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Healthy life styles and perceived health status in the general population of a Northern Italian health district: a cross-sectional study

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Abstract

Background: Evidence should drive public health initiatives to better address the most important health issues. Chronic diseases represent the main burden of healthcare expenditure in Western countries and are determined by risk factors related to behaviour. Population-based surveys should lead to well informed decision making in this field.

Methods: A cross-sectional survey was carried out among the general population aged between 18 and 69 in the district of Monza-Brianza in Northern Italy through phone interviews. A validated questionnaire investigating health-related lifestyles and behaviours was used. The questionnaire was divided into the following parts: general health status, physical activity, smoking habit, nutrition, alcohol consumption, driving safety, cardiovascular risk, cancer screening, mental health, domestic safety and socio-economic status.

Results: In total, 308 interviews were carried out (response rate=76%). Almost 40% reported a body mass index >25, 64.9% had high school or university degrees, 60.4% worked full-time, 26.2% were assessed as physically inactive, and 13.3% were on a weight –loss diet. In addition, 19.7% had an "at risk" alcohol consumption , especially among younger age groups. Symptoms of depression were identified in 4.9% of the study subjects, particularly in women.

Conclusions: Age, body mass index, education, and occupation were significantly associated with the likelihood of reporting poor health status. Young subjects were more likely to be smokers and drinkers at risk. Psychological health and appropriate prescription of anti-cholesterol and anti-hypertensive drugs are areas deserving further investigations. Nutrition, physical activity, driving safety and youth health, especially concerning drinking habits, are areas where initiatives should be undertaken.

Key words: health survey, life style, motor activity, nutrition, smoking, alcohol drinking

Introduction

Public health strategies and initiatives may cause large costs for the national health services but they can also help save relevant amounts of money when appropriate and effective [1-4]. New prevention initiatives, based on the evidence from epidemiologic studies and on the investigation of true health needs of the population, are therefore highly recommended in order to use public resources more efficiently and effectively [5].

In 2005, the World Health Organization (WHO) estimated that non-transmittable diseases such as cardiovascular disorders, tumors, type II diabetes, chronic respiratory illnesses, muscular-skeletal disorders and mental health problems accounted for about 86% of the deaths and 77% of Quality Adjusted Life Years (QALYs) lost in the European Region, and for about 77% of the healthcare budget of the countries in this geographic area [6].

Risk factors for the most frequent chronic diseases are mainly related to behaviour and are therefore quite difficult to investigate with accuracy. Data collection can, in fact, only be performed by directly asking the subjects about their attitudes and habits through validated questionnaires. To this regard, cross sectional surveys on health status and life styles in the general population have often been used in order to monitor the prevalence of behaviours and attitudes associated with risks for common diseases and to plan appropriate preventive strategies [7-9], although reported information is always prone to bias [10-12].

Nevertheless, this type of study can still convey some useful information. It can allow one to generate hypotheses, allow new targeted investigations to be carried out and even appropriate new public health interventions to be performed, as it appears that adherence to healthy lifestyle habits is generally decreasing [13].

Since the 1980s, the Centers for Disease Control and Prevention (CDC) implemented a surveillance system (Behavioural Risk Factors Surveillance System, BRFSS) by using a validated questionnaire about life styles and health attitudes in the American population [14]. The questionnaire has been developed and modified over time and has been recently used in many other countries as well.

The Italian National Institute of Health (Istituto Superiore di Sanita' – ISS) in 2005 proposed to adopt the BRFSS questionnaire in order to set up a surveillance system in Italy [15]. Some Local Health Authorities chose to use the questionnaire to perform an initial baseline cross-sectional evaluation before starting a subsequent surveillance. Similarly, in 2007, the Local Health Authority n.3 of the province of Milan (now named Local Health Authority of Monza-Brianza) carried out a population-based survey in the Monza-Brianza area in cooperation with the Department of Experimental Medicine (DIMS) of the University of Milan-Bicocca, aimed at investigating the impact of the burden of unhealthy lifestyles in the general population and in specific subgroups.

