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Sources of information in health education: A cross-sectional study in Portuguese university students

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RESEARCH

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ABSTRACT

Background
Literacy is a public health priority. The way people access health information is changing. It's crucial to understand this movement towards new communication tools, to better deal with it.

Aims
To describe the sources of health information in younger population.

Methods
Cross-sectional study of a sample of Portuguese university students, by survey, asking for the sources of information in health issues, and crossing it with the literacy levels.

Results
We surveyed 485 participants (77.5 per cent females; median age 23 years). The main source of information was the internet (78.8 per cent; 95 per cent CI:75.1–82.4 per cent), followed by health providers and by family. A linear regression model adjusted for age, gender and having education in health issues, showed that using the internet is adversely associated with the literacy score.

Conclusion
The internet is preferred to search for health information, but ineffective to improve the literacy rate, making us to conclude for the need of increasing the quality of available resources.

Key Words
Health literacy, health education, health promotion, preventive health services, directive counselling

What this study adds:

1. What is known about this subject?
Internet is a powerful source of health information, leading to empowered patients, more capable of taking better choices on health issues.

2. What new information is offered in this study?
This study confirms internet as the largest source of information in University students. However, it is linked with worse levels of literacy.

3. What are the implications for research, policy, or practice?
There is an urgent need of good tools to verify the quality of information surfing in the internet. Health providers play an important role by adapting the information to the specific case and by forcing the introduction of relevant health issues in the public opinion.

Background

Autonomy in health is a civil right, recognized to the citizens as agents involved in the shared medical decision making. It's a recent concept developed after the end of 2nd World

War that became a fundamental ethical principle nowadays. It empowers the patients in the relation with their doctors, but makes them the main responsible for the maintenance of their own health. Most people are healthy and want to go on like this for several years. Following adequate lifestyles is crucial to guarantee this goal. It implies a personal option, which must be based on up-to-date and understandable information capable of empowering persons for the decisions they freely take.

The process of learning about the available information will lead to the acquisition of skills and the change of contexts, promoting health literacy, defined by "the capacity to obtain, process and understand basic health information, as well as the knowledge of the necessary services to make appropriate health options".[1]

To improve health literacy is a public health priority,[2] able to promote better rationality in resource's allocation, with gains for the individual and for all society. It includes all health providers, both in the individual care of their patients and in public interventions, focusing either the entire population or selected core groups.

In our unit of General and Family Medicine at Faculty of Medicine of Porto, Portugal, we have a large background of education for health with more than 10 years of population interventions.[3] Our process follow the proposal of Centre for Health Promotion of the University of Toronto, Canada[4] in six sequential steps from initial planning to the final evaluation, including the diagnostic assessment, identification of goals and objectives, programming strategies towards the defined aims, definition of performance indicators, and reprogramming the strategies according new incomes through the process, before the implementation of the program on the field and evaluate it towards a new cycle. Core groups are usually addressed in interactive sessions, complemented by distribution of written material (pamphlets, brochures or digital support).[3] The diagnostic assessment usually focuses the topic of interest by surveying a sample of population. However, it's also crucial to define the best ways to intervene, adapting the strategies to the specific characteristics of the population. New ways of getting health information were born since last years' facilitation of communication processes. The old paradigms are no longer valid, making necessary to update the processes and to adapt them to these constantly renewing times.

The aim of this study is to characterize the sources used by college students when they need to gather information about health issues and their relationship with health literacy. Secondarily, we aimed to check the main topics searched by young people.

Method

Study design

This observational cross-sectional study involved the students of the University of Porto, Portugal, applying an online self-response questionnaire. Every student had to authenticate for answering, ensuring each one to answer only once.

Population under study included all the students of University of Porto, the second largest University of Portugal. The sample size of 380 participants was calculated assuming a maximal error of 5 per cent for a confidence interval of 95 per cent to a universe of 30,000 students at the University of Porto, and unknowing the expected results.

The invitations to answer were distributed using the institutional e-mail addresses by central services of the University to all students in Campus (about 30.000 students of pre-graduation). Four series of invitations were sent between March and May/2015, sequentially, till reaching the minimal sample size.

Questionnaire

The questionnaire included socio-demographic variables, the characterization of self-perceived health status, the information sources on health issues and the most searched topics. The Portuguese version of European Health Literacy Survey tool (HLS-EU-PT), under authors' authorization,[5] assessed the level of literacy.

The questionnaire HLS-EU was developed by European Health Literacy Project. It has two parts: the first one with 47 questions evaluates the literacy, and the second evaluates the determinants and outcomes related to literacy. Psychometric properties of the questionnaire are discussed elsewhere.[6] It presents a good internal consistence (Cronbach's alpha-of 0.97 for global instrument and 0.93 for health care, 0.93 for disease prevention and 0.93 for health promotion dimensions).[5,6] Questionnaires were valid if more than 80 per cent of questions were answered.

