

Gender Differences in Dementia Knowledge among Slovenian Adolescents

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ABSTRACT

Objectives: Current evidence suggests that attitudes towards people with dementia may develop at a young age. Therefore, it is important that adolescents of both sexes are already informed about dementia as much as possible.

Aim: In the group of adolescents to determine whether exist gender differences in knowledge of dementia and desired resources for further education.

Methods: 1128 students (aged 14 -19) from non-health related secondary schools in Slovenia completed the dementia-related knowledge survey.

Results: Of 20 claims of dementia, participants were on average able to answer 71.5% correctly ($M = 14.30$; $SD = 2.56$). Boys showed poorer knowledge regarding ten claims of dementia compared to the girls ($p < 0.05$). Student suggestions for further dementia education did not differ between girls and boys ($p > 0.05$).

Conclusions: Considering the dementia knowledge differences between male and female adolescents evident in this study, education may be more effective by being gender-specific.

Keywords

Dementia, Gender-specific knowledge, Adolescents, Slovenia.

Introduction

One of the key findings of the 2019 Alzheimer Europe Yearbook, "Estimating the prevalence of dementia in Europe" is that, despite a marked reduction in the prevalence of dementia, the number of people with dementia is nonetheless set to double by 2050 [1]. Dementia is a syndrome – usually of a chronic or progressive nature – in which there is deterioration in cognitive function (i.e. the ability to process thought) beyond what might be expected from normal ageing. It affects memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgement. Consciousness is not affected. The impairment in cognitive function is commonly accompanied, and occasionally preceded, by deterioration in emotional control, social behaviour, or motivation. There are many different forms of dementia. Alzheimer's disease is the most common form and may contribute

to 60–70% of cases [2].

Attitudes towards people with dementia may develop at a young age [3-5]. Therefore, it is important that adolescents of both sexes are already informed about dementia as much as possible. Additionally, they 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 [6].

Slovenian research articles on knowledge of dementia rarely focus on young people [7]. Šadl and Hlebec (2007) found that emotional support within the family is strongly sexually determined: it is offered mainly by women - daughters, mothers and other relatives, friends and neighbors; this suggests that women know more about dementia than men [8]. The assumption that girls are likely to know more about dementia than boys can also be supported by the

fact that care work in the family is still predominantly performed by women [9]. The assumption that female adolescents probably know more about dementia than male adolescents is also supported by the fact that in Slovenian 15-year-olds there are important differences between the sexes in reading achievement in favor of 15-year-old girls [10].

However, it is not clear whether gender disparity applies to real knowledge of dementia, or to interest in further education on dementia. For the purpose of the research, we formulated the following research questions:

1. Are there gender differences in adolescents in cognition the correct claims about dementia and the risk factors for dementia?
2. Do adolescents' desires for sources of further information on dementia differ by gender?

Method

Participants

For research purposes, data on knowledge of dementia were collected in a voluntary and anonymous online survey. The research sample included students from Slovenian secondary schools without medical program. Thus, in the period from 25 September 2019 to 2 December 2019, we offered a questionnaire to be completed by students from 50 secondary schools from all 12 Slovenian statistical regions. The survey included students of those secondary schools whose management approved the survey on the basis of fulfilled ethical conditions. Based on the data on the region and type of secondary school, we can conclude that at least 20 secondary schools responded, but we do not have exact data, as the approach to the survey was voluntary and anonymous. In order to make the comparison as objective as possible, we did not include secondary school medical students in the research, as they are more familiar with the facts about dementia in class than other high school students. During the survey, a total of 1128 students completed the survey and were included in the current analyses.

Data collection method

We used a questionnaire compiled on the basis of questionnaires used by Hwang et al. and Glynn et al. [11,12]. We created a structured online questionnaire divided into three sections: the first part consisted of 14 claims on knowing the basic facts about dementia and 6 claims of modifiable risk factors of dementia, in the second part we wanted to find out the ways of already acquired knowledge and the ways in which students want to acquire knowledge in the future, and in the last part we asked about basic demographic data.

Ethical considerations

Permission for the study was granted by the local education department and head teachers of the school involved in the study. All students were provided with an information sheet for themselves and their parents informing them of the purpose of the study, their right not to participate and to withdraw at any time, and assuring them that all questionnaires returned would be anonymous.