Methods

A modified version of the questionnaire used at a national level was used to investigate health behaviour in the general population of the area served by the Local Health Authority n.3 of the province of Milan, which accounts for a total population of about 750,000 people.

The questionnaire was made of eleven different parts, each one dealing with the following topics: general health status, physical activity, smoking habits, nutrition, alcohol consumption, driving safety, cardiovascular risk, cancer screening, mental health, domestic safety and socio-economic status.

The subjects, aged between 18 and 69 years, were chosen from the patients list of the Local Health Authority which was considered as the target population. For the study, a random sample of 550 subjects was selected from that reference population after stratifying by gender, age group and district in order to ensure a representative sample for these three variables.

A letter from the Local Health Authority was sent to every subject in order to inform them of the initiative and that they were going to be called soon for an interview. Another letter was also sent to each participant's general practitioner (GPs) in order to inform them too of the initiative.

The aims of the study and confidentiality issues were stated in the letter sent to both the GPs and the participants and they were read out loud again to the participants before any phone interview. The subjects gave their informed consent or decided to refuse to participate at the moment of the phone call.

Phone interviews of about twenty minutes each were performed by six trained physicians who would call the study subjects at different times during the day and in different days of the week in order to maximize the probability of reaching them. A subject was classified as "unreachable" when called at least seven times without an answer.

Privacy and ethical issues were dealt with according to the national guidelines issued by the Italian National Institute of Health (Istituto Superiore di Sanita' - ISS) [16]. The data were entered directly in an electronic version of the questionnaire that was prepared using the software package EpiInfo (3.3.2 version). The electronic questionnaire allowed an automatic control of the information entered and of the questions possibly skipped by the interviewer.

In the analysis, the software package SPSS 15.0 for windows was used and chi-square test, Fisher's exact test and Student's t-test for independent samples (α=0.05) were carried out when comparing the different strata or cross tabulating different items.

The interviews took place in the period between November 2007 and May 2008. Of the 550 sampled subjects, 58 (10.5%) were dropped because they had no available phone number and 87 (17.7%) were unreachable. Of the remaining 405 subjects, 97 (19.7%) refused to participate. In the end, 308 interviews were carried out with a response rate of about 76% (taking into account only the subjects who were reached by phone). A detailed description of the sample is shown in Table 1, while the frequencies of the most relevant issues included in the questionnaire are reported in Table 2.

Results

When generally asked about self-assessed health status, subjects with a higher BMI (p=0.001) and older age groups (p<0.001) reported poorer health, but no significant difference between gender was found. However, when specifically focusing on the number of days of poor physical health in

Table 1. Study participants.

	No.	(%)
Gender		
Females	127	(41.2)
Males	181	(58.8)
Age group		
18-39	101	(32.8)
40-59	141	(45.8)
60-69	66	(21.4)
Body mass index		
< 18.5	24	(7.8)
≥ 18.5 and <25	155	(50.3)
≥ 25 and <30	97	(31.5)
≥ 30	26	(8.4)
Unknown	6	(1.9)
Marital status		
Single	94	(30.5)
Married	193	(62.7)
Divorced	9	(2.9)
Widows	11	(3.6)
Unknown	1	(0.3)
Level of education		
Primary school	30	(9.8)
Secondary school	77	(25.0)
High school	150	(48.7)
University degree	50	(16.2)
Unknown	1	(0.3)
Occupation		
Self-employed	50	(16.2)
Full-time employee	136	(44.2)
Part-time employee	13	(4.2)
Housewife	18	(5.8)
Student	18	(5.8)
Retired	62	(20.1)
Unemployed	6	(1.9)
Unknown	5	(1.6)
Housing		
Owned	273	(88.6)
Rented	33	(10.7)
Unknown	2	(0.6)
Monthly income[a]		
< 1,000 €	81	(26.4)
≥ 1,000 €	225	(73.1)
Unknown	2	(6.5)

[a]Personal income after taxes.

the last month, women reported a mean of 5.19 days of poor health and men reported 3.12 days (p=0.026). Women also reported a mean of 5.65 days of poor psychological health in the last month and men 3.41 (p=0.023) though no significant difference between age groups was found.

