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HEALTH PSYCHOLOGICAL ASPECTS IN THE TREATMENT OF CARDIOVASCULAR PATIENTS

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1. INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death worldwide. In Europe, CVD is responsible for 43% of total mortality (Timmis et al., 2018), and in 2019 cardiovascular disease accounted for nearly half of all deaths in Hungary, according to the Global Burden of Disease Study.

The most common diseases of the cardiovascular system include: *1. ischemic heart disease,* which results from a pathological process of narrowing and/or occlusion of the coronary arteries that supply oxygen and nutrients to the heart (Aaronson et al., 2000); *2. chronic heart failure,* when the heart is unable to provide the filling pressure of cardiac output required for tissue blood flow due to the reduced ability of the heart muscle to contract, or the natural aging process of the left ventricle, or other causes; and *3. arrhythmias* (abnormalities of heart rhythm or heart rate), by which we mean problems with the formation or drainage of a stimulus (Aaronson et al., 2000).

Risk factors for cardiovascular diseases are classified into non-controllable and controllable categories. Risk factors that cannot be controlled include age, gender, and familial incidence of heart disease (genetic factors). Controllable risk factors include dyslipidaemia (abnormal levels of one or more lipoproteins), hypertension (blood pressure above 140/90 mmHg), diabetes, and obesity, which may be alleviated or eliminated by lifestyle changes or medication. Controllable and lifestyle-related factors include unhealthy eating, physical inactivity, smoking, and excessive alcohol consumption (Aaronson et al., 2000).

*Psychosocial risk factor*s can be classified into 3 major categories (Piepoli et al., 2016).

1.1. ACUTE STRESSORS (FOR EXAMPLE JOB LOSS, DEATH IN THE FAMILY) AND CHRONIC STRESSORS (E.G. WORK-RELATED STRESS, MARITAL STRESS, LOW SOCIAL SUPPORT, LOW SOCIO-ECONOMIC SITUATION)

Acute mental stress through the autonomic nervous system can result in acute cardiac symptoms and events or acute cardiac death. Studies have linked these cardiac events predominantly to traumatic experiences suffered acutely in the previous 24 hours (Kumar & Goel, 2008). *Chronic work-related stress* causes a two- to three-fold increase

in the probability of cardiac event. Determining factors include overwork, low sense of control, lack of recognition, shift work, monotonous work activity, and the threat of unemployment (Kivimaki et al., 2002). While work-related stress is of paramount importance among men, marital stress (negative, dismissive, or hostile behaviour of the spouse) is the leading factor among women (Balog & Mészáros, 2005). In relation with *social support,* namely the absence of it, the unavailability of support resources and complete social isolation pose an increased risk for heart patients (Everson-Rose & Lewis, 2005), while low socioeconomic status accompanied by an unhealthy lifestyle is generally associated with an increased cardiac risk factor (Albert et al., 2006).

1.2. Negative Emotional or Mood Disorders or Other Psychopathological Symptoms: Depression, Anxiety, Vital Exhaustion, Sleep Disturbance

Major depression and depressive symptoms below the psychiatric diagnostic threshold, as well as prolonged above-average *anxiety,* could be independent risk factors for CVD and probably a consequence of heart disease (Everson-Rose & Lewis, 2005; Roest et al., 2010).

Vital exhaustion (fatigue/weariness, increased irritability, and feelings of discouragement/hopelessness) is a long-term predictor of myocardial infarction and fatal coronary heart disease (Appels, 1990), and the presence of *insomnia* in a cardiologically healthy population increases the likelihood of developing and / or dying from heart disease by 45% (Sofi et al., 2014).

Furthermore, *short sleep time* (<5–6 hours) and too *long sleep time* (> 9–10 hours) and *a number of other sleep disorders*, e.g. sleep apnea syndrome may also be associated with the development of cardiovascular disease (Kronholm et al., 2011; Mezick et al., 2011; Sofi et al., 2014).

1.3. Maladadaptive Personality Traits: Hostility and/or Tendency to Anger and/or Aggressive Behaviour; D-type Personality Traits (Piepoli et Al., 2016).

Hostility and chronic anger (Williams, 1987) have been shown to have moderate significance associated with the development and poorer prognosis of CVD and coronary artery disease, especially the latter (Chida & Steptoe, 2009).

