

Cardiovascular disease risk factor knowledge assessment among medical students

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ABSTRACT

Background: Cardiovascular disease (CVD) is the primary cause of disability and premature death throughout the world. Past decade has seen a rise in the awareness of heart disease and its risk factors in general population. This may be attributed to the implementation of various health promotion policies. Whereas similar data among health-care providers, especially among medical students, who will play a key role in disease prevention and treatment are still lacking. **Aims and Objective:** To assess the CVD risk factor knowledge among first-year medical students. **Materials and Methods:** An exploratory cross-sectional survey was conducted among 154 medical students by distributing an anonymous pretested, self-administered, and structured questionnaire. The questionnaire contained 30 multiple choice questions and was prepared keeping in mind the key themes of identification of CVD and its risk factors. **Result:** Major risk factors for heart disease as identified by students are dyslipidemia (96.8%), obesity (94.1%), high blood pressure (92.8%), smoking (84.4%), diabetes (82.4%), age (81.8%), male gender (80.4%), lack of physical activity (73.9%), and family history (63.6%). However, only 12.5% correctly identified High density lipoprotein (HDL) to be the good cholesterol. On comparing the mean knowledge score for individual components, female participants scored better for epidemiology (3.01 ± 0.10 vs. 3.33 ± 0.11 , $p = 0.031$) and lifestyle behavior (2.97 ± 0.11 vs. 3.60 ± 0.12 , $p = 0.0001$). We could also derive statistically significant differences between students with smoking history (21.82 ± 0.26 vs. 18.75 ± 1.01 , $p = 0.001$) and alcohol consumption (21.84 ± 0.26 vs. 18.91 ± 0.92 , $p = 0.001$) compared with those without, in case of total knowledge score. **Conclusion:** These results suggest that there are few areas of concern in our medical education that needs to be reformed. A sound knowledge of CVD is very essential for the medical students and to achieve this, change in the core medical curriculum starting from basic medical sciences is recommended.

KEY WORDS: CVD; Knowledge; Medical Students; Medical Education

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INTRODUCTION

The global burden of cardiovascular disease (CVD) has risen to epidemic proportions. It is the primary cause of morbidity and mortality all over the world.^[1] Though the disease pathogenesis occurs over years, life-threatening cardiovascular events such as myocardial infarction and stroke occur suddenly and are often fatal. Past 30 years has seen a 60% decline in CVD factors in

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Western countries whereas a 300% rise in India.^[2] This acceleration in risk factors is alarming and is attributed to the urbanization, lack of knowledge, and effective preventive strategies.^[3] Risk factor alteration can help minimize clinical events and deaths in people with recognized CVD as well as in those who are at high risk because of one or more risk factors. The classical risk factors for CVD include hypertension, hyperlipidemia, smoking, overweight, sedentary lifestyle, and unhealthy diet. All these risk factors are modifiable, thus making prevention of CVD an achievable target.^[4] For successful prevention of CVD, knowledge is an important prerequisite. Knowledge and perceptions of CVD risk factors are very essential for medical students as they will be the health-care providers of future. Many studies in Indian subcontinent have reported a lack of knowledge among general population.^[5,6] Whereas similar studies elucidating the knowledge of CVD risk factors among medical students is still lacking. Thus, in this study, we aimed at assessing the knowledge of medical students toward CVD risk factors.

MATERIALS AND METHODS

After getting the approval of the institutional ethics committee, an exploratory, descriptive, cross-sectional survey was conducted in the Department of Physiology at SRM Medical College, Hospital, and Research Centre, Kattankulathur, Tamil Nadu, India, during the month of August 2015. A total of 154 adult students participated in the study. The study participants included first-year Bachelor of Medicine & Bachelor of Surgery (MBBS) students who were above the age of 18 years and who had completed the first-year university exams. Students were given a brief overview of the survey questionnaire and its goals. After obtaining written informed consent, an anonymous self-administered, structured questionnaire was distributed by the researchers to students who agreed to participate. None of the students denied participation. After collection of the forms, the students were given the correct answers with explanations by the principal investigator. The questionnaire was evaluated by a nonmedical person who was provided with the correct answers.

