LIFESTYLE RISK FACTORS FOR CHRONIC NON-COMMUNICABLE DISEASES IN AN INNER BRAZILIAN CENTRAL-WESTERN MUNICIPALITY

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ABSTRACT — Aims: to study the epidemiology of lifestyle risk factors among a population from a municipality of the Central-Western Brazilian region. Methods: a validated food frequency and lifestyle questionnaire (smoking, alcoholic drinking, sleep) were applied to adults from 18 to 70 years old of a Central-Western Brazilian municipality. Results: More men (26.8%) than women (14.3%) declared drinking three or more days per week (p=0.0006). Considering sleeping hours, 18.5% and 21.4% of men and women slept only up to 5 hours per night with no statistical difference. Only 4.6% of men and 10% of women eat five portions of fruits each day. The frequency of meat consumption of 5 to 7 days per week reached 61.4% for women and 67.6% for men. Furthermore, only 5.7% and 9.3% of women and men (respectively) had eaten two portions of cereals almost every day. In respect of consumption of fried foods by 5 to 7 days per week, men (50.93%) did it more than women (27.2%), with p<0.0001. Finally, women consumed more bakery, candies and sweeties than men 5 to 7 days per week. Conclusions: although consumption of fruits, vegetables and legumes was lower, excessive intake of meat and its products, as well fried foods and bakery foods/candies/sweeties were found in the present study.

KEYWORDS — sleep, fried foods, foods of confectionery, fruits, legumes, meat.

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INTRODUCTION

In only three decades there was an incredible rise in both incidence and prevalence of overweight, obesity and metabolic syndrome among Brazilians (Schmidt et al., 2011). Although the obesity epidemic is influenced by different risk factors, certainly the most important factor is the unfavorable change of the traditional Brazilian diet to Western diets, especially those rich in processed and ultraprocessed foods (Schmidt et al., 2011; Martins, Levy, Claro, Moubarac & Monteiro, 2013; Louzada et al., 2015).

According to the "National Health Study", a population-based Brazilian study, about 40% of Brazilians eat excessive amounts of meat and its products, a great proportion of the population regularly enjoy soft drinks (25%), and fifth of the population regularly eat bakery foods, candies and sweeties, both eating habits which unfavorably increased the risk of development of chronic non-communicable diseases (CNCD) among Brazilians (Claro et al., 2015).

Recently, the burden of chronic non-communicable diseases and its risk factors among Brazilians were also pointed out by another important epidemiologic survey, the Vigitel (Malta et al., 2015; Malta et al., 2016), as well as other regional and local studies.

In this manner, unhealthy lifestyles such as physical inactivity, smoking, alcohol abuse, inadequate intake of fruits and vegetables, associated with several socio-environmental factors, such as low income and poor educational level, precarious working conditions, lack of leisure opportunities, lack of or insufficient social support, poor quality of health information available to the general public, and other crucial issues have contributed to the development of CNCD in the Brazilian population (Sá & Catarina, 2010; Dias et al., 2011; Schmidt et al., 2011; Galego et al., 2014; Farias jr et al., 2014; Garcia & Freitas, 2015; Malta et al., 2015; Azevedo & Silva et al., 2016).

Nevertheless, CNCDs continue to be important causes of premature mortality and high treatment costs for the population and the Brazilian National Health System (SUS) (Alves & Morais Neto, 2015; Tavares et al., 2015).

Then, due the scarcity of studies regarding food consumption and other lifestyle risk factors in inner

regions, the objective of the present study was to study the epidemiology of lifestyle risk factors among a population from a municipality of the Central-Western Brazilian region.

METHODS

Bom Jardim de Goiás, located at 16° 12′ 36″ S, 52° 10′ 19″ W (GeoHack, 2018), has 8,423 inhabitants and a population density of 4.55 inhabitants/km^2, and is located in middle-west region of the Goiás state – Brazil (IBGE, 2018).

Considering the population of the Bom Jardim de Goiás and a confidence level of 95%, the sample size needed was estimated in 368 inhabitants by the use of the survey system software (https://www.surveysystem.com/sscalc.htm).

