Factors related to the accumulation of healthy behavior among older adults attending primary Health Care

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Abstract

The adoption and maintenance of healthy behaviors contribute for its accumulation throughout life, which require more than information disclosure and recommendations. Biopsychosocial factors may work as barriers to adherence to healthier behaviors, and yet have been underexplored. The objective was to investigate the factors related to the accumulation of healthy behavior among older adults attending Primary Health Care. Cross-sectional analysis with 201 older adults from baseline of Longitudinal Investigation of Functioning Epidemiology (LIFE) was performed in a Southeastern Brazilian city. The Healthy Behavior Score (HBS), ranging from 0 to 8, was calculated by the sum of the following habits: Physical activity practice, healthy eating, water consumption, night sleep time, not smoking, not drinking alcohol, frequent social relations, and spirituality. A linear multivariate regression was performed to test the influence of biopsychosocial aspects on HBS, with 95% confidence interval. Higher number of healthy behaviors was related to high social support, better cognitive status, less depressive symptoms and lower functional performance. Additionally, age and resilience score were correlated to healthy behaviors, which were higher among women and those with sufficient income. Multivariate analysis revealed depressive symptoms, functional performance and education as independent predictors of HBS. Depressive symptoms, functional performance and education are predictors of accumulation of health behaviors, independently of health status, contextual and sociodemographic aspects. Higher social support partially contributed to the higher number of healthy behaviors, and should be considered in public health policies for healthy longevity.

Keywords Quality of life · Public Health · Health Promotion · Preventive medicine · Aging

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Published online: 14 July 2022

🙆 Springer

Introduction

Identifying and controlling risk factors for noncommunicable chronic diseases in the context of population ageing have been challenges for health systems (Chang et al., 2019; Azeredo-Passos et al., 2020). Cardiovascular and neoplasias account for the global burden of disease, mortality and disability worldwide (Costa-Filho et al., 2018; Hernandez-Aceituno et al., 2017). Therefore, bold attitudes focused on both preventive and long-term care are needed to support overwhelmed societies (Leeson et al., 2013; Veras, 2020). Engaging in healthy behavior, for instance, eating, physical activity, sleep duration, in addition to quitting unhealthy habits, such as smoking and drinking alcohol are recognized to be effective strategies for preventing noncommunicable diseases in older population (Yen et al., 2021; Hernandez-Aceituno et al., 2017; Selivanova et al., 2014).

The evidence of the benefits of healthy eating, satisfactory sleep and physical activity for longevity and quality of life have been well documented (Mamalaki et al., 2019; Yen, 2021). Diet habits based on daily fruits and vegetables intake was related to lower risk of cancer and early mortality (Mamalaki et al., 2019). Regular physical activity practice is recognized to promote additional years without disability, which means a more independently life as people grow older (Yen, 2021). Longer duration of sleep may be more associated with adverse outcomes compared with shorter sleep durations and subjective poor sleep quality was associated with coronary heart disease (Kwok et al., 2018). Tobacco and alcohol consumption are known to increase risk of many types of cancer, contributing to anticipate death (Jiang et al., 2018). Additionally, other conditions or behaviors have been recognized to reduce mortality, protecting people against the risk of chronic diseases by increasing immunity, reducing stress and improving mental health, which include social relationships (Holt-Lunstad et al., 2010) and spirituality (Chida et al., 2009).

Some researchers have discussed the effect of combinations of health behaviors on morbidity, mortality and use of health services compared to isolated behaviors (Storeng, 2020; Loprinzi 2016). Loprinzi (2016) found that regular physical activity combined with smoking avoidance and healthy eating combined with adequate sleep were significantly related to lower inflammation when compared to any behavior singly. Compared to those with none poor health behavior, those with more than four poor health behaviors were 3.49 times more likely to dead in 20 years (Kavaaki, 2010). Additionally, combined healthy behaviors was related to less use of health services (Hernandez-Aceituno et al., 2017). From a positive perspective, increasing number of healthy behaviors incrementally decreased the risk of adverse health outcomes (Storeng, 2020).