Data analysis

Results were presented in the form of frequencies and percentages, in the bivariate analysis we used only nonparametric tests (Mann-Whitney U test, Kruskal Wallis test, hi-square test, Spearman rank correlation coefficient). When the assumptions for performing the hi-square test were not met, we used the Kullback 2Ī-test (Likelihood ratio) instead of the hi-square statistic. In the bivariate analysis, only valid answers were considered. For each correct answer, the respondent was assigned one point. The total variable knowledge of dementia that occurs in the analysis was compiled by summing up the individual correct answers out of a total of 20 possible correct ones. The number of points scored could thus vary from 0 to 20.

Results

The results are presented in three parts. In the first part, we determined knowledge of dementia by different demographic variables. In the second part, we checked the knowledge of dementia according to the gender of the respondents. In the third part, we identified which sources of further education on dementia students would prefer according to gender.

The knowledge of dementia by different demographic variables

Of the 1812 respondents who responded to survey invitation, the final sample comprised 1128 respondents (62.3%) who completed the survey. Male and female students demonstrated their knowledge of dementia by answering 20 claims. On average students scored 14.30 points out of 20 possible, the dispersion of data is close to between 2 and 3 (SD = 2.56), so for so many points the values deviate from this estimate on average, which can be seen from Table 1 and Graph 1.

For each correct answer, the respondent was assigned one point, the maximum number of points is 20, the lowest number of points is 0, and on average students scored 14.30 points, the dispersion of data is close to between 2 and 3 (SD = 2.56), so for so many points the values deviate from this estimate on average.

Table 1: Descriptive statistics for the dementia knowledge variable.

	N	Min	Max	M	SD	Asymmetry coefficient	Flatness coefficient
Knowledge about dementia	1128	4	20,0	14,30	2,56	-0,502	0,261

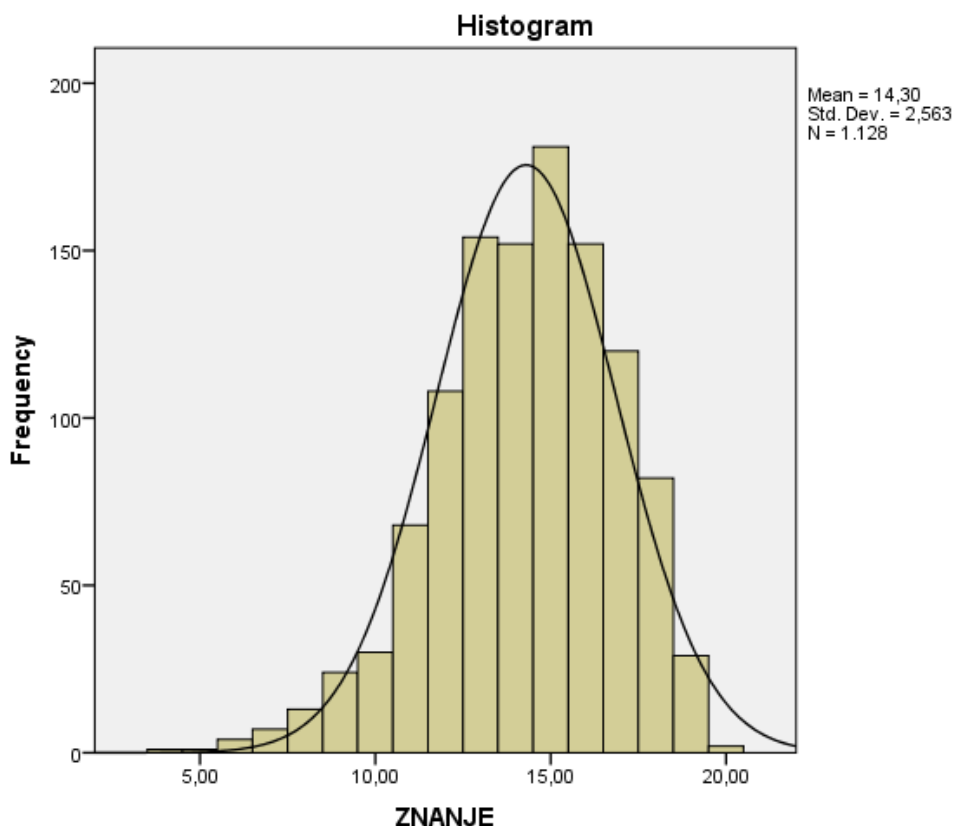
Notes: N = number of respondents; M = arithmetic mean; SD = standard deviation; Min = minimum value; Max = maximum value.