Survey Questionnaire and Scoring

The questionnaire was prepared keeping in mind the key themes of identification of CVD and its risk factors. The questions were tailored according to first-year MBBS syllabus. Inputs from previously published studies and guidelines have been imparted in the questionnaire.^[7]

The questionnaire had two sections. In section A, details regarding the demographic and anthropometric characteristics of the subjects including blood pressure values were collected. Section B included 30 multiple choice questions that assessed their knowledge, perception, and attitude regarding CVD and its risk factors. The questionnaire had six subdivisions and each subdivision contained five questions assessing the knowledge, perception, and attitude of the participants. In brief, following were the subdivisions:

1. Epidemiology of heart disease
2. Physical exercise and heart disease

3. Role of age, comorbidities, and genetics in heart disease
4. Lifestyle behaviors and heart disease
5. Diet and heart disease
6. Diagnosis and treatment of heart disease

Most of the questions had close-ended responses such as true/false and few questions in subdivision 6 needed numerical information such as recommended level of blood pressure, serum cholesterol, and so on, to be selected as response. Each correct response was given a score of one (1) and a wrong response was scored as zero (0), thus making the total score as 30 and each subdivision having a score of 5. This questionnaire was developed in English and pretested on 30 students belonging to medical colleges other than the one included in this study.

Statistical Analysis

The data collected were entered and analyzed using statistical package for social sciences (SPSS) version 21, manufactured by IBM Corp. Data were analyzed by using descriptive statistics such as frequencies, percentages for categorical variables and mean, standard deviation for quantitative variables, and inferential statistics such as independent *t* test for comparing the means.

RESULT

All the 154 students included in the study had filled and returned the questionnaire thus making the response rate as 100%. Table 1 describes the demographic and anthropometric characteristics of our study population along with their blood

Table 1: Demography, anthropometry, and blood pressure of the student participants

Characters	Number (n = 154)	Percentage (%)
Age (years)	18.8 ± 0.79	
Gender		
Male	94	61
Female	60	38.9
BMI (kg/m ²)		
< 18.5	14	9.1
18.5–22.9	54	35.1
23.0–24.9	29	18.8
≥ 25	57	37.0
Systolic BP (mm Hg)		
< 120	93	60.4
120–139	57	37.0
140–159	4	2.6
> 160	0	—
Diastolic BP (mm Hg)		
< 80	94	61.0
80–89	44	28.6
90–99	16	10.4
> 99	0	—

BMI, body mass index; BP, blood pressure.

pressure values. Of the total 154 participants, we had 61% (94) male students and 39% (60) female students. Mean age of the participants was 18.8 ± 0.79 years. It is important to note that 37% of the students were overweight and their systolic blood pressure was in the prehypertensive range. Similarly, 29% of them had diastolic blood pressure in the prehypertensive range.

The percentage of students who correctly identified the CVD risk factors and the perception and practices of the students toward heart health is tabulated in Table 2. Major risk factors for heart disease as identified by students are dyslipidemia (96.8%), obesity (94.1%), high blood pressure (92.8%), smoking (84.4%), diabetes (82.4%), age (81.8%), male gender (80.4%), lack of physical activity (73.9%), and family history (63.6%). Though they

Table 2: Percentage of students giving correct response to CVS disease risk factors and their health-care behavior

Question	Number (n = 154)	Percentage (%)
Cardiovascular disease is the most common cause of death in India	132	88%
The older a person is, the greater their risk of having heart disease	126	81.8%
Smoking is a risk factor for heart disease	130	84.4%
Hypertension is a risk factor for heart disease	142	92.8%
High cholesterol is a risk factor for heart disease	149	96.8%
If your HDL is high you are at risk for heart disease	19	12.5%
If your LDL is high you are at risk for heart disease	131	85.6%
If you have a family history of heart disease, you are at risk for developing heart disease	98	63.6%
Obesity increases a person's risk for heart disease	144	94.1%
Diabetes is a risk factor for developing heart disease	126	82.4%
Exercise lowers a person's chance of getting heart disease	113	73.9%
Men have a greater risk of heart disease than women	123	80.4%
Has your weight increased in the last 12 months?	26	17%
Have you ever had your cholesterol checked?	48	31.4%
Have you ever smoked?	19	12.4%
Do you drink beverages containing alcohol?	21	13.7%
Other than your regular college duties do you participate in any physical activities such as running, swimming, gardening, or walking for exercise	66	43.1%

