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A healthy lifestyle score and healthy behaviour of adults in Bulgaria

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Abstract: *The positive impact of numerous healthy behaviours on human health and wellbeing is well known. This study is the first to provide a comprehensive single healthy lifestyle score for a heterogeneous adult population in Bulgaria. The aim of this study is to make single healthy lifestyle score of the adults in Bulgaria. The survey was carried out with 714 randomly selected participants. A relative lifestyle score (RLS) was based on smoking status, alcohol consumption, physical activity, diet and BMI of respondents. The RLS ranged from 0 to 5, and a higher score representing a healthier lifestyle. The relationship between respondents' healthy behaviours and demographic features was determined via the Pearson correlation coefficient. We found that the healthy lifestyle score of the participants is 2.98 of 5.00. The relatively lifestyle score of halves (45.94%) of them is in the range of 3.9-4.29. Regarding smoking and alcohol consumption, respondents' behaviour is the healthiest: 63.31% nonsmokers and 68.63% abstainers. Low physical activity and mixed diet patterns are the main risk factors for optimal healthy lifestyle achievement. We identified the demographic groups that are most vulnerable. Our study provides a possibility for reliable comparisons of healthy lifestyle levels among populations across countries. The RLS is a reliable tool for assessment a healthy lifestyle both of individuals and the community.*

Keywords: Questionnaire; Heterogeneous groups; Smoking status; Alcohol consumption; Physical activity; Diet; body mass index

INTRODUCTION

A healthy lifestyle is a popular topic in modern society. There is agreement that a healthy lifestyle is a way of living that lowers the risk of being seriously ill or dying early [1–5]. An important task of political

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leaders and health care organizations is to ensure the socio-economic well-being and the healthy lifestyle of the community. Promoting healthy behaviours at the population has long been recognized as crucial [6]. Europe is currently facing the challenge of adapting European Union (EU) policies and strategies to ensure healthy aging of the community [7]. The health of both individuals and the entire population is formed from genetics, environment, and individual behaviour [8].

Existing investigations are focused on target samples including patients with specific health conditions or demographic groups. A single score based on basic health behaviors of heterogeneous groups has still not been done. Therefore, this study aims to make numerical score of adults healthy lifestyle at the Bulgarian community (without the minors). The emphasis in our study is 1) on similarities and differences between the main demographic groups in patterns of health behaviour, and 2) on the power of relationship between individual demographic features and individual healthy behaviours.

MATERIALS AND METHODS

Study population

The survey was carried out with randomly selected participants from different regions of Bulgaria during the period from June to December, 2023. Of 725 respondents, minors (< 18 years) (n = 5), adults living outside the country, and adults with missing information to create RLS were excluded (n = 6). The final sample contained 714 respondents.

Health interview survey

The questionnaire described by Hautekiet et al. [1] with some modifications was used. The face-to-face interview technique was used and carried out by qualified interviewers.

As a first step in the study, voluntary and informed consent to participate was declared by each respondent. The second part included questions on participants' healthy behaviour. In the third step, the demographic features of the people who accepted to participate in the interview were recorded.

Relative lifestyle score

A relative lifestyle score was based on smoking status, alcohol consumption, physical activity, diet and body mass index (BMI). Each respondent's RLS was calculated as described by Hautekiet et al. [1]. Briefly, each health behaviour was classified into categories, which were then scored. The value of each behaviour's score was divided by the maximum possible score to calculate a relative score, with a possible maximum value of 1. In this way, to each health behaviour was given equal weight. The RLS of each participant is sum of the five personal relative scores. The individual's RLS ranged from 0 to 5, with a higher score indicating a healthier lifestyle.

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The RLS of the entire sample and each demographic group were presented as mean and standard deviation.

