

Knowledge of Modifiable Dementia Risk Factors among Slovenian Adolescents

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ABSTRACT

Objective: Recently, several studies have shown a relationship between the development of dementia, and lifestyle-related risk factors. Adolescents must be informed that diminishing of modifiable risk factors can help reduce the risk of developing dementia when they are older.

Our aim was to evaluate Slovenian adolescents' knowledge of dementia and of modifiable dementia risk factors.

Methods: An online survey was undertaken of 1812 adolescents, aged 14-19 years, from non-health-related schools with upper secondary education in Slovenia. They were invited to complete a series of questions that assessed their knowledge of dementia and dementia risk reduction. Descriptive analysis and chi-square test were performed.

Results: Respondents ($n = 1128$; 68.3 % of females) had satisfactory general knowledge of dementia. Out of 20 questions on dementia knowledge, respondents answered more than two-thirds correctly (Min = 4, Max = 20.0, $M = 14.30$, $SD = 2.56$). Respondents with relatives with dementia reported higher knowledge ($p = 0.002$), and males reported lower knowledge than females ($p = 0.000$). There was limited knowledge of specific risk factors: just two-thirds of respondents recognized digital world addiction and obesity as risk factors. 22.7 % of respondents wished that dementia education will be done by healthcare professionals.

Conclusion: Despite the importance of health lifestyle and smart usage of digital technology for dementia prevention, significant gaps in adolescents education clearly exist. Pediatricians are those who may equip adolescents with proper knowledge of diminishing dementia risk factors, and encourage them and their family to lead a healthy and active lifestyle.

Keywords

Dementia, Modifiable risk factors, Knowledge, Adolescent, Slovenia.

Introduction

In an ageing society, the number of people with Alzheimer's disease and with other forms of dementia is rapidly increases [1-3]. Slovenia follows the broader European trend of the numbers of people with dementia almost doubling by 2050, and despite

the decrease in population, the overall numbers of people with dementia will almost double from 34.137 in 2018 to 65.892 in 2050 [4]. Similarly, as a percentage of the overall population, people with dementia will represent 3.40% in 2050 compared to 1.65% in 2018 [4].

Dementia is an umbrella term for several diseases that are mostly progressive, affecting memory, other cognitive abilities and

behaviour, and that interfere significantly with a person's ability to maintain daily living activities. Alzheimer's disease, the most common form of dementia, represents 60–70% of cases [1-3]. Although age is the strongest known risk factor for dementia, it is not a natural or inevitable consequence of aging [2,3].

Modifiable risk factors

Adolescence (between ages 13 and 19) is the period when many risky behaviours start having a major impact on adolescent's future health as adults [5]. Researchers have identified several modifiable risk factors that affect the likelihood of developing one or more kinds of dementia (6). Adolescents must be informed that in offline face-to-face world exist risk factors like harmful use of alcohol, tobacco use, obesity, intake of unhealthy diets, and inadequate physical activity, in online world exist risk factors like addiction to different social media, online games, digital screens, and mobile devices [7-23].

Obesity

Obesity in children and adolescents aged 5–19 years is defined as body mass index (BMI) +2 standard deviations [14]. Childhood obesity is considered one of the most serious public health challenges of the 21st century [5,8,9,14,15,20]. Over 340 million children and adolescents aged 5-19 were overweight or obese in 2016, and stemming the rising obesity rate is both important and urgent [8,14]. In the coming decades, obesity is expected to cause enormous increases in disease, death, and the economic cost of health care [9]. The health consequences of excess body weight are well documented. Obesity increases the risk of developing type 2 diabetes, hypertension, sleep apnoea and cardiovascular disease [14]. Most young people will not outgrow the condition: about four in every five adolescents who become obese will continue to have weight problems as adults [8]. Type 2 diabetes is largely preventable with a mix of dietary management and physical exercise, but fewer people seemed to see obesity, lack of exercise, dietary behaviour as associated with the risk of diabetes [14]. According to the study published in 2012, Slovenian adolescents do not eat enough fruit and vegetables, but do enjoy sweets and sugar-sweetened beverages, the majority of Slovenian adolescents do not meet the physical activity guidelines, and risk behaviours (tobacco, alcohol use) are a widespread phenomenon amongst them [20]. According to the review article published in 2006, we are still facing a big health problem in Europe, obesity in populations of children and adolescents, because food is a heavily promoted commercial product [15].

Smoking

People who smoke have a higher risk of atherosclerosis and other types of vascular disease, which may be the underlying causes for the increased dementia risk [2,6]. According to the study published in 2010, among Tunisian adolescents aged 10-19 years, the overall prevalence of smoking was 30.2% among males and 4.6 % among females, the first smoking was at mean age of 13.8 years [10]. Similar, results of Slovenian study published in 2012 indicated that 24% of 15-year-olds first tried smoking at 13 years, and among them were fewer females than males [20]. Results of

Australian study published in 2003 indicate that adult focused anti-smoking campaigns may have been successful in promoting anti-smoking attitudes among adolescents [16].

