scarce resource for rest and self-care. Long working hours, combined with family responsibilities, generate daily stress, which over time has been normalized as part of working and urban life. This is reflected in the following testimony:

*“I don’t even have time to go to the doctor. You get up, go to work, and come home to sleep; that’s how the week goes by, and your body just gets used to being tired.”* (PW4).

## **3. Body, illness, and self-care**

The body is conceived as a work tool rather than a space for care. Illness is recognized only when it affects worker productivity or disrupts the work routine.

*“Your body gives you warning signs, but you really don’t pay attention until you start feeling seriously unwell. Thanks to you (the researchers), I realized I had high blood pressure.”* (PM5).

## **4. Gender, family, and economic responsibility**

Workers’ accounts reveal gender inequalities in the experience of HTA, with men assuming the economic burden as a historical pressure and source of ongoing stress. Meanwhile, women report facing a double workload, both at work and at home, which increases physical and emotional fatigue.

*“I work all day, and then I come home to take care of my children, cook, clean. When do I take care of my health? There’s just no time for that.”* (PW1).

The triangulation process enabled the integration of results from the three phases of the study by articulating statistical findings with the accounts of workers diagnosed with HTN within the SDH perspective. The triangulated results were organized into three analytical dimensions: structural, particular, and singular, which facilitated understanding of the social conditions and modes of living and lifestyles that determine HTN.

### **Structural dimension**

The presence of HTN observed predominantly among formal workers, individuals older than 45 years, and with a high level of education, cannot be reduced to an exclusively biological event. It should be reconsidered as an expression of bodily wear and tear originating in the impositions of the capitalist model of work organization, which prioritizes productivity over worker well-being. Likewise, the results show that HTN is not homogeneously distributed but is concentrated in lower and middle socioeconomic strata, where conditions of greater vulnerability converge. From a public health perspective, this condition should not be interpreted as the consequence of “poor individual habits” but as the historical outcome of a process of structural inequality that shapes how workers live and experience illness.

### **Particular dimension**

Some characteristics of the work environment, such as constant demands, limited control over working time, and long working hours, among other information described in the quantitative results, were further explained and expanded upon in the qualitative accounts. This contributed to identifying work as a contradictory setting that, on one hand, provides economic stability (protective process) and, on the other hand, generates physical and emotional exhaustion (harmful process) for workers.



The modes of living of these workers are organized around the time required by both their employment and family responsibilities, which hinders the allocation of time for productive activities and self-care. Additionally, gender relations assign men the role of providers and women the greater burden of domestic and caregiving work, thereby limiting the opportunities for health care.

### **Singular dimension**

The alterations identified in these workers, such as high blood pressure, overweight, and sedentary lifestyles, when contrasted with their accounts, explain the workers' embodied experiences. The body emerges as a space where the stress of work life, family life, and social inequalities accumulate, a territory that embodies the wear and tear of life itself. Consequently, HTN is not only a biological condition but also an expression of the deterioration of the worker's body.

### **Discussion**

Of a total of 285 participants included in the study, 38 were identified as having HTN, corresponding to a moderate prevalence of 13.33%; that is, approximately one in eight individuals had this condition. Although noteworthy, this prevalence is lower than that reported in studies conducted in other international settings: Russia (40%)<sup>20</sup> and Indonesia (27%)<sup>21</sup> among industrial workers; Spain (34.7%) among bus and taxi drivers<sup>22</sup>; Canada (18.7%) in office workers<sup>23</sup>; and Benin (27.1%) in textile workers<sup>24</sup>.

In contrast, the results were similar to those reported in Latin America: Peru (19.6%)<sup>25</sup> among miners, Brazil (12.6%)<sup>26</sup>, and Ecuador (19.2%)<sup>27</sup> among administrative professionals. It should be noted that, as Camafort et al.<sup>6</sup> point out, studies conducted in the Latin American region often rely on smaller population samples due to limitations in infrastructure and resources, as well as heterogeneity in levels of development and stages of epidemiological transition. At the national level, the prevalence observed in this study was higher than that reported in Puerto Gaitán, Meta (7.58%)<sup>28</sup>, Bogotá (4.8%)<sup>29</sup>, and Cali (9.27%)<sup>30</sup>. It was also similar to that documented among workers at the Cauca Liquor Industry (17%)<sup>31</sup> and among university faculty members (10.2%)<sup>32</sup> within the local context of the city.