Statistical analysis

The data were presented as percentages and frequency distributions. The significance of the difference between groups of data was evaluated using the chi-square test and t-test. The significance level is set to 0.05. The relationship between respondents' healthy behaviours and demographic features was determined via the Pearson correlation coefficient (r) [9]. Six correlation types were differentiated: lack of correlation ($r = 0$), weak correlation ($0 < r \leq 0.3$), moderate correlation ($0.3 < r \leq 0.5$), significant correlation ($0.5 < r \leq 0.7$), strong correlation ($0.7 < r \leq 0.9$), and functional dependence ($r = 1$).

RESULTS

Demographic features and relative lifestyle score

In the present survey, a total of 714 people were included. The demographic characteristics of the respondents are presented in Table 1. The two-thirds (62.89%) of the participants were women. The average age (±SD) was 54.33 (±20.20) years. The smallest subsamples were 18-19, 30-39, and 80-89 aged. The rate of other age subsamples was in the rate of 12.04% to 20.45%. The most common educational level was basic school (42.16%), followed by university (28.85%) and high school (28.15%). Only primary school had completed 0.42% of respondents. The pensioners (45.66%) were the largest group and workers (30.11%) were in second place. Unemployed and university students were 12.46% and 11.48%, respectively. The rural area was a residence for 55.46% of participants. The city dwellers were 43.56%.

Table 1. Demographic characteristics and RLS of the study population (*n* = 714)

Characteristics	Demographic groups Number (%)	RLS (mean ± SD)
All respondents	714 (100.00%)	2.98±0.82
Gender		
Men	265 (37.11%)	2.75±0.91*
Women	449 (62.89%)	3.11±0.73*
Age (years)[#]		
18-19	7 (0.98%)	3.73±0.77*
20-29	113 (15.83%)	3.22±0.77*
30-39	63 (8.82%)	3.09±0.89
40-49	107 (14.99%)	2.85±0.89

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50-59	86 (12.04%)	2.78±0.96*
60-69	121 (16.95%)	2.91±0.80
70-79	146 (20.45%)	2.95±0.69
80-89	64 (8.96%)	2.93±0.62
Educational level[#]		
Primary school	3 (0.42%)	2.44±0.95
Basic school	301 (42.16%)	2.87±0.72*
High school	201 (28.15%)	2.94±0.84
University	206 (28.85%)	3.17±0.91*
Occupation[#]		
University student	82 (11.48%)	3.26±0.70*
worker	215 (30.11%)	3.04±0.94
unemployed	89 (12.46%)	2.61±0.94*
pensioner	326 (45.66%)	2.96±0.69
Place of residence[#]		
Urban area	311 (43.56%)	3.08±0.91
Rural area	396 (55.46%)[#]	2.89±0.73

RLS - relative lifestyle score; * - statistically significant difference compared to data of all respondents (P≤0.05); RLS is presented as mean and standard deviation (SD); [#] - the percentage is different from 100% because an answer was not indicated by some respondents

The average RLS of all respondents was 2.98 of 5.00 (Table 1). The RLS of half (45.94%) of participants was in the range of 3.9-4.29 and of about one-third (33.05%) was in 2.73-3.12. The women`s RLS was higher than the men`s and the entire sample (Table 1). The volume of RLS of age groups was from 2.78 to 3.73. Young people aged 18 to 29 had a significantly higher RLS, but 50-59-year-olds had a significantly (P≤0.05) lower score compared to the RLS of the sample. The people with basic and high school possessed smaller score than those of the sample. The best lifestyle score was established for people with a university level of education (3.17), and the worst – was for primary school (2.44). The relative lifestyle score of the unemployed was the lowest (2.61), but university student has the best RLS – 3.26. Respondents from urban areas had a higher score than those from rural areas.

Health behaviours

A healthy lifestyle score was generated by the evaluation of five health behaviours, presented in Table 2. The alcohol consumption (RLS=0.88 out of 1) and smoking status (RLS=0.71 out of 1) were the healthiest

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behaviours in the Bulgarian community (Fig. 1). They were followed by BMI (RLS=0.59 out of 1) and physical activity (RLS=0.49 out of 1). Most unhealthy behaviour for the sample was diet (RLS=0.31 out of 1).