Alcohol drinking

Harmful drinking among adolescents is a major concern in many countries. It reduces self-control and increases risky behaviours, such as unsafe sex or dangerous driving, and it can also lead to health problems in later life [5,6]. Findings of study published in 2005 indicated that alcohol abuse in adolescents is associated with reduction in the size of the left hippocampus which is responsible for memory and learning [19]. Easy availability of alcohol in adolescent's home, at school or work, or in one's community increases the risk of repeated use [17,18]. Additionally, adolescents are strongly influenced by their peers and, in generally seeking to be liked by them, may adopt many of their behaviors, particularly alcohol abuse. Forward, study published in 2012 showed that alcohol use among Slovenian 15-16-years-olds exceeds the average of peers in other countries [20]. Further, study among Slovenian 3.130 students published in 2015 showed that the following variables proved to be independently associated with the risky drinking: male sex, daily consumption of fried food, and smoking [18]. General, setting a minimum age for buying and consuming alcohol and regulating how alcoholic drinks are targeted at the younger market are among the strategies for reducing harmful drinking [5].

Physical activity

Physical activity provides fundamental health benefits for adolescents, including improved cardiorespiratory and muscular fitness, bone health, maintenance of a healthy body weight, and psychosocial benefits. WHO recommends for adolescents to accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily, which may include play, games, sports, but also activity for transportation (such as cycling and walking), or physical education [3,5]. Despite the positive effects of physical activity on brain health, world's adolescent population is insufficiently physically active [5,21]. The drop in physical activity is partly due to inaction during sedentary behavior because of technology and of digital world addiction in adolescents [11-13]. In a four factor-model study by Kalman et al. [8], authors analyzed motives for eleven to fifteen-year-old schoolchildren in the Czech and Slovak Republics, engaging in leisure time physical activity. The new motive was a combination of internal and external motivation and was added to three main motives for physical activity (health, social, achievement). Authors concluded that better understanding of all four motives behind physical activity of young people could significantly contribute to evidence-based planning and development of national health strategies.

Digital world

Social media is internet-based and gives users quick electronic communication, especially applications and Web sites, through which users create and share information, ideas, and personal messages in an online community. The most prominent platforms for this activity are Facebook, Instagram, Twitter, and Snapchat.

Excessive use of social media can bring negative consequences in physical, psychological, and social aspects of adolescents' lives [22]. The average child opens her first social media account at 11.4 years, and the usage of social media progressively increases into adulthood [22]. Adolescents engaging in low levels of social media reap positive benefits of social connection and access to information, but those in the top of 10% of time on social networking platforms are at increased risk for negative consequences, including depression, feelings of isolation and decreased selfworth [22]. Today's digital media devices have been rapidly developed from personal computer-based forms to smart phones. Smartphone addiction is becoming a new form of addiction along with internet addiction for today's adolescents [23].

'Some risk factors for dementia, like age and genetics, can't be changed. Despite everything, researchs suggest that around a third of cases of dementia may be due to modifiable factors including smoking, diet and not getting enough exercise that we could change [2,5,6]. Because of this, informed adolescents can take some simple steps to help lower the risk for dementia.

Objectives

To our knowledge, research studies in relation to adolescent knowledge of dementia and reduction of modifiable dementia risk factors are rare. Given international evidence indicates that the adolescents are confused about the modifiable nature of dementia risk. Establishing dementia knowledge and positive attitudes towards modifiable factors for reduce risk of getting dementia in adolescents is important, because many of them will become active members of dementia-friendly communities, or even will become carers themselves. Understanding whether adolescents have gaps in their knowledge and negative attitudes towards dementia risk reduction could provide focus for their future education of the adolescents in Slovenia. This study aimed to assess adolescents' general knowledge and their attitudes towards modifiable dementia risk factors.

Methods

We performed study in Slovenia from 25 September to 2 December 2019. 1KA online survey allowed investigators access to large samples of students in non-health related secondary schools in whole country. We approached the head teacher of fifty schools in all Slovenian regions and explained the project and obtained his/her agreement for distribution the questionnaires to students. Then students from schools with parents approval for students to fulfil in a survey were provided with information sheet, informed that participation in the research was voluntary, that the questionnaire was anonymous, and that they were able to miss questions if they do not feel comfortable answering them. Students were then invited to complete online survey. A total of 1,812 participants, aged between 14 and 19 years old, were provided questionnaires to complete on their attitudes and knowledge about dementia. There were no other inclusion or exclusion criteria.