This study enabled a comprehensive analysis of the health-disease process related to HTN in a diverse working population in the city of Popayán, articulating the findings within the Social Determination of Health (SDH) model. This model proposes that health cannot be understood as the result of individual factors alone, but rather as an expression of a structural, historical, and political framework that shapes modes of living and lifestyles of participating workers<sup>33,34</sup>.

From a structural perspective, the findings reflect that the social organization of work imposed by the neoliberal model acts as a key determinant in the development of HTN. Although 89.47% of workers diagnosed with HTN were formally employed, a substantial proportion had unstable working conditions (fixed-term or service provision contracts), long working hours, and high exposure to psychosocial risks, such as stress and economic insecurity with monthly incomes below three times the legal minimum wage (SMLV). This context creates an overall unhealthy environment for workers, resulting from structural characteristics in which they are embedded. As noted by Raju<sup>35</sup>, hiring is contingent upon the changing demands of capital, creating job insecurity that is reflected in the limited value attributed to workers by the state (low wages, precarious working conditions, inadequate infrastructure, among others). Consequently, and in line with authors such as Kalleberg et al.<sup>36</sup>, Landsbergis et al.<sup>37</sup>, and García et al.<sup>38</sup>, these critical processes influence the incidence of disease in working populations.

These findings are consistent with those proposed by Breilh<sup>16</sup>, who warns that within the framework of capitalism, workers are reduced to commodities subordinated to the logic of capital accumulation, a situation that leads to progressive physical and emotional deterioration manifested in chronic diseases such as HTN. Complementarily, Mikucka et al.<sup>39</sup> indicate that the harmful effects of job insecurity persist even after employment stability is regained, evidencing a silent and ongoing deterioration of physical and psychological well-being. This structural wear is exacerbated in precarious urban contexts, as observed in the population analyzed, where illness becomes

normalized as part of working life. In the same vein, Casallas<sup>40</sup> emphasizes that the internalization of a logic of sacrifice characteristic of the neoliberal system imposes forms of work on the working class that silently and progressively undermine health.

Modes of living, in turn, revealed a series of internal inequalities that are differentially expressed according to social class positions, type of employment, educational level, and gender. Women demonstrated greater adherence to protective practices, such as active breaks and healthy eating; however, they face an increased burden due to their dual role in paid work and domestic responsibilities. This pattern is supported by recent studies, such as those by Azizi et al.<sup>41</sup> and Heillman et al.<sup>42</sup>, which indicate how sociocultural factors, including gender roles and unpaid domestic work, intersect with cardiovascular risk in women, especially in postmenopausal stages. Similarly, Khattak et al.<sup>43</sup> report that physical inactivity, reproductive history, and psychosocial stress are risk factors with higher prevalence among women in vulnerable contexts. This situation creates a differential psychosocial vulnerability that increases the risk of developing cardiovascular disease, as documented by García et al.<sup>38</sup> in urban work settings.

In addition, dietary habits and physical activity are influenced by economic conditions. Although most workers reported the availability of healthy foods in their neighborhoods, this does not necessarily translate into healthy eating habits due to limited purchasing power and time constraints. As Pérez and Achcar<sup>44</sup> point out, access to healthy practices depends not only on availability but also on a set of structural conditions that define the material possibilities for consumption and care. Likewise, the urban environment of the city discourages active mobility, fostering sedentary behavior as an imposed way of life. This is consistent with Córdova<sup>15</sup> perspective that urban modes of living shape everyday practices that favor the development of noncommunicable diseases.

Regarding the singular dimension, HTN is expressed as a chronic disease recognized by workers; however, their capacity to act upon it is limited due to multiple structural barriers. Additionally, the perception of helplessness or resignation in the face of the disease represents, as Mata<sup>45</sup> argues, part of the subjective colonization of the biomedical model, which shifts responsibility for health onto the individual, while disregarding the social conditions that limit self-care. Thus, the management of HTN is reduced to medication use, without addressing the structural causes underlying the problem.

