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CLUSTERING OF SOCIAL DETERMINANTS OF HEALTH ASSOCIATED WITH HEALTHY LIFESTYLE AMONG A SAMPLE OF ADVENTISTS: A PERSON-CENTERED APPROACH

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ABSTRACT

Objective: To analyze how clusters of social determinants of health are associated with healthy lifestyle practices among Brazilian Adventist adults and older adults.

Method: A cross-sectional study was conducted with 216 participants. Health behaviors were assessed using the Eight Natural Remedies Questionnaire. Latent Class Analysis (LCA) and linear regression models were used to identify behavioral patterns and associations with socioeconomic factors.

Results: Two latent classes were identified. Individuals in Class 2, associated with lower socioeconomic and educational levels, showed significantly lower scores in exercise-related behaviors compared to those in Class 1. No significant differences were found in other lifestyle factors.

Conclusion: The findings suggest that lower socioeconomic status and limited education negatively influence exercise habits among Adventists, emphasizing the need for targeted public health interventions.

Keywords: Health Inequities. Physical activity. Religion and medicine. Socioeconomic Factors.

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AGRUPAMENTO DE DETERMINANTES SOCIAIS DA SAÚDE ASSOCIADOS AO ESTILO DE VIDA SAUDÁVEL EM UMA AMOSTRA DE ADVENTISTAS: UMA ABORDAGEM CENTRADA NA PESSOA

RESUMO

Objetivo: Analisar como os agrupamentos de determinantes sociais da saúde estão associados a práticas de estilo de vida saudável entre adultos e idosos adventistas no Brasil.

Método: Estudo transversal com 216 participantes. Os comportamentos de saúde foram avaliados por meio do Questionário dos Oito Remédios Naturais. Utilizaram-se Análise de Classes Latentes e modelos de regressão linear para identificar padrões comportamentais e associações com fatores socioeconômicos.

Resultados: Foram identificadas duas classes latentes. Indivíduos da Classe 2, com menor escolaridade e condição socioeconômica, apresentaram pontuação significativamente menor em comportamentos relacionados ao exercício físico. Não houve diferenças significativas em outros hábitos de vida.

Conclusão: Os resultados indicam que níveis socioeconômicos e educacionais mais baixos influenciam negativamente os hábitos de exercício entre adventistas, destacando a importância de intervenções em saúde pública direcionadas.

Palavras-chave: Desigualdades de Saúde. Atividade Física. Religião e medicina. Fatores socioeconômicos.

AGRUPAMIENTO DE LOS DETERMINANTES SOCIALES DE LA SALUD ASOCIADOS CON UN ESTILO DE VIDA SALUDABLE EN UNA MUESTRA DE ADVENTISTAS: UN ENFOQUE CENTRADO EN LA PERSONA

RESUMEN

Objetivo: Analizar cómo los agrupamientos de determinantes sociales de la salud se relacionan con prácticas de estilo de vida saludable entre adultos y adultos mayores adventistas en Brasil.

Método: Estudio transversal con 216 participantes. Los comportamientos de salud se evaluaron utilizando el Cuestionario de los Ocho Remedios Naturales. Se aplicaron análisis de clases latentes y modelos de regresión lineal para identificar patrones conductuales y su asociación con factores socioeconómicos.

Resultados: Se identificaron dos clases latentes. Los individuos de la Clase 2, con menor nivel educativo y socioeconómico, mostraron puntuaciones significativamente más bajas en

comportamientos relacionados con el ejercicio físico. No se observaron diferencias significativas en otros hábitos de salud.

Conclusión: Los resultados sugieren que un menor nivel socioeconómico y educativo afecta negativamente los hábitos de ejercicio entre adventistas, resaltando la necesidad de intervenciones de salud pública específicas.

Palabras clave: Inequidades en la salud. Actividad física. Religión y medicina. Factores socioeconómicos.

1. INTRODUCTION

The Seventh-day Adventist Church (SDAC) has stood out for its adherence to health practices. Ecclesiastical guidelines advise its members to adopt a lifestyle based on a vegetarian diet, abstaining from smoking, and moderate alcohol consumption, among other measures (Gashugi et al., 2023; Portes; Silva, 2017; Butler et al., 2008; Giaquinto; Spiridigliozzi, 2007). Additionally, research consistently reveals that Seventh-day Adventists (SDA) in Brazil demonstrate: (1) a lower prevalence of high blood pressure compared to the national average (Silva et al., 2012); (2) a significant reduction in mortality due to external factors among this population (Velten et al., 2017); (3) a lower incidence of deaths due to ischemic heart and cerebrovascular diseases (Oliveira et al., 2016); (4) a life expectancy that exceeds the general population average by 4.57 years (Velten, 2013); (5) and exhibit a lower biological age when compared to groups not affiliated with the SDAC (Kanno; Sella; Oliveira, 2014). These reasons guided our choice of SDAs as an analytical unit. We believe that this corresponds to the scope of Lifestyle Journal.

However, that those attending the SDAC manifest different lifestyles (Gashugi et al., 2023). Those who adhere to the semi-vegetarian regime demonstrating more favorable lifestyle traits compared to non-vegetarians (Ferreira et al., 2011). There is a significant incidence of high blood pressure among members of the SDAC, especially among the elderly, those who report high levels of stress, and individuals who eat meals at intervals of less than two hours (Silva et al., 2017). Also, there are disparities in the prevalence of high blood pressure between SDA residing in metropolitan areas and those living in rural areas, possibly due to more favorable socioeconomic conditions and differences in lifestyle patterns (Silva et al., 2012).

An essential approach to analyzing these socioeconomic aspects involves considering the Social Determinants of Health (SDH). As highlighted by Badziak and Moura (2010), it is important to highlight that SDH does not present a constant cause-and-effect relationship.

Further, it is crucial to highlight those individual determinants are not sufficient to explain health conditions at a societal level or within specific groups within society. The observed discrepancies are intrinsically linked to factors associated with social inequities (Badziak; Moura, 2010; Buss; Pellegrini Filho, 2007).

