BIOPSYCHOSOCIAL AND BEHAVIOURAL CORRELATES OF CORONARY HEART DISEASE

Réka Baranyai, M.D.

Supervisor and Head of Doctoral Program: Prof. Mária Kopp, M.D., D. Sc.
Head of Doctoral School: Prof. István Bitter, M.D., D. Sc.
Research Setting: Institute of Behavioral Sciences
Semmelweis University Budapest
Central Institute of Mental Health
University of Heidelberg

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INTRODUCTION

Cardiovascular disease is the leading cause of death worldwide. According to World Health Report 2003, 16.7 million people died due to cardiovascular disorder in 2002, which accounts for 29.2% of total global deaths. The most common cardiovascular disorder is coronary heart disease (CHD): out of the nearly 17 million deaths 7.2 million are due to ischaemic heart disease, being responsible for 13% of deaths worldwide. Furthermore, at least 20 million people survive heart attacks every year, a significant proportion of them requiring costly clinical care. Coronary heart disease affects people in their mid-life years, often leading to a worsening of the socioeconomic situation and of psychosocial well-being. It influences not only the affected individuals, but their families as well, and by putting a huge burden on care resources, it has even national consequences.

Although recently there has been a drop in age specific CHD incidence as well as death rates in most parts of the developed world and its prognosis has improved markedly, CHD remains still the leading cause of deaths in developed countries. However, in contrast to the decrease of CHD incidence and death rates seen in Western and Northern European countries, there is a morbidity and mortality crisis in Central and Eastern European societies. In addition, an even higher prevalence of coronary heart disease is expected in future: it has been projected that cardiovascular disease will climb worldwide to the first most common cause of death, with more than 36 percent of all deaths in 2020.

Thus the analysis of the social, psychological and biological factors that contribute to these huge number of patients with CHD are of special interest. Much has been learned about the importance of some risk factors like smoking, lack of exercise, overweight/obesity, hypertension, or hypercholesterolemia. Furthermore, it has been suggested that not all patients with coronary heart disease have one of the established coronary risk factors mentioned above. These findings have lead to a search for potential novel markers and other non-traditional risk factors in order to provide a better assessment of the cardiovascular risk. Among the most important novel and non-conventional risk and prognostic indicators were psychosocial variables such as depression, hostility, lack of social support, work or marital stress, low socioeconomic status as well as biological markers, such as changes in the autonomic nervous system, inflammation or platelet activation.

Recently there is a growing body of literature pointing out that exploring psychosocial characteristics that could attenuate the negative effect of risk indicators, would be of utmost importance, as it is not easy to modify detrimental habits or behaviours. Well-being, self-efficacy, spirituality, purpose in life, self-rated health have been proposed among others as possible protective factors.

Based on these findings, the PhD research was built on two pillars: epidemiologic studies were carried out assessing psychosocial and behavioural factors associated with myocardial infarction (MI). We aimed at improving the efficacy of both primary and secondary prevention strategies, and to provide clinicians, other health care professionals and policy makers specific hints on the special characteristics of the targeted population, pointing out possible drawbacks and pitfalls of the interventions. On the other hand we conducted laboratory research, examining a potential mechanism between depression and heart disease, the role of platelet activation, which could become in the future a part of the pharmacological treatment.

The first study therefore evaluated health behaviour, health beliefs, risk awareness and psychosocial factors among university and college students; the 2nd study involved patients who suffered a heart attack, in order to identify and monitor those behavioural and psychosocial factors that could play a role in the recovery of Hungarian patients; and the 3rd study examined a postulated mechanism, platelet reactivity in depressed patients.