However, the final sample comprised 534 subjects (210 women, and 324 men) from 18 to 70 years old. Socioeconomic characterization of the population is show in Table 1.

Table 1. *Socioeconomic characterization of the studied population from Bom Jardim de Goiás, GO, Brazil, 2018*

Variable	Categories	N	%
Age	18–34	287	53.75
	34–59	194	36.33
	≥60	53	9.92
Education	Illiterate	40	7.5
	Fundamental	246	46
	High school	227	42.5
	College	21	4
Ethnicity	Afrobrazilian	229	42.9
	Caucasian	282	52.8
	Indigenous	23	4.3
Gender	Female	210	39.3
	Male	324	60.7
Familial income*	≤1 M.S.	251	47
	≥1–2 M.S.	131	24.6
	> 2 M.S.	122	22.8
	Not answered	30	5.6

** In National base salaries per month (US$281.00)*

In January 2018, the Brazilian minimum salary was R$954.00 which is equivalent to US$281.00 according to the Ministry of work and employment (http://portal.mte.gov.br/sal_min/).

The inclusion criteria were to be willing to participate in the study and sign the informed consent form. Exclusion criteria were the refusal to participate in the study, as well as being bedridden, invalid, pregnant or lactating.

In order to evaluate food habits, sleep, and other lifestyle risk factors, a dietary questionnaire regarding food frequency intake was used (Spanhol & Ferrari, 2015). The instrument was adapted from previously validated food frequency and daily habits questionnaires (Vieira et al., 2002; Spanhol & Ferrari, 2015). Questionnaires were applied between November 2017 and April 2018.

Ethical and statistical aspects

Before engaging into the research people received an explanation regarding the procedures and they signed a written informed consent. This study is a subsample from study "The Epidemiology and Risk Factors of Chronic Non-Communicable Diseases: Development and Application of a Health Promotion Scale (HPS) which was approved by the Ethics Committee on Research of the "Campus Universitário do Araguaia" from "Universidade Federal de Mato Grosso (UFMT)" (protocol CAAE: 62989416.1.0000.5587). Statistical analysis was done using the program Epitools® (Australia). In order to correct, standardize and balance the samples by gender, a two-tailed, 2-proportion z-test was performed. Statistical significant differences were considered when $p<0.05$.

RESULTS

In accordance with national profile, smoking behavior is decreasing. Among women, only 10% declared smoking, whereas 25,9% of men did it. This difference was significant with $p<0.0001$.

In respect of alcoholic drinking, more women (51.4%) than men 31.5% declared not drinking which was significantly different with $p<0.0001$. The proportion of women and men which drunk up twice per week was 34.3% and 41.7%, respectively, with no significant difference ($p=0.0865$). Beyond that, more men (26.8%) than women (14.3%) declared drinking three or more days per week ($p=0.0006$) (Fig. 1).

Considering sleeping hours, 18.5% and 21.4% of men and women slept only up to 5 hours per night with no statistical difference ($p=0.4086$). Furthermore, more women (57%) than men (44.4%) slept up to 7 hours/night (with $p=0.004$). More men slept eight hours or more compared to women ($p=0.0001$) (Fig. 2).

In respect of daily intake of five portions of fruits, 41.4% of women and 50.9% of men did it only once per week. Furthermore, only 4.6% of men and 10% of women eat five portions of fruits each day. Other fruit consumption patterns are presented in Fig. 3. There was no difference comparing women to the men.

On contrary to fruit consumption, meat and meat products eating was higher amongst the subjects. The frequency of meat consumption of 5 to 7 days per week reached 61.4% for women and 67.6% for men.

Other meat and meat products consumption patterns are presented in Fig. 4.

Women tend to drink milk and eat dairy foods more than men (Fig. 5). However, as observed in that figure, only 21.3% of men and 30% of women consume milk or dairy in a daily basis.

