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# PERCEPTION OF KNOWLEDGE, ATTITUDES AND PREVENTIVE PRACTICES ABOUT WARNING SIGNS AND SYMPTOMS FOR CORONARY ARTERY DISEASE AND OTHER CARDIOVASCULAR RISK FACTORS IN PEOPLE WITH HIV

**Marise Ramos de Souza[1], Marlene Andrade Martins*[1]; Cristiane Jose Borges[1]; Larissa Alves Peixoto[2]; Helena Cardoso Bernardes[2], Felipe de Andrade Bandeira[2], Darine Sabbadin[3], Thaís Mendes de Oliveira[4], Araceli Rezende Farias Chaves[5], Gabriela Shihadeh Iwata de Freitas[5] and Letícia Palota Eid[1]**

[1]Nursing Course, Federal University of Jataí, Goiás, GO, Brazil; [2]Medicine Course, Federal University of Jataí, Goiás, GO, Brazil; [3]Hospital Unimed of Jataí, Jataí State Hospital Dr. Serafim de Carvalho, Goiás, GO, Brazil; [4]Nursing Student, Federal University of Jataí, Goiás, GO, Brazil; [5]Nurse, Jataí Municipal Health Secretariat, Goiás, GO, Brazil

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****Corresponding author:***
***Marlene Andrade Martins,***

## ABSTRACT

***Objective:*** to evaluate the perception of people with HIV about knowledge, attitudes and preventive practices about warning signs for Coronary Artery Disease (CAD) and cardiovascular risk factors. ***Methods:*** cross-sectional study conducted in a Specialized Care Service (SAE) for people with HIV in a hospital in the city of Jataí-GO, Mid-West, Brazil. A questionnaire with open and closed questions was used. Bivariate analysis stratified by sex was performed to check the factors associated with warning signs of Coronary Artery Disease (CAD) and cardiovascular risk factors. Poisson regression analysis was carried out for the outcome of knowledge of warning signs, and the result of the analysis was presented as Prevalence Ratio and confidence interval (CI) of 95%. ***Results:*** it was attended by 112 people with HIV. The mean age was ±41.28 years. It was found that 50.9% of people with HIV were males, aged between 40-59 years. Regarding sex, only marital status was in proportion. Most denied smoking (77.7%) and drinking (63.4%). Of the total participants, there was a prevalence of 83% (95% CI: 75.9-91.1%) with low knowledge of cardiovascular risk factors. On the other hand, 94.6% (95% CI: 89.3-98.4%) of the total number of participants had low knowledge of the seven warning signs for CAD. ***Conclusion:*** the results of this study reveal that people cared for by SAE have low knowledge of both cardiovascular risk factors and warning signs for CAD; and, therefore, continuing education strategies that address knowledge, attitudes and practices about cardiovascular risk factors are recommended.



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# INTRODUCTION

The last decade presented advances in the quality of life of people with HIV/AIDS. We highlight some measures to cope with HIV/AIDS such as better awareness of people, expansion of pre- and post-exposure prophylaxis care, as well as those related to treatment (De Cock, 2021). Nevertheless, according to the Joint United Nations Program on HIV/AIDS (UNAIDS), 39 million people worldwide were living with the disease in 2022, with 630,000 dying from AIDS-related illnesses (Unaids, 2022). Global prevalence peaked in 2005, declined for 5 years and then resumed an increasing trend since 2010, possibly due to increased survival from antiretroviral therapy (ART). The incidence rate of the disease has a bimodal distribution, affecting children through perinatal transmission and young adults through sexual transmission and needle sharing (Govender, 2021). Brazil has registered a mean of 36.8 thousand new AIDS cases annually over the last five years. The Southeast and South regions have the highest concentration of cases, proportionally, with 50.6% and 19.8% of total cases; the Northeast, North and Mid-West regions account for 16.5%, 6.9% and 6.2% of total cases, respectively. The age group with the highest prevalence was observed in individuals aged between 25 and 39 years: 52.0% of males and 47.8% of females. The detection rate has been falling in Brazil since 2012. In 2020, the largest annual reduction in the rate was observed, which reached 14.1 cases per 100,000 inhabitants, which is partly related to the effects of underreporting of cases caused by the overload of health services during the COVID-19 pandemic (Brasil, 2021). With the increase in life expectancy of HIV/AIDS patients, an epidemiological transition marked by the increase in chronic non-communicable diseases (NCDs) was observed in this population (Shah, 2018). Accordingly, Cardiovascular Diseases (CVDs) are the NCDs of greatest concern because they represent the leading cause of death in Brazil and worldwide (Barbaresko et al., 2018 and Oliveira, 2021). NCDs account for about 70% of global deaths, of which 45% are caused by CVD. Brazil has a similar distribution, where NCDs are responsible for 70% of deaths, of which 30% are due to CVDs (Oliveira, 2022). According to the GBD Study, in 2019, the prevalence of CVD in the Brazilian population was 6.1% and the incidence rate was 475 per 100,000 inhabitants, not differing significantly between the FUs of the country (Oliveira, 2022). Shah et al. (2018) presented in a meta-analysis study that, among patients with HIV/AIDS, the crude CVD rate was 61.8 per 10,000 person-years. In addition, the cardiovascular mortality rate in this population was 14.1 per 10,000 person-years (5). In Brazil, Domingues and Waldman (2014) showed in a study that CVDs were responsible for 10.11% of deaths of people with HIV/AIDS in the city of São Paulo (Hyle, 2017). In this context, studies highlight a synergistic intersection between HIV/AIDS and CVDs (Hyle, 2017). Consequently, this relationship seems to be associated with diverse mechanisms such as direct vascular inflammation, dyslipidemia and insulin resistance (Shah, 2018). With the advancement of access to antiretroviral therapies (ARTs), an improvement in the quality of life of people living with HIV (PLWHA) could be noted. However, despite this improvement, this group is more prone to a number of comorbidities, including cardiovascular diseases (CVDs). Comparing the general population with this population segment, PLWHA have an approximately 1.5 to 2 times higher risk of developing CVDs, which tends to manifest themselves in earlier stages of life (Achhra, 2021). In this sense, knowledge of cardiovascular risk factors is extremely necessary in order to provide better adherence to drug and non-drug treatment for PLWHA. Some predictive models for the general population are already used to predict the risk for CVD in PLWHA, including: "Framingham Heart Study" (FHS); "Pooled Cohort Equations" (PCE) and "Systematic Coronary Risk Evaluation" (SCORE). Among the risk factors, items such as: age; sex; increased blood pressure; increased levels of total cholesterol; smoking; obesity; diabetes mellitus; sedentarism; increased levels of triglycerides; decreased levels of HDL-cholesterol and psychosocial factors (Achhra, 2021).