The figure below summarises the research design.
AIMS

I. Epidemiologic Studies

Health Behaviour, Health Beliefs, Risk Awareness and Psychosocial Well-Being in University and College Students in Hungary

1) Assessment of health behaviour, beliefs and risk awareness of CHD in university and college students
2) To evaluate the psychological and social well-being of students
3) To determine the possible effect of risk awareness, beliefs and psychosocial factors on health behaviour
4) To assess gender differences in health behaviours, risk awareness, beliefs and psychosocial factors
5) Comparison of Hungarian data with international results
6) Assess changes in behaviour, beliefs and risk awareness between 1990 and 2000
7) To suggest further possible targets of subsequent health promotion programmes in Hungary in order to improve the efficacy and to reduce the risk of the development of cardiac disease
Possible Targets of Interventions After Coronary Events - Lessons Learned from Hungarostudy 2002

1) Evaluation of the health behaviour of patients with a history of a heart attack compared to controls
2) To assess the prevalence of psychosocial protective and risk factors, focusing on special and common characteristics
3) To examine the interrelationship between depressive symptoms and psychosocial factors
4) To explore the interrelationship between well-being, self-rated health and other psychosocial factors
5) To suggest possibilities of improving the efficacy of rehabilitation programmes offered to patients after coronary events
6) To draw attention the of health care professionals and policy makers to the social, economic and psychological factors relevant in the rehabilitation of patients

II. Laboratory Research

Platelet Reactivity in Depressed Patients

1) Examination of platelet function in depressive patients under baseline conditions
2) Assessment of platelet reactivity following mental stress
3) Evaluation of platelet reactivity following physical stress
4) Estimation of the effects of treatment of depression on platelet function

METHODS

Health Behaviour, Health Beliefs, Risk Awareness and Psychosocial Well-Being in University Students in Hungary

Our study was part of an international survey called “International Health and Behaviour Study”, initiated by Professor Andrew Steptoe and Jane Wardle, PhD from the University School London. I was responsible for organising the survey in Hungary in 2000. The same methodology was used across the countries, enabling international comparisons. Students of medical universities and health colleges were excluded from the study, in order to assess the health beliefs and risk awareness of non-health-professionals. A national, cross-sectional survey was carried out. In order to ensure a representative sample, demographic data were acquired from the Hungarian Central Statistical Agency. The student sample was stratified by the proportion of the students in the different field of studies. Then universities were randomly selected in the certain field of studies, representing the west-east regional axis and Budapest in Hungary. Participation was voluntary, students were asked to fill-in a self-report anonymous questionnaire. The final sample corresponded well to the description of the Central Statistical Agency, with deviations indicating a sampling error within statistically acceptable limits.
Altogether 590 university students (237 men and 353 women) aged between 18-28 years returned evaluable questionnaires, the mean age was 21.8 years (±1.8). A high response rate was observed (above 90%).
**Measures**

Out of *conventional risk factors* we assessed the behavioural characteristics: smoking, lack of exercise, overweight, unhealthy dietary practices. Furthermore, we examined the *risk awareness or knowledge* of students concerning health measures that influence heart disease, and students’ *beliefs* in the benefits of healthy lifestyles.

The questionnaire developed for the international survey was amended with a set of questionnaires added by us with the kind allowance of Professor A. Steptoe to be able to examine *psychosocial risk and protective factors* among students. We included questions concerning psychological risk factors (depressive symptoms, hostility, social distrust), and consistent with the holistic approach of mental illnesses we also assessed psychological indicators that are considered to have protective effects (purpose in life, self-efficacy, spirituality, coping strategies, well-being). The following standardised questionnaires were used: Beck Depression Inventory (BDI), shortened Purpose in Life Questionnaire by Crumbaugh és Maholick, Ways of Coping Questionnaire by Folkman and Lazarus, shortened Cook and Medley Hostility subscale and General Self-Efficacy Scale by Schwarzer.

*Socioeconomic factors:* social support, subjective socioeconomic status and objective socioeconomic status (number of cars the family possesses) were included.

**Possible Targets of Interventions After Coronary Events - Lessons Learned from Hungarostudy 2002**

Data were obtained from the Hungarostudy 2002 (n=12,643), a national, cross-sectional survey that is representative of the Hungarian population older than 18 years according to sex, age, and the 150 subregions in the country. The health survey was conducted by the Institute of Behavioural Sciences, Semmelweis University Budapest in 2002. Participants reporting of treatment received because of myocardial infarction were identified as coronary heart disease patients (n = 365), representing 2.9% of the sample. Controls were respondents in the same age group namely aged 45 to 90 years, who did not report of a history of heart disease, stroke or vascular diseases. 4352 persons matched these criteria. The mean age of controls was 59.3 ± 10.8 years, whereas MI-patients were older (66.8 ± 10.5 years). Furthermore, gender differences have also been observed (58.5% of controls were women, while only 38.6% of MI-patients). Therefore in our analyses we also adjusted for age and gender.