As for physical activity carried out during spare time, 74.8% of women reported performing moderate physical activity in the month prior to the interview compared to 58.0% of men (p=0.002). On the other hand, 25.0% of men reported intense physical activity as opposed to only 11.3% of women (p=0.003). Moderate physical activity was also more often significantly reported (p=0.042) by people who lived in rural areas (67.7%) compared to those who lived in the suburbs North of Milan (55.8%), and more often reported by the older age groups (77.3%) compared to younger ones (56.4%). No significant difference was found in BMI. Young age groups reported practicing more intense physical activity than older age groups (p=0.002). The rate of physically inactive subjects (no physical activity in spare time and sedentary occupation) was 26.2%, and this was particularly associated with gender, education and income (Table 3).

The rate of smokers (those who smoked more than 100 cigarettes overall, or who currently smoked almost everyday or have quitted in the last six months) was 29.1%. Some non significant

differences according to BMI, gender, age and occupation were found (Table 3). Present smokers reported smoking an average of 10 cigarettes per day (median value) whilst young smokers reported smoking less . Smokers with a BMI lower than 18 or higher than 25 reported smoking more than the rest. Of the present smokers, 45.2% reported trying to quit smoking at least for one day in the last year, and of these, 84.6% tried without seeking any external help.

When asked about nutrition, 37.7% thought that their body weight was too high and most of them were correct (p<0.001), while 8.1% thought it was too low. There was no significant difference according to self-assessment of body weight by gender. 81.2% thought that their nutrition was healthy or fairly healthy, 50.6% reported eating one or two portions of fruit and vegetables per day, although only 36.5% of men did so (p<0.001). Older age groups reported eating fruit and vegetables significantly more often than younger age groups (p=0.004), though, quite

Table 2. Main health items by gender.

	Males, No.(%)	Females, No.(%)	Overall, No.(%)
Reported good/fair health status	134 (74.0)	89 (70.1)	223 (72.4)
	p=0.518		
Moderate physical activity (last month)	105 (58.0)	95 (74.8)	200 (64.9)
	p=0.002		
Intense physical activity (last month)	45 (25.0)	14 (11.3)	59 (19.4)
	p=0.003		
Self-assessed poor physical activity in the last month	95 (58.1)	78 (61.9)	173 (56.2)
	p=0.487		
Ever smoker	112 (61.9)	51 (40.2)	163 (52.9)
	p<0.001		
Current smoker	54 (29.8)	30 (23.6)	84 (27.3)
	p=0.258		
Smoking never allowed at home	138 (76.2)	98 (77.2)	236 (76.6)
	p>0.999		
On a diet to lose weight	20 (11.0)	21 (16.5)	41 (13.3)
	p=0.176		
Self-assessed not healthy diet	31 (17.1)	24 (18.9)	55 (17.9)
	p=0.689		
Not always eating at home	112 (61.8)	63 (49.6)	175 (56.8)
	p=0.034		
Often eating snacks between meals	37 (20.5)	51 (40.2)	88 (28.6)
	p=0.001		
Alcohol intake mostly during the weekends[a]	56 (35.9)	36 (49.3)	92 (40.2)
	p=0.061		
Alcohol intake mostly between meals[a]	22 (14.2)	16 (22.0)	38 (16.6)
	p=0.181		
At least one episode of binge drinking (last month)	14 (9.0)	3 (4.2)	17 (7.3)
	p=0.280		
Always wearing seatbelt when sitting on front seats of the car	163 (90.1)	119 (93.7)	282 (91.6)
	p=0.216		
Always wearing the helmet on scooters/motorbikes[b]	51 (87.9)	22 (95.7)	73 (90.1)
	p=0.429		
On treatment with drugs that lower blood pressure[c]	33 (67.3)	17 (56.7)	50 (63.3)
	p=0.349		
On treatment with drugs that lower blood cholesterol level[d]	15 (26.8)	10 (31.3)	25 (28.4)
	p=0.806		

[a]Among people who report some alcohol intake; [b]Among those who reported riding or being passengers on scooters or motorbikes; [c]Among those who reported having high blood pressure; [d]Among those who reported having high blood cholesterol level.

interestingly, there was no significant difference in fruit and vegetable consumption and reported BMI (p=0.602). Overweight and obese people reported always eating at home in a larger proportion (p=0.018).