Table 2. The health behaviours of the respondents (n = 714)

Health behaviours	Number	Percentage
Smoking status		
Regular smoker	168	23.53%
Occasional smoker	29	4.06%
Former smoker	65	9.10%
Nonsmoker	452	63.31%
Alcohol consumption		
≥ 22 drinks/week	14	1.96%
15–21 drinks/week	14	1.96%
8–14 drinks/week	42	5.88%
1–7 drinks/week	154	21.57%
< 1 drink/week or abstainers	490	68.63%
Physical activity		
Sedentary activities	132	18.49%
Light activities < 4 h/week	186	26.05%
Light activities > 4 h/week or sport < 4 h/week	330	46.22%
Sport > 4 h/week or intense training	66	9.24%
Diet		
The lowest category	344	48.18%
The middle category	297	41.60%
The highest category	73	10.22%
BMI		
Underweight	139	19.47%
Normal weight	287	40.20%
Overweight	265	37.11%
Obese	23	3.22%

BMI - body mass index

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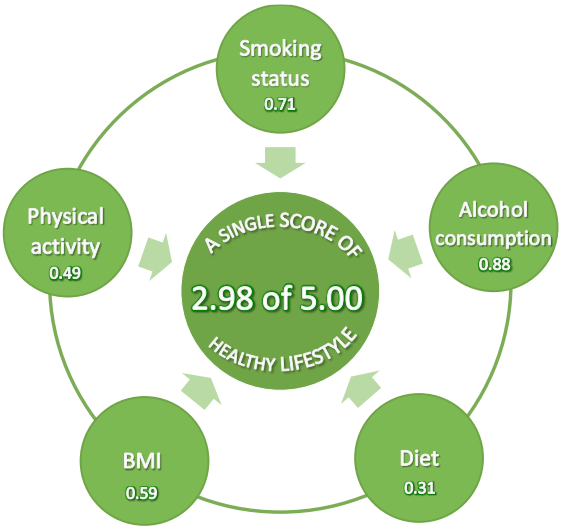

Figure 1. Contribution of each component to the value of sample`s RLS (n = 714)

Nonsmokers were the largest part (63.31%) of participants in this study. Regular smokers were the second largest group (23.53%) and it consists mainly of 40-59-year-olds (working or unemployed). The rate of occasional and former smokers was relatively few.

Regarding the alcohol consumption, 90% of respondents adhered to the healthiest behaviours - abstainers, < 1 or 1-7 drink/week. Most of those consuming 1–7 drinks/week are 40-59-year-olds with higher education, working and living in the city.

Most people (72.27%) define their physical activity as light. One in five understood that their lifestyle is sedentary - the typical representative for this group was from 70 to 80+ year-old pensioner with primary education and living in the village.

The behaviours about the diet were divided into three categories: from the latest (non-healthy) to the highest (healthy behaviour). The answers to the questions about the frequency of consuming fruit, vegetables, snacks, and, sodas put most of the respondents into two categories – the least (48.18%) and the middle (41.60%) category. The diet of about 82.91% of the participants often included fruits and vegetables, but they often consumed snacks and sodas. Only 10.22% had the best diet and these were 40-49 years old, with a university degree, workers, and living in the city.

In regard to BMI of respondents 40.20% of people have normal weight, but almost as many (43.42%) were overweight and obese. The percentage of underweight respondents is also not small. Participants with obesity were 40-59 aged, workers with primary school. The respondents who were overweight came two main groups: workers in the city with a university degree, and pensioners in the village with primary school education.