More men (25%) than women (15.7%) did not eat cereals (p=0.01). After all, only 26.8% of men and 40% of women ate 2 portions of cereals once per week. Furthermore, only 5.7% and 9.3% of women and men (respectively) had eaten two portions of cereals almost every day (Fig. 6).

The consumption of two portions of legumes was also lower, since 35.7% of women and 32.4% of men did it once per week. However, considering the consumption of 2 portions of legumes by 2 to 4 times per week, the frequency of intake was higher among men (56.5%) compared to women (37.1%) (p<0.0001), whereas adequate consumption of legumes, e.g., 5 to 7 times per week was higher among women (20%) than man (5.5%) (p<0.0001). Other aspects are presented in Fig. 7.

If consumption frequencies of fruits, legumes and cereals were lower, the daily intake of fried foods and bakery, candies, and sweeties were higher.

Considering the consumption of fried foods by 2 to 4 days per week, women (45.7%) eaten more compared to the men (15.74%) with p<0.0001. On the contrary, observing the consumption of fried foods by 5 to 7 days per week, men (50.93%) did it more than women (27.2%), with p<0.0001 (Fig. 8).

Very interesting was an inverse pattern of consumption of bakery foods, candies, and sweeties among women and men. Although more men (51.9%) than women (30%) (p<0.0001) eaten bakery, candies and sweeties by 2 to 4 days per week, more women (50%) than men (19.4%) did it by 5 to 7 days per week. (Fig. 9).

DISCUSSION

In the present study, smoking prevalence was higher among more men (25,9%) compared to women (10%). Our results differ from the results from the ELSA-Brazil cohort study which reported prevalence of smoking of 14.4% for men and 12.2% for women (Faleiro et al., 2017).