**Measures**

Similar to the study conducted in university students I examined the prevalence of health and risk behaviour (*conventional risk factors*).

Besides the *psychological factors* assessed in the students’ study, religious involvement and sense of coherence (Rahe) were also examined as putative protective psychological factors.

*Socioeconomic factors:* social support, subjective socioeconomic status and objective socioeconomic status (monthly income of household) were included.
Platelet Reactivity in Depressed Patients

We included ten patients who had been admitted to the Clinic of Psychiatry and Psychotherapy at the Central Institute of Mental Health, Mannheim, University of Heidelberg, Germany. The following inclusion criteria were applied: (1) an episode of major depression according to DSM-IV criteria; (2) a score of at least 18 on the 21-item Hamilton Depression Rating Scale; (3) age between 18 and 65; (4) written informed consent was given. Exclusion criteria were: (1) history of psychosis, schizophrenia, substance dependence; (2) bleeding disorders; (3) other medical conditions or ingestion of drugs known to influence platelet function (aspirin, clopidogrel, dipyridamol, etc.). For each patient, a German age- and sex-matched healthy comparison subject was selected, with no history of a past or present major psychiatric disorders and fulfilled all the other conditions mentioned above. Platelet activation was measured twice in patients (first after a five-day period without antidepressant medication to provide at least a 5-day wash-out period, and then before discharge).

I have established and validated the protocol of platelet measurement in our institute using flow cytometry with Florian Lederbogen, MD. Flow cytometry is one of the most sensitive methods to detect changes in platelet function via determining and recognising specific membrane receptors with monoclonal antibodies. The following monoclonal antibodies (mab) were applied: CD41 (directed against a complex of glycoprotein IIb/IIIa); Isotype-matched mouse IgG for detecting non-specific binding; and either P-selectin (CD 62) or lysosomal GP53 (CD63) for estimating platelet activation. P-selectin and GP53 are not normally found in the plasma or on the surface of platelets, only during platelet activation. In our laboratory, the coefficient of variation for analysis of P-selectin was 5% and for GP53 4%. The study protocol of the measurements with applying mental and physical stressors was developed. Impedance cardiography and sphygmomanometer was used to monitor cardiovascular parameters.

Platelet activation was measured under baseline circumstances (patients and controls were asked to refrain from major physical activity two days prior to the study, not to smoke or eat after 10.00pm the evening before and to drink only water on the day of the study). We also assessed changes in platelet activation following mental stress (20-minute computer-based detection task) and physical stress (administering a recumbent treadmill test using a modified Bruce protocol).

Statistical Analyses
Besides descriptive statistics (mean, standard deviation, crosstabulation) differences in distributions were compared using chi-square and (in case of multilevel variables) Mann-Whitney-U-tests, two-way ANOVA. Adjusting for age and gender was carried out with general linear model. Multivariable logistic and linear models were applied to explore the relationship between the examined factors.

Data were analysed using SPSS 9.0 for Windows (Statistical Package for Social Sciences). A \( p \)-value of less than .05 was considered indicating statistical significance.
RESULTS

Health Behaviour, Health Beliefs, Risk Awareness and Psychosocial Well-Being in University Students in Hungary

1. Health Behaviour

Smoking
- No gender difference was found in the prevalence of smoking: about 19% of men and women reported of smoking. 7.7% of men and 5.7% of women smoked more than 10 cigarettes a day, while 5.1% of men and 6.5% of women quit smoking.
- Similar proportions of men and women would like to quit smoking (70.8%).
- Compared to European data, the prevalence of smoking was quite low. However, compared to Hungarian data from 1990, the prevalence increased with about 3% (although not significant).