CVS, cardiovascular; HDL, high density lipoprotein; LDL, low density lipoprotein.

identified dyslipidemia to be a risk factor, there existed confusion between HDL and LDL cholesterol. Only a few students (12.5%) correctly identified HDL to be the good cholesterol. We measured their heart health behavior by assessing their perception and practices toward the same. Less than one-third (31.4%) reported to have their lipid profile checked. Likewise, only 43.1% actively engaged in sports and 17% stated that their weight has increased in the past year. Pertaining to personal history, 12.4% were smokers and 13.7% regularly consumed alcoholic beverages.

Table 3 gives an overview of the mean score for each of the six key components that assessed the participant's knowledge in detail on CVD risk, diagnosis, and treatment. The total knowledge score was 71.4%. The students had good knowledge regarding diagnosis of CVD (90.2%). Similarly, their knowledge on physical activity (86.1%), epidemiology (79.1%), dietary habits (80.4%), and comorbidities (78.2%) associated with CVD was fairly good. However, the proportion of respondents with knowledge on lifestyle behavior (35.4%) and its influence on CVD were meager.

Figures 1, 2, and 3 show the mean component score for CVD knowledge between genders, smokers and nonsmokers, and alcoholics and nonalcoholics, respectively. Female students scored significantly better on the knowledge score for epidemiology (3.01 ± 0.10 vs. 3.33 ± 0.11 , $p = 0.031$) of heart disease as well as lifestyle behavior (2.97 ± 0.11 vs. 3.60 ± 0.12 , $p = 0.0001$). The identification of risk factors was enhanced among those students who followed better lifestyle practices as we could derive statistically significant difference between students with smoking history (21.82 ± 0.26 vs. 18.75 ± 1.01 , $p = 0.001$) and alcohol consumption (21.84 ± 0.26 vs. 18.91 ± 0.92 , $p = 0.001$) compared with those without. As expected, students devoid of smoking history (Figure 2) and alcoholic intake (Figure 3) scored significantly better in individual components of knowledge such as epidemiology, physical activity, lifestyle behavior, and dietary habits as well as in the total knowledge score (Figures 4 and 5).

DISCUSSION

This study provides valuable information on the current level of knowledge of medical students on CVD. Being medical students,

Table 3: Mean components score for CVD knowledge

Components	Mean score (5)	Percentage (%)
Epidemiology knowledge score	3.14	79.1%
Physical activity knowledge score	4.36	86.1%
Comorbidities knowledge score	3.90	78.2%
Lifestyle behavior knowledge score	2.21	35.4%
Dietary habits knowledge score	4.01	80.4%
Diagnosis knowledge score	4.47	90.2%
Total knowledge score	21.42 (30)	71.4%

CVD, cardiovascular disease.