In respect of alcoholic drinking, more women (51.4%) than men (31.5%) declared

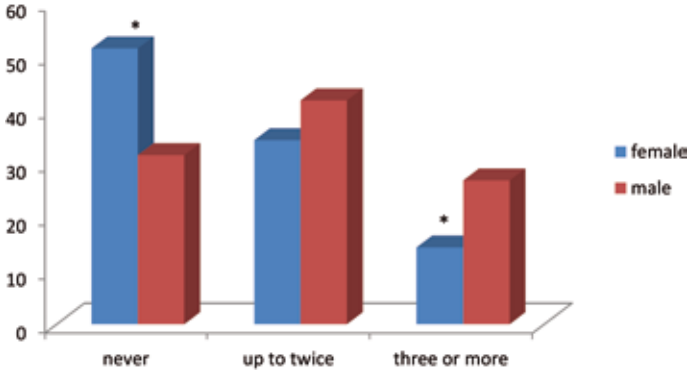

Fig. 1. Frequency of drinking of population from Bom Jardim de Goiás, Brazil

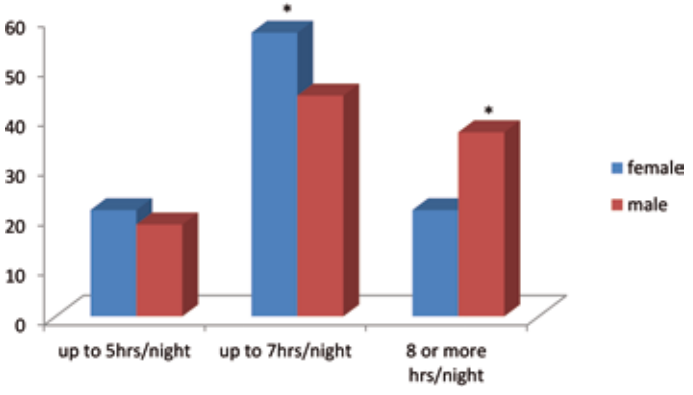

Fig. 2. Sleeping hours of population from Bom Jardim de Goiás, Brazil

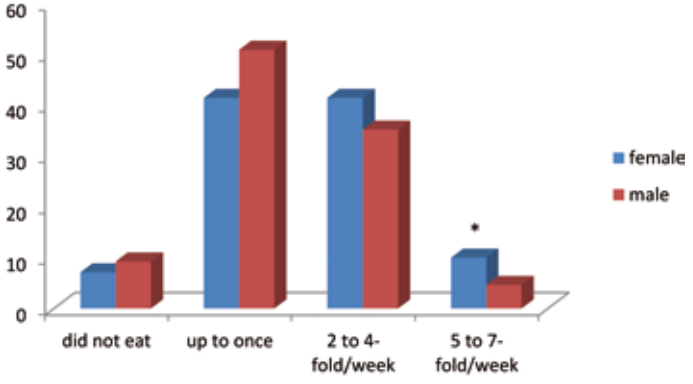

Fig. 3. Consumption of 5 daily portions of fruits by week in the population from Bom Jardim de Goiás, Brazil

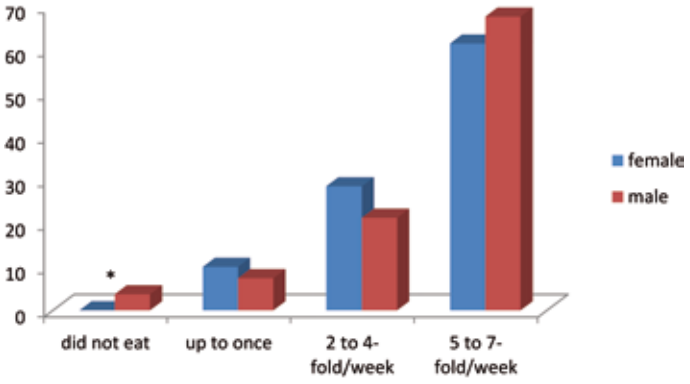

Fig. 4. Consumption of meat and meat products by week in the population from Bom Jardim de Goiás, Brazil

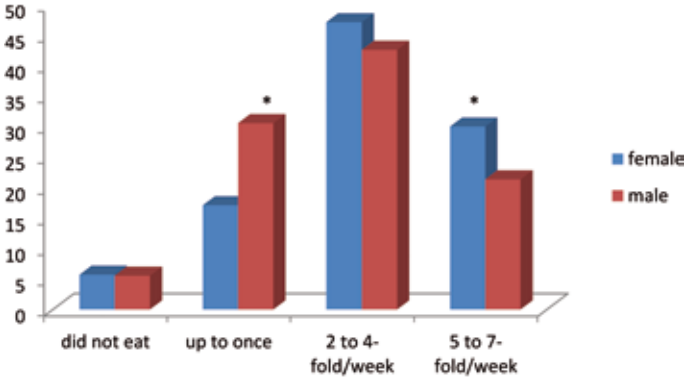

Fig. 5. Consumption of milk and dairy foods by week in the population from Bom Jardim de Goiás, Brazil

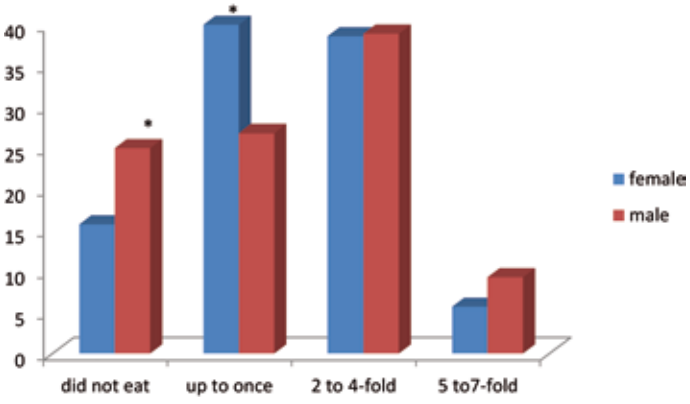

Fig. 6. Consumption of 2 daily portions of cereals by week in the population from Bom Jardim de Goiás, Brazil