The evaluation of literacy integrates three domains of health: health care, health promotion and disease prevention, and 4 levels of information processing, crucial to decision making: access, understanding, evaluation and

use, allowing the calculation of the global literacy index and seven partial indices, varying each one between 0 and 50 points. It also allows the categorization of literacy levels in inadequate (<26), problematic (<33), sufficient (<42) and excellent.

Ethical considerations

Study protocol was assessed and approved by Ethical Committee of Hospital de Sao Joao / Faculty of Medicine of Porto. The conduction of research followed the recommendations of Helsinki Declaration and of World Health Organization, as the Portuguese Laws. In the first page of the online survey, participants were informed about the aim of this study and asked for their explicit consent, allowing the refusal with automatically dropout of study.

Statistical analysis

Statistical analysis was performed using software IBM® SPSS Statistics ® V22.0.

For general description, we used frequency and dispersion measures. The normality distribution of continuous variables was assessed by Kolmogorov-Smirnov test. T-student test or non-parametric were used to verify associations. Wald's modified method was used to calculate the confidence intervals.

The linear regression model included gender, age and having education or experience in health as adjustment variables. Other variables with a significance level <0.1 in univariate analysis entered in the model using a stepwise approach.

An alpha error of 0.05 was accepted.

Results

We obtained a total of 485 answers to the survey (77.5 per cent of females), with a median age of 23 years old (Interquartile range=6). Table 1 shows the main characteristics of population by gender. There were significant differences between gender in age and in education/experience in health. Males showed higher prevalence of harmful habits (such as tobacco and alcoholic drinks consume) and overweight, but they also were more prone to practice physical exercise. Literacy in health levels were similar between two groups, both in comprehensive index, as in partial ones (Table 2).

Internet was the main source used by students when searching for health information (78.8 per cent, 95 per cent CI:75.1–82.4 per cent), followed by doctors, family and friends and information obtained from school sources, such as classes or training courses (school). Other sources of information such as the media, specialty journals or other health professionals, namely nurses and pharmacists, were identified in 14.0 per cent (Figure 1). Women were more prone to use school as information source. Family and friends were more common among youngers. Those with education or experience in health used less the medical providers, family and friends, and more the school sources and specialized journals.

When questioned about the topics they felt the greatest need for health information, students identified stress management, issues related to healthy eating, information on specific diseases, immunization, and the practice of physical activity (Figure 2).

In the univariate analysis, those who appeal to family and friends as a source of health information had lower literacy rates and those who used specialty journals presented better literacy (Table 3). In the remaining sources of information identified, there were no significant differences between users and non-users.

A linear regression model adjusted for age, gender and having education in health issues, showed an inverse association between the use of internet and the literacy score. Students using internet had worst performance than who didn't use it (beta=-2.53; 95 per cent CI:-4.49–-0.56; p=0.012). A good access to attending physician (beta=2.77; 95 per cent CI:0.98–4.57, p=0.002), a good health status (beta=3.18; 95 per cent CI: 1.15-5.21, p=0.003), and being physically active (beta=1.84;95 per cent CI:0.22–3.45, p=0.026) were associated to better health literacy levels.

Discussion

The internet is the main source when university students need to get information on health issues. Several circumstances may justify it. Internet provides an easy and quick access to a great number of sites where they can obtain answers to many questions about health and diseases. It's useful even when there isn't a structured search query, either because users don't know exactly what to look for, or because they are simply surfing about an issue. Moreover, internet is commonly perceived as an anonymous environment, providing enough privacy in each device to allow the search without being obliged to explain the ultimate reasons for it.

Since the generalization of internet in the last years of 20th Century, we are constantly seeing a growth on available

tools, providing a world-wide access to real time information. Literature shows that the more reliable and accessible information is, the greater the potential benefit to people who use it. People more informed are more able to make good choices in their living, towards a better health, or refuse them in a conscious, free and informed decision.[7]

However, in our study young people who use the internet to access health information have lower literacy rates. In 2008, Shieh et al. found different results from a low-income pregnant women sample,[8] concluding that a better access to internet was associated to higher literacy, and Neter et al. found better literacy levels in those who use internet, also using other sources more often.[9] We don't have a definitive justification for this negative relation. One reason is certainly in the quality of information available online, calling for the responsibility of all in the acceptance of some low-quality tools, without a clear differentiation from good implemented programs.