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Relationship between healthy behaviours and demographic features of respondents

Influence of socio-demographic features on residents' healthy behaviours

The impact of demographic features of respondents to their healthy behaviours were evaluated by Pearson's correlation coefficient (Table 3). The smoking status moderately depended on demographic variables age and occupation. The most of the regular smokers were respondents aged 30-39 who were employed. Alcohol consumption was moderately influenced by gender, age, and occupation. The unemployed 40-59 aged men consumed the most alcohol. The moderate correlations between demographic features and physical activity are the most noticeable. The physical activity significantly correlates with occupation and place of residence. The lowest physical activity was reported by pensioners living in villages. There is a weak correlation of diet and BMI with the demographic variables.

Table 3. Influence of demographic variables of the respondents to their healthy behaviours (n = 714)

	Demographic features				
Healthy behaviours	**Gender**	**Age**	**Educational level**	**Occupation**	**Place of residence**
Smoking status	0.23*	0.35*	0.27*	0.35*	0.23*
Alcohol consumption	0.42*	0.38*	0.28*	0.40*	0.28*
Physical activity	0.16*	0.45*	0.44*	0.51*	0.53*
Diet	0.23*	0.22*	0.18*	0.29*	0.14*
BMI	0.17*	0.22*	0.19*	0.21*	0.21*

BMI - body mass index; * - statistical difference between expected and observed frequency ($P \leq 0.05$); r – Pearson's correlation coefficient: lack of correlation ($r = 0$), weak correlation ($0 < r \leq 0.3$), moderate correlation ($0.3 < r \leq 0.5$), significant correlation ($0.5 < r \leq 0.7$), strong correlation ($0.7 < r \leq 0.9$), and functional dependence ($r = 1$).

DISCUSSION

A healthy lifestyle is a combination of many healthy behaviour factors. Developing and implementing techniques and tools to assess healthy lifestyles across all demographics is the goal of much research [10-16]. Healthy behaviours have a synergistic effect and therefore, their combined assessment better reflects the real situation. In this study we score the adults in Bulgaria using the suggested by Hautekiet et al. [1] relative lifestyle score (RLS), which combines smoking, alcohol consumption, physical activity, diet and BMI - body mass index. To the extent of our knowledge, this study is the first to provide a single healthy lifestyle score at both the community and individual levels with and without specific health conditions. The RLS of most

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respondents and the entire sample are above the average of the maximum possible score. We found that youth, university students, and people with a university education possessed the highest RLS. The worst lifestyle score is established for 40-49-year-olds, people with primary school and unemployed. Health-riskier behaviour is more characteristic of lower social classes [17]. There is general agreement that lifestyle is behaviour based on individual choice and on behaviour that is shared with people in similar circumstances [18]. The idea of a healthy lifestyle is certainly not new. Scientists, politicians, and government officials have long sounded the alarm about the adverse effects of changing lifestyles of people [19]. Obviously, 40-49-year-olds, people with only a primary school education, and the unemployed from the Bulgarian population need the most intervention. The benefits of a healthy lifestyle are well-known to the general public. Despite these, only part of adults undertakes changes to healthier lifestyles [8,20]. Probably, for most people, the effect of healthy behaviours is more or less abstract, and therefore the lifestyle change is so problematic.

Separate assessment of different health behaviours provides valuable information, too [1]. In our investigation, most respondents exhibit the healthiest behaviours regarding smoking status and alcohol consumption. This is in accordance with weak to moderately weak influence of demographic features on these two groups of behaviours. These results are not following data for 54.9% smokers in 1994 [18] and 37% - in 2017-2018 in Bulgaria [21] but in line with data for 2020 [22]. Obviously, over the years, tobacco smoking among the population decreases. There is also a trend of decreasing alcohol consumption over the years [18,23,24]. These positive trends are likely largely a response to a series of social policies and measures implemented by the World Health Organization and the European Union to control alcohol and tobacco consumption [21, 25, 26].