One of the critical aspects addressed in studies investigating SDH is the consideration that certain factors, relevant to explaining disparities in the health status of individuals, cannot be generalized to different groups or communities within a society (Buss; Pellegrini Filho, 2007). Buss and Pellegrini Filho (2007) emphasize that equity in income distribution is one of the factors that deserve particular attention in this context. Consequently, health discrepancies between human groups cannot be adequately justified based on purely biological factors or individual behavior. On the contrary, these health disparities appear to derive from patterns of behavior and habits shaped by society, and, above all, from elements that are beyond the direct control of both the individual and the group in question.

In this context, the person-centered approach emerges as a valuable way for comprehending the emergence of distinct subgroups within a given dataset predicated on the selection of specific variables, as well as discerning the associations between these subgroups and various outcomes, including but not limited to physical and mental health. A spectrum of statistical techniques has been developed for the analysis of person-centered data. Among these methodologies, prominent ones encompass cluster analysis, mixture modeling, and latent class analysis. The application of person-centered analysis represents a potent means for the exploration of individual variations and the identification of underlying patterns within heterogeneous populations (Woo et al., 2018; Woo et al., 2024).

Although we have seen that the adoption of healthy habits linked to the use of Eight Natural Remedies (8NR) expresses better quality of life and health, however, living and working conditions, socioeconomic and cultural situations, and access to essential goods and services (e. g., education and health) can interfere in many aspects regarding the use of 8NR and its effectiveness. That way, the aim of the present study was twofold: I) to verify how the social determinants of health were grouped in a sample of Adventist adults and elderly people, and II) to verify how these groupings are associated with a healthy lifestyle in a sample of adult and elderly Adventists.

2. METHODS

2.1. Study design and participants

Data from the *Estilo e Condições de Vida de Adventistas do Sétimo Dia* (ECOVIDA) – Lifestyle and Living Conditions of Seventh-day Adventists – Study were analyzed. The sampling was conventional, not probabilistic. The collection period consisted of two moments: 1) October of 2022 to January of 2023, and 2) April to June of 2023. To participate in the research, it was necessary to meet the following inclusion criteria: a) be 18 years old or older and both sexes; b) obtain an electronic address; c) be a baptized member and belong to the membership in question; d) consent to participate in the research freely, agreeing to the consent form; e) Complete the form in its entirety. The exclusion criteria are: a) not responding to the questionnaire completely; b) requesting the exit and removal of your responses from the survey. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This research was approved by the Ethics and Research Committee of the xxx (CAAE: xxx).

2.2. Procedures

The initial step involved in this study entailed soliciting interest and collaboration from the IASD Health Department in the Amazonas region. The intention was to facilitate the dissemination of information derived from the questionnaire responses. Upon obtaining the necessary authorization, outreach efforts were initiated with two distinct churches situated in disparate neighborhoods within the city of Manaus—namely, São José Operário and Japiim 2.

The leadership of these churches exhibited a keen interest and expressed readiness to deliberate the matter with the broader church hierarchy. Subsequently, the active involvement of the congregation was officially sanctioned, following due approval. After this crucial administrative groundwork, the research team embarked on the recruitment phase. Prospective participants were formally invited through informal dialogues and announcements disseminated within the religious precinct. A comprehensive orientation regarding the research's objectives and the prescribed questionnaire procedures was provided. Given the virtual nature of the survey, participants were individually furnished with access links to the Google Form platform

through personal messaging applications on their mobile devices. Additionally, group communications were employed to reach diverse congregational departments.

Acknowledging the potential technological barriers, participants were encouraged to extend their engagement by inviting others to partake in the survey, sharing the access link, and assisting individuals, particularly the elderly, who might encounter difficulties navigating the technological aspects of the questionnaire. Furthermore, we implemented a proactive measure to provide support for individuals who lacked the necessary technological assistance. This included offering in-home assistance for those facing challenges in completing the forms independently.

2.3. Measures

2.3.1. Healthy lifestyle

To assess the healthy lifestyle of Adventists, we used the Eight Natural Remedies Questionnaire (8NRQ), validated for the Brazilian population by Abdala et al. (2018). The instrument contains 22 questions comprising eight dimensions: nutrition (3 items), exercise (3 items), water (2 items), sunlight (2 items), temperance (4 items), clean air (2 items), rest (2 items), and trust in God (4 items). There is evidence of validity of the 8NRQ instrument, whose goodness of fit adjustments were: CFI = 0.965, Tucker-Lewis Index (TLI) = 0.952 and Parsimony adjustment index (RMSEA) = 0.034. Cronbach's Alpha was 0.72, indicating internal reliability (Abdala et al., 2018).

After applying the questionnaire, the total scores and for each of the eight natural remedies were calculated: total score (0-88 points), nutrition (0-12 points), exercise (0-12 points), water (0-8 points), sunlight (0-8 points), temperance (0-16 points), clean air (0-8 points), rest (0-8 points), and trust in God (0-16 points). Scores closer to the maximum indicate a healthy lifestyle in the total score and/or in each of the dimensions of the 8 natural remedies.

2.3.2. Social determinants of health

To measure social determinants of health, participants were asked about their sex (male or female), age in years (later age was classified into four age groups: 18-24 years, 25-39 years, 40-59 years, and ≥ 60 years), race (white, brown, black, yellow or indigenous; later this variable was dichotomized into no brown-skinned people and brown-skinned people), salary income (in minimum wages; later this variable was categorized into up to two minimum wages, of three to

5 minimum wages, and more than 5 minimum wages), education (illiterate, incomplete primary education, complete primary education, incomplete secondary education, complete secondary education, incomplete higher education, complete higher education, postgraduate: specialization, postgraduate undergraduate: master's, postgraduate: doctorate; later this variable was dichotomized into: without higher education and with higher education). For socioeconomic status (SES), the Brazilian Criteria Questionnaire from the Brazilian Association of Research Companies (ABEP) was used. The instrument has 15 questions that cover the items the person has at home, access to public services (piped water and paved streets), and the level of education of the head of the family (later this variable was categorized into Upper (ABEP strata A), Middle (ABEP strata B1 and B2), and Low (ABEP strata C, D, and E).

2.3.3. Covariates

The covariates considered were: time since baptism (years), number of people living together (unit), and stray from the church (yes or no).