In view of this scenario, it should be underlined that some specific predictive models for PLWHA already exist, such is the case of the main one: the "Data Collection on Adverse Events of Anti-HIV Drugs" (D:A:D). Produced in 2010 and updated in 2016, the model in question developed a method that predicts the 5-year CVD risk for PLWHA based on a cohort of this predominantly European population segment, prospective collection of factors from traditional CVD risk factors and CVD outcomes (9).In this line of reasoning, a study developed by Touloumi et al. (2020) correlates cardiovascular risk factors in PLWHA in Greece (10) and by Bae et al. (2022) in Korea. In turn, works developed by Sanuade et al. (2021), Achila et al. (2022), Ahmed et al. (2022) and Douglas et al. (2021), sought to point out cardiovascular risk factors in PLWHA in different countries of the African continent. An interesting point in this perspective is the scarcity of Brazilian studies that address the theme. In this perspective, the present study sought to evaluate the perception of people with HIV about knowledge, attitudes and preventive practices about the warning signs for Coronary Artery Disease (CAD) and cardiovascular risk factors.

# MATERIALS AND METHODS

***Study setting and design:*** Cross-sectional study carried out between December 2019 and December 2020 in a medium-sized hospital in the city of Jataí, Mid-West, Brazil. The setting in which the study was developed is a Specialized Care Service (SAE, as per its Portuguese acronym) in HIV/AIDS composed of a multidisciplinary and interdisciplinary team for the care, testing and monitoring of people with HIV, located in a hospital in the city of Jataí, Goiás State, Mid-West Region, Brazil. The SAE unit is part of the Regional Sudoeste II, which serves a population of about ten surrounding municipalities (Doverlândia, Caiapônia, Santa Rita do Araguaia, Portelândia, Mineiro, Perolândia, Serranópolis, Jatai, Aporé and Chapadão do Céu).

***Participants and sample:*** The study population consisted of people undergoing outpatient care in SAE. Participants were selected by simple random sampling. Eligibility criteria included people of both sexes, over 18 years of age, diagnosed with acute or chronic HIV-1 infection, asymptomatic or symptomatic, using ART for at least 6 months, regardless of CD4+ T cell count and plasma viral load. Patients in default of the treatment regimen (so classified by the service), pregnant and lactating women, those with a medical diagnosis of hypertension, diabetes mellitus and dyslipidemia prior to ART initiation and those with any acute illness requiring medical/surgical treatment or hospitalization were excluded.

***Data collection instrument:*** A questionnaire containing mixed questions about knowledge about warning signs and symptoms of CAD and cardiovascular risk factors was used. The perception of participants about attitudes and preventive practices of cardiovascular risk factors (CVRFs) and warning signs for CAD were also evaluated using an open-ended question.

1 -Sociodemographic data: sex, age, skin color, marital status, occupation and education.

2 - Knowledge about clinical cardiovascular risk factors and warning signs and symptoms of CAD. A questionnaire validated by other studies was used to evaluate knowledge about general cardiovascular risk factors, including a checklist with ten items of clinical variables related to cardiovascular risk factors and seven items of clinical warning signs and symptoms of CAD (Temu , 2015; Vaidya , 2013 and Vaidya; 2013). For this analysis of the data related to other cardiovascular risk factors of ten items, for each answer, the result was dichotomized into 0 for the wrong answer and 1 for the correct answer, and therefore the score ranged from 0 to 10 points (Temu et al., 2015). Answers were classified as correct or incorrect following the recommendations of the America Heart Association (Mozaffarian et al., 2016). Finally, knowledge for general CVRFs was categorized into two levels, low (items scoring ≤ 2 and ≥ 3). In order to evaluate the warning signs and symptoms, the participants received a checklist containing seven warning signs and symptoms for CAD. The checklist items were: dizziness, shortness of breath, sweating, toothache, pain radiating to the arm or jaw, loss of consciousness, chest pain, nausea and vomiting, which were dichotomized in the tabulation into "yes", "presence of the sign or symptom and no" and"absence of sign or symptom" (Temu, 2015). For each answer of the participant, the result was dichotomized into 0 for a wrong answer and 1 for a correct answer, and therefore the minimum score was 0 and the maximum score 7 points. Answers were classified as correct or incorrect, using the guidelines of the American Heart Association (Mozaffarian, 2016). Knowledge about warning signs was categorized into two levels, low (answers ≤ 2) and moderate (≥ 3).