Distribution of the common variable knowledge of dementia deviates from the normal distribution, so we used nonparametric tests for comparisons and correlations between the variables (Table 2, Table 3).

Table 2: Distribution normality test for the dementia knowledge variable.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Knowledge about dementia	0.109	1128	0.000	0.970	1128	0.000

a. Lilliefors Significance Correction



Graph 1: Knowledge about dementia.

Notes: ZNANJE = KNOWLEDGE; Frequency = frequency distribution; N = number of respondents; Mean = arithmetic mean; Std. Dev = standard deviation.

Additional comparisons of the dementia knowledge variable with other variables:

Age data were provided by 1104 students (Table 3). The age of the students ranged from 14 to 19 years, most of them were aged 15 (36.9 %) and 16 (24.8 %), at least 19 years (1.1 %).

Table 3: Descriptive statistics for age.

	N	Min	Max	Mean	Std. Deviation
Age (in years)	1104	14	19	16.0	1.19

Note: N = number of respondents

Table 4: Correlation (Sperman rho) between dementia knowledge and age of students (N = 1108).

		Age of students
Knowledge about dementia	Sperman rho	0.148**
	p value	0.00

The age of students and knowledge about dementia are positively correlated, so we can conclude that older students know more about dementia, but the most important finding is that the value of the correlation is weak (Table 4).

Summary table (Table 5) shows that typical participant was female (68, 9%), from general secondary school, aged 16 years (14-19), almost one third of respondents (29.7%) reported knowing relative with dementia.

Table 5: Comparison of differences in knowledge about dementia by other demographic variables.

Demographic variables	N	M	SD	MW U / KW	p value
Relative with dementia*	YES	335	14.67	2.44	116482.500 0.002
	NO	789	14.14	2.60	
Gender*	Female	770	14.63	2.36	106979.000 0.000
	Male	348	13.63	2.82	
Residence	City	375	14.17	2.49	129917.000 0.086
	Countryside	739	14.40	2.58	
Type of school*	LVS	201	13.53	2.69	43.627 0.000
	SVS	140	13.63	2.33	
	STVS	79	14.73	2.63	
	GSS	695	14.64	2.46	

Note: *p<0.05 = degree of comparison the difference between groups being statistically significant; N = number of respondents; M = arithmetic mean (age, knowledge) ; SD = standard deviation; MW U / KW = Mann-Whitney test / Kruskal Wallis test; LVS = Lower vocational school; SVS = Secondary vocational school; STVS = Secondary technical and vocational school; GSS = General secondary school

The knowledge of dementia according to the gender of the respondents

Significant statistical differences in knowledge of dementia claims were shown between males and females in knowing half of the claims (Table 6). Male students are less familiar with the claims that people with dementia have impaired: memory, orientation, speech, recognition and behavioral pattern, that dementia occurs in large numbers after age 65 and that Alzheimer's disease is the most frequent form of dementia. Additionally, male students are less aware than female students of the increased risk of dementia due to smoking, alcohol consumption and excessive use of digital media.

The sources of knowledge of dementia already obtained and future sources.

Data from which sources students obtained information on dementia are given in Table 7. An open-ended question, in which

the answers were classified into content-related categories, some of them listed answers that fall into several categories, so a larger number of answers is possible for one respondent.

Most of them obtained information from their parents or grandparents (55.8 %), a little less than a fifth from teachers (16.7%), almost a tenth from television shows (9.1 %). The comparison of gender proportions did not show statistically significant differences in the results ($p > 0.05$).

The sources for further education on dementia suggested by the students are shown in Table 8. An open-ended question, in which the answers were classified into content-related categories, some of them listed answers that fall into several categories, so a larger number of answers is possible for one respondent.