A physical activity represents an integral part of a healthy lifestyles [27]. There is widespread knowledge and a body of evidence-based research on the importance of physical activity for physical and mental health, and wellbeing [28]. Physical activity is defined as bodily movement that involves skeletal muscles and energy expenditure [29]. Alarmingly large is the part of respondents who perform only light or sedentary activities. These findings are in line with other data and this trend has not changed over the years in the population [18, 30-32]. One in four adults in Bulgaria is not motivated to exercise due to a lack of time, facilities, or infrastructure [33]. No significant chang in physical activity was observed in the Feel4Diabetes intervention in healthy adults in Bulgaria [34]. The reasons why Bulgarians practice exercise are not for medical reasons. There are more links to be recognizable/popular [35, 36]. Physical inactivity is a critical non-communicable factor for disease and mortality [31]. Therefore, increasing levels of physical activity are beneficial for both the individuals and the general population [37]. Enhancing these healthy behaviours can be a complex process, complicated by individuals'-built environments [34]. Our results confirm in terms of the importance of the socio-economic status of the general population for the practice of physical exercises.

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The diet should allow of the man to adapt to the constant physical, social, and psychological changes [38]. Nutrition is the main energy source [39]. It is generally accepted that an increased caloric intake is the main reason for the increased weight [40]. BMI is the most often used anthropometric indicator of the nutritional and health status and it is directly related to eating habits [39, 41]. The diet of the participants in our study can hardly be described as healthy. On the one hand, there is a tendency to regular consumption of fresh fruits, vegetables, and juices. However, on the other hand, packaged foods and soda are often present on their menu. The adoption of a mixed diet in Bulgaria has also been reported [42]. As expected, most are overweight and obese. These findings are in line with respondents' self-reported low physical activity. The trend of increase the rate of individuals with an unhealthy weight in Bulgaria is observed [33, 39, 43-48]. These are some of the big public health challenges [33, 44, 48]. Nowadays approximately 40% of the global adult population is considered overweight or obese. This fact indicates that the WHO's global target has not been achieved - by 2025 the problem of obesity in European countries to be solved [44]. Eating behaviours and habits are important for maintaining a healthy weight. However, overeating/poor eating is considered less risky than dangerous driving and smoking [49]. Despite the well-known benefits of a healthy lifestyle, only some of adults change their lifestyles [8]. A major significant connection between education and overweight or obesity is reported [33]. We found a weak influence of the demographic variables of respondents on their diet and BMI. This requires a better understanding of the reasons for its occurrence. We must be ready to accept a major change in the way we think about eating behaviour [40]. Obesity is the result of the interaction of genetic and environmental factors [33, 50]. Since the genes of the population do not change rapidly, environmental factors seem to be responsible for the dramatic spread of obesity [33].

STRENGTHS AND LIMITATIONS

A strength of this study is the use of a validated RLS, which can easily be applied to lifestyle score of other heterogeneous groups and countries.

Some limitations of our study should be considered. In formulation of the sample of the respondents, a territorial distribution of the population in the country is not used. Furthermore, we used self-reported data. This may also explain some difference between our results and a future representative study of the entire population.

CONCLUSIONS

The score of healthy lifestyles among adults in Bulgaria is above average. Low physical activity and mixed diet patterns were the main risk factors for optimal healthy lifestyle achievement. Also, we have identified demographic groups that are most vulnerable: 30-39 aged worked respondents were regular

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smokers; unemployed 40-59 aged men were alcohol consumators; reported by the pensioners living in the village have the lowest physical activity; most of respondents have unhealthily diet. Our results confirmed RLS as a reliable tool for assessment a healthy lifestyle and healthy behaviours of community.

We found that political leaders and public health organizations in the community should focus on developing strategies and programs to increase physical activity and improve diets by promoting the consumption of more fruits and vegetables. Our study enables future comparative research in this socio-medically significant interdisciplinary field at regional, national, and international population level.

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CONFLICTS OF INTEREST

The authors report no financial or any other conflicts of interest in this work.

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