As for alcohol consumption in the previous month, 25.9% of participants reported no consumption at all, while 29.9% reported an everyday consumption of at least one unit of alcohol (one glass of wine, one can of beer or one little glass of spirits). In Table 3, "drinkers at risk" were defined as those who were often drinking between meals, or were binge drinkers (more than six units of alcohol in at least one single occasion in the last month) or were strong drinkers (males drinking more than three units of alcohol per day and females drinking more than two). Of the 61 subjects who met these criteria, there was a significantly larger proportion among the young age group (Table 3). Males reported drinking more often than females (p<0.001), and elderly people reported drinking more often than youngsters (p<0.001). The majority of drinkers reported consuming alcohol throughout the week and during meals (Table 2).

Of the participants, 17.5% reported driving at least once in the last month after drinking more than one unit of alcohol whilst 13.1% reported having been at least once in the last month in a car with a driver who had just drunk more than one unit of alcohol. The seat belt was consistently used by 91.6% when sitting in the front seats of the car (Table 2), but only by 16.9% when sitting in the back seats. 42.9% reported never using the seat belt when in the back seats. Mobile phones were used by 53.1% or subjects while driving, and of these, only 58.7% reported using earpieces or blue-tooth.

Table 3. Reported poor health determinants by subgroups.

	Poor health status	Physically not active	Smoker	Drinker at risk	Hypertension	Hyper-cholest.	Poor fruit/vegetables intake[a]	Depression
BMI[b]								
< 18.5	1 (4.2)	7 (29.2)	11 (45.8)	6 (37.5)	2 (11.1)	2 (12.5)	11 (45.8)	2 (8.7)
18.5-24.9	36 (23.2)	37 (23.9)	48 (31.6)	34 (28.8)	26 (18.1)	35 (30.4)	88 (56.8)	8 (5.4)
25-29.9	35 (36.1)	28 (28.9)	27 (28.7)	17 (22.4)	32 (35.2)	33 (38.4)	48 (49.5)	3 (3.2)
≥ 30	12 (46.2)	9 (34.6)	4 (16.0)	2 (14.3)	9 (37.5)	10 (40.0)	14 (53.8)	2 (8.3)
X^2 test	*p=0.001*	*p=0.622*	*p=0.147*	*p=0.382*	*p=0.006*	*p=0.114*	*p=0.602*	*p=0.608*
Age group								
18-39	10 (9.9)	26 (25.7)	35 (35.7)	38 (48.7)	6 (7.1)	7 (11.9)	63 (62.4)	4 (4.3)
40-59	43 (30.5)	41 (29.1)	40 (29.0)	16 (15.5)	39 (28.7)	45 (36.3)	77 (54.6)	5 (3.6)
60-69	32 (48.5)	14 (21.2)	15 (23.1)	7 (14.9)	28 (44.4)	29 (46.0)	24 (36.4)	6 (9.8)
X^2 test	*p<0.001*	*p = 0.482*	*p =0.214*	*p<0.001*	*p<0.001*	*p<0.001*	*p=0.004*	*p=0.167*
Gender								
Males	47 (26.0)	55 (30.4)	59 (33.5)	42 (27.1)	46 (27.1)	52 (36.9)	115 (63.5)	5 (2.9)
Females	38 (29.9)	26 (20.5)	31 (24.8)	19 (26.0)	27 (23.9)	29 (27.6)	49 (38.6)	10 (8.3)
X^2 test	*p=0.445*	*p=0.052*	*p=0.103*	*p=0.865*	*p=0.551*	*p=0.108*	*p<0.001*	*p=0.038*
Area								
Metropolitan	43 (23.5)	46 (25.1)	50 (27.6)	31 (23.3)	42 (24.9)	23 (24.5)	97 (53.0)	9 (5.1)
Non-metropolitan	40 (32.5)	35 (28.5)	40 (33.9)	29 (31.2)	30 (26.8)	58 (38.4)	66 (53.7)	6 (5.2)
X^2 test	*p=0.082*	*p=0.519*	*p=0.248*	*p=0.187*	*p=0.716*	*p=0.020*	*p=1.000*	*p=0.960*
Education[c]								
High	41 (20.5)	59 (29.5)	57 (29.4)	44 (27.0)	46 (25.6)	47 (30.7)	106 (53.0)	9 (4.8)
Low	43 (40.2)	22 (20.6)	33 (31.1)	16 (25.0)	27 (26.5)	34 (36.6)	57 (53.3)	6 (5.8)
X^2 test	*p<0.001*	*p = 0.090*	*p = 0.752*	*p=0.759*	*p = 0.866*	*p = 0.332*	*p =1.000*	*p =0.708*
Occupation[d]								
Full-time	40 (21.5)	55 (29.6)	60 (33.1)	38 (26.0)	39 (22.9)	40 (27.6)	108 (58.1)	6 (3.4)
Other	43 (36.8)	25 (21.4)	28 (24.3)	22 (27.8)	34 (31.5)	40 (40.8)	53 (45.3)	9 (8.0)
	p=0.004	*p=0.115*	*p=0.106*	*p=0.768*	*p=0.115*	*p=0.038*	*p=0.034*	*p=0.083*
Income								
<1,000 €	23 (28.4)	15 (18.5)	21 (26.3)	15 (28.3)	15 (20.8)	18 (30.0)	37 (45.7)	4 (5.2)
≥ 1,000 €	61 (27.5)	65 (29.3)	69 (31.9)	45 (26.3)	58 (28.0)	63 (34.8)	122 (55.0)	11 (5.2)
X^2 test	*p=0.875*	*p=0.060*	*p=0.344*	*p=0.775*	*p=0.232*	*p=0.495*	*p=0.156*	*p=0.998*