3 - The perception of the participants about attitudes towards warning signs for CAD – Participants were also asked to identify the steps they would take if they suspected a heart attack. From the answers of all participants, three items converged: "I ask for medical help", "I ask for help from a family member" and "I do not know what to do".

4- The perception of the participants about preventive practices related to cardiovascular risk. Participants were asked to describe what they did and what they considered preventive practice activities regarding cardiovascular risk. Based on the answers of these participants, eleven items were listed: I have a careful eating, I perform physical activity, I try to avoid stress and try to be distracted, I avoid alcoholic beverages, I avoid ingesting too much salt, I seek medical care and undergo the indicated examinations, I adhere to the use of prescribed medicines, I undergo blood pressure evaluation, I avoid smoking, I look for quality sleep and I try to maintain and/or lose weight.

5 – Prevalence of cardiovascular risk factors: For this step, clinical and laboratory variables of cardiovascular risk were identified. Thus, the participants were evaluated through physical examination, considering the latest results of laboratory examinationscarried out in SAE. Among the clinical variables, we had: smoking, drinking, high blood pressure, high cholesterol, obesity, DM, stress, sedentarism, physical activity, BMI (Body Mass Index), pulse pressure, WHR (waist-hip ratio), WC (waist circumference), time since HIV diagnosis, time using ART (antiretroviral treatment), altered blood glucose, LDL (low-density lipoprotein), TC (Total Cholesterol), triglycerides, DM (diabetes mellitus) and SAH (Systemic Arterial Hypertension).

The participants were weighed wearing light clothing and barefoot, in an orthostatic position, on a digital scale with a capacity of 150 kg and accuracy of 100 g. The evaluated participants were instructed to remove heavy objects such as keys, belts, glasses, cell phones and any other objects that could interfere with the total body mass. Height was obtained using a portable vertical stadiometer measuring 213 cm and accurate to 0.1 cm.Weight values were recorded in kilograms (Kg) and height was recorded in centimeters (cm). Weight and height data were used to classify nutritional status by calculating BMI (calculated using the weight/height equation). In order to determine WC and HC, the individuals were placed in an upright position with the abdomen and arms relaxed along the body and a flexible measuring tape (accurate to 1mm) was placed horizontally at the midpoint between the lower edge of the last rib and the iliac crest for WC and at the height of the trochanters for HC. Measurements were performed with the tape firmly applied to the skin, but without tissue compression. Two measurements were performed, the smallest measurement being used. Nonetheless, when the measurements obtained a difference greater than 0.2 cm, new measurements were taken. Next, the waist/hip ratio (WHR) was calculated by dividing the waist perimeter by the hip perimeter (cm), respectively. For the classification of anthropometric values, the cut-off points recommended by the World Health Organization were adopted (WHO, 1995).

The measurement and classification of BP values will be based on the recommendations of the Brazilian Society of Hypertension (Malachias, 2016). A non-distensible measuring tape will be used to measure the arm circumference (AC) of the subjects at the midpoint between the acromion and the olecranon, in order to choose the appropriate cuff for each one. The clinical laboratory parameters, the cut-off points were adopted according to the Brazilian guideline of dyslipidemias and prevention of atherosclerosis (Faludi, 2017). Blood pressure was checked with an Omron automatic device (Model HEM-7200) in order to minimize the influence of the observer, and with a rubber cuff closer to 40% of the arm circumference. Still as recommended, the cuff was placed 2 to 3 cm above the antecubital fossa. The diaphragm will be free of clothing, palm facing up and the right arm preferred to avoid false readings.BP checks were performed in a calm environment, in the SAE itself, in a room reserved for this purpose on the days of data collection, with the individual in a sitting position, feet flat on the floor, uncrossed legs, emptied bladder andarm extended at the height of the fourth intercostal space and supported on a flat and solid surface. Care related to resting for 5 to 10 minutes was also observed (Malachias, 2016).

***Ethical aspects:*** The study was approved by the Research Ethics Committee involving human beings of the Federal University of Goiás under protocol nº 64902417.5.0000.5083. We inform you that the requirements of anonymity, secrecy and confidentiality have been met. All participants agreed and signed the Free and Informed Consent Form – FICF.

**Statistical analysis**

Data analysis was conducted in the SPSS® for Windows program, version 19.0. Sociodemographic and clinical descriptive data related to quantitative variables were presented with mean, standard deviation (SD) and absolute and relative frequencies. Data normality was checked for quantitative data using the Kolmogorov-Smirnov test.Cardiovascular risk factors were dichotomized into "yes", "present" and "no", "absent"and stratified by sex. Pearson Chi-square or Fisher Exact tests were used to check differences between proportions. In all analyses, p-values < 0.05 were considered statistically significant. The main outcome, level of knowledge, included seven items about the warning signs and symptoms of CAD, which were categorized into "low knowledge" (those participants who scored 1-2 items) and "moderate knowledge" (those who scored 3-7 items). Poisson regression analysis was conducted for the outcome of knowledge about warning signs, where the result of the analysis was presented as Prevalence Ratio and confidence interval (CI) of 95%.