2.4. Statistical analysis

For descriptive data analysis, mean and standard deviation were used for numerical variables, and relative and absolute frequencies for categorical variables. Latent class analysis (LCA) was the procedure used to identify the number of sociodemographic groups considering the six variables of the social determinants of health: age group, sex, race, salary income, education, and SES. LCA represents a significant methodological advancement over conventional cluster analysis methods such as K-means, hierarchical clustering, and Gaussian Mixture Models (GMMs), particularly in identifying and characterizing heterogeneous subpopulations in complex data. While traditional approaches often rely on distance heuristics or similarity criteria to group observations, resulting in arbitrary, mutually exclusive cluster assignments that can be highly sensitive to initial conditions and the presence of outliers (Nylund, Asparouhov and Muthén, 2007), LCA adopts a statistical model-based approach. This probabilistic framework allows LCA to estimate the probability that each observation belongs to a given latent class, providing a “soft” and more nuanced classification rather than “hard” assignments (Collins and Lanza, 2009). LCA’s ability to formally test model fit and compare models with different numbers of classes using information criteria (e.g., BIC, AIC) provides

an objective statistical basis for determining the optimal number of clusters, a notorious and often subjective challenge in model-free clustering approaches (McLachlan, Lee and Rathnayake, 2019).

The superiority of LCA Is manifest In IIbility to Infer the underlying class structure from the observed associations between variables, offering a theoretically richer and more validatable interpretation of the identified clusters. Unlike the merely descriptive clustering produced by traditional methods, latent classes derived from LCA represent distinct typologies that are statistically grounded and replicable, providing a deeper understanding of the mechanisms that drive population heterogeneity. By estimating item-response parameters for each class, LCA generates detailed class profiles that describe the unique characteristics of each subgroup, facilitating the design of targeted interventions or market segmentation strategies with greater precision and impact.

Analytically, the treatment of each variable was mentioned previously. The number of classes was based on the best combination of low maximum log-likelihood, Akaike information criteria (AIC), Bayesian information criteria (BIC), adjusted BIC (Abic), and consistent AIC (CAIC). LCA was performed using the 'poLCA' package version 1.6.0.1 of the statistical language R.

For exploratory analysis, that is, to verify the association of clusters of social determinants of health with a healthy lifestyle (total score and each of the 8NR), multiple linear regression models were used. The results are presented in association coefficients with their respective 95% confidence intervals (95%CI). Furthermore, the coefficient of determination (R2) was used as an indicator of the effect size of the models' association with each outcome. All inferential analyses had a significance level set at 5% (i.e., p-value<0.05). Furthermore, the heteroscedasticity of the models was verified through graphical analysis of the model residuals, residual normality test, and the Breusch-Pagan test. All analyses were carried out in the R language (R Core Team, 2024) using the R software for Windows version 4.2.2.

3. RESULTS

Descriptive information about the study sample can be found in Table 1. Briefly, of the total of 216 participants, the sample is mostly composed of females, brown-skinned people, with higher education, medium socioeconomic status, and with a higher prevalence of aged 40 to 59 years (sample mean age: 41.3 ± 14.2 years), and who receive 3 to 5 minimum wages (Table 1).

Table 1. Descriptive analysis of the sample of Adventist adults and elderly people (n = 216), ECOVIDA Study, Brazil, 2022-2023.

Variables	Mean (standard-deviation)	Minimum; Maximum	n (%)
Total score (0-88)	61.32 (9.20)	34;81	
Nutrition (0-12)	6.31 (2.43)	0-11	
Exercise (0-12)	6.54 (3.87)	0-12	
Water (0-8)	5.54 (1.45)	1-8	
Sunlight (0-8)	5.78 (1.43)	0-8	
Temperance (0-16)	13.56 (2.17)	8-16	
Clean air (0-8)	4.37 (1.58)	0-7	
Rest (0-8)	4.53 (2.08)	0-8	
Trust in God (0-16)	14.69 (1.84)	2-16	
Baptism time (years)	17.94 (12.82)	0-50	
Nº of people living together	3.73 (1.72)	1-14	
Strayed from the church			
Yes			66 (69.4)
No			150 (30.6)
Age group			
18-24			35 (16.2)
25-39			67 (31.0)
40-59			92 (42.6)
≥60			22 (10.2)
Sex			
Male			79 (36.6)
Female			137 (63.4)
Race			
Non brown-skinned			72 (33.3)
Brown-skinned			144 (66.7)
Salary income			
Up to 2 minimum wages			69 (31.9)
From 3 to 5 minimum wages			90 (41.7)
Mora than 5 minimum wages			57 (26.4)
Education			
No higher education			96 (44.4)
With higher education			120 (55.6)
Socioeconomic status			
Upper (A)			31 (14.3)
Middle (B)			111 (51.4)
Low (C, D, and E)			74 (34.3)

Note: n: absolute frequency; %: relative frequency.

Data source: Research data (2023).

The model fit for two to six latent classes is presented in Table 2. The two-class model was selected as the best-fitting model because it was conceptually more meaningful than the

others and had the lowest values for all indicators, except for AIC. The classes characteristics and item-response probabilities are shown in Figure 1. Class 1 (33.3% of the sample) was characterized by high probabilities of being brown-skinned, having a salary income of more than five minimum wage, having higher education, and belonging to the middle SES. Besides, Class 2 (66.7% of the sample) was characterized by high probabilities of having a salary income up to two minimum wages, having no higher education, and belonging to the lower SES. Both classes had similarities in probabilities for age group (40-59 years) and sex (female). The only specificity was in race for class 2, where both response options were at 50%.