Adoption and maintenance of healthy behaviors contribute to the accumulation of good habits throughout life course, which require more than information disclose and medical recommendations. Biopsychosocial factors may work as barriers to adherence to healthier behaviors, and yet have been underexplored in the literature (Kim et al., 2017; Jackson et al., 2015). Psychological well-being was independently associated with attaining and maintaining higher physical activity levels over 11 years in Kim's et al. study (Kim et al., 2017; Jackson et al., 2015) investigated 3,722 older adults from the English Longitudinal Study of Ageing with regard to smoking and

physical activity and found that, among couples when one partner changes the behavior positively, the other one is more likely to change as well, compared to those who did not change. Yen et al. (2021) identified that older people who reported self-confidence and resilience were more likely to present healthy eating and be physically active. These findings suggest the influence of psychosocial aspects on healthy behavior among older adults, which may be barriers to accumulation of healthy behaviors.

Recently, evidence of the contribution of neighborhood barriers perception to health status has grown (Ferrari et al., 2021; Gao et al., 2021). Environment characteristics, such as security, built environment and access to facilities have been pointed as important and modifiable barriers to physical activity practice and access to healthy food (Ferrari et al., 2021; Gao et al., 2021). Furthermore, unhealthy behaviors are commonly socially encouraged and reinforced by high dissemination of those habits in the media, stimulating by the consumerism and private interests (Malta et al., 2018). Nevertheless, social support and educational level may protect people against unhealthy behaviors, increasing the odds of living longer and healthier (Kamphuis et al., 2019).

In general, the exposure to smoking, inadequate diet and physical inactivity begins earlier in life and consolidates along adulthood, accumulating unhealthy habits through the life course, which implies in long-term deterioration of health and quality of life in old age (Selivanova et al., 2014; Kim et al., 2017). The impact of behavioral risk factors on health is felt at older ages and is associated to slowly and severely progressive diseases (Chang et al., 2019). With advancing age, older adults tend to gradually reduce their participation in social and outdoors activities, which are important to maintain healthy behaviors (Pinto et al., 2017; Pinto et al., 2017). Therefore, the number of healthy behaviors maintained among older adults can indicate the extent of maintenance of good lifestyle habits that contribute to active and healthy longevity. Understanding the influence of biopsychosocial and environmental aspects on the accumulation of health behaviors would be useful to inform preventive programs and public policies in primary health care. The objective herein was to investigate which factors are related to the accumulation of healthy behaviors among older adults attending Primary Health Care in a Southeastern Brazilian city.

Methods

Design and sampling

Data from the baseline of the Longitudinal Investigation of Functioning Epidemiology (LIFE) were cross-sectionally analyzed in the present study. LIFE was conducted in 2019, designed to investigate determinants of physical functioning, considering the influences of biopsychosocial aspects among older adults attending primary health care in a Southeastern Brazilian city. Due to Covid-19 pandemic, the study baseline was interrupted with sample composed by 201 older adults and the scheduled follow-ups were postponed to attend local and global sanitary restrictive recommendations.

In order to build a representative sample, participants were recruited in three health units randomly selected in the municipality, being one of each of three health

macro regions, which have different social and economic conditions. Data from a pilot study (n=118) previously performed was used to calculate the sample size. The variable of reference was the time in seconds to perform the Time Up and Go Test (TUGT). The cutoff point that indicates low capacity in the mobility test (slowness) for Brazilian older people is 12.47 s, according to Alexandre et al., (2012), which classified 20% of the participants (Alexandre et al., 2012). A 10% margin of error and a 95% confidence interval were also adopted, adding up to a minimum sample size of 62 for each research setting. Participants were recruited and interviewed in the selected health units, totalizing 201 participants. More detailed methodological information was published elsewhere (Pinto et al., 2022).

Inclusion criteria were being 60 years of age or older, having permanent residence in the geographic area of the MHU and giving consent to participating in the research. Hospitalized, institutionalized, bedridden people with severe functional dependence, advanced dementia, and terminal illnesses were not eligible. These criteria were adopted due to the need of applying tests and instruments that require satisfactory communication, cognition, and mobility, all of which were subjectively perceived by the researchers. This recruitment process was carried out by trained researchers. Potential participants were invited to participate in the research while waiting for medical appointments. They received information about the objectives and procedures, and consent to participate in the study through signing the free and informed consent form. Participants were interviewed regarding their sociodemographic, physical and mental health status, environmental aspects, social support and subjective well-being. The total interview time was approximately 60 min.

The research proposal was authorized by the Municipal Health Department, approved by the Research Ethics Committee of the UFTM, under the number 2.557.676, CAAE: 81115717.5.0000.51542.0, on March 22, 2018. The research was funded by the Research Support Foundation of Minas Gerais (FAPEMIG), APQ process −03367-18.