# RESULTS

The results were analyzed based on 112 participants who agreed to participate in the study undergoing SAE care, Mid-West Region, Goiás, Brazil. The mean age was 41.28 years (standard deviation, SD ±11.07). Half of the people with HIV were males (50.9%), aged between 40-59 years. There was a predominance of single (55.4%), non-white (61.6%), with more than 8 years of study, with work and/or income (61.6%). Most denied smoking (77.7%) and drinking (63.4%). Table 1 shows the bivariate analysis between sociodemographic factors and lifestyle habits dichotomized by sex. We found a higher proportion of single men compared to single women (p=0.018); who work or have income (p=0.000). We also identified a higher proportion of men with more than 8 years of study compared to women, with marginal significance (p=0.060). Table 2 shows the perception of people who participated in the study about having knowledge of cardiovascular risk factors for CAD. Most

**Table 1. Bivariate analysis of the characteristics of the participants according to sex, Mid-West Region, Brazil, 2019**

| Age | | | | |
|---|---|---|---|---|
| Characteristics | N=112 | Male | Female | p* |
| Age(years), mean ± SD 41.28 ± 11.07 | | | | 0.399 |
| 18-39 | 52 (46.4) | 30 (52.6) | 22 (40.0) | |
| 40-59 | 56 (50.0) | 25 (43.9) | 31 (56.4) | |
| ≥ 60 | 4 (3.6) | 2 (3.50) | 2 (3.60) | |
| Marital status | | | | 0.018 |
| Married | 31 (27.7) | 11 (19.3) | 20 (36.4) | |
| Single | 62 (55.4) | 40 (70.2) | 24 (43.6) | |
| Divorced/widowed | 17 (15.2) | 6 (10.5) | 11 (20.0) | |
| Skin color | | | | 0.464 |
| White | 43 (38.4) | 20 (35.1) | 23 (41.8) | |
| Non-white | 69 (61.6) | 37 (64.9) | 32 (58.2) | |
| Education (years of study) | | | | 0.060 |
| ≤ 8 years | 51 (45.5) | 21 (36.8) | 30 (54.5) | |
| > 8 | 60 (53.6) | 36 (63.2) | 25 (45.5) | |
| Occupation | | | | 0.000 |
| Works/with income | 69 (61.6) | 46 (80.7) | 24 (43.6) | |
| Does not work/without income | 43 (38.4) | 11 (19.3) | 31 (56.4) | |

*Pearson Chi-square or FisherExact test.

reported as an answer the option “no”, that is, the risk factor would not be related to the risk for CAD; and, among them, we have age (99.1%), high blood pressure – BP (92%), high cholesterol (84.8%), smoking (69.6%), obesity (83.9%), DM (98.2%), stress (66.1%), drinking (81.3%), sedentarism (58.9%), having a family history of familial hypercholesteromia (97.3%) and reported not having knowledge when asked (82%). Also in this table, the bivariate analysis dichotomized by sex related to cardiovascular risk factors is presented. There were no statistically significant differences between sexes in relation to knowledge about cardiovascular risk factors. There was a higher proportion of males (93%) who did not perceive obesity as a cardiovascular risk factor (p=0.008).

Data on the knowledge of people about the warning signs and symptoms of CAD are presented below. Of the total participants, regarding the prevalence of warning signs, we found that 94.6% (95% CI: 89.3 - 98.4%) had low knowledge in relation to the listed clinical aspects. Table 3 shows the participants' knowledge regarding the warning signs and symptoms of coronary artery disease (CAD). Of the eight warning signs listed, in seven of them (dizziness, shortness of breath, sweating, pain in the teeth, arms and jaws, loss of consciousness, nausea and vomiting and I do not have knowledge), in both sexes, all reported they did not have knowledge about their association with CAD (above 69%).

**Table 2.Bivariate analysis about knowledge of adults about CVRFsaccording to sex, Mid-West Region, Brazil, 2019**

| | | Knowledge about CVRFs | | |
|---|---|---|---|---|
| Variables | N=112 | Male | Female | p* |
| Cardiovascular risk factors | | | | - |
| Age | n (%) | n (%) | n (%) | |
| Yes | 1 (0.90) | 1 (1.8) | - | |
| No | 111 (99.1) | 56 (98.2) | 55 (100) | |
| High BP | | | | 0.272 |
| Yes | 9 (8.00) | 3 (5.3) | 6 (10.9) | |
| No | 103 (92.0) | 54 (94.7) | 49 (89.1) | |
| High cholesterol | | | | 0.384 |
| Yes | 17 (15.2) | 7 (12.3) | 10 (18.2) | |
| No | 95 (84.8) | 50 (87.7) | 45 (81.8) | |
| Smoking | | | | 0.268 |
| Yes | 34 (30.4) | 20 (35.1) | 14 (25.5) | |
| No | 78 (69.6) | 37 (64.9) | 41 (74.5) | |
| Obesity | | | | 0.008 |
| Yes | 18 (16.1) | 4 (7.0) | 14 (25.5) | |
| No | 94 (83.9) | 53 (93) | 41 (74.5) | |
| DM | | | | - |
| Yes | 2 (1.8) | - | 2 (3.6) | |
| No | 110 (98.2) | 57 (100) | 53 (96.4) | |
| Stress | | | | 0.183 |
| Yes | 38 (33.9) | 16 (28.1) | 22 (40) | |
| No | 74 (66.1) | 41 (71.9) | 33 (60) | |
| Drinking | | | | 0.193 |
| Yes | 21 (18.8) | 8 (14) | 13 (23.6) | |
| No | 91 (81.3) | 49 (86) | 42 (76.4) | |
| Sedentarism | | | | 0.190 |
| Yes | 46 (41.1) | 20 (35.1) | 26 (47.3) | |
| No | 66 (58.9) | 37 (64.9) | 29 (52.7) | |
| Family background | | | | |
| Yes | 3 (2.7) | - | 3 (5.5) | - |
| No | 109 (97.3) | 57 (100) | 52 (94.5) | |

*Pearson Chi-square or Fisher Exact test.