The questionnaire consisted of 20 questions in total (main questions and subquestions) about knowledge of dementia, 9 questions about

attitudes toward dementia, and 7 questions about demographic characteristics. At the time of testing there was no validated questionnaire for this age group, questions about knowledge and attitudes toward dementia were based on questionnaire without ambiguity in wording used in recent pilot study [24].

Descriptive data was reported on demographic information (e.g. gender, age, relative with dementia, educational type of school, living in rural or urban region), as well as knowledge and attitudes toward dementia questionnaires. For knowledge questions, responses were scored with 1 point for each correct answer and 0 points for each incorrect answer, with a final score of 0-20 points. Total dementia knowledge scores were compared between demographic outcomes using a Mann-Whitney U test, Kruskal Wallis test, Chi-Square test. Spearman's correlation coefficient, and if necessary Kullback 2I-test (Likelihood ratio). A P-value <0.05 was considered to be statistically significant.

Results

Of the 1,812 online returned questionnaires, 1128 were fulfilled (62.3 %). The typical participant was female (68.3 %), from grammar school (61.6 %), in year 16 (aged 14-19), and living in a rural part of Slovenia (65.5 %). Less than a third of respondents (29.7 %) reported having relative with dementia. Out of 20 questions on dementia knowledge, respondents answered more than two-thirds correctly (Min = 4, Max = 20.0, M = 14.30, SD = 2.56). Respondents with relatives with dementia reported higher knowledge ($p < 0.05$), males reported lower knowledge than females ($p < 0.05$), respondents visiting grammar school reported higher knowledge than those who visited secondary vocational and professional school ($p < 0.05$), and neither urban or rural location of permanent residence affected scores on the dementia knowledge ($p > 0.05$) (Table 1).

Participants were most successful in answering that dementia is a disease of the brain, that impaired memory is the most frequent consequence of dementia, and that Alzheimer's disease is the most frequent form of dementia, with 1099 (97.4 %), 1117 (98.9 %) and 1104 (98.1 %) participants answering each question correctly, respectively. The question that most participants answered unsuccessfully was that impaired memory is normal part of getting old, with only 30 (2.6 %) answering correctly. Additionally, the knowledge of two modifiable factors which can reduce risk of getting dementia was insufficient. The question that almost third participants answered unsuccessfully was that healthy weight can reduce risk of getting dementia, with even 350 (30.9 %) answering incorrectly. Similar, the question that almost third participants answered unsuccessfully was that rational use of digital world can reduce risk of getting dementia, with 337 (30.1 %) answering incorrectly (Table 2).

For several statements, responses reflected that adolescent students had positive attitudes toward activities for reduction dementia risk. Conversely, some responses to items reflected more negative attitudes. For example, tenth of the students of the secondary vocational school agreed with the statement that smoking is

activity for reduction dementia risk, and almost third of them disagreed with statement that healthy weight can reduce risk of getting dementia (Table 3).

22.7 % of respondents wished that dementia education will be done by healthcare professionals.

Demographic variable		N	M	SD	MW U / KW	P-value
Relative with dementia*	YES	335	15	2.44	116482.5	0.002
	NO	789	14	2.6		
Gender*	Female	770	15	2.36	106979	0
	Male	348	14	2.82		
Location of permanent residence	Urban setting	375	14	2.49	129917	0.086
	Rural setting	739	14	2.58		
Type of school providing education*	SVS	201	14	2.69	43.627	0
	SPS	140	14	2.33		
	PGS	79	15	2.63		
	GGs	695	15	2.46		

Table 1: Comparison of difference in dementia knowledge level by different demographic variables.

*P < 0.05 was considered to be statistically significant; N =number of respondents;

SVS = Secondary vocational school; SPS = Secondary professional school; PGS = Professional grammar school; GGS = General grammar school; M = mean-value; SD = standard deviation; MW U /KW = Mann-Whitney U test /Kruskall Walis test.

Statements about dementia and dementia risk	Females (N=770)	Males (N=348)	Total (N=1128)	P-value
Brain disease	2.3%	2.9%	2.6%	0.595
Impaired memory*	0.1%	1.4%	1.1%	0.02
Impaired orientation*	41.9%	54.0%	46.2%	0
Impaired hearing	4.2%	5.5%	4.6%	0.333
Impaired speech	74.8%	81.3%	77.0%	0.017
Impaired planning	63.4%	64.7%	64.1%	0.68
Impaired mental ability	48.1%	51.7%	49.6%	0.255
Impaired recognition*	23.9%	39.4%	29.4%	0
Impaired behavioural pattern*	55.8%	62.4%	58.1%	0.041
Dramatic rise by 65 years of age*	2.3%	8.0%	4.1%	0
Impaired memory is normal part of getting old	86.0%	81.9%	84.7%	0.079
Dementia is contagious	1.4%	2.9%	1.9%	0.099
Alzheimer's disease is most frequent form of dementia*	26.0%	38.2%	29.9%	0
Person with dementia can live at home	21.0%	23.3%	21.7%	0.401
Regularly physical activity can reduce risk of getting dementia	15.1%	14.9%	15.1%	0.958
Alcohol abuse can reduce risk of getting dementia*	2.6%	7.8%	4.0%	0
Healthy weight can reduce risk of getting dementia	30.6%	31.6%	30.9%	0.748
Smoking can reduce risk of getting dementia*	3.4%	6.6%	4.10%	1.4%
Healthy diet can reduce risk of getting dementia	11.6%	13.2%	12.1%	0.43
Rational use of digital world can reduce risk of getting dementia*	23.2%	45.4%	30.1%	0