Physical Activity
- The prevalence of leisure-time physical activity at recommended levels was 59.3% in men and 51.6% in women ($p = .064$). Strikingly, 14.8% of men and 16.8% of women were not doing any exercise. Low-frequency activity (1 to 3 times in two weeks) was mentioned by 31.6% of women, and 25.8% of men.
- More inactive women than men would like to do more exercise (94.1% and 78.1%, respectively; $p < .05$). No gender difference was observed among students reporting of low-frequency activity: 94.5% of women and 98.3% of men would like to increase the amount of exercise.
- The prevalence of doing exercise was among the best in Europe. Nevertheless, it was lower than in 1990: in women with 12.5% ($p < .001$), whereas in men with 5.8% ($p < .05$).

Overweight
- In our sample 15.7% of men and 5.4% of women ($p < .001$) gave heights and weights placing them in the range of overweight ($\text{BMI} \geq 25 \text{ kg/m}^2$). More women than men would like to lose weight even in the normal range (47.4% és 17.3%, $p < .001$), as well as in the overweight group 78.9% and 51.4% ($p < .05$), respectively.
- Men tended to be more overweight in 2000. No difference was seen in women.

Diet
- The prevalence of healthy dietary practices was lower: 35.7% of students ate fruit at least once daily, 23.9% ate fibre-rich food, and 30.7% reported of trying to avoid food with high fat and cholesterol content.
- Fruit consumption and limiting fat intake was below the European average.
- A consistent decrease in all examined food choices was observed between 1990 and 2000: the prevalence of fruit consumption decreased with 21.9% in women ($p < .001$) and 14.8% in men ($p < .005$); limiting fat intake 8.6% ($p < .05$) and 11.6% ($p < .001$), while concerning fibre-rich food 12.7% ($p < .001$) and 13.0% ($p < .005$), respectively.
- Across all dietary measures, women were more likely to pay attention to a healthy diet than men.

2. Risk Awareness and Health Beliefs (Attitudes)
- There was a high awareness of the influence of overweight (93.2%) and dietary fat intake (76.6%) on heart disease. In contrast, only about half of students knew about the connection between smoking or physical activity and heart disease. Solely 18.4% of students mentioned fibre consumption. 71.8% were aware of the risk of stress.
- The majority of students reported of strong beliefs in the benefits of not smoking (86.4%), physical activity (93.1%), keeping a normal body weight (87.8%) and fruit
consumption (90.8%). In contrast, eating high-fibre food and limiting fat intake were accorded lower levels of importance for health (61.2% and 59.3%, respectively). Avoiding/coping with stress was important for 51.4% of students.

3. Mental Health – Psychosocial Factors

- Mild depressive symptoms were reported by 24.2% of women and 16.7% of men. Moderate or severe symptoms were characteristic of 4.8% of students, with a female preponderance.
- While the prevalence of hostility was 10%, the prevalence of social distrust was quite high: men were more likely to report of social distrust than women (56.6% versus 44.3%, respectively, \( p < .001 \)).
- According to our expectations, the prevalence of protective factors was high, as the sample consisted of university and college students. 93.5% had purposes in life, 71% were self-effiacious, 78.5% were satisfied with their lives. Problem-oriented coping was characteristic of 61.1% of the sample, while emotion-focused coping of 3.6%. Faith was important for more than half of students. These measures did not differ by gender.

4. Interrelationship between Risk Awareness, Health Beliefs, Psychosocial Factors and Behaviour

- Our results revealed that in all behaviours but one (smoking), there were no significant associations between risk awareness and behaviour. Moreover, the relationship between the knowledge of the link between smoking and heart disease was not in the direction that might be expected: risk awareness was positively associated with smoking.
- In contrast to risk awareness, a robust relationship was demonstrated between beliefs in health benefits and tobacco use as well as healthy dietary practices. Concerning physical activity strong beliefs were associated with doing exercise, however, it showed only in tendency with doing exercise at a recommended level.
- Women were more likely to show a healthy lifestyle, even when reporting the same level of knowledge in the following risk factors: overweight, fibre-poor diet and unlimited fat-intake.
- Gender differences in beliefs in the importance of healthy eating and differences in dieting explained the gender differences observed in fat avoidance and fruit consumption. Women were still more likely to report of eating high-fibre food than men, even after considering the effects of age, beliefs and dieting.
- The robust relationship demonstrated between beliefs in health benefits still held, even after taking into account the effects of psychosocial factors.