**Table 3. Bivariate analysis about the knowledge of the participants about the warning signs for CAD, Mid-West Region, Brazil, 2019**

| | N=112 | Male | Female | p* |
|---|---|---|---|---|
| Knowledge about warning signs | n (%) | n (%) | n(%) | |
| Dizziness | | | | 0.073 |
| Yes | 9 (8.00) | 2 (3.5) | 7 (12.7) | |
| No | 103 (92.0) | 55 (96.5) | 48 (87.3) | |
| Shortness of breath | | | | 0.174 |
| Yes | 34 (30.4) | 14 (24.6) | 20 (36.4) | |
| No | 78 (69.6) | 43 (75.4) | 35 (63.6) | |
| Sweating | | | | 0.537 |
| Yes | 3 (2.7) | 1 (1.8) | 2 (3.6) | |
| No | 109 (97.3) | 56 (98.2) | 53 (96.4) | |
| Pain in the teeth, arms and jaws | | | | 0.344 |
| Yes | 18 (16.1) | 11 (19.3) | 7 (12.7) | |
| No | 94 (83.9) | 46 (80.7) | 48 (87.3) | |
| Loss of consciousness | | | | 0.291 |
| Yes | 4 (3.6) | 1 (1.8) | 3 (5.5) | |
| No | 108 (96.4) | 56 (98.2) | 52 (94.5) | |
| Chest pain | | | | 0.571 |
| Yes | 56 (50) | 30 (52.6) | 26 (47.3) | |
| No | 56 (50) | 27 (47.4) | 29 (52.7) | |
| Nausea and vomiting | | | | - |
| Yes | 5 (4.5) | - | 5 (9.1) | |
| No | 107 (95.5) | 57 (100) | 50 (90.9) | |
| I do not have knowledge | | | | 0.473 |
| Yes | 32 (28.6) | 18 (31.6) | 14 (25.5) | |
| No | 80 (71.4) | 39 (68.4) | 41 (74.5) | |

* Pearson Chi-square or Fisher Exact test.

**Table 4. Prevalence between knowledge of people living with HIV about cardiovascular risk factors and sociodemographic and clinical characteristics, Mid-West, Brazil, 2018**

| | Low knowledge | Moderateknowledge | PR[2] (95% CI[1]) | p* |
|---|---|---|---|---|
| Variables | n (%) | n (%) | | |
| Sex | | | | |
| Female | 41 (44.1) | 14 (73.7) | 1.15 (1.02-1.29) | 0.014 |
| Male | 52 (55.9) | 5 (26.3) | 1 | |
| Skin color | | | | |
| White | 36 (38.7) | 7 (36.6) | 1 | |
| Non-white | 57 (61.3) | 12 (63.2) | 0.99 (0.87-1.19) | 0.879 |
| Marital status | | | | |
| With partner | 40 (43.0) | 8 (42.1) | 1 | |
| Without partner | 53 (57.0) | 11 (57.9) | 0.99 (0.88-1.12) | 0.942 |
| Age | | | | |
| ≤ 40 | 51 (54.8) | 6 (31.6) | 1 | |
| > 40 | 42 (45.2) | 13 (68.4) | 1.11 (0.99-1.25) | 0.058 |
| Occupation | | | | |
| Works | 56 (60.2) | 14 (73.7) | 1.07 (0.95-1.20) | 0.269 |
| Does not work | 37 (39.8) | 5 (26.3) | 1 | |
| Education | | | | |
| ≤ 8 years | 44 (47.3) | 7 (36.8) | 1 | |
| > 8 | 49 (52.7) | 12 (63.2) | 1.05 (0.93-1.18) | 0.404 |
| Smoking | | | | |
| Yes | 21 (22.6) | 4 (21.1) | 1 | |
| No | 72 (77.4) | 15 (78.9) | 1.01 (0.87-1.16) | 0.883 |
| Drinking | | | | |
| Yes | 31 (33.3) | 10 (52.6) | 1.10 (0.97-1.25) | 0.112 |
| No | 62 (66.7) | 9 (47.4) | 1 | |
| Physical activity | | | | |
| Yes | 36 (38.7) | 6 (31.6) | 1 | |
| No | 57 (61.3) | 13 (68.4) | 0.96 (0.85-1.08) | 0.549 |
| BMI | | | | |
| ≤ 24.9 | 49 (52.7) | 5 (26.3) | 1 | |
| > 24.9 | 44 (47.3) | 14 (73.7) | 1.13 (1.01-1.27) | 0.027 |
| Pulse pressure | | | | |
| Normal | 51 (54.8) | 13 (68.4) | 1.06 (0.95-1.20) | 0.276 |
| Altered | 42 (45.2) | 6 (31.6) | 1 | |
| WHR | | | | |
| Normal | 44 (47.3) | 4 (21.1) | 1 | |
| Altered | 49 (78.9) | 15 (52.7) | 1.13 (1.02-1.27) | 0.021 |
| WC | | | | |
| Normal | 43 (46.2) | 4 (21.1) | 1 | |
| Increased risk | 50 (53.8) | 15 (78.9) | 1.13 (1.01-1.26) | 0.026 |
| Diagnosis time | | | | |
| 0 – 5 years | 34 (36.6) | 4 (21.1) | 1 | |
| > 5 years | 59 (63.4) | 15 (78.9) | 1.08 (0.96-1.22) | 0.156 |
| ART | | | | |
| 0 – 5 years | 68 (73.1) | 10 (52.6) | 1.12 (0.98-1.28) | 0.077 |
| > 5 years | 25 (26.9) | 9 (47.4) | 1 | |
| Altered blood glucose | | | | |
| Yes | 21 (22.6) | 3 (15.8) | 1 | |
| No | 72 (77.4) | 16 (84.2) | 0.95 (0.83-1.09) | 0.511 |
| LDL 2º | | | | |
| Yes | 29 (31.2) | 4 (21.1) | 1 | |
| No | 64 (68.8) | 15 (78.9) | 0.94 (0.83-1.06) | 0.377 |
| TC | | | | |
| Yes | 40 (43.0) | 12 (63.2) | 1.10 (0.97-1.24) | 0.109 |
| No | 53 (57.0) | 7 (36.8) | 1 | |
| Triglycerides | | | | |
| Yes | 32 (34.4) | 9 (47.4) | 1.06 (0.94-1.21) | 0.285 |
| No | 61 (65.6) | 10 (52.6) | 1 | |
| DM | | | | |
| Yes | 6 (6.5) | 1 (5.3) | 1 | |
| No | 87 (93.5) | 18 (94.7) | 1.02 (0.81-1.29) | 0.845 |
| SAH | | | | |
| Yes | 18 (19.4) | 5 (26.3) | 1.05 (0.90-1.22) | 0.494 |
| No | 75 (80.6) | 14 (73.7) | 1 | |