Outcomes

Accumulation of healthy behaviors – was operationalized for the purpose of the present study, indicated by the number of behaviors currently adopted. Each healthy behavior described below received a score of 1, whereas when considered harmful received the score 0. Then, the variable ranged from 0 to 8. The higher the score, the higher would be the number of healthy behaviors.

Physical activity practice – the regular practice of physical activity was investigated through the short form of the International Physical Activity Questionnaire (IPAQ) (Matsudo et al., 2001). This version considers the number of days in the week and time per day spent on leisure-time physical activity, including walking, moderate and vigorous activities; in domestic activities and work. Weekly time was calculated in minutes and was used to classify groups in active, insufficiently active, and sedentary (Matsudo et al., 2001). Due to low prevalence of insufficiently active participants, those were allocated with the group of sedentary. Therefore, participants who practice at least 150 weekly minutes of moderate activity or walking and/or 75 weekly minutes of vigorous activities were classified as active and received 1 point.

Healthy eating – Participants were asked about the frequency of fruit and vegetables consumption, with the response options: every day; from 4 to 6 days/week; 1 to 3 days/week; less than once a week; less than 1 time per month or never. Participants who reported consuming fruits and vegetables every day, that is, those who consumed at least one serving of fruit and vegetables a day were classified in the category of adequate food and received 1 point (Barros et al., 2016; Malta et al., 2018).

Water consumption – it was asked if the participant consumed at least approximately 2 L of water daily. The answer choices were yes (1) and no (0). Participants who answered "yes" received 1 point (Barros et al., 2016; Malta et al., 2018).

Night sleep time – participants were asked about the number of hours on average they slept per night. Those who slept between 6 and 8 h per night were classified as "adequate sleep" and received 1 point (Barros et al., 2016; Malta et al., 2018).

Smoking – it was asked if the participant was currently smoker. The answer negative was considered as healthy behavior being coded as 1, while those who smoked were coded as 0. Therefore, participants who do not smoke received 1 point (Barros et al., 2016; Malta et al., 2018).

Alcohol consumption – the participant was asked if they drank much alcohol (more than 1 dose for women and 2 for men per day) or very often (more than 3 times a week). Participants who answered "no" were classified as healthy in relation to this behavior and received 1 point (Barros et al., 2016; Malta et al., 2018).

Social relations – it was evaluated through the question: 1) How often do you meet friends or family to talk? The answer options were: rarely or never; few times; often and always or almost always. Categories were grouped and coded as follows: Little or never/low frequency of social relationships (0) and often or always/satisfactory frequency (1). The last one received 1 point.

Spirituality – it was evaluated by the third item of the Spirituality Scale (Dias & Pais-Ribeiro, 2017) to which the participant responded if they strongly agree, agree, disagree or strongly disagree when answering the question: I see the future with hope. The categories were grouped and defined as "yes" (agree) (1) and "no" (disagree) (0). Participants classified in "yes" group received 1 point.

Exposures

Neighborhood barriers – it was assessed by the individual's perception of infrastructure, security and social capital, through a structured questionnaire based on literature. The adopted instrument was used in international multicenter study that included Brazilian older people (Vafaei et al., 2016). Higher scores indicate more barriers reported by the participant.

Perceived social support – it was evaluated through five questions in which answers could be "yes" (1) or "no" (0), as follow: (1) Do you have anyone to help you with household chores if you get sick?; (2) Do you have anyone to trust? (3) Do you have anyone to accompany you in community activities?; (4) Do you have anyone to ask for advice or information?; and (5) Do you have anyone to help you economically?. The items were added and the final score varied from 0 to 5 (Neri et al., 2013).

Cognitive status – was assessed by the Leganés Cognitive Test. It is a screening instrument for cognitive deficit suggestive of dementia not influenced by educational

level. The instrument was developed in Spain and validated for low-income population in Brazil, and includes temporal and spatial orientation, immediate and late memory, language and attention. The score ranges from 0 to 32 (Caldas et al., 2012).

Depressive symptoms – were assessed using the Geriatric Depression Scale (GDS), consisting of 15 items with dichotomous answers (Yes/No) and score ranging from 0 to 15 (Almeida et al., 1999). Higher scores indicate more depressive symptoms.

Disability – was assessed using the short version of World Health Organization Disability Assessment Schedule - WHODAS 2.0, composed by 12 items for assessment of the degree of difficulty to perform daily life activities, ranging from 1 (no difficulty) to 5 (extreme difficulty). Total score ranges from 5 to 60, with higher score meaning lower disability (Moreira et al., 2015).