The following psychosocial factors were associated with behaviour independent of age, gender, beliefs, risk awareness (when relevant) and other psychosocial factors:

- With growing importance of religious issues in their lives women were less likely to smoke as opposed to their male counterparts with same perceived importance of faith. Emotion-focused coping was also independently associated with smoking.
- Physical activity was more common in students reporting of a lower socioeconomic status, although not at a recommended level. Higher social distrust was related to inactivity.
- Socioeconomic status proved to be the principal psychosocial determinant of overweight and healthy food choices: a healthy diet was more characteristic of students coming from a better socioeconomic background, especially in women. Purposes in life was the only psychosocial factor that showed an association with healthy diet in the case of eating high-fibre food.
Possible Targets of Interventions After Coronary Events - Lessons Learned from Hungarostudy 2002

1. Health Behaviour

Smoking

- 18.5% of men and 8.7% of women smoke after surviving a heart attack. Moreover, 63.8% of male and 46.2% of female smokers reported of smoking more than 10 cigarettes a day.
- 21-29% (age-adjusted) of former smokers quitted smoking after a heart attack

Physical Activity

- Regular physical exercise, as recommended by the WHO was observed only in about 10% of both controls and MI population. More than three-quarters of patients reported of not doing any exercise.

Overweight

- Only male patients were more obese than age-adjusted controls, while there were no differences observed in women. However, every 3rd man and every 4th woman is obese (BMI ≥ 30 kg/m²).

2. Mental Health – Psychological Factors

- Concerning risk factors, MI-patients were more likely to feel depressed \((p < .001)\), while severe depressive symptoms were significantly more common among women regardless of age. 21% of patients showed mild depressive symptoms. Clinically relevant depression can be assumed with every 3rd female and every 4th male patient regardless of age, whereas an increase with age was observed in controls.
- Social distrust was more prevalent among patients \((p < .001)\), while no difference was seen regarding hostility.
- Male patients felt less self-efficacious than controls \((p < .05)\), contrary to women.
- Importance of faith and religious involvement showed a similar picture: more female patients regarded faith as important, and were more likely to attend church services than men \((p < .005)\). Sense of coherence of male patients was lower than that of controls, in women no difference was seen.

3. Social Factors

- Social support, defined here as counting on somebody’s help in difficult situations showed primarily a gender difference, whereas differences by history of MI showed no relevant associations.
- About 59% of women with a history of heart attack is living alone (mostly retired), with 48.3% being widowed, whereas the majority of men with heart disease live in a stable relationship. After adjusting for age and gender the difference remained significant.
- The level of education of more than half of patients was primary school and skilled labour training (63.8% of men and 73.0% of women).
- Women were more likely to report a monthly income of household less than 50,000 HUF.
- It is important to note, that a monthly income of household of less than 100,000 HUF was reported by 68.7% of men and 79.4% of women with a history of heart attack.

4. Interrelationship of Psychosocial Factors

- Socioeconomic factors were relevant for self-rated health, well-being as well as depressive symptoms in our study. However, we found that their effect was largely mediated by psychological factors.
• The major components correlating independently with a higher well-being in the Hungarian postinfarct population were problem focused coping strategies, a lesser degree of depressive symptoms and a higher self-rated health.

• MI patients reporting of depressive symptoms were more likely to apply emotional-focused coping strategies, be hostile and have a lower educational level. Interestingly, faith was more important for depressed patients. Self-efficacy and sense of well-being as well as religious involvement, however, were negatively associated with depressive symptoms.

• Sense of well-being (positively) and depressive symptoms (negatively) were related to a better self-rated health independent of the other factors. Patients perceiving their financial status to be better, tended to rate their health better, too.