[1]Confidence interval of 95%. ²PR: Prevalence ratio. [3]Wald Chi-square.

In the bivariate analysis, it was observed that males do not perceive the sign of dizziness (96.5%; p= 0.073), in a higher proportion than females, but with marginal significance. Although there were no differences between the sexes in the analysis of the proportion of warning signs, in both sexes, among all the listed signs, the answer "I do not have knowledge" was reported as the most prevalent. Only the sign of chest pain, which had 50% answers"yes" and 50% "no". Of the total number of participants, there was a prevalence of 83% (95% CI: 75.9 - 91.1%) of participants with low knowledge of the listed cardiovascular risk factors.

In this analysis shown in Table 4, we observed a higher proportion of female participants with moderate knowledge about cardiovascular risk factors (73.7%) when compared to males and also with moderate knowledge (26.3%), (Prevalence Ratio: 1.15; 95% CI: 1.02-1.29; p < 0.014). We also found a higher prevalence of people with moderate knowledge about cardiovascular risk factors in those with BMI > 24.9, (73.5%), (Prevalence Ratio, PR: 1.13; 95% CI: 1.01 - 1.27; p=0.027). Similarly, higher prevalence of people with altered WHR (78.9%) with low knowledge about cardiovascular risk factors, PR: 1.02 - 1.27; p=0.021) and also in those with increased waist circumference (78.9%), PR: 1.13; 95% CI: 1.01 - 1.26; p= 0.026. In Table 4, we can also note a marginal significance for the outcome of people aged over 40 years (68.4%), with moderate knowledge, (p= 0.0058) and also in people using ART between 0 - 5 years who had a prevalence (73.1%) of low knowledge about cardiovascular risk factors (p = 0.077).

and related to the vision of people undergoing treatment about knowledge, attitudes and preventive practices related to cardiovascular risk. In this study, mostpeople undergoing care were young adults, male, single, with more than eight years of study, exercising labor activity, and these data corroborate with other studies reporting this population (23-25).

**Table 5. Perception regarding the attitude(s) and preventive practices of participants in relation to the warning signs, Mid-West, Brazil, 2018**