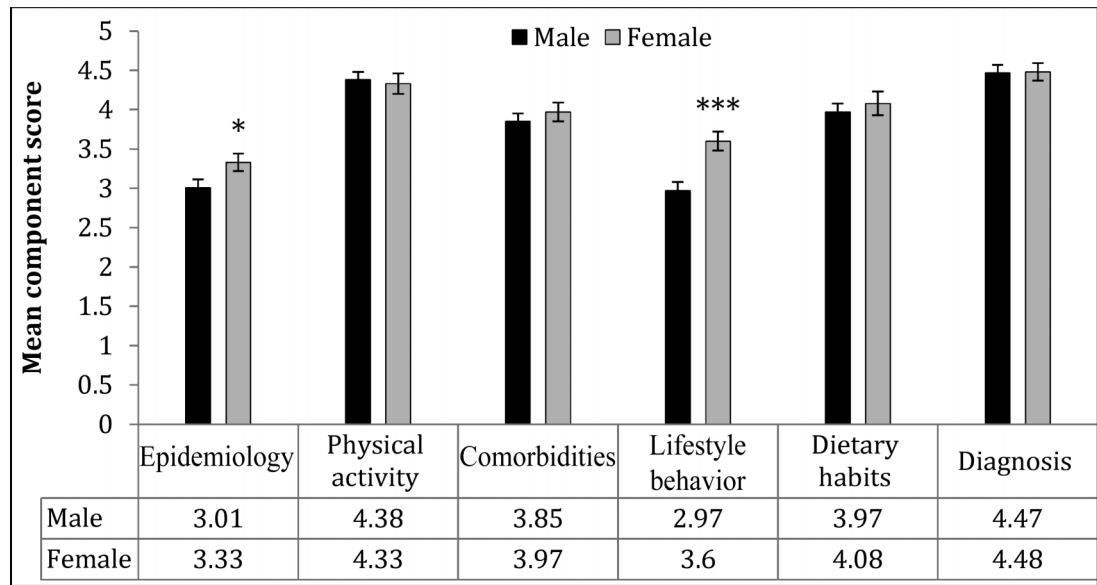


Figure 1: Mean components score for cardiovascular disease (CVD) knowledge among male and female participantsResults are expressed as mean ± standard deviation; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

the overall knowledge score (Table 2) was above average for our participants and female students scored better than male students (Figure 4); however, there were two areas of concern where the score was suboptimal, namely the lifestyle behavior and epidemiology knowledge score.

Similarly, data on the anthropometric and blood pressure profile of our student participants reveal that more than one-third are obese and their blood pressure falls in the prehypertensive range (Table 1). These findings clearly show

the gap between awareness/knowledge and practices. These findings correlate well with our results of suboptimal score for lifestyle behavior and the epidemiology. Even after completing their first year of medical education, their knowledge still remains low on the disease burden. This might be a problem with the curriculum. In the first year, though community medicine classes are compulsory, students do not show much interest as it is not included in the university exams. Introducing the students to integrated teaching modules right

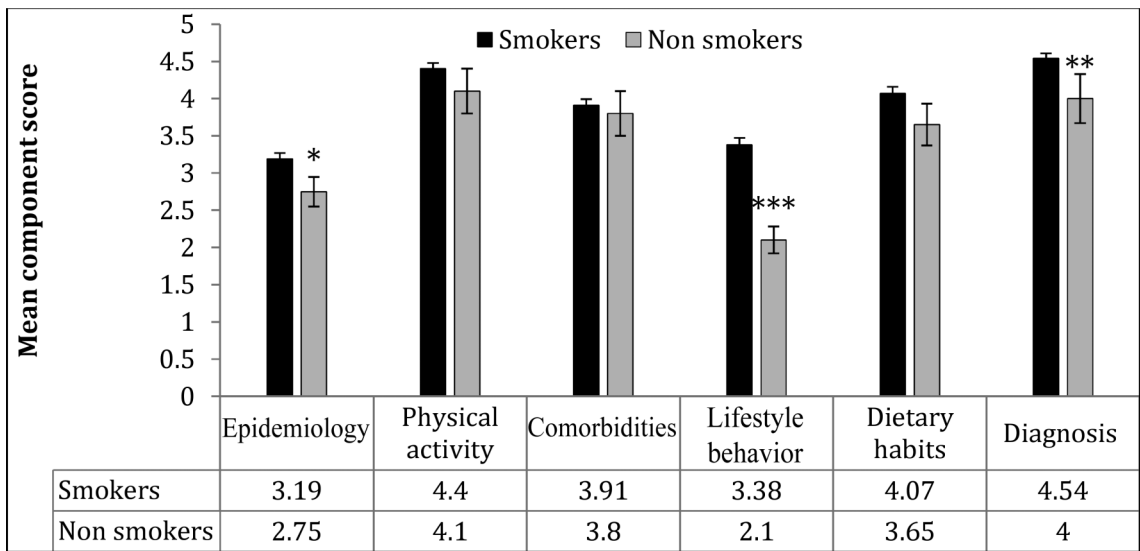


Figure 2: Mean components score for cardiovascular disease knowledge among smokers and nonsmokersResults are expressed as mean ± standard deviation; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