As Chaturvedi et al.<sup>46</sup> assert, the fragmentation of disease within the biomedical model tends to render structural inequalities invisible, narrowing the focus to pharmacological interventions that, although necessary, are insufficient if not integrated with policies addressing the social causes of disease. These findings are consistent with the study by Dickson et al.<sup>47</sup>, who argue that workers with chronic illness experience constant tension between work demands and the need for self-care, leading to poor control of their condition and a progressive loss of agency over their health. Additionally, Kleman et al.<sup>48</sup> point out that managing a chronic condition entails an invisible burden placed on the individual, in the absence of the necessary structural support. This burden ultimately deteriorates personal agency, making deterioration a normalized experience and an inevitable part of productive life.

The results of this study demonstrate how HTN among formal and informal workers emerges as a manifestation of multiple structural tensions, in which health deterioration is not only a biological process, but also the expression of social wear, whereby class, gender, and labor inequalities are embodied in the worker's body. The unequal burden of self-care, the normalization of physical discomfort as part of work performance, and structural barriers to exercising agency over one's own health configure a scenario in which illness becomes integrated into productive life as part of the worker's everyday routines.

These findings are an invitation to continue exploring how social and working conditions shape scenarios conducive to the development of the disease. They also highlight the need to adopt a more critical and comprehensive approach to reconsider health promotion and HTN prevention strategies. Such strategies should move beyond interventions focused solely on the individual or changing habits and should also aim to improve working conditions and address the structural processes that determine the real possibilities for caring for workers' health.

## Implications

The results suggest that HTN among the working population of Popayán cannot be understood solely as a biological problem, but rather as the expression of structural and social tensions that shape patterns of illness. The unequal burden of self-care, job insecurity, and the normalization of physical discomfort call for a more comprehensive approach to health promotion and disease prevention programs, focusing not on the individual who becomes ill but on the structural determinants (social, economic, cultural, environmental) that contribute to illness. Therefore, this study represents a starting point for interdisciplinary research on HTN from the SDH perspective. Although the sample size did not allow for population-level generalizations, it was relevant and sufficient for the purposes of a sequential explanatory mixed-methods design, as it enabled the identification of quantitative trends and an understanding of health-disease processes from the workers' voices. The study provides a baseline regarding structural, occupational, and lifestyle factors associated with HTN, which may inform the design of health promotion and HTN prevention strategies in occupational settings, as well as guide future research using representative sample sizes.

## Conclusions

The results of this study indicate that HTN among the working population of Popayán is related to social and working conditions, beyond individual factors or lifestyles. Although formal employment conditions and social security coverage were identified, the qualitative findings revealed processes of precariousness expressed through constant exposure to work-related stress, long working hours, and excessive responsibilities. These conditions create a contradictory scenario between contractual stability and physical wear, which favors the development and persistence of the disease.

These findings reaffirm the need for health promotion and HTN prevention strategies in workplace settings to move beyond the traditional biomedical approach. There is a need to advance toward intersectoral interventions that integrate work, health, and social development, aimed at improving working conditions and reducing structural processes that negatively affect workers' health. Similarly, companies should implement comprehensive occupational health programs based on equitable and sustainable policies that promote workers' health.

Finally, the results of this study provide baseline evidence for decision-makers to recognize that workers' well-being is a key indicator of regional social development and that HTN prevention is essential, as it constitutes an intermediate determinant that accelerates the transition toward various chronic noncommunicable diseases.

## Author contributions

AM and RE designed and conducted the study, prepared the report, and drafted and revised the manuscript. AL provided guidance on the statistical and methodological analyses. AM, RE, and AL reviewed, edited, and approved the final version of the manuscript.

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## Ethical considerations

The study was conducted in accordance with Resolution 8430 of 1993 and current Colombian regulations on personal data protection (Law 1581 of 2012 and Decree 1377 of 2013). It was classified as minimal risk research.

All participants provided written informed consent, and confidentiality and voluntary participation were ensured. The project was approved by the Ethics Committee under approval code ID 6463 of 2024.

## Conflict of interest

The authors declare that they have no conflicts of interest.

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No artificial intelligence (AI)-assisted technologies were used in the preparation of this study.

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