| | Total | Male | Female | |
|---|---|---|---|---|
| Attitudes/Perception | n (%) | n (%) | n (%) | p* |
| I ask for medical help | | | | 0.731 |
| Yes | 86 (76.8) | 43 (78.2) | 43 (78.2) | |
| No | 26 (23.2) | 14 (24.6) | 12 (21.8) | |
| I ask for help from a family member | | | | 0.578 |
| Yes | 27 (24.1) | 15 (26.3) | 12 (21.8) | |
| No | 85 (75.9) | 42 (73.7) | 43 (78.2) | |
| I do not know what to do | | | | 0.948 |
| Yes, I do not know | 12 (10.7) | 6 (10.5) | 6 (10.9) | |
| No, I know | 100 (89.3) | 51 (89.5) | 49 (89.1) | |
| Preventive practices | | | | |
| Careful eating | | | | 0.997 |
| Yes | 57 (50.9) | 29 (50.9) | 28 (50.9) | |
| No | 55 (49.1) | 28 (49.1) | 27 (49.1) | |
| I perform physical activity | | | | 0.526 |
| Yes | 42 (37.5) | 23 (40.4) | 19 (34.5) | |
| No | 70 (62.5) | 34 (59.6) | 36 (65.5) | |
| I try not to stress, I have leisure | | | | 0.499 |
| Yes | 12 (10.7) | 5 (8.8) | 7 (12.7) | |
| No | 100 (89.3) | 52 (91.2) | 48 (87.3) | |
| I avoid alcoholic beverages | | | | 0.743 |
| Yes | 10 (8.9) | 6 (10.5) | 4 (7.3) | |
| No | 102 (91.1) | 51 (89.5) | 51 (92.7) | |
| I avoid ingesting too much salt | | | | 0.679 |
| Yes | 6 (5.4) | 4 (7.0) | 2 (3.6) | |
| No | 106 (94.6) | 53 (93.0) | 53 (96.4) | |
| I seek the doctor and undergo the indicated examinations | | | | 0.770 |
| Yes | 9 (8.0) | 5 (8.8) | 4 (7.3) | |
| No | 103 (92) | 52 (91.2) | 51 (92.7) | |
| I adhere to the use of medicines | | | | 0.024 |
| Yes | 8 (7.1) | 1 (1.8) | 7 (12.7) | |
| No | 104 (92.9) | 56 (98.2) | 48 (87.3) | |
| I try to control my BP | | | | - |
| Yes | 1 (0.9) | - | 1 (1.8) | |
| No | 111 (99.1) | 57 (100) | 54 (98.2) | |
| I avoid smoking | | | | 0.189 |
| Yes | 15 (13.4) | 10 (17.5) | 5 (9.1) | |
| No | 97 (86.6) | 47 (82.5) | 50 (90.9) | |
| I look for quality sleep | | | | 0.980 |
| Yes | 2 (1.8) | 1 (1.8) | 1 (1.8) | |
| No | 110 (98.2) | 56 (98.2) | 54 (98.2) | |
| I look for ways to lose weight | | | | - |
| Yes | 1 (0.9) | 1 (1.8) | - | |
| No | 111 (99.1) | 56 (98.2) | 55 (100) | |

*Pearson Chi-square or Fisher Exact test.

In the multivariable analysis not shown in the table, the only factor associated with moderate knowledge was the sex of the participant, adjusted for prior FH, LDL (adjusted PR: 1.14; 95% CI: 1.01 - 1.28; p < 0.024). In Table 5, regarding the attitude towards the warning signs and symptoms of CAD, there was a predominance (76.8%) of those seeking medical help as a priority, either by calling the Emergency Mobile Care Service (SAMU, as per its Portuguese acronym) or the Fire Department. In the bivariate analysis, there was no difference in proportion between males and females. Regarding preventive practices, there was a difference in proportion regarding the description of adherence to the use of indicated medicines. Here, 98.2% of the surveyed men reported not having adherence to the use of indicated medicines (p < 0.024), compared to women (87.3%).

# DISCUSSION

This study presents relevant data about people with HIV/AIDS undergoing outpatient care in a specialized service in the Mid-West Region-GO, Brazil. It is a contribution in terms of public health by describing epidemiological data referring to a medium-sized hospital

The differences in proportion in relation to sex were related to marital status and occupation to the male gender; therefore,single and employed men constitute a majority, which is why these findings are similar to the results of other studies (26-27). Differently from these results in research conducted in Kenya, where the authors identified a prevalence rate of women and with low knowledge about cardiovascular risk factors (16). In this study, the knowledge about cardiovascular risk factors (CVRFs) evaluated from the ten items of the checklist revealed a high level of answers reporting low knowledge about CVRFs in both sexes. Even though we did not identify in this research a difference in proportion in the dichotomization by gender (Table 2), most participants (percentage above 90%) did not mention that parameters usually known by the population, such as high blood pressure, high cholesterol and age, may be associated with a higher risk for cardiovascular event. According to the American Heart Association, 2019, heart disease and stroke may be common in people with HIV, and therefore rates related to heart attack, heart failure and stroke are significantly higher in these people than in those without HIV (28). In a systematic review and meta-analysis, the authors concluded that people living with HIV are twice as likely to develop CVDs (5). Other studies corroborate the strong association between CVR in people with HIV (8-11). Nevertheless, regarding knowledge of CVRFs, in another study conducted with the Lebanese population with and without CVDs, 91% of the surveyed respondents knew that hypertension is a risk factor for CVDs. Despite this, these same authors concluded that knowledge, attitude and practices had poor to reasonable levels in both groups of the case-control study and report that continuing education actions are necessary to prevent and reduce complications arising from the risks to which they were exposed (29). Healthprofessionals should be aware of the importance of routine monitoring of BP levels in patients with HIV/AIDS, where early identification and appropriate therapy are clinically relevant issues for these patients. In addition, traditional hypertension control measures such as diet, weight control and physical exercise should be considered and worked on in this population (8-11).

We highlight a high frequency of 94.6% of low knowledge about the warning signs and symptoms, considering the seven evaluated items in this study. Although there was no proportional difference between sexes in the bivariate analysis, this result corroborates those identified in another study conducted in Kenya, where the same questionnaire items were applied. It is noteworthy that, in our study, the highest proportion rate per item found during the survey was 41.1% for the factor “sedentarism”, while 77% of the respondents could not identify any warning signs in the survey conducted in Kenya, where the highest frequency alone was the risk factor “loss of consciousness”, with only 10.3% (16). On the other hand, in this study, the low knowledge was also associated with gender, age, BMI and WHR, considering the overall prevalence of 83% from the ten evaluated items about the general risk factors. This frequency was subtly lower than the prevalence for warning signs (94.6%); however, it presupposes gaps in knowledge regarding cardiovascular risk factors in this population. Thus, continuing education actions and strategies that can impact on the lifestyle change of these people are expected. It is pertinent that these experiences and data collected from this research can contribute to a better understanding of the current context and, consequently, help health professionals to reflect, in a multidimensional and interdisciplinary way, on strategies that can motivate and promote changes in the behavior of subjects in the face of the risks to which they are exposed.