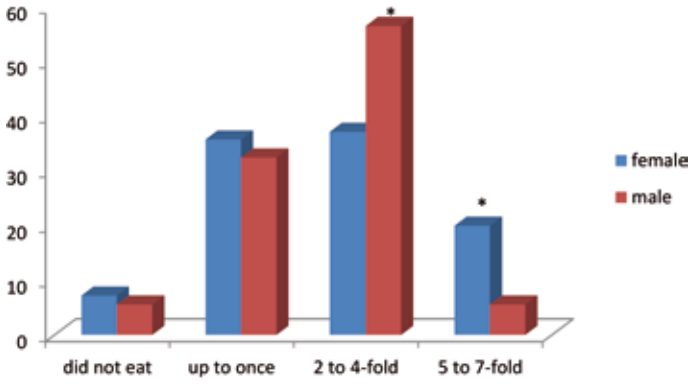

Fig. 7. Consumption of 2 daily portions of legumes by week in the population from Bom Jardim de Goiás, Brazil

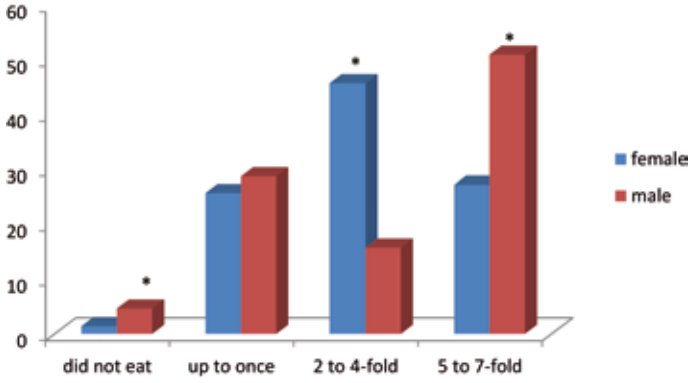

Fig. 8. Consumption of fried foods by week in the population from Bom Jardim de Goiás, Brazil

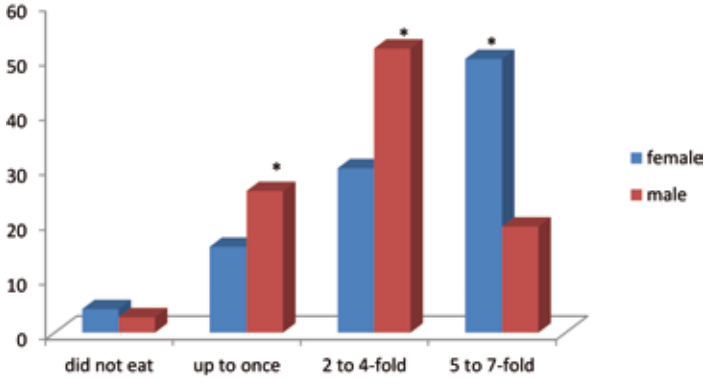

Fig. 9. Consumption of bakery foods, candies and sweeties by week in the population from Bom Jardim de Goiás, Brazil

not drinking, and the prevalence of alcoholic drinking was higher amongst men than women. This gender difference is in accordance with the National Health Study-NHS (Machado, Monteiro, Malta & Lana, 2017). However, the prevalence of alcoholic use in the present study was higher compared to the NHS.

Still regarding alcoholic drinking, the current results are similar to those found in Barra do Garças (MT state), a nearby city (Spanhol & Ferrari, 2016). The prevalence of alcoholic drinking of women

Considering sleeping hours, 18.5% and 21.4% of men and women slept only up to 5 hours per night. Sleeping less than 7–8 hours per night increases the risk and severity of both anxiety and stress-related symptoms (Almondes & Araújo, 2003; França et al., 2011).

Sleeping less than 8 hours, especially 5 hours or less, raises the risk and mortality by hypertension, type 2 diabetes, obesity and cardiometabolic syndrome (Chaput, McNeil, Després, Bouchard & Tremblay, 2013, Colwell & Matveyenko 2014; Tamakoshi & Ohno, 2004; Tufik, Andersen, Bittencourt & Mello, 2009; Santos, Ferrari & Ferrari, 2015; Wu et al., 2012).