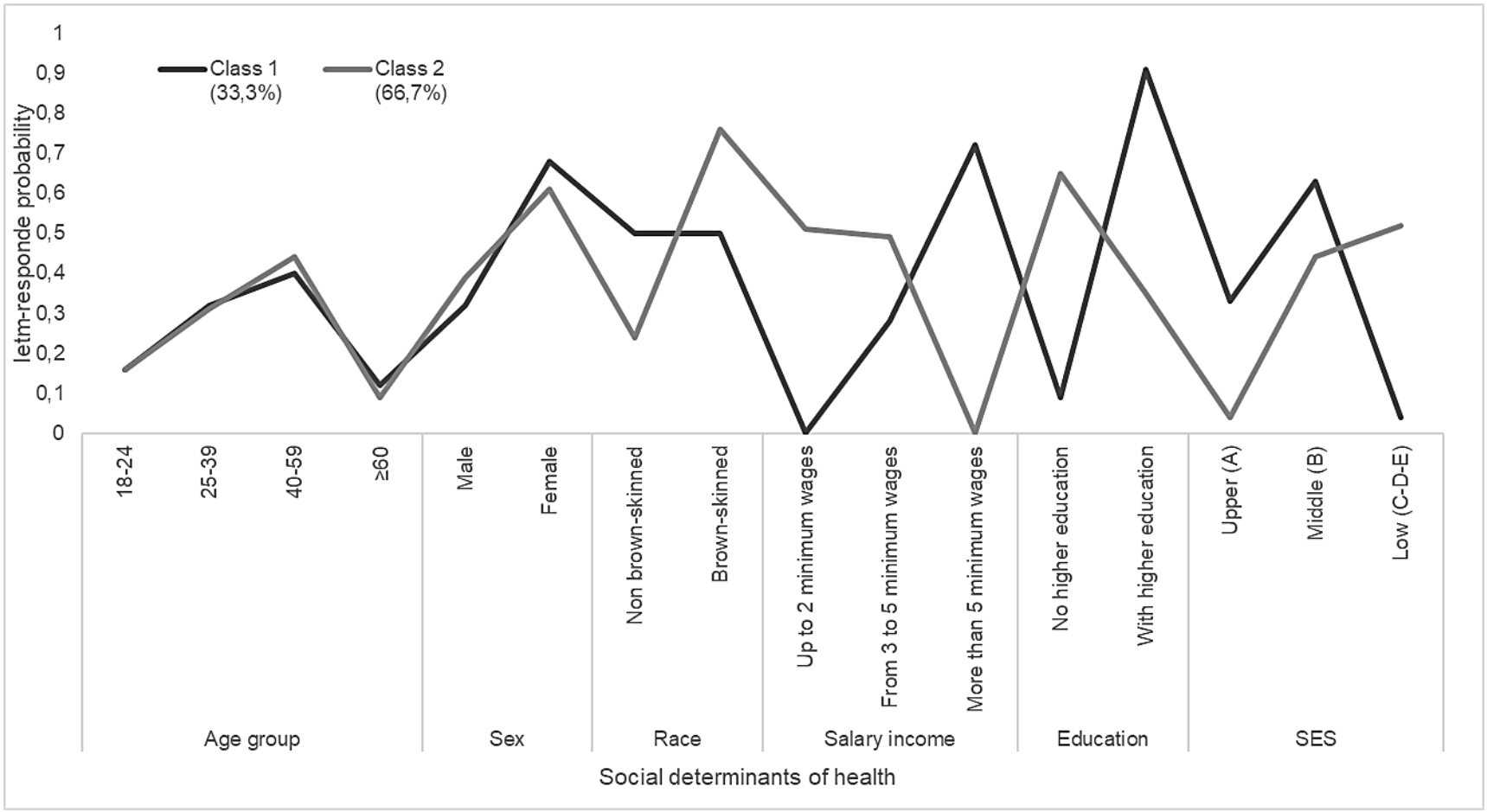
Table 2. Latent class models parameters (n = 216), ECOVIDA Study, Brazil, 2022-2023.

Nº of classes	Maximum Log-Likelihood	BIC	aBIC	AIC	CAIC
2	-1082,087	2277,055	2210,509	2206,174	2298,055
3	-1071,161	2314,330	2212,928	2206,321	2346,330
4	-1059,860	2350,857	2214,597	2205,720	2393,857
5	-1050,886	2392,036	2220,919	2209,771	2446,036
6	-1043,496	2436,386	2230,411	2216,993	2501,386

Note: Nº: number; BIC: Bayesian information criteria; aBIC: adjusted Bayesian information criteria; AIC: Akaike information criteria; CAIC: consistent Akaike information criteria.

Data source: Research data (2023).

Figure 1. Item-response probabilities of each social determinant of health indicator for each class among a sample of Adventist adults and elderly people (n = 216), ECOVIDA Study, Brazil, 2022-2023.



Data source: Research data (2023).

The association of classes of social determinants of health with the total score and each of the eight natural remedies is presented in Table 3. In sum, only participants allocated in Class 2 had lower scores of exercise construct than their peers in Class 1, both in brute and adjusted models. There was no association between the classes of social determinants of health with the total score or the other 7 natural remedies (Table 3).

Table 3. Association between clusters of social determinants of health with the total score and each of the eight natural remedies in a sample of Adventist adults and elderly people (n = 216), ECOVIDA Study, Brazil, 2022-2023.

Outcomes	Crude			Adjusted			Adjusted R^2
	Coef. (95CI%)		p-value	Coef. (95CI%)		p-value	
	Class 1	Class 2		Class 1	Class 2		
Total score	Ref.	-2.15 (-4.75; 0.46)	0.106	Ref.	-1.47 (-3.97; 1.02)	0.246	0.10
Nutrition	Ref.	-0.56 (-1.24; 0.13)	0.114	Ref.	-0.39 (-1.05; 0.27)	0.244	0.11
Exercise	Ref.	-1.46 (-2.54; -0.37)	0.009	Ref.	-1.36 (-2.44; -0.27)	0.015	0.04
Water	Ref.	0.06 (-0.36; 0.47)	0.791	Ref.	0.08 (-0.34; 0.49)	0.719	<0.01
Sunlight	Ref.	0.34 (-0.06; 0.74)	0.098	Ref.	0.39 (-0.01; 0.79)	0.055	0.03
Temperance	Ref.	0.08 (-0.54; 0.70)	0.791	Ref.	0.20 (-0.40; 0.81)	0.504	0.06
Clean air	Ref.	-0.41 (-0.86; 0.04)	0.073	Ref.	-0.40 (-0.84; 0.05)	0.081	0.03
Rest	Ref.	0.05 (-0.55; 0.64)	0.872	Ref.	0.15 (-0.44; 0.73)	0.618	0.03
Trust in God	Ref.	-0,.25 (-0.77; 0.27)	0.347	Ref.	-0.15 (-0.66; 0.36)	0.565	0.06

Note: Models adjusted for baptism time, number of people living together, and stray from the church; Coef.: Coefficient; 95%CI: 95% confidence intervals; Ref.: Reference category.
Data source: Research data (2023).