[a]Less than two portions per day of fruit and vegetables; [b]Body Mass Index; [c]Low education is considered as no education, primary school or secondary school (up to the age of 13/14), average to high education is considered high school or university education; [d]Full time occupation includes full time employees and self employed; "other" includes students, part-time employees, housewives, retired, unemployed.

When asked about their cardiovascular health, 23.7% of subjects had been told at least once in their life that they had high blood pressure while 73.3% reported having had their blood pressure checked in the last year. 26.3% were told at least once in their life that they had high blood cholesterol level and 57.1% had it checked in the last year.

4.9% showed symptoms of depression according to the Patients Health Questionnaire PHQ-2 score [17] and it seemed to be associated with gender and possibly with occupation (Table 3).

Discussion

The population investigated showed a rather good general perception of its health status and to be fairly informed about which behaviours posed the greatest health risks. Nevertheless variables such as age, BMI, education and occupation were strongly associated with reported poor health status (Table 3) and this suggests that socio-economic status is an important predictor of perceived health [18] although this finding might also have been partially confounded by age and cohort effects that make elderly people less likely to be working full time, or to have a good education and hence to report a good health status. Socio-economic status is always quite difficult to investigate and is in general prone to bias due to multiple reasons, so these findings are to be interpreted with caution.

Young subjects reported smoking less but in a larger proportion compared to more elderly groups although more often they tended to be weekend drinkers and drinkers "at risk", as defined above. Young subjects also reported a significantly lower intake of fruit and vegetables and to perform moderate physical activity to a lesser extent and this is a negative long term predictor of health outcome [19]. Young age groups, psychologically, did not feel significantly better compared to the elderly. This feature is quite interesting and might suggest some possible social or psychological problem among the youth, and in particular young women.

Reported BMI distribution was skewed to the right and people with reported BMI greater than 25 often felt more physically sick, ate at home more often, and smoked more cigarettes if they were smokers. On the other hand, they did not feel psychologically worse nor eat less fruit and vegetables, and they had a correct perception of their excess body weight. Quite surprisingly, they did not seem to differ significantly in terms of physical activity [20] and alcohol consumption, but they suffered more often from hypertension (Table 3) [21].