Table 6. Comparison of dementia knowledge level by gender of respondents – displayed is the share of incorrect answers.

Claims 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%	0.020
Impaired orientation*	41.9%	54.0%	46.2%	0.000
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%	0.680
Impaired mental ability	48.1%	51.7%	49.6%	0.255
Impaired recognition*	23.9%	39.4%	29.4%	0.000
Impaired behavioral pattern*	55.8%	62.4%	58.1%	0.041
Dramatic rise by 65 years of age.*	2.3%	8.0%	4.1%	0.000
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%	0.000
Person with dementia can live at home.	21.0%	23.3%	21.7%	0.401
Regular 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%	0.000
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%	4.1%	0.014
Healthy diet can reduce risk of getting dementia.	11.6%	13.2%	12.1%	0.430
Rational use of digital world can reduce risk of getting dementia.*	23.2%	45.4%	30.1%	0.000

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

Table 7: Please write where and from whom or where did you hear about the term dementia.

Sources of information	Total (N=1128)		Boys (N=348)		Girls (N=770)	
	f	f %	f	f %	f	f %
Parents or grandparents	629	55.8%	178	51.1%	446	57.9%
Teachers	188	16.7%	42	12.1%	146	19.0%
Television shows	103	9.1%	28	8.0%	75	9.7%
Friends, classmates	80	7.1%	20	5.7%	59	7.7%
Adults, in the retirement home	69	6.1%	29	8.3%	39	5.1%
Other relatives	65	5.8%	14	4.0%	51	6.6%
Web pages	44	3.9%	19	5.5%	25	3.2%
Health, pharmacy workers	38	3.4%	4	1.1%	34	4.4%
Books, magazines, jokes, lectures	29	2.6%	8	2.3%	20	2.6%
Films, theater performances	19	1.7%	4	1.1%	15	1.9%
I don't know	60	5.3%	26	7.5%	32	4.2%
No answer	67	5.9%	21	6.0%	45	5.8%

The comparison of proportions did not show statistically significant differences in the results ($p > 0.05$). N = number of respondents; f = frequency; f % = frequency percentage

Table 8. Where else do you think you could get information on dementia?

Possible sources of information	Total (N=1128)		Boys (N=348)		Girls (N=770)	
	f	f %	f	f %	f	f %
Web pages	783	69.4%	247	71.0 %	536	69.6 %
Doctors, in the health center, in the hospital	256	22.7%	55	15.8 %	199	25.8 %
Books, textbooks, magazines, newspapers, info points	229	20.3%	57	16.4 %	172	22.3 %
In school lessons	176	15.6%	35	10.1 %	140	18.2 %
Informal lectures, Forget-me-not associations	40	3.5%	7	2.0 %	32	4.2 %
Parents, other relatives	39	3.5%	10	2.9 %	29	3.8 %
People with dementia, their relatives	29	2.6%	8	2.3 %	21	2.7 %
In the retirement home	27	2.4%	9	2.6 %	18	2.3 %
TV shows, radio, movies	24	2.1%	5	1.4 %	19	2.5 %
Psychologist, social worker	15	1.3%	7	2.0 %	8	1.0 %
Friends, adults	8	0.7%	2	0.6 %	6	0.8 %
I don't know	17	1.5%	10	2.9 %	6	0.8 %
No answer	68	6.0%	17	4.9 %	46	6.0 %

The comparison of proportions did not show statistically significant differences in the results ($p>0.05$). N = number of respondents; f = frequency; f % = frequency percentage.

First, it is gratifying that even a higher percentage of boys than girls (95.1 % v.s. 94 %) answered the question “Where else do you think you could get information on dementia?” (Table 8). More than two-thirds (69.4 %) want to get information about dementia online, a good fifth (22.7 %) from health professionals and a fifth (20.3 %) from books, textbooks, magazines, newspapers and info points. Even with these statements, the comparison of gender proportions did not show statistically significant differences in the results ($p>0.05$).

Discussion

In the research, we focused to find out the extent to which students of Slovenian secondary schools without a health program recognize correct claims about dementia, and we were more specifically interested if there is a gender difference. We were also interested in whether there are gender differences in the use of resources for further education, namely the resources suggested by the students themselves.