Efforts have been made to development rules of quality rating to assess the health websites.[10,11] However, both the tools and conduct codes are difficult to adopt by patients and often forgotten by providers, making necessary the investment to enhance their utilization in an easier way.[12,13] Fifteen years are passed over the paper of Benigeri et al. and the problems they pointed are still actual: information on internet have incorrections on contents too many times, industry bias, lack of peer review, and inappropriately high reading levels of writing, hardly comprehensible to most of people.[14]

The trustfulness of information sources is crucial.[10,13] Brown-Johnson et al. found that although most of population call on the internet and other electronic sources for tobacco-related health information, the highest trust was in interpersonal sources, especially providers and family & friends, far above the internet, media and social networks.[15] In the same sense, Weaver et al. found the highest levels of trust in information about health effects of electronic nicotine delivery systems in the providers and official health institutes versus the manufacturers, commercial sellers and media.[16] Some sites are not rigorous in providing information, which contributes to this lack of trust. A recent quality analysis of the reproducibility of one screening instrument to evaluate primary immunodeficiencies risk of disease showed significant deviations from the original instrument in several adaptations and variants published online, raising concerns about standards for scientific information.[17]

Although we didn't directly check the confidence of students in the sources they used, our results point to the same conclusion, showing that a good access to attending physician is associated to a better literacy level. The possibility of having a reliable doctor, providing an effective channel of communication, is a major determinant for processing and understanding basic health information. Kamali et al. confirmed it in pregnant women.[18] Or contrariwise, the case of immunization described by Tabachi et al.,[19] or the overweight and eating habits of Valmorbida et al.,[20] where the poor access to good quality sources conditioned the observed outcomes. Health literacy is a key factor for effective preventive medicine and it's associated to better health self-perception.[21] The role of health providers is crucial to help to defining aims for patients' health, to designing strategies for achieving them, to implementing the solutions and to evaluating the all process, in a cycling of continuous aims and achievements towards a better health. Unfortunately, we still see that the most accessible sources of information are the less reliable, conditioning the benefit of its use.[22]

A particular aspect in this discussion is the need to educate the population for epidemiologically relevant health problems that may change the natural history of the diseases, whether in primary, secondary and tertiary prevention. Recently, Nagano found media, and especially TV, as the main source of information for a common orthopaedic problem, with internet appearing just in 4th place.[23] Although anterior cruciate ligament injury is prevalent in the population, the relevance of information about it comes rather from a TV report, or an affected friend, than from the curiosity that could be expected by the epidemiology patterns. If we think that this may happen all over patients' relationship with the diseases, we conclude that it's crucial to have good opinion makers, leading the public discussion for the relevant health topics.
Asked about the health topics they search, students answered mainly stress management and mental health issues, showing to be a major problem in academic population, also focused by World Health Organization.[24] Information about all other diseases played an important place but the dispersal of topics made us to think that they look for specific diseases sometime in their life, but fighting diseases isn't a priority in this younger population. On the other hand, diet related questions, immunization, physical activity, sexual problems and addictions are important queries of search. These issues are among the more relevant for global burden in young people,[25] conditioning future mortality, and show a real curiosity by preventive health strategies.

Our study has the problem of being an online survey asking for who uses the internet. That's almost a pleonasm. The high use of electronic tools by our population was expectable. University students are accustomed to using internet for most of daily academic tasks. Far from being a weakness, this characteristic thickens the frailty of literacy in the students, strengthening our conclusions. Although the large experience in using the internet tools, students can't distinguish the good from the bad ones. And if we think in general population, significantly less used to electronic information sources and to discuss their validity, we may expect a greater negative impact.

Conclusion

The Portuguese university students use the internet as the main source of information on health issues. However, this source isn't associated with improved literacy. On the contrary, literacy worsens with internet and improves when there is good access to medical assistance, although we can't affirm the causality between each other. In the era of virtual communication, doctors must be able to adapt their organizational behaviour to provide effective channels for delivering accessible and trustful health education, capable of truly improving the capacity of processing and understanding health information.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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ETHICS COMMITTEE APPROVAL

Study protocol was assessed and approved by Ethical Committee of Hospital de Sao Joao / Faculty of Medicine of Porto (Authorization no. 92/2015).