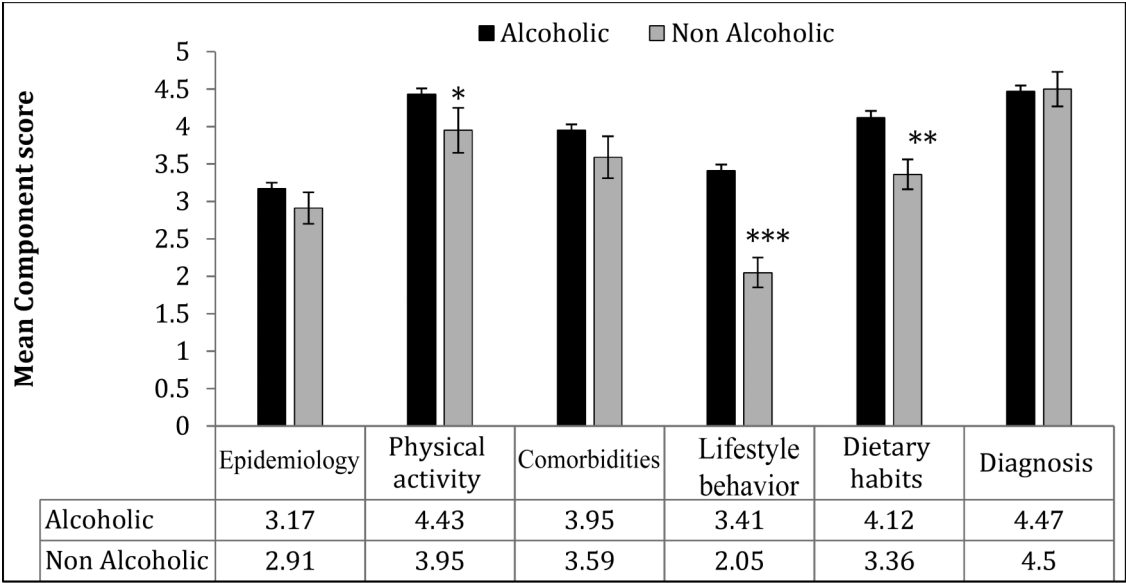


Figure 3: Mean components score for cardiovascular disease knowledge among alcoholics and nonalcoholicsResults are expressed as mean ± standard deviation; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

from the first year will help better in sensitizing them to the disease burden and costs involved in treatment. It is seen that student's performance and involvement is enhanced when the basic medical science subjects are taught from a clinical view point as case-based learning.^[8] In 2001, the institute of medicine in USA conducted a landmark survey that reported several underlying failings in the current medical education and training, which is almost a century old.^[9,10] In the preliminary work done by Thomas et al.,^[11] it is encouraging to note that

not only the students did better, but the faculties who were anxious at the commencement of the project later actively participated in improving the curriculum and were full of ideas about how to accomplish the same.

Correct identification of risk factors was highest for dyslipidemia; nevertheless, most of them (87.5%) did not know the difference between LDL and HDL cholesterol (Table 2). Among the various risk factors for heart disease, only 63.6% considered family history to be a risk factor. Such an observation

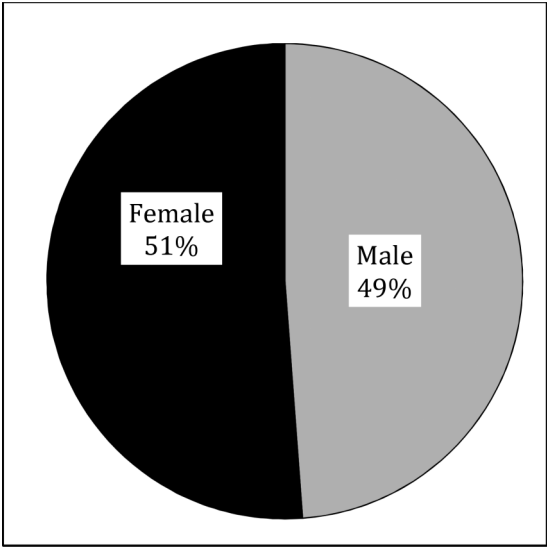


Figure 4: Pie chart showing the total knowledge score among male and female participants.