4. DISCUSSION

This study aimed to investigate how the social determinants of health were grouped in a sample of Adventist adults and elderly individuals, and to examine how these groupings are associated with a healthy lifestyle in this sample. Our main findings indicate that two classes were founded, and that class 2 is twice as large and can be considered more vulnerable when compared to class 1. Additionally, we found that the latent classes were significantly associated

only with the exercise domain, i.e., it was observed that class 2 scored lower in the exercise domain than class 1.

Overall, socioeconomic circumstances, influencing lifelong patterns of life and health, and the structural conditions of the environment play essential roles in shaping individual behavior and physical and mental health (Alvarez-Galvez et al., 2013; Alvarez-Galvez et al., 2014; Alvarez-Galvez, 2018). In post-industrialized societies, health disparities closely correlate with inequalities in the distribution of family income, social position, occupational status, and educational level (Alvarez-Galvez, 2018; Costa-Font; Hernandez-Quevedo, 2012). Additionally, an increase in SES is associated with a reduction in the prevalence of health problems and mortality (Alvarez-Galvez, 2018). Furthermore, a scoping review indicated that unfavorable socioeconomic conditions often relate to intermediate health determinants, such as harmful lifestyles and risk behaviors (Mello et al., 2021).

Thus, as in any other region of the Western world, in capitalist societies, Brazil is a country divided into social classes that reveal disparate socioeconomic conditions. Historically, facing Brazilian social inertia, inequalities between classes were structured in processes of slavery and/or alienation of Black (Cardoso, 2008) and Indigenous peoples. Thus, peripheral regions were created in cities and states, whose populations suffer from processes of inequities and social vulnerability. Furthermore, from a regional perspective, it is observed that the North and Northeast regions suffer from the unequal distribution of resources and technologies when compared to the South and Southeast regions of Brazil. That is why to establish a reflection on this reality, it is necessary to problematize the relationships of oppression that affect people in a neoliberal and capitalist context (Freire, 2019).

Indeed, the landscape of physical activity in Brazil is marked by notable inequalities in different domains of physical activity according to VIGITEL (Brasil, 2023). These disparities are influenced by various factors such as gender, age group, and socioeconomic status. Men and individuals with higher education levels exhibit higher rates of participation in physical activity and sports, with a pronounced difference among those with a family income above three minimum wages, especially between five and 10 minimum wages. Geographical analysis highlights profound regional inequalities in Brazil, stemming from its continental dimensions and historical issues.

Botelho et al. (2021) reinforced evidence of disparities in physical activity and sports, consistently revealing across the country that men, white individuals, urban residents, and those with higher education levels show a more significant prevalence of these practices. The

Southern and Northern regions exhibit more pronounced inequalities, indicating the need for specific interventions to promote equity in participation in physical and sports activities nationwide. These results point to the complexity of socioeconomic and geographical influences on physical activity practice in Brazil, emphasizing the importance of inclusive approaches to mitigate such disparities.

Undoubtedly, this underscores the importance of problematizing inequalities in the practice of physical and sports activities, considering them as vectors of human development (PNUD, 2017). In them, we can observe relationships of oppression, but we can also identify other possibilities for overcoming social inequalities when we put intentional action into play, guiding the human being as a "being for the world" (Sérgio, 2003, p. 26).

Data from national surveys such as the Census (Brasil, 2022), VIGITEL (Brasil, 2023), the National Health Survey (Brasil, 2020), and the National Human Development Report of Brazil (PNUD, 2017) support our reflection on the impacts that social inequalities have on the most vulnerable populations, including those of black, brown, and indigenous ethnicity. The guaranteed rights stipulated in the Brazilian Federal Constitution of 1988 and policies for income transfer and expanded access to goods and services (health, education, housing, employment, income, etc.) have not yet been able to reverse historically constructed inequalities that structure the socioeconomic vulnerability of these populations. Despite being the majority, indicators demonstrate that better levels of living conditions are lacking in these populations (Brasil, 2022).

Social inequalities harm health. Barata (2009) indicates that the processes of structuring a society (i.e., social reproduction) are the same ones that generate social inequalities and iniquities, thus creating specific epidemiological profiles of health and disease. Recent studies based on Brazilian national surveys indicate that social inequalities reflect people's health conditions (Crochemore-Silva et al., 2018; Viacava et al., 2019; Cobo; Cruz; Dick, 2021). Viacava et al. (2019) observe that the North and Northeast regions had the worst indicators in access to health services and that regional and social inequalities still persist. Crochemore-Silva et al. (2018) point out that individuals with lower income had worse health conditions and less use of health services. The authors also emphasize that resolving such problems involves reducing social inequalities for an improvement in people's quality of life.

In the face of these issues, our findings also indicate that class 2 has a lower score in the exercise domain compared to class 1. As mentioned earlier, class 2 has higher processes of socioeconomic vulnerability. These data mirror the problems pointed out by the United Nations

Development Programme's Movement is Life report in the Brazilian territory (PNUD, 2017). According to the report, black people, women, those with lower income, and formal education tend to have less access to physical and sports activities. Knuth and Antunes (2021) support this report, indicating that access to body practices and physical activities is not an individual choice but is influenced by living conditions.

The authors highlight the inherent complexity of integrating movement into daily life, emphasizing that such an association cannot be simplified to a mere individual choice. On the contrary, it is conceived as a gesture of resistance and courage in the face of impositions resulting from living conditions and social disparities in Brazil. In this perspective, participation in body practices/physical activity, especially when supervised by specialized professionals, proves to be as intricate and unequal as access to medical services and other health-related care, with this complexity also culturally shaped (Knuth; Antunes, 2021). Therefore, it is a privilege enjoyed by only a small portion of the population (more socioeconomically favored).