Chronic musculoskeletal pain – participants were asked if they have pain during the last three months in any body region. They answered yes or no.

Personal aspects – were obtained by self-report and included gender – male/female; age – in years; education – in years and income sufficiency. Resilience was assessed using the Brief Resilience Scale for which participants answered if they strongly disagree, disagree, neither agree nor disagree, agree and strongly agree to the following questions: (1) I tend to recover quickly from difficult times; (2) I have a hard time going through stressful events; (3) It doesn't take me long to recover from stressful events; (4) It's hard to pull myself together when something bad happens; (5) It usually takes me a long time to overcome setbacks in my life. Scoring of questions 2, 4 and 5 were inverted. The score ranges from 5 to 25, higher score higher resilience (Coelho et al., 2016).

Data Analysis

Data were analyzed using the IBM Statistical Package for Social Science software, version 22. Descriptive analyses were performed to characterize the sample, concurrently with assessment of data normality using the Shapiro-Wilk test, with significance 5%. Then, bivariate analyses were carried out using T test Student and Pearson's Correlation test. The multivariate analysis was performed using multiple linear regression with enter method, with the healthy behavior score as a dependent variable and biopsychosocial aspects as independent variables inserted in different blocks. In the first block, neighborhood barriers and social support were inserted as contextual variables; in the second block, health status indicators were entered, including cognitive status, depressive symptoms, disability and chronic musculoskeletal pain; and, in the third block, personal aspects, such as age, sex, education, income sufficiency and resilience. This strategy was employed to prioritize the test of the influence of contextual aspects and observe their relationships with the accumulation of healthy behaviors when health and personal aspects are considered. Confidence interval of 95% was adopted.

Table 1 Characteristics of the sample. Brazil, 2019. n=201

	F (%)	m (SD)	Min-Max
Neighborhood barriers		2.23 (1.35)	0–4
Social support		3.42 (1.48)	0–5
Cognitive status		26.52 (3.29)	14–32
Depressive symptoms		5.04 (2.99)	1–15
Disability		22.16 (8.49)	12–45
Chronic musculoskeletical pain			
No	64 (31.8)		
Yes	137 (68.2)		
Age		68.1 (6.8)	60–89
Sex			
Male	46 (22.9)	--	
Female	155 (77.1)	--	
Education	--	5.62 (4.12)	0–18
Income sufficiency	--		
No	135 (67.2)	--	
Yes	66 (32.8)	--	
Resilience		13.72 (2.88)	5–22

F: Frequency; SD: Standard deviation; Min: Minimum; Max: Maximum.

Results

Participants were assessed according to eight healthy behaviors, however, none of them practiced all behaviors and all of them practiced at least one. The mean of healthy behavior was 4.04 (SD:1.46). Sample was characterized by female (77.7%), and mean age 68.1 (SD:6.8) years. The disability was relatively high, since the mean of difficult reported in daily life activity was 22.1, ranging from 12 to 45; and, the prevalence of chronic musculoskeletal pain was 68.2%. More descriptive results are showed in Table 1.

In the bivariate analysis, the accumulation of healthy behavior was positively correlated to related to social support (r:0.281), cognitive status (r: 0.184), education (r: 0.297) and resilience (r: 0.155). Higher depressive symptoms (r: -0.407), higher disability (r: -0.342) and higher age (r: -0.183) were correlated to lower number of healthy behaviors. The means of number of healthy behaviors were higher among women compared to men and among those reporting sufficient income compared to those reporting insufficient income (Table 2).

Multivariate analysis revealed that social support was related to accumulation of healthy behavior when controlled by health status, but not when personal aspects were considered. In the second block, despite social support, depressive symptoms and disability were also related to number of healthy behaviors. In the final model, depressive symptoms (β: -0.269; B: -0.136 [-0.214/-0.057]), disability (β: -0.201; B: -0.035 [-0.062/-0.007]) and education (β: 0.146; B: 0.051 [0.001/0.102]) were related to accumulation of healthy behaviors (Table 3).