**Platelet Reactivity in Depressed Patients**

Baseline values of platelet activation were observed to be higher in controls than in patients. However, no differences have been found in cardiovascular parameters. Depressive patients exhibited a greater increase in the activation-dependent surface markers P-selectin and GP53 after physical activity than healthy volunteers ($p < .05$). After three weeks of anti-depressant therapy, with the remission of depressive symptoms we found that the expression of P-selectin tended to increase after physical activity while the fluorescence indicating the number of GP53-molecules was unchanged, indicating a lower level of platelet reactivity.

**SUMMARY- CONCLUSIONS**

1) Although in comparison with international data less Hungarian students smoke and more students exercise, exploring changes of behaviours between 1990 and 2000, the prevalences of risk behaviours have risen. Furthermore, concerning fruit consumption and healthy dietary fat intake, the low prevalences seen in 1990 have even more decreased, and are below the European average.

   ➔ In spite of prevention programmes introduced in the last decade, the prevalence of risk behaviour is still high, denoting a need for improvement in all areas of the examined health behavioural patterns.

2) The most well-known risk factors of CHD were the influence of overweight and dietary fat intake, with more than three-quarters of students mentioning them. Strikingly, only about one-half of students were aware that smoking was relevant to the risk of heart disease, and even less students knew that physical activity played a role, whereas less than one-fifth mentioned fibre consumption.

   ➔ The levels of knowledge of the risk factors of CHD are disappointingly low even in students, who form the best educated sector of their age-group, where the highest knowledge of risk factors could be expected.

3) There were no significant associations between risk awareness and behaviour in the assessed behaviours but one (smoking: remarkably a positive relation was observed). In contrast to risk awareness, a robust relationship was demonstrated between beliefs in health benefits and tobacco use, physical activity and healthy dietary practices.

   ➔ Our results highlight that in order to achieve a substantial decrease in the prevalence of risk behaviours, it is not enough to give information. Health education must aim besides informing about risk factors also a change of beliefs, attitudes and intentions. It is essential to establish the frame for a healthy lifestyle, like making healthy food available at schools, at universities, providing exercise facilities and opportunities, prohibiting tobacco use at all school facilities and public venues or
events, involving students (and staff) in programmes that help them to lose weight or quit smoking. Providing specific detailed guidelines and information about when, where and how one can take action may further enhance learning a healthy lifestyle.

4) Gender differences were demonstrated in three food choice behaviours in Hungarian students: men are less likely than women to follow important healthy eating guidelines. Furthermore, women showed stronger beliefs in the benefits of health behaviours, than men. In addition, women were more likely to show a healthy lifestyle, even when reporting the same level of knowledge regarding overweight, fibre-poor diet and unlimited fat-intake.

- Prevention programmes must have a special emphasise on reaching and convincing men, as they are at a higher risk for CHD, and as our results suggest, men are more likely to “put aside” acquired knowledge of risks of unhealthy lifestyle.

5) Socioeconomic status proved to be the principal psychosocial determinant of behaviour in students even after adjusting for age, gender, health beliefs and other psychosocial factors: poorer students exercise more, whereas wealthier students eat healthier and are at smaller risk of being overweight, especially if they are females. In addition, importance of faith, purpose in life (both enhancing) and emotion-focused coping (hindering) emerged as salient correlates of health behaviour.

- As socioeconomic status cannot be modified, prevention programmes could focus on improving purposes in life, encourage religiosity, finding real values in life, and teach students life skills in order to be able to cope adequately with stressors instead of tobacco use.

6) Concerning health behaviour of coronary patients a disappointing picture was seen: every 5th men reported of smoking (3 to 4 out of 5 former smokers), 9 out of 10 patients of not doing regularly physical activity, every 3rd man and 4th woman is obese. Although more patients with a history of heart attack succeeded in quitting smoking than controls, no clinically relevant increase in physical activity can be assumed.

- The modification of physical activity seems to be less efficient than smoking cessation in the rehabilitation of cardiac patients. More emphasis on changing exercise patterns and encouraging patients to loose weight is recommended. Patient information by medical staff and easily accessible information material on this important matter may be suboptimal?

7) Physicians, other health care professionals and policy makers must consider that:

- About three-quarters of men live in an intact marriage, whereas more than half of women live alone (almost 50% are widowed), having reduced financial resources and social support provided mostly by their children and relatives.