Women performed more moderate physical activity compared to men although their reported physical and psychological health was worse at any age. The comparison between those who had been smokers and present smokers showed a trend towards a relative increase of smoking among women [22]. Women tended to consume more fruit and vegetables, to be less overweight but also to be more depressed.

Subjects who did not have a full time occupation (unemployed, students, housewives, retired people, part-time employees) tended to have a poorer self-assessed health status, more symptoms of depression, more reported hypercholesterolemia but also larger consumption of fruit and vegetables. Reported daily physical activity seemed rather satisfactory with a median of 62 minutes per day of moderate physical activity for women, 39 minutes for men, and 17 minutes of intense daily physical activity overall [23]. Of course, response bias is possible and there might have been some overestimation.

Unlike in other populations [24], regarding alcohol consumption we can identify two different types of drinkers: the traditional drinker who more often belongs to older age groups and drinks a unit or two of alcohol everyday and principally during meals, and the young drinker who drinks over the weekend and tends to drink more units of alcohol in a single occasion [25,26]. The rather common bad behaviour of driving after drinking alcohol still persists. On the other hand, there was a reassuringly high report of appropriate seat belt use in the front seats, and of helmet use when riding scooters or motorbikes. The use of seatbelts when sitting in the backseats of the car, instead, was still disappointing.

Depression is difficult to measure and this questionnaire was not designed to properly address this issue [27]. Nevertheless, about 5% showed symptoms of depression and this was more evident among women and among the elderly [28].

The authors are aware of the limitations of this study. First of all, a survey carried out through phone interviews might introduce selection bias since all the individuals who did not possess a phone would be excluded from the sampling procedure. Also, non-responders might have particular motivations not to participate that could be associated with their health behaviour [29]. However, in the location where the study was conducted, the former issue was quite unlikely to happen since the population is rather wealthy and relatively stable, and anyway even larger

degrees of selection bias would possibly occur if other approaches, like web-based questionnaires, would have been used [30]. Another limitation is the relatively small sample size. Nevertheless a proportion of 0.4‰ of 751,196 inhabitants was interviewed and plenty of detailed questions about lifestyles and health behaviours rather common in the general population were asked. When comparing our findings with the ones of other areas of the Lombardy region [31] we could not find relevant differences. The population of the area of Monza-Brianza is also traditionally quite stable, active and wealthy, and socially and culturally it can be considered fairly similar to the population living in the whole area between the cities of Milan and Venice.

There was a different proportion of men and women in the sample possibly due to a more frequent association of household phone numbers with males. Nevertheless a stratified analysis by gender was carried out whenever appropriate (Table 2) and the crude results did not significantly differ from those of other similar investigations that used the same questionnaire [15]. Interviewer bias was accounted for by standardized training of their conductors and by a pilot study that was carried out before the actual study began. Nevertheless, although data management and analysis was assured to be strictly anonymous, the subjects could have been influenced by the fact that they were asked questions directly by a person over the phone.

There are also some important strengths of this study. All interviewers were physicians and were therefore very competent, motivated and able to reassure and explain the interviewee about any possible doubts. The authors believe that this also significantly increased the participation rate and the quality of the data. The questionnaire used had already been validated in many previous studies and is currently used by many Local Health Authorities in Italy as a surveillance tool. Thus, the data from our study are easily comparable with the data from other Italian areas and eventually with national and international reference data. The amount of information given allowed us to assess multiple lifestyle profiles that show which unhealthy behaviours are more often associated with perceived health status and within which strata.

In the light of all these results, the authors suggest further investigations and new public health initiatives particularly targeted towards the young and towards those who do not have full-time employment. Depression among women, and in the young and elderly, as well as new "at risk" drinking habits among young people, have to be studied in more detail. Moderate daily physical activity [32] and healthy nutrition are two priority fields of intervention that require support from the community.

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