In the present study, about 38% adequately consumed fruits from 2 to 4 days per week, and only 4.6% of men and 10% of women eat five portions of fruits each day. Results of the current study were in accordance with the ELSA-Brazil cohort study which observed that men ingested less fruits and vegetables than women (Faleiro et al., 2017). This gender difference was also reported in a nearby city from Legal Amazon (Spanhol & Ferrari, 2016).

On contrary to fruit consumption, meat and meat products eating was higher amongst the subjects. The frequency of meat consumption of 5 to 7 days per week reached 61.4% for women and 67.6% for men. These results are similar to those found in another study covering health professionals from three nearby municipalities of the same region (Wadi & Ferrari, 2017).

Women tend to drink milk and eat dairy foods more than men, but regular intake of milk and dairy was lower. Data from the current study corroborates a previous report in nearby municipalities (Wadi & Ferrari, 2017). A national survey also reported more consumption of dairy and milk by women in relation to the men (Possa et al., 2017).

Intake of milk and dairy foods of this study was also lower than the observed in Sao Paulo, Southwest Brazil (Ferrari & Ferreira, 2011).

More men (25%) than women (15.7%) did not eat cereals (p=0.01). After all, only 26.8% of men and 40% of women ate 2 portions of cereals once per week. The daily consumption of two portions of cereals was only 5.7% and 9.3% among women and men, respectively.

Considering the consumption of 2 portions of legumes by 2 to 4 times per week, the frequency of intake was higher among men (56.5%) compared to women (37.1%), whereas adequate daily consumption of legumes was higher among women (20%) than man (5.5%). A similar lower pattern of intake of legumes was found in a previous study covering the same geographic region (Wadi & Ferrari, 2017).

According to the Interheart, a cohort of 52 world's nations, it is very important to note that an adequate intake of vegetables and fruits comprises one of the most important modifiable factors that can materially diminish the risk for myocardial infarction (Yusuf et al., 2004).

If consumption frequencies of fruits, legumes and cereals were lower, the daily intake of fried foods and bakery, candies, and sweeties were higher.

Considering the consumption of fried foods by 2 to 4 days per week, women (45.7%) eaten more compared to the men (15.74%). On the contrary, observing the consumption of fried foods by 5 to 7 days per week, men (50.93%) did it more than women (27.2%). These data revealed a very excessive intake of those foods even when compared with a previous study developed in the same region (Wadi & Ferrari, 2017).

Very interesting was an inverse pattern of consumption of bakery foods, candies, and sweeties among women and men. Although more men (51.9%) than women (30%) ($p<0.0001$) eaten bakery, candies and sweeties by 2 to 4 days per week, more women (50%) than men (19.4%) did it by 5 to 7 days per week. The prevalence of consumption of bakery, candies and sweeties was very higher compared to the national prevalence as noted in the VIGITEL study (Malta et al., 2015). The consumption of bakery, candies and sweeties was also very higher compared to data from the NHS (Claro et al., 2015).

CONCLUSION

In this population from Central-Western Brazil the consumption of fruits, vegetables, cereals, legumes and milk/dairy products is not adequate and there is an excessive intake of fried foods and bakery, candies and sweeties. Those eating habits increase the risk for chronic non-communicable diseases.

REFERENCES

Almondes, K.M. de, Araújo, J.F. de (2003). Padrão do ciclo sono-vigília e sua relação com ansiedade em estudantes universitários. Estudos de Psicologia, 8, 37–43.

Alves, C.G., Morais Neto, O.L. de (2015). Tendência da mortalidade prematura por doenças crônicas não

transmissíveis nas unidades federadas brasileiras. Ciência & Saúde Coletiva, 20, 641–54.

Azevedo e Silva, G., Moura, L. de, Curado, M.P., Gomes, F. da S., Otero, U., Rezende, L.F.M., de, Daumas, R.P., ..., Boffetta, P. (2016). The fraction of cancer attributable to ways of life, infections, occupation, and environmental agents in Brazil in 2020. PLoS One, 11, e0148761.