- A monthly income of household of less than 100,000 HUF was reported by the majority of patients. Women were more disadvantaged, with 40% having an income less than 50,000 HUF.

- The reduced financial resources may become especially relevant in light of the current prizes of therapeutics, drugs etc. with a reduced possibility to improve their lifestyle by a healthy diet, money-consuming physical activities, like swimming etc. Encouraging patients to take part in retiree or patients’ clubs could improve their social support and make possible access to healthy diet or physical activities by getting group-discounts.

8) A communication problem can be posed by the discrepancy of the patients and doctor's educational level: more than half of patients do not have secondary school degree.

- Information given by the medical staff or even information brochures of the simplest kind might exceed patients' knowledge about their own body and bodily complaints. Being aware of these differences might not only improve the physician-patient communication, but also enhance patients’ compliance.
9) Every 2nd patient complained of depressive symptoms. Therapeutically relevant depression can be assumed in every 3rd female and 4th male patient regardless of age.
   ➔ We would like to encourage therefore a higher awareness of cardiologists and other health care professionals who are in contact with coronary patients, regarding assessment and initiating proper treatment of depression in order to improve the quality of life and the compliance of patients.

10) Low education level, low self-efficacy, hostility and emotional coping showed a significant correlation with depressive symptoms.
    ➔ Concerning depressive symptoms clinicians especially need to keep their eyes on patients with lower education levels, on those reporting of a low sense of competence concerning mastering the situation, on hostile, aggressive, “unpleasant” patients, and on patients applying emotion-focused coping strategies.

11) Among protective psychological factors self-efficacy and religious involvement were associated with less depressive symptoms. Self-rated health was associated with well-being, and after controlling for its effect self-efficacy and problem-focused coping were still related to a better well-being.
    ➔ In order to improve the well-being of patients after a heart attack, based on our findings we would like to underline the importance of making available rehabilitation programmes that aim at improving self-efficacy, problem-focused coping to all patients, and encourage religious patients to attend church services.

12) Faith played a more important role for patients with depressive symptomatology (adjusted for psychosocial factors).
    ➔ Further research is needed to elucidate the proper interpretation of this finding. On one hand, it might indicate that believers who suffered a myocardial infarction have to cope not only with the consequences of the illness, but also with basic questions of their faith (i.e. “Why did God allow this?”; “Is the illness a punishment?”). On the other hand, we assume that patients with depressive symptoms more often try to find meaning, goals for their lives and hope in order to persevere and keep on going. Surviving a heart attack is often a crucial watershed: several patients are confronted with their own death, and many reconsider their lives and values.

13) Religious involvement (church attendance) was associated with less depressive symptoms (adjusted for importance of faith and other psychosocial symptoms).
    ➔ This finding highlights the importance of religious ministry in hospitals and during rehabilitation, providing the possibility for patients to attend services and also for spiritual counselling.

14) Depression was associated with a heightened platelet reactivity connected to physical stress.
    ➔ Our study underscores the importance of heightened platelet reactivity as a postulated link between depression and coronary heart disease. Further longitudinal studies could clarify the issue, whether using drugs for platelet inhibition in the pharmacological prevention of CHD in depressed patients contributes to a lower risk of coronary events and/or coronary deaths.

In order to achieve a substantial decrease in the prevalence of coronary heart disease, primary prevention must start as soon as possible, so to say, already “before birth”. Health education must aim besides informing about risk factors also a change of beliefs, attitudes and intentions. For the efficacy of primary and secondary prevention programmes it is of crucial importance that all parties, starting from the individuals through families, teachers, clinicians, mental health professionals, public health officials to policy makers, understand and acknowledge the immense burden and the tremendous opportunities that might be used to combat the morbidity and mortality crisis due to coronary heart disease.
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Publications Connected to the Topic

Scientific Papers


Baranyai R, Nonell A, Deuschle M, Lederbogen F. How depression may increase cardiac risk: effect of hypercortisolism on platelet activation markers. (submitted to Neuropsychobiology)

Abstracts


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Publications not Connected to the Topic

Scientific Papers


Books and book chapters


Abstracts


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