Research question no. 1: Are there gender differences in adolescents in cognition the correct claims about dementia and the risk factors for dementia?

Our study found that the adolescent population’s total dementia knowledge rate was 71.5%, which was an overall satisfactory level compared to those found in other studies [4,5,11].

Knowledge of half of the total 20 claims about dementia is significantly ($p<0.05$) worse in boys than in girls, thus confirming the first hypothesis. Significantly more boys than girls are not adequately aware of half of the claims about dementia ($p<0.05$). This applies to claims that dementia means impaired: memory, orientation, recognition, behavioral pattern, and speech, that Alzheimer's disease is most frequent form of dementia, especially after age 65. In addition, the finding that female students have better knowledge of dementia is also consistent with other research, which showed that care work in the family is still predominantly

performed by women what affects their knowledge about illnesses and conditions of persons receiving care [3,9].

Additionally, significantly gender differences were found in knowing of importance of risk factors for dementia, too. Significantly more boys than girls underestimate modifiable risk factors for developing dementia such as: abuse of digital world, smoking, and alcohol abuse ($p<0.05$). Glynn et al. (2017) showed that in Ireland people over 15 years of age knowledge of risk and protective factors for dementia is very poor [12]. Namely, less than half (46%) of 1.217 participants believed that there were things they could do to reduce their risk of developing dementia.

So, it should be a challenge for every educational system to develop of appropriate dementia awareness initiatives for adolescents. Farina (2017) reported that local dementia education initiatives exist in England schools but it is unclear what the wider uptake of such programmes are [13]. A self-created survey was sent to staff in a number of secondary schools (teaching ages 11–16) across Sussex, England. While the majority of schools expressed an interest in including some form of dementia education within their school in the future, only nine schools (15%) at the time of the survey had dementia education embedded within their curriculum. The conclusion of the research was quite pessimistic: despite government calls to reduce stigma and improve attitudes towards dementia, it seems very little is being taught in secondary schools on the topic [13].

Current evidence suggests that negative and stigmatising attitudes towards dementia may develop at a young age [3-5]. As a result, it takes place a number of dementia education and awareness initiatives aimed at reducing stigma, though they have not been robustly evaluated to establish the impact on dementia attitudes or suitability in adolescent populations. So, Farina and co-workers (2020) explored the efficacy and satisfaction of one such initiative (Dementia Friends) in a British sample of 301

adolescents (M = 12.6 years old, SD = 0.73) [14]. They were assigned to either receive Dementia Friends (a 60-min interactive class that teaches about dementia and its effects on people's lives) or education as usual. Results showed that adolescents in the dementia awareness group showed little to no improvements between time-points. Conclusions were that Dementia Friends did not have a negative effect on attitudes, and the majority of adolescents enjoyed the sessions. On the other hand, Dementia Friends did not fulfill achieving its goal of improving adolescents' attitudes towards dementia. The authors recommend that these findings are replicated in a larger randomised-controlled study. Parveen et al. (2018) established the dementia education needs of adolescents in UK (15). A total of 42 adolescents aged 12 to 18 years participated in eight focus group discussions. Key themes to emerge from discussions included: the importance of dementia awareness, topics of interest within dementia, preferred methods of learning, the inclusion of the person living with dementia and the use of social media.