Table 2: Comparison of dementia knowledge level by gender of respondents – displayed is the share of incorrect answers.

*P < 0.05 was considered to be statistically significant; N = number of respondents.

	SVS N=201	SPS N=140	PGS N=79	GGs N=695	Total N=1128	P-value
Regularly physical activity	84.90%	83.50%	85.70%	86.40%	84.90%	0.815
Alcohol abuse	5.50%	3.60%	3.90%	3.00%	4.00%	0.472
Stay at a healthy weight*	60.30%	62.60%	76.60%	72.50%	69.10%	0.001
Smoking*	10.00%	2.90%	5.20%	2.00%	4.10%	0
Healthy diet	86.50%	86.30%	88.30%	89.20%	87.90%	0.641
Rational use of digital world	66.50%	66.90%	64.50%	72.50%	69.90%	0.169

Table 3: Frequency of answers on activities for reduction dementia risk among respondents regarding a type of school providing education.

*P < 0.05 was considered to be statistically significant; N = number of respondents.

SVS = Secondary vocational school; SPS = Secondary professional school; PGS = Professional grammar school; GGS = General grammar school.

Displayed answer is »YES«, which is correct in others cases except in case «Alcohol drinking» and in case »Smoking« where correct answer is »NO».

total dementia knowledge rate was 71,5%, which was an overall satisfactory level compared to those found in other studies [25-27]. From the knowledge category, the identification rate of modifiable risk dementia factors was low. According performed study, 69.9 % of Slovenian respondents recognized that rational use of digital world can reduce dementia risk, and only 69.1 % of them recognized that healthy weight can diminished possibility of getting dementia, meaning that almost third of the Slovenian adolescents could not recognize that risk factors correctly.

Nikolaidu et al. established that Greek grandchildren (aged 14-21) are emotionally affected by the dementia of grandparents and by the burden on their mothers, and that they need psycho-educational programmes [28]. In England study about adolescents' perceiving dementia, Farina et al recognized that 23,2 % of adolescents (aged 13-18), particularly females whose had better attitudes towards persons with dementia, provide care for someone with dementia [29]. In our study 29.7 % of Slovenian adolescents (aged 14-19) had relative with dementia. Those that did have relative with dementia, especially female adolescents, had on average a greater dementia knowledge than those that did not ($p < 0.05$).

Despite the fact that dementia knowledge among some groups of adolescents is satisfactory, misconceptions of impaired memory as normal part of getting old and of reduction dementia risk exist. Similar, the general public in Ireland are confused about dementia and ageing, and knowledge of risk and protective factors for dementia is very poor [25]. The education programs should be proceeded to provide adolescents with correct information about dementia.

Limitations

It is important to consider the limitations and strengths of the study. An important strength is that we collected relevant data from nationally-representative samples of adolescents from age groups relevant for establishing dementia-related knowledge. The questionnaires were filled in anonymously and with assurances of confidentiality. A limitation of our study is that the survey response rate was only 62.25 % ($n = 1,128$) although 1,812 students had accepted the invitation. These findings therefore need to be confirmed in studies with large size of the study group. Our research is based on the dementia knowledge only among students from non-health related secondary schools. A study which include students both from health-related and non-health related secondary schools would have strengthened the findings, allowed the deeply investigation and comparison of both groups, and this is our plan for future research.

Conclusion

This survey found that Slovenian male adolescents without relatives with dementia, and those with lower (secondary vocational school) education, demonstrated a lower level of dementia knowledge, especially in believing that impaired memory is normal part of getting old, and of modifiable risk factors (smoking, obesity, and abuse of digital world). We suggest that pediatricians

equip adolescents with proper knowledge of diminishing dementia risk factors, and encourage them and their family to lead a healthy and active lifestyle. In addition, adolescents, the part of the workforce that will support the elderly in the future, should also be educated about dementia through mass media and other means.

Ethical approval was not necessary as only anonymous data of respondents who voluntary participated in the survey were used. The study has been performed in accordance with the declaration of Helsinki and approved by the head teachers of participating secondary schools.

The authors declare that no conflicts of interest exist.

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