Botelho et al. (2021) indicate that men, white individuals, urban dwellers, and those with higher levels of formal education showed greater participation in sports and physical activities in all Brazilian regions, thus highlighting inequalities in the country's regions. In view of the data discussed so far, we can conceive that despite studies pointing to better health conditions in Adventists (Gashugi et al., 2023; Silva et al., 2012; Velten et al., 2017; Oliveira et al., 2016; Velten, 2013; Kanno; Sella; Oliveira, 2014), there is a limit to health development (at least in the exercise domain) when we consider its social determinants. Religion is considered a social determinant of health. People who practice a religion have a 40% lower risk of mortality. However, other social determinants (income and net worth) also influenced this index (Idler et al., 2017). In other words, individual effort alone is not sufficient in the face of iniquities generated by social inequalities.

Given this scenario, we agree with Crochemore-Silva et al. (2020) on the need to advocate for public policies promoting body practices and physical activities, including their connection with the Unified Health System (SUS) based on its principles of universality, equity, and comprehensiveness. Such actions can contribute to providing contextualized access to body practices and physical activities for people in vulnerable situations. The SDAC may include in its programs instructions on how its members can access the health services offered by the SUS; that includes motivating them as well.

Regarding the classes of social determinants of health, no significant associations were observed with the other domains that make up the 8NR, nor with the overall score. Several

hypotheses can be raised regarding these findings, directly related to the inherent limitations of this study. Firstly, it is possible that we encounter a methodological limitation related to the sample size, suggesting that with a larger sample, the verification of a significant association could be achieved. On the other hand, it is plausible that the sample participants adopted social desirability or corporatist behaviors, hiding or distorting responses to integrate into the community and/or protect the institution. In this sense, we may have a bias of a social-religious nature affecting the data.

Second, the sampling was conventional, not probabilistic. Therefore, the representativeness of the target population was not guaranteed, requiring reservations in the generalization of the findings. It is important to emphasize that convenience sampling is widely used because it is fast and cost-effective, but it has critical limitations since it does not involve random selection, it tends to generate selection bias and underrepresentation, compromising external validity and preventing robust generalizations for the target population. It also does not allow for estimating the margin of error, compromising statistical accuracy. Consequently, its results are only reliable for the specific group studied, and studies with broad implications require probabilistic samples or mitigation strategies, such as increasing the sample size, diversifying collection sites, and full transparency regarding methodological limitations.

On the other hand, the study also has strengths. First, from a methodological standpoint, the statistical analysis in the person-centered approach stands out. Secondly, we emphasize the study's relevance in addressing the theme of religion, an intrinsic element of Brazilian culture, whose population demonstrates significant adherence to Christianity. In this context, it is notable that the Seventh-day Adventist denomination has established beliefs about health, providing guidance for a considered healthy lifestyle. Moreover, it is fruitful to investigate whether such beliefs, in the realm of individual agency, exert (or not) influence on actions in the face of living conditions (i.e., social determinants of health). Finally, we can mention that, to date, there is a shortage of studies addressing the health of Adventists related to living conditions in Brazil, especially in the Northern region of the country.

5. CONCLUSION

We conclude that among the Adventists in our sample, there are two classes of social determinants of health, with one of them having double the prevalence of the other and being more vulnerable. In this context, those in a more vulnerable situation scored lower in the

construct related to exercise, suggesting that individual effort alone may not be sufficient to promote engagement in this domain. Thus, it becomes evident that religious guidelines alone may not have a significant relationship with individual actions when people face life contexts permeated by inequities and vulnerabilities.

In light of this, we recognize the need for public policies that strengthen opportunities for connection with physical activity but also, and mainly, reduce the socioeconomic inequalities that generate processes of social inequity. The SDAC can contribute by providing guidance and motivation to its members to access existing policies in the SUS. For future studies, we suggest the use of a larger and randomized sample, as well as the development of longitudinal studies with a guarantee of total anonymity of responses for respondents. Finally, we emphasize that studies emphasizing living conditions can provide fruitful data for the formulation of public policies aimed at meeting the health needs of the population.

6. REFERENCES

ABDALA, Gina Andrade; MEIRA, Maria Dyrce Dias; ISAYAMA, Ricardo Noboro; RODRIGO, Gabriel Tagliari; WATAYA, Roberto Sussumu; TERTULIANO, Ivan Wallan. Validation of the eight natural remedies questionnaire – Q8RN – adult version. **LifeStyle Journal**, São Paulo, v. 5, n. 2, p. 109-34, July/Dec. 2018. https://jlsr.emnuvens.com.br/LifestyleJournal/article/view/1171

ALVAREZ-GALVEZ, Javier. Multidimensionality of Health Inequalities: A Cross-Country Identification of Health Clusters through Multivariate Classification Techniques. **International Journal of Environmental Research and Public Health**, [s.l.], v. 15, n. 9, 1900, Sep. 2018. https://doi.org/10.3390/ijerph15091900

ALVAREZ-GALVEZ, Javier; RODERO-COSANO, Maria Luisa; GARCIA-ALONSO, Carlos; SALVADOR-CARULLA, Luis. Changes in socioeconomic determinants of health: Comparing the effect of social and economic indicators through European welfare state regimes. **Journal of Public Health**, [s.l.], v. 22, n. 4, p. 305-11, May 2014. http://dx.doi.org/10.1007/s10389-014-0623-x

ALVAREZ-GALVEZ, Javier; RODERO-COSANO, Maria Luisa; MOTRICO, Emma; SALINAS-PEREZ, Jose; GARCIA-ALONSO, Carlos; SALVADOR-CARULLA, Luis. The impact of socio-economic status on self-rated health: Study of 29 countries using European social surveys (2002–2008). **International Journal of Environmental Research and Public Health**, [s.l.], v. 10, n. 3, p. 747-61, Feb. 2013. https://doi.org/10.3390/ijerph10030747

BADZIAK, Rafael Policarpo Fagundes; MOURA, Victor Eduardo Viana. Determinantes sociais da saúde: um conceito para efetivação do direito à saúde. **Revista de Saúde Pública de Santa Catarina**, Florianópolis, v. 3, n. 1, p. 69-79, jan./jun. 2010. https://revista.saude.sc.gov.br/index.php/files/article/download/21/23/72

BARATA, Rita Barradas. **Como e por que as desigualdades sociais fazem mal à saúde**. Rio de Janeiro: FIOCRUZ, 2009.