Also from the knowledge category, the identification rate of some modifiable risk dementia factors was lower in boys than in girls ($p < 0.05$). According performed study, the boys underestimate the findings that abuse of digital world, smoking, and alcohol abuse are risk factors for development of dementia. Agarwal and Kumar Kar (2015) noted that technologies like mobile, tablets, internets are frequently used by people (including adolescents) to meet day to day needs [16]. However, abnormal, excessive, unnecessary use of technology leads to addiction and can lead to the development of some lifestyle-related risk factors for development of dementia, such as physical inactivity, and unhealthy diets [6]. Although most Slovenian primary and secondary schools are members of the Slovenian Network of Healthy Schools, these recommendations are too often neglected, and students smoke and drink alcohol [17]. Nagel et al. (2005) drew attention to the fact that alcohol abuse in adolescents is associated with reduction in the size of left hippocampus which is responsible for memory and learning (18). Risky and harmful drinking of alcohol also affects the students in Slovenia [19]. Namely, at the University of Maribor, Slovenia, 3,130 first- and fourth-year students (38.9% were males), attending the mandatory preventive health check, were included in a cross-sectional study between October 2009 and May 2010. There were 871 (27.8%) students that were screened as risky drinkers, and the lowest percentage of risky drinkers attended the Faculty for Health Sciences. Students, recognized as healthier by the physicians, reported risky drinking significantly less often ($p = 0.015$). Variables, proved to be independently associated with the risky drinking in the multivariate analysis, were: bad health status ($p = 0.044$), male sex ($p < 0.001$), daily consumption of fried food ($p = 0.017$), smoking ($p < 0.001$), illicit drugs ($p < 0.001$), not attending the Faculty for Health Sciences ($p = 0.002$). While the prevalence of risky drinking among students in this study was high, a structured preventive programme should be implemented for students, including also illicit drug use and smoking [19]. Rovio et al. (2017) concluded that cumulative burden of cardiovascular risk factors (including smoking) from childhood/adolescence associate with worse midlife cognitive performance independent of adulthood exposure [20].

Adopting a healthy lifestyle in adolescence can improve health, and reduce the risk of developing dementia in old age. The guidelines from the World Health Organization (2019) state that we can reduce the risk of developing dementia by regular physical activity, avoiding smoking and drinking harmful amounts of alcohol, maintaining a healthy weight, eating a balanced healthy diet and maintaining normal blood pressure, cholesterol and blood sugar [6].

Learning that comprehensively covers the facts about the risk of dementia could encourage young people of both sexes to take care of their health in order to stay healthy even in old age.

Research question no. 2: Do adolescents' desires for topical sources of further information on dementia differ by gender?

According to the proposed sources of further information on dementia, male adolescents were expected to have less positive relation than female adolescents. Surprisingly, it turned out in our study that boys showed the same desire as girls for further education on dementia, especially through websites. To similar conclusions about further education on dementia also came Chinese authors (2020): young people and those with a secondary education preferred to get their dementia information from social media [21]. However, improved knowledge about the digital media and better awareness of the use of modern technology are the only way to equip pediatricians with proper knowledge to give parents and educators clear advice on safe use of modern technologies. Pediatricians are namely those, who should empower and encourage children and their families to lead a healthy and active lifestyle [22].

Although male adolescents reported less knowledge of dementia and understanding risk factors for developing dementia than girls, most still appeared to be receptive to receiving more information. Especially in boys, it can also be an effective way to improve health literacy regarding dementia. Health literacy, associated with variable risk factors for developing dementia, enables an adolescent to make decisions that will reduce his or her risk of developing dementia in adulthood. Experts around the world agree that adolescents have a positive attitude towards real and objective health information and are very receptive to teaching about the variable risk factors for dementia that depend on lifestyle.

We also recognised certain shortcomings of the research. The first shortcoming would be a sample that could include a larger number of male adolescents from all Slovenian regions and would be more representative in certain areas (e.g., experiencing activities in relation to healthy life-style as prevention for the development of dementia). In addition, teachers, as adolescents' educators, should also be included in the research. In the future, it would be useful to explore the components of knowledge and attitudes towards people with dementia also among secondary school students with a health program.

Conclusion

This study highlights that although male adolescents reported less knowledge and understanding of preventable risk factors for dementia than female adolescents, most still appeared to be receptive to receiving more information. Given that less than a fifth of adolescents have been taught about dementia in school, teachers' knowledge of dementia should also be explored. Further information based on gender-specific educational interventions may be more appropriate and effective than traditional school approaches. Many non-governmental associations for help at dementia Forget-me-not operate in Slovenia, which can be an excellent partners for schools in designing gender-specific educational programs on dementia for adolescents. By no means should we forget that the key role in education is played by the people with dementia with their participation in the education of adolescents.

All procedures performing in study were in accordance with Helsinki declaration and approved by the head teachers of participating secondary schools which were provided an information sheet. All potential participants were provided information sheets, and had the opportunity to opt-out from the research study.

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