Chaput, J.-P., McNeil, J., Després, J.-P., Bouchard, C., & Tremblay, A (2013). Seven to eight hours of sleep a night is associated with a lower prevalence of the metabolic syndrome and reduced overall cardiometabolic risk in adults. PLoS ONE, 8, e72832. doi:10.1371/journal.pone.0072832.

Claro, R.M., Santos, M.A.S., Oliveira, T.P., Pereira, C.A., Szwarcwald, C.L., & Malta, D.C.(2015) Unhealthy food consumption related to chronic non-communicable diseases in Brazil: National Health Survey, 2013. Epidemiologia e Serviços de Saúde, 24, 257–265.

Colwell, C.S. & Matveyenko, A.V. (2014). Timing is everything: implications for metabolic consequences of sleep restriction. Diabetes, 63, 1826–1828.

Dias, E.C., Oliveira, R.P. de, Machado, J.H., Minayo-Gomes, C., Perez, M.A.G., Hoefel, M. da G.L. & Santana, V.S. (2011). Condições de emprego e iniquidades em saúde: um estudo de caso no Brasil. Cadernos de Saúde Pública, 27, 2452–2460.

Faleiro, J.C., Giatti, L., Barreto, S.M., Camelo, L.V., Griep, R.H., Guimarães, J.M.N., Fonseca, M.J.M.,... & Chagas, M.C.A. (2017). Posição socioeconomica no curso da vida e comportamentos de risco relacionados à saúde: Elsa-Brasil. Cadernos de Saúde Pública, 33, e00017916. https://doi.org/10.1590/0102-311X00017916

Farias-Jr, J.C., Florindo, A.A., Santos, M.P., Mota, J. & Barros, M.V.G. (2014). Perceived environmental characteristics and psychosocial factors associated with physical activity levels in adolescents from Northeast Brazil: structural equation modelling analysis. Journal of Sport Sciences, 32, 963–973.

Ferrari, C.K.B. & Ferreira, R.F. (2011). Quality of life and exposition to unhealthy lifestyle risk factors of nocturnal university students from a greater metropolitan city. Journal of Biological and Environmental Sciences, 5, 129–134.

França, E.L., Silva, N.A., Lunardi, R.R., Honorio-França, A.C., Ferrari, C.K (2011). Shift work is a source of stress among military police in Amazon, Brazil. Neurosciences, 16, 384–386.

Galego, C.R., D'Avila, G.L. & Vasconcelos, F.A.G de (2014). Factors associated with the consumption of fruits and vegetables in schoolchildren aged 7 to 14 years in Florianópolis, South of Brazil. Revista de Nutrição, 27, 413–22.

Garcia, L.P. & Freitas, L.R.S de (2015). Consumo abusivo de álcool no Brasil: resultados da pesquisa nacional de Saúde 2013. Epidemiologia e Serviços de Saúde, 24, 227–37.

Geohack–Bom Jardim de Goiás. https://tools.wmflabs.org/geohack/geohack.php?language=pt&pagename=Bom_Jardim_de_Goi%C3%A1s&params=16_12_36_S_52_10_19_W_type:city_region:BR_scale:75000 [05/02/2018].

IBGE. Instituto Brasileiro de Geografia e Estatística. IBGE cidades. https://cidades.ibge.gov.br/brasil/go/bom-jardim-de-goias/panorama [04/30/2018].

Louzada, M.L.C., Martins, A.P.B., Canella, D.S., Baraldi, L.G., Levy, R.B., Claro, R.M., Moubarac, J.-C....& Monteiro, C.A. (2015). Ultra-processed foods and the nutritional dietary profile in Brazil. Revista de Saúde Pública, 49, 38. Epub July 10, 2015.https://dx.doi.org/10.1590/S0034-8910.2015049006132

Machado, I.E., Monteiro, M.G., Malta, D.C., Lana, F.C.F. (2017). Pesquisa nacional de saúde 2013: relação entre uso de álcool e características sociodemográficas segundo o sexo no Brasil. Revista Brasileira de Epidemiologia, 20, 408–422.