BOTELHO, Vivian Hernandez; WENDT, Andrea; PINHEIRO, Eraldo dos Santos; CROCHEMORE-SILVA, Inácio. Desigualdades na prática esportiva e de atividade física nas macrorregiões do Brasil: PNAD, 2015. **Revista Brasileira de Atividade Física & Saúde**, Pelotas, v. 26, n. 1, e0206, 2021. https://doi.org/10.12820/rbafs.26e0206

BRASIL. **Desigualdades sociais por cor ou raça no Brasil**. 2. ed. Rio de Janeiro: IBGE, 2022.

BRASIL. **Pesquisa Nacional de Saúde:** 2019: percepção do estado de saúde, estilos de vida, doenças crônicas e saúde bucal: Brasil grandes regiões. Rio de Janeiro, IBGE, 2020.

BRASIL. **Vigitel Brasil 2023:** vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico: estimativas sobre frequência e distribuição sociodemográfica de fatores de risco e proteção para doenças crônicas nas capitais dos 26 estados brasileiros e no Distrito Federal em 2023. Brasília: Ministério da Saúde, 2023.

BUSS, Paulo Marchiori; PELLEGRINI FILHO, Alberto. A Saúde e seus Determinantes Sociais. **Physis: Revista de Saúde Coletiva**, Rio de Janeiro, v. 17, n. 1, p. 77-93, 2007. https://doi.org/10.1590/S0103-73312007000100006

BUTLER, Terry; FRASER, Gary; BEESON, Laurence; KNUTSEN, Synnøve; HERRING, Patti; CHAN, Jacqueline; SABATÉ, Joan; MONTGOMERY, Susanne; HADDAD, Ella; PRESTON-MARTIN, Susan; BENNETT, Hannelore; JACELDO-SIEGL, Karen. Cohort profile: The Adventist Health Study-2 (AHS-2). **International Journal of Epidemiology**, [s.l.], v. 37, n. 2, p. 260-5, Apr 2008. https://doi.org/10.1093/ije/dym165

CARDOSO, Adalberto. Escravidão e sociabilidade capitalista: um ensaio sobre inércia social. **Novos Estudos**, São Paulo, v. 80, p. 71-88, Mar. 2008. https://doi.org/10.1590/S0101-33002008000100006

COBO, Barbara; CRUZ, Claudia; DICK, Paulo. Gender and racial inequalities in the access to and the use of Brazilian health services. **Ciência & Saúde Coletiva**, Rio de Janeiro, v. 26, n. 9, p. 4021-32, Sep. 2021. https://doi.org/10.1590/1413-81232021269.05732021

COLLINS, Linda M.; LANZA, Stephanie T. **Latent Class and Latent Transition Analysis:** With Applications in the Social, Behavioral, and Health Sciences. Hoboken: John Wiley & Sons, 2009.

COSTA-FONT, Joan; HERNANDEZ-QUEVEDO, Cristina. Measuring inequalities in health: What do we know? What do we need to know? **Health Policy**, [s.l.], v. 106, n. 2, p. 195-206, Jul. 2012. https://doi.org/10.1016/j.healthpol.2012.04.007

CROCHEMORE-SILVA, Inácio; KNUTH, Alan; MIELKE, Gregore Iven; LOCH, Mathias Roberto. Promotion of physical activity and public policies to tackle inequalities: considerarions based on the Inverse Care Law and Inverse Equity Hypothesis. **Cadernos de Saúde Pública**, São Paulo, v. 36, n. 6, e00155119, 2020. https://doi.org/10.1590/0102-311X00155119

CROCHEMORE-SILVA, Inácio; RESTREPO-MENDEZ, Maria Clara; COSTA, Janaína Calu; EWERLING, Fernanda; HELLWIG, Franciele; FERREIRA, Leonardo Zanini; RUAS, Luis Paulo Vidaletti; JOSEPH, Gary; BARROS, Aluísio. Measurement of social inequalities in health: concepts and methodological approaches in the Brazilian context. **Epidemiologia e**

Serviços de Saúde, Brasília, v. 27, n. 1, e000100017, 2018. https://doi.org/10.5123/s1679-49742018000100017

FERREIRA, Greciane Marks Farias; STAUT, Thaís Cristina de Pontes; ARAÚJO, Sara Pereira; OLIVEIRA, Natália Cristina; PORTES, Leslie Andrews. Estilo de vida entre brasileiros adventistas do sétimo dia. **Lifestyle Journal**, São Paulo, v. 1, n. 1, p. 17-25, 2011. https://revistalifestyle.org/LifestyleJournal/article/view/132

FREIRE, Paulo. **Pedagogia do oprimido**. 84. ed. São Paulo: Paz e Terra, 2019.

GASHUGI, Leonard; OH, Jisoo; MASHCHAK, Andrew; FRASER, Gary. Lifestyle-Related Behavior and Self-Reported Health Status Among Seventh-Day Adventists. **American Journal of Lifestyle Medicine**, [s.l.], published online 2023. https://doi.org/10.1177/15598276231184401

GIAQUINTO, Salvatore; SPIRIDIGLIOZZI, Cristiana. Possible influence of spiritual and religious beliefs on hypertension. **Clinical and Experimental Hypertension**, [s.l], v. 29, n. 7, p. 457-64, Oct. 2007. https://doi.org/10.1080/10641960701615683

IDLER, Ellen; BLEVINS, John; KISER, Mimi; HOGUE, Carol. Religion, a social determinant of mortality? A 10-year follow-up of the Health and Retirement Study. **Plos One**, [s.l], v. 12, n. 12, e0189134, 2017. https://doi.org/10.1371/journal.pone.0189134

KANNO, Daniela Tiemi; SELLA, Luiz Fernando; OLIVEIRA, Natália Cristina. Estilo de vida de adventistas do sétimo dia e de não adventistas do município de Cotia, São Paulo. **Revista de Ciências Médicas**, Campinas, v. 23, n. 3, p. 137-44, set./dez. 2014. https://doi.org/10.24220/2318-0897v23n3a2824