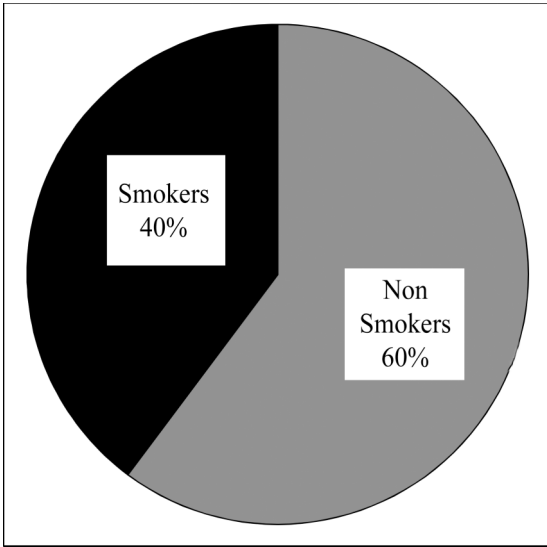


Figure 5: Pie chart showing the total knowledge score among smokers and nonsmokers.

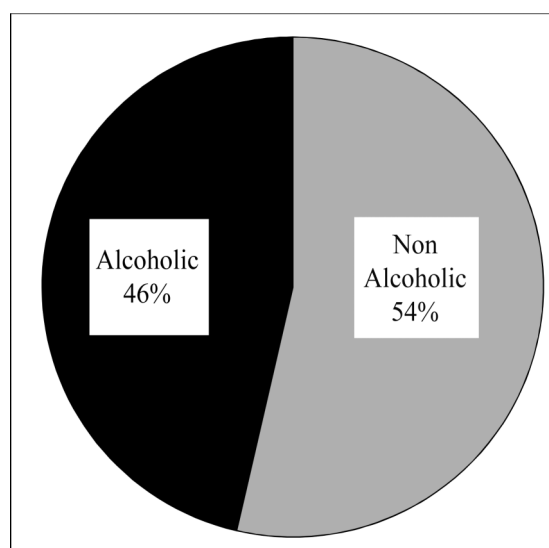


Figure 6: Pie chart showing the total knowledge score among alcoholics and nonalcoholics.

is not new as many authors from various countries have observed similar results, emphasizing the need to bring change in the current medical curriculum.^[12–14] Despite the enormous changes in the environment, we have made only relatively minor changes and improvements in our medical educational and training programs.

Deeper probe into the lifestyle behavior of our students revealed very disturbing facts. In spite of the knowledge of ill effects of cigarette smoking, 12.4% reported regular smoking and 13.7% admitted to be consuming alcoholic beverages on everyday basis (Table 2). These were the participants who scored significantly less in the total knowledge score (Figures 5 and 6) as well in the individual key components. Nonsmokers scored better with respect to epidemiology, lifestyle behavior, and disease diagnosis (Figure 2), likewise nonalcoholics had sound knowledge about physical activity, lifestyle behavior, and dietary habits (Figure 3). This is in agreement with two Spanish studies where 32.5% and 31% of them had started smoking during their medical studies.^[15,16] A cross-sectional survey conducted among undergraduate medical students in Asian countries also reported similar prevalence rate of 31.7% among medical students.^[17]

The lack of knowledge among medical students about smoking- and alcoholism-related diseases and cessation practices poses to be a great threat to health-care delivery and calls for immediate reforms in the education pattern.

Our results have to be interpreted with some caution as there are a few limitations. As with any survey, the convenient method of sampling involving students of a single medical college limits the extrapolation of the results to other medical colleges. Also, it is a self-administered questionnaire and so there could be the problem of reporting bias especially with the lifestyle behavior scores.