Table 1: Sociodemographic characteristics of sample by gender

	Female (n=376, 77.5%)	Male (n=109, 22.5%)	p
Age (Median, IQR)	22 (6)	23 (11)	0.002
Civil status			NS
Single	90.1%	81.1%	
Married	8.2%	16.0%	
Divorced	1.4%	2.8%	
Widow	0.3%	0%	
Education or experience in health	35.7%	24.1%	0.024
Familial income <1350€	50.7%	42.3%	NS
General health perception (good or very good)	79.7%	73.4%	NS
In the last 6 months the health problems had limited the own capability	33.0%	30.6%	NS
Access to the public health system	89.4%	89.1%	NS
Easiness to access to own physician (easy or very easy)	69.2%	75.7%	NS
Frequency of medical appointments >2 times/ last 12 months	43.5%	34.9%	NS
Frequency of paramedical appointments >2 times/ last 12 months	39.2%	35.8%	NS
Frequency of emergency services >2 times/ last 12 months	20.1%	8.3%	0.004
Tobacco			<0.001
Smoker	10.8%	15.7%	
Former-smoker	7.0%	19.4%	
Acute alcoholic abuse (5 or more drinks in one occasion) at least once a week	8.3%	19.8%	0.002
Any alcoholic beverage in the last year	80.5%	83.5%	NS
Any alcoholic beverage in the last month	61.1%	71.6%	0.047
Regular practice of physical exercise	39.1%	53.7%	0.007
Involvement in social and community networking	47.5%	44.9%	NS
Overweight	12.4%	28.3%	<0.001
Obesity	4.3%	8.5%	
Level of self-reported information in relation to health issues (min=1; max=7)	5.21	5.07	NS
Health literacy			NS
Inappropriate	23.7%	28.0%	
Problematic	42.7%	35.5%	
Enough	27.2%	25.2%	
Excellent	6.5%	11.2%	

IQR: interquartile range

Table 2: Distribution of indices of evaluation of health literacy by gender, according to the calculation of the European Health Literacy Scale[5,6]

Index	Total	Male	Female	p *
Comprehensive Health Literacy index (95%CI)	30.7 30.1-31.4	30.5 28.8-32.1	30. 8 30.1-31.5	0.787
Access/obtain health information (95%CI)	30.0 29.2-30.8	30.0 28.1-31.8	30.0 29.1-30.8	0.890
Understanding health information (95%CI)	34.7 34.0-35.3	33.6 31.9-35.3	35.0 34.2-35.7	0.195
Process/Appraise health information (95%CI)	27.3 26.5-28.2	27.4 25.5-29.3	27.3 26.4-28.2	0.913
Apply/Use health information (95%CI)	31.3 30.7-32.0	31.2 29.7-32.8	31.4 30.6-32.1	0.799
Health Care index (95%CI)	31.4 30.7-32.1	30.6 29.0-32.2	31.6 30.9-32.4	0.227
Disease prevention index (95%CI)	31.1 30.4-31.9	30.7 28.9-32.4	31.3 30.4-32.1	0.702
Health promotion index (95%CI)	29.7 28.9-30.4	30.2 28.3-32.1	29.5 28.7-30.3	0.505

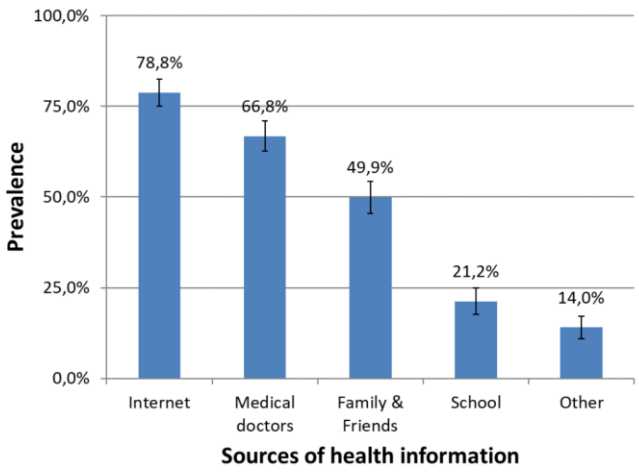
95%CI: 95% confidence interval; * t Student test, comparing outcome in males vs females

Table 3: Literacy score according the source of information

Information source	User (literacy score, 95%CI)	Non-user (literacy score, 95%CI)	p *
Internet	30.3 29.6-31.1	31.6 30.0-33.1	NS
Medical doctors	30.7 29.9-31.5	30.4 29.1-31.7	NS
Family & Friends	29.4 28.5-30.2	31.8 30.8-32.8	<0.001
School	31.7 30.2-33.3	30.3 29.5-31.0	NS
Other	32.1 29.9-34.2	30.4 29.7-31.1	NS
Media	28.5 25.5-31.5	30.8 30.1-31.4	NS
Specialized journals	36.4 33.3-39.6	30.2 29.5-30.9	<0.001

* t Student test

Figure 1: Sources of information in education for health



Columns represent the absolute prevalence of people using the different sources with 95% confidence intervals

Figure 2: Health topics identified by students with a greater need of information