KNUTH, Alan; ANTUNES, Priscilla de Cesaro. Práticas corporais/atividades físicas demarcadas como privilégio e não escolha: análise à luz das desigualdades brasileiras. **Saúde & Sociedade**, São Paulo, v. 30, n. 2, e200363, 2021. https://doi.org/10.1590/S0104-12902021200363

MCLACHLAN, Geoffrey J.; LEE, Sharon X.; RATHNAYAKE, Suren I. Finite Mixture Models. **Annual Review of Statistics and Its Application**, [s.l.], v. 6, p. 355-378, 2019. https://doi.org/10.1146/annurev-statistics-031017-100325

MELLO, Gabrielli Thais; LOPES, Marcus Vinicius Veber; MINATTO, Giseli; COSTA, Rafael Martins; MATIAS, Thiago Sousa; GUERRA, Paulo Henrique; BARBOSA FILHO, Valter Cordeiro; SILVA, Kelly Samara. Clustering of Physical Activity, Diet and Sedentary Behavior among Youth from Low-, Middle-, and High-Income Countries: A Scoping Review. **International Journal of Environment Research and Public Health**, [s.l.], v. 18, n. 20, 10924, Oct. 2021. https://doi.org/10.3390/ijerph182010924

NYLUND, Karen L.; ASPAROUHOV, Tihomir; MUTHÉN, Bengt O. Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. **Structural Equation Modeling: A Multidisciplinary Journal**, [s.l.], v. 14, n. 4, p. 535-569, out. 2007. https://doi.org/10.1080/10705510701575396

OLIVEIRA, Elizabete Regina Araújo; CADE, Nágela Valadão; VELTEN, Ana Paula Costa; SILVA, Gulnar Azevedo; FAERSTEIN, Eduardo. Comparative study of cardiovascular and cancer mortality of Adventists and non-Adventists from Espírito Santo State, in the period from 2003 to 2009. **Revista Brasileira de Epidemiologia**, São Paulo, v. 19, n. 1, p. 112-21, Jan./Mar., 2016. https://doi.org/10.1590/1980-5497201600010010

PORTES, Leslie Andrews; SILVA, Natália Cristina Vargas de Oliveira. Estilo de vida: fundamento adventista de saúde. **LifeStyle Journal**, São Paulo, v. 4, n. 2, p. 103-11, jul./dez. 2017. https://revistalifestyle.org/LifestyleJournal/article/view/1037/944

PROGRAMA DAS NAÇÕES UNIDAS PARA O DESENVOLVIMENTO (PNUD). **Relatório de Desenvolvimento Humano Nacional - Movimento é Vida:** Atividades Físicas e Esportivas para Todas as Pessoas: 2017. Brasília: PNUD, 2017.

R CORE TEAM. **R:** A language and environment for statistical computing. The R Project for Statistical Computing. Accessed November 24, 2024. https://www.R-project.org/

SÉRGIO, Manuel. **Alguns Olhares sobre o Corpo**. 2. ed. Portugal: Instituto Piaget, 2003.

SILVA, Edlla Laurindo; SANTOS, Jeniffer Cardoso; CAMPOS, Islanne; TEIXEIRA, Wandenberg Silva; MARTIS, Eliel; PÔRTO, Elias Ferreira. Prevalência de hipertensão arterial sistêmica entre adventistas do sétimo dia na zona sul de São Paulo. **LifeStyle Journal**, São Paulo, v. 4, n. 2, p. 87-102, jul./dez. 2017. https://jlsr.emnuvens.com.br/LifestyleJournal/article/view/1034

SILVA, Leilane Bagno Eleutério; SILVA, Stael Silvana Bagno Eleutério; MARCÍLIO, Amanda Garcia; PIERIN, Angela Maria Geraldo. Prevalence of Arterial Hypertension Among Seventh-Day Adventists of the São Paulo State Capital and Inner Area. **Arquivos Brasileiros de Cardiologia**, [s.l.], v. 98, n. 4, p. 329-37, Apr. 2012. https://doi.org/10.1590/S0066-782X2012005000018

VELTEN, Ana Paula Costa. **Comparação da mortalidade dos adventistas do sétimo dia com a população não adventista no período de 2003 a 2009 no Estado do Espírito Santo**. 2013. 117f. Dissertação (Mestrado em Saúde Coletiva) – Centro de Ciências da Saúde, Universidade Federal do Espírito Santo, Vitória, 2013. http://repositorio.ufes.br/handle/10/5681

VELTEN, Ana Paula Costa; CADE, Nágela Valadão; SILVA, Gulnar Azevedo; OLIVEIRA, Elizabete Regina Araújo. Profile of mortality from external causes among Seventh-day Adventists and the general populations. **Ciência & Saúde Coletiva**, Rio de Janeiro, v. 22, n. 7, p. 2375-82, July 2017. https://doi.org/10.1590/1413-81232017227.13792015

VIACAVA, Francisco; PORTO, Silvia Marta; CARVALHO, Carolina de Campos; BELLIDO, Jaime Gregório. Health inequalities by region and social group based on data from household surveys (Brazil, 1998-2013). **Ciência & Saúde Coletiva**, Rio de Janeiro, v. 24, n. 7, p. 2745-60, Jul. 2019. https://doi.org/10.1590/1413-81232018247.15812017

WOO, Sang Eun; HOFMANS, Joeri; WILLE, Bart; TAY, Louis. Person-centered modeling: Techniques for studying associations between people rather than variables. **Annual Review of Organizational Psychology and Organizational Behavior**, [s.l.], v. 11, p. 453-80, Jan. 2024. https://doi.org/10.1146/annurev-orgpsych-110721-045646

WOO, Sang Eun; JEBB, Andrew; TAY, Louis; PARRIGON, Scott. Putting the "Person" in the Center: Review and Synthesis of Person-Centered Approaches and Methods in Organizational Science. **Organizational Research Methods**, [s.l.], v. 21, n. 4, p. 814-45, Jan. 2018. https://doi.org/10.1177/1094428117752467