Our study presents some limitations related to the type of cross-sectional study. In addition, we did not apply Likert scale or checklist type questions in the item related to attitude and preventive practices, based on the recommendations of the Extended-Action Research Community (CAP, as per its Portuguese acronym) methodology, with a validated questionnaire in this clientele (30). In this study, the questions were open-ended because we wanted to know the perception of people with HIV/AIDS about what they would do in the face of warning signs and symptoms of heart attack. Accordingly, we did not develop a predictive model of questions about attitudes and preventive practices regarding risk factors. Nevertheless, in the item“knowledge”, we applied it following the model of another study for the questions about cardiovascular risk factors and warning signs, even though it was validated in another country (16). Finally, there are discrepancies about which questions related to knowledge, attitudes and practices should be included in the questionnaire during the approach of the participants and that better cover the findings concerning the object of study related to cardiovascular risk factors. The theme is broad and requires further studies that report on how to direct the questions of the CAP method, considering people with HIV/AIDS undergoing treatment and the cardiovascular risk.In Brazil, initiatives in this direction were noted in the study by Cunha et al., 2022, where the authors developed and evaluated a CAP survey in relation to healthy lifestyle in people with HIV. According to the study, the domain “knowledge” was formulated with ten questions with answers ranging from “yes”, “no” and “I donot know”. In turn, the domain “attitude” was also formulated containing ten questions with answers dichotomized into “yes” and “no”. Finally, the domain of healthy practices was formulated with eleven questions and answers on a scale with“yes”, “no” and “I do not know”. According to the authors, the three CAP domains could be independently evaluated as adequate and inadequate (30). In another study, the authors evaluated the effectiveness of a booklet about the CAP method of the healthy lifestyle in people with HIV. However, the results showed that there was no difference between groups in terms of knowledge, where the impact of the booklet was delayed, thus increasing its effectiveness inthe revaluations. Regarding the item “attitude”, there was a difference between groups at the two- and four-monthrevaluations compared to baseline. Finally, in practice, there was a difference in the intervention group in the control at two, four and six months compared to baseline. Although the use of this booklet was effective, according to the authors, knowledge alone is not enough and, consequently, engagement, motivation and different strategies that can contribute to lifestyle changes are required (24).

In the course of this investigation, the meetings with people with HIV/AIDS allowed us to make a reflective immersion on the cardiovascular risk factors of this population. Despite having a clinical condition that can lead to approximately twice the chances of developing atherosclerotic cardiovascular disease (1-2; 5-6, 8-14), for this evaluated people, this condition does not seem to influence their perceptions in relation to the risks to which they are exposed. In the study carried out in the United States, the authors suggest that an intentional, focused and continuous conversation between exposed people and members of the multidimensional health team about these risks, with attention to values and preferences of patients, can help to improve cardiovascular health. Still in this research, for those individuals who have modest influence over health care, the care procedures related to physical activity, food intake and smoking rates were still suboptimal (31). A worrying fact in terms of public health was identified in this study, where more than 90% of the interviewees, in both sexes, did not even self-describe in the evaluated perception that the lack of adherence to medicines is a preventive practice factor that can contribute to the reduction of CVRFs.Nevertheless, in this item, we emphasize that the question was left open so that we could evaluate the answers that emerged from the participants and, consequently, such medicines could be both ART and for the control of blood pressure and other pathologies that could be associated in each one of the interviewed people. In another mixed method study, the authors identified intriguing observations regarding medication adherence. People living with HIV adhered much more to the use of medicines when compared to others without this condition (31). However, there is a strong culture of adherence to ART among people living with HIV, with excellent adherence rates, but it cannot yet be said thatthere is a perception that the use of other drugs can contribute to the reduction of cardiovascular risk among the participants (31). In another study conducted in Brazil, non-adherence to antiretroviral therapy was 28.4% and associated with age less than 35 years, smoking, sedentarism, lack of medication and lack of knowledge of the serological condition by the patient and his/her family members (32). We emphasize here that other factors, such as, for example, the difference in geographic locations, the study scenarios, the clinical characteristics of the population and even the study designs, are taken into account when considering and comparing studies. Therefore, more studies are required to clarify the influence of HIV infection and antiretroviral drugs on blood pressure (BP) levels, as well as the mechanisms involved in this association, in different geographical locations, involving different populations.In addition, resources remain limited in developing countries, despite the fact that efforts are being made to conduct robust studies in terms of cardiovascular risk stratification that better report on the theme.

# CONCLUSION

Based on this study with people with HIV/AIDS undergoing treatment in a medium-sized hospital in the SAE context, we highlight the low frequency of knowledge about cardiovascular risk factors and warning signs and symptoms for heart attack. We also found that attitudes towards warning signs and symptoms in both sexes revealed that people primarily seek medical help and a family member and that preventive practices are more focused on careful eating and physical activity. The challenge remains for the multiprofessional team to understand the complexity of multiple exposures to different risk factors in this population and then propose measures in terms of knowledge, attitudes and preventive practices that can impact on lifestyle changes in order to mitigate long-term effects.

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