Table 2 Correlations and mean comparison between number of healthy behaviors and all independent variables. Brazil, 2019. n=201

	Healthy Behavior Score	
	r	mean (SD)
Neighborhood barriers	0.003	
Social support	0.281*	
Cognitive status	0.184*	
Depressive symptoms	-0.407*	
Disability	-0.342*	
Chronic musculoskeletical pain		
No		4.24 (1.45)
Yes		3.96 (1.46)
Age	-0.183*	
Sex		
Male		3.87 (1.49)
Female		4.09 (1.45)*
Education	0.297*	
Income sufficency		
Insuficient		3.85 (1.49)
Suficient		4.44 (1.33)*
Resilience	0.155*	

r: Pearson's Correlation Coefficient; SD: Standard deviation. *p<0.05.

Table 3 Multiple Linear Regression. Brazil, 2019. n=201

	Block 1	Block 2	Block 3
	β/B [CI]	β/B [CI]	β/B [CI]
Neighborhood barriers	0.025/0.027 [-0.131-0.185]	0.054/0.058 [-0.089-0.205]	0.034/0.037 [-0.106-0.180]
Social support	0.283/0.287 [0.139–0.435]*	0.165/0.167 [0.023–0.311]*	0.131/0.133 [-0.007-0.273]
Cognitive status		0.092/0.043 [-0.024-0.111]	0.034/0.016 [-0.051-0.083]
Depressive symptoms		-0.279/-0.141 [-0.221-(-0.061)]*	-0.269/-0.136 [-0.214-(-0.057)]*
Disability		-0.191/-0.033 [-0.061-(-0.005)]*	-0.201/-0.036 [-0.062-(-0.007)]*
Chronic musculoskeletical pain		0.048/0.154 [-0.329-0.638]	0.065/0.207 [-0.264-0.676]
Age			-0.134/-0.029 [-0.060-0.003]
Sex			0.091/0.318 [-0.149-0.784]
Education			0.146/0.051 [0.001–0.102]*
Income sufficency			0.105/0.328 [-0.097-0.752]
Resilience			0.115/0.090 [-0.012-0.130]

*p<0.005; β: linear coefficient; CI: Confidence Interval.

Discussion

The present study investigated factors related to the accumulation of healthy behaviors among older adults attending Primary Health Care. An innovative and positive perspective on healthy behavior investigation was used to inform health professionals and managers with regard potential barriers that could be overcome in the public health systems, in order to promote active and healthy ageing among older populations. Findings brought light to the aspects that should be regularly assessed and monitored by health team, in order to remove or attenuate the barriers for healthy behaviors. Some strengths included: (1) the comprehensive evaluation of health behaviors, which includes spirituality and social relations as positive health habits; (2) the operationalization of the accumulation of healthy behaviors, which was explored as outcome indicating the current practice of simultaneous positive life habits; (3) the testing of the influence of biopsychosocial aspects on the accumulation of healthy behaviors, which characterized a comprehensive approach of potential barriers, including both personal and contextual aspects. Previous studies used similar methods to investigate health behavior and lifestyle habits in population-based sample, arguing for the benefit of accumulate good habits to preventing cardiovascular diseases, cancer, stroke, obesity and other chronic diseases, which risk factors are widely known (Loprinzi, 2016; Storeng et al., 2020; Kvaavik et al., 2010). Despite the relevance of the subject for public health, to our knowledge, this is the first study dedicated to the investigation of the factors related to accumulation of healthy behavior among older adults.

The main findings pointed that greater social support was related to accumulation healthy behaviors, probability facilitating the adoption and maintenance of positive habits, which contribute to better health outcomes. Social network plays an important role in promoting healthy ageing (Au et al., 2020). Social network, when supportive, can work as an important source of information, motivation and help to engage and maintain healthy behaviors (Mamalaki et al., 2019). Social relations, support and capital have been extensively related to lower mortality risk among older adults (Hill et al., 2016). This phenomenon is likely explained by the higher probability of socially engaged older adults being exposed to healthier behaviors, such as physical activity, adequate food and sleep which are protective against mortality due to cardiovascular disease or cancer, for example.

Education was also found as protector factor against fewer healthy behaviors in the present study. More educated people tend to have more access to qualified information and health care services (Barros et al., 2016; Malta et al., 2018). Additionally, greater educational level was related to higher health literacy, which contribute to empower people to self-care practices. Kamphuis et al., (2019) found that lower educated people having bridged social capital with higher educated friends reduced the likelihood to report overweight, while higher educated people in frequent contact with friends with a lower educational level increased the likelihood to report daily smoking, lower level of physical activity and poorer food intake, which corroborates out findings with regard to the role of social support and education on accumulating healthy behaviors.