Malta, D.C., Campos, M.O., Oliveira, M.M. de, Iser, B.P.M., Bernal, R.T.I., Claro, R.M., Monteiro, C.A.,...& Reis, A.A.C. (2015). Prevalência de fatores de risco e proteção para doenças crônicas não transmissíveis em adultos residentes em capitais brasileiras, 2013. Epidemiologia e Serviços de Saúde, 24, 373–387.

Malta, D.C., Santos, M.A.S., Araújo, S.S.C., Oliveira, T.P., Stopa, S.R., Oliveira, M.M., Jaime, P. (2016). Time trend in adult obesity indicators in Brazilian state capitals, 2006–2013. Ciência & Saúde Coletiva, 21, 1061–1069.

Martins, A.P.B., Levy, R.B., Claro, R.M., Moubarac, J.-C. & Monteiro, C.A. (2013). Participacao crescente de produtos ultraprocessados na dieta brasileira (1987–2009). Revista de Saúde Pública, 47, 656-665. https://dx.doi.org/10.1590/S0034-8910.2013047004968

Possa, G., Castro, M.A., Sichieri, R., Fisberg, R.M., Fisberg, M. (2017). Dairy products consumption in Brazil is associated with socioeconomic and demographic factors: Results from the National Dietary Survey 2008–2009. Revista de Nutrição, 30, 79-90.

Sá, N.N.B. de & Moura, E.C. (2010). Fatores associados à carga de doenças da síndrome metabólica entre adultos brasileiros. Cadernos de Saúde Pública, 26, 1853–1862.

Santos, P.R. dos, Ferrari, G.S.L. & Ferrari, C.K.B. (2015). Diet, sleep and metabolic syndrome among a Legal Amazon population, Brazil. Clinical Nutrition Research, 4, 41–45.

Schmidt, M.I., Duncan, B.B., Azevedo, S.G., Menezes, A.M., Monteiro, C.A., Barreto, S.M., Chor, D. & Menezes, P.R (2011). Chronic non-communicable diseases in Brazil: burden and current challenges. The Lancet, 377, 1949–1979.

Spanhol, R.C. & Ferrari, C.K.B. (2016). Obesity and lifestyle risk factors among an adult population in Legal Amazon, Mato Grosso, Brazil. Revista de Salud Pública, 18, 26–36.

Tamakoshi, K. & Ohno, Y (2004). Self-reported sleep duration as a predictor of all-cause mortality: results from the JACC study, Japan. Sleep, 27, 51–54.

Tavares, N.U.L., Costa, K.S., Mengue, S.S., Malta, D.C., Silva jr, J.B. da (2015). Uso de medicamentos para tratamento de doenças crônicas não transmissíveis no Brasil: resultados da pesquisa nacional de saúde, 2013. Epidemiologia e Serviços de Saúde, 24, 315–323.

Tufik, S., Andersen, M.L., Bittencourt, L.R.A. & Mello, M.T. de (2009). Paradoxical sleep deprivation: neurochemical, hormonal and behavioral alterations. Evidence from 30 years of research. Anais da Academia Brasileira de Ciências, 81, 521–538.

Vieira, V.C.R., Priore, S.E., Ribeiro, S.M.R., Franceschini, S. do C.C. & Almeida, L.P. (2002). Socioeconomic, nutritional and health profile of adolescents recently admitted to a Brazilian public university. Revista de Nutrição, 15, 273–282.

Wadi JML, Ferrari CKB. (2017). Knowledge and intake of functional foods by primary health care professionals from a Legal Amazon region, Brazil. Revista Brasileira de Obesidade, Nutrição e Emagrecimento, 11, 313–321.

Wu, M.C., Yang, Y.C., Wu, J.S., Wang, R.H., Lu, F.H. & Chang, C.J. (2012). Short sleep duration associated with a higher prevalence of metabolic syndrome in an apparently healthy population. Preventive Medicine, 55, 305–309.

Yusuf, S., Hawken, S., Ôunpuu, S., Dans, T., Avezum, A., Lanas, F., McQueen, M... & Interheart Study Investigators (2004). Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. The Lancet, 364, 937–952.