CONCLUSION

The results from our study indicate that there are few areas of concern in our medical education that need to be reformed. This is reflected by the fact that our students scored poorly on the knowledge score pertaining to lifestyle behavior, epidemiology, and dietary habits. A sound knowledge of CVD is very essential for the students as they are the health-care providers of the future and to achieve this, a change in the core medical curriculum starting from basic medical sciences becomes imperative.

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REFERENCES

1. Alwan A. Global Status Report on Noncommunicable Diseases 2010. Geneva, Switzerland: World Health Organization, 2011.
2. World Health Organization. *The World Health Report 2002: Reducing risks, Promoting Healthy Life* Geneva, Switzerland: WHO, 2002. Available at: http://www.who.int/whr/2002/en/whr02_en.pdf [accessed January 27, 2013].
3. Reddy KS, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. *Circulation*. 1998;97(6):596–601.
4. Reiner Ž. How to improve cardiovascular diseases prevention in Europe? *Nutr Metab Cardiovasc Dis*. 2009;19(7):451–54.
5. Jafary FH, Aslam F, Mahmud H, Waheed A, Shakir M, Afzal A, et al. Cardiovascular health knowledge and behavior in patient attendants at four tertiary care hospitals in Pakistan – a cause for concern. *BMC Public Health*. 2005;5:124.
6. Khan MS, Jafary FH, Jafar TH, Faruqui AM, Rasool SI, Hatcher J, et al. Knowledge of modifiable risk factors of heart disease among patients with acute myocardial infarction in Karachi, Pakistan: a cross sectional study. *BMC Cardiovasc Disord*. 2006;6:18.
7. Reiner Ž, Sonicki Z, Tedeschi-Reiner E. The perception and knowledge of cardiovascular risk factors among medical students. *Croatian Med J*. 2012;53(3):278–84.
8. Johns M. The time has come to reform graduate medical education. *JAMA*. 2001;286(9):1075–76.
9. Whitcomb ME. CME reform: an imperative for improving the quality of medical care. *Acad Med*. 2002;77(10):943–44.
10. Institute of Medicine Committee on Quality of Health Care in America. *Crossing the Quality Chasm: A new Health System for the 21st Century*. Washington, DC: National Academy Press, 2001.
11. Lawley TJ, Saxton JF, Johns MME. Medical education: time for reform. *Trans Am Clin Climatol Assoc*. 2005;116:311–20.
12. Keil U; EUROASPIRE Study Group. Cardiovascular prevention guidelines in daily practice: a comparison of EUROASPIRE I, II, and III surveys in eight European countries. *Lancet*. 2009;373(9667):929–40.
13. Kotseva K, Wood D, De Backer G, De Bacquer D, Pyorala K, Reiner Z, et al. EUROASPIRE III. Management of cardiovascular risk factors in asymptomatic high-risk patients in general practice: cross-sectional

- survey in 12 European countries. *Eur J Cardiovasc Prev Rehabil.* 2010;17(5):530-40.
14. Prugger C, Keil U, Wellmann J, de Bacquer D, de Backer G, Ambrosio GB, et al. Blood pressure control and knowledge of target blood pressure in coronary patients across Europe: results from the EUROASPIRE III survey. *J Hypertens.* 2011;29(8):1641-8.
 15. Mas A, Nerin I, Barrueco M, Cordero J, Guillén D, Jiménez-Ruiz C, et al. [Smoking habits among sixth-year medical students in Spain]. *Arch Bronconeumol.* 2004;40(9):403-8.
 16. Nerin I, Guillén D, Mas A, Crucelaegui A. [Evaluation of the influence of medical education on the smoking attitudes of future doctors]. *Arch Bronconeumol.* 2004;40(8):341-7.
 17. Sreeramareddy CT, Suri S, Menezes RG, Kumar HH, Rahman M, Islam MR, et al. Self-reported tobacco smoking practices among medical students and their perceptions towards training about tobacco smoking in medical curricula: a cross-sectional,

questionnaire survey in Malaysia, India, Pakistan, Nepal, and Bangladesh. *Subst Abuse Treat Prev Policy.* 2010;5(1):29.

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