Concurrently, depressive symptoms, disability and age work as barriers to the accumulation of healthy behavior, deserving attention from heath team, in order to create opportunities and encourage older people to maintain their positive lifestyle while grow older. The evidence of the association between unhealthy behavior and depression were well documented, even when the causal relation is hypothetical (Kim et al., 2021; Kim et al., 2018). Smoking, alcohol abstinence, physical inactivity, and social inactivity were associated with more depressive symptoms in Koreans older adults (Kim et al., 2018), and such relationships were moderated by living arrangements. These findings suggest that social support may contribute to the magnitude of the influence of health behavior on depressive symptoms. However, these relationships can be reciprocal, once depressed older adults can be less motivated to engage in healthier habits or change behaviors and interact in social relations, which increase depression status (Sin et al., 2016). Whether and to what extent depressive symptoms contribute to maintenance of unhealthy behaviors were less explored in the literature. Sin et al., (2016) investigated bidirectional relationships between depressive symptoms and lifestyle behaviors (physical activity, medication adherence, body mass index, waist-to-hip ratio, sleep quality, and smoking status) at baseline and 5 years later among a prospective cohort of 667 patients with stable coronary heart disease. They found that greater depressive symptoms at baseline predicted poorer lifestyle behaviors. After adjustments, depressive symptom severity remained predictive of subsequent worsening of physical activity and sleep quality. In this sense, the results provided by the present study support long-term investigation on this topic, in order to better understand the role of depressive symptoms as barrier to healthy behaviors adoption and maintenance.

People physically impaired may experience difficult to attend community programs that comprise preventive actions and health promotion due to personal limitations and the lack of environmental accessibility (Vafaei et al., 2016; Costa-Filho et al., 2018). The scenario favors the increase of sedentarism, social isolation, poor quality of sleep and nutrition, and other health conditions that contribute to morbidity and mortality among older adults.

This study is particularly relevant in the Brazilian ageing population context, which may be appliable for other Latin American countries, once brings light to Primary Health Care, which attend the majority of older population. Among Brazilian older adults, 70% are exclusively public health care users (Azeredo-Passos et al., 2020; Veras, 2020; Macinko et al., 2018). Among PHC assignments, encouraging and facilitating preventive programs have been priority, which benefit from the multidisciplinary teamwork, the struggle against inequities, family and community approach and comprehensive care (Castro et al., 2019; Macinko et al., 2018). In this context, social inequalities may directly impact the adoption and maintenance of healthy behaviors. Since it was found that age, sex, education and income sufficiency were related to the accumulation of healthy behaviors, corroborating national (Barros et al., 2016; Peixoto et al., 2018) and international studies (Selivanova et al., 2014), the study helps to inform public policies and programs, which should consider specificities and unmet needs, in order to encourage healthy habits and deal with the burden of emergent chronic diseases and disability.

The present findings need to be interpreted considering some limitations. The representativeness of the sample may be insufficient to extrapolate the data to the older population under primary care, as the data collection took place within the health units and not in the households that belonged to the geographic region covered by the health service. Although sample size calculation was performed and attended the minimum, this study design benefit from larger samples which increase the power of tests and contribute to better generalization of the findings. Because of the selection bias, the sample represents the portion of the population that actively attends primary health care, characterized by being more active and participatory, mostly women and younger.

The strategy of operationalized the accumulation of healthy behaviors is plausible, since all behaviors assessed were previously singly mentioned in the literature and several studies have already discussed the effect of combined healthy habits for better health and quality of life. However, most of them were obtained by self-report through one single and simple question, which may underestimate the results. For example, to evaluate alcohol and tobacco consumption there are validated questionnaires that cover all aspects related to the individual habits. The assessments tools chosen for this study considered the study setting, the profile of the participants, the lack of time and appropriate instruments to assess these aspects more deeply. Thus, these indicators may have been underestimated in the sample. On the other hand, they consist of direct and simple questions, generally used in population-based studies or rapid screening, nationally and internationally (Malta et al., 2018; Barros et al., 2016; Peixoto et al., 2018).

Conclusions

Depressive symptoms, disability and education are related to accumulation of healthy behaviors, regardless of health status, contextual and personal aspects. Depressive symptoms and disability may work as barriers to adoption and maintenance of healthy behaviors, which should be target by health team. Higher social support and education played an important contribution to the higher number of healthy behaviors, probably protecting older adults against the abandon of positive behaviors, which deserves attention and investments of physicians and policymakers.

Declarations

Conflict of interest None.

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