The traits of the D-type personality construct (negative affectivity and social inhibition) together show a strong association with morbidity and mortality connected with coronary heart disease. In terms of maladaptive personality traits, increased levels of physiological hyperreactivity and increased activity of pro-inflammatory cytokines are suggested (Pedersen & Denollet, 2003; Williams et al., 2000).

It is important to emphasize that the risk factors presented above add up and in the short, medium, and long term can have an effect and not in isolation, which may eventually lead to coronary artery disease as a kind of ultimate common pathway. It

should also be accentuated – and necessarily taken into account as a basic principle when designing prevention and rehabilitation programs – that in most cases the effect of these factors is not merely added together, but exponential (Tiringer, 2017).

The goal of cardiological rehabilitation programs is to reduce the physical and psychiatric symptoms of heart disease, stabilize atherosclerotic processes, and improve the functional and psychosocial status of heart patients which could improve their quality of life and decrease the likelihood and severity of relapses or cardiac death.

Cardiological rehabilitation is a multidisciplinary program in the form of an outpatient or institutional setting, which is supervised by a cardiological rehabilitation specialist and involves a number of health professionals working in different fields, e.g. dietitians, physiotherapists, psychologists, social workers (Veress et al., 2003).

In the process of cardiac rehabilitation, psychological activity is of paramount importance, including assessing mental status, exploring psychosocial risk factors and initiating ways to change them (for example support to quit smoking), and stimulating coping resources such as mobilizing social supporters and learning stress management techniques (Linden et al., 2007).

During the psychological activity, depending on the degree, *health psychological and clinical psychological interventions* can be applied. For health psychological interventions, programs developed on the basis of empirically supported theoretical models are more effective. These interventions include, for example, increasing risk perception and personal efficacy, planning to implement health behaviours and then using self-control techniques during execution, and taking into account the patient's current motivation and their stage of change (Witte & Allen, 2000).

2. The Case of Zoltán – a Typical Case Study Illustrating the Relationship between Coronary Artery Disease and Psychological Factors

To illustrate the theoretical and practical aspects of our chapter so far, we present a fictional case compiled from our general clinical experience. In this case, we would also like to point out that although scientific evidence convincingly demonstrates the importance of psychosocial factors in cardiovascular disease, clinical practice still has not reflected much on it.

Zoltán is 45 years old, living alone, working in a large factory as a skilled worker. Four years ago he divorced from his wife, who moved to a neighboring town with their children (then 8 and 12 years old). Conflicts over contact with his children and child visitation issues are still regular. Zoltán rarely sees his children, and he still feels distant from them. His financial situation is also difficult due to the payment of child support. He does not feel well in his partnership over the past two years because his partner (43

years old) is quite busy with problems with her adolescent son. They are usually only able to meet on weekends, which sometimes conflicts with visiting their own children. Zoltán has been smoking for 15 years, and has been smoking 30 cigarettes a day for a long time. He eats mostly in restaurants; he especially likes fast food and eats a lot of bread, while he rarely eats fruit and vegetables. At a height of 179 cm, he weighs 92 kg. He was diagnosed with high blood pressure four years ago (approximately 150/90 mmHg; but he also often measured 180/105 mmHg at a time when the workplace atmosphere was more tense due to competition between employees, an unstable economic situation, and possible layoffs).

He used to play football, which he had to stop at the age of 32 due to an injury. Except for casual exercise with children, he is no longer active in sports. He has no close friends; he maintains some more personal relationships at work. His most important relationship is with his girlfriend, but he is overwhelmed by his own problems.

Basically, it is difficult for Zoltán to talk about topics that affect his emotions. He tried to get over the supposedly depressive period after the divorce and move by burying himself in work. He feels quite alone with his current workplace conflicts. ("No one can help me.")

One day, when he felt pain and weakness in his chest at work, his boss immediately sent him to the emergency room, but his symptoms eased before the examination. ECG and laboratory examination did not indicate an acute myocardial infarction. The examining doctor recommended further cardiac examination and mapping of coronary heart disease risk factors. Zoltán did not accept this advice until his complaints came back again. He worried about his absence from his job because of the tests and treatment, which would make his boss resent him. He did not want to appear weak in front of his colleagues in the context of fierce competition. He was also worried about what might happen if he had surgery. Instinctively, he dismissed the idea that he might even have serious heart disease. He linked his chest pain, which occurred several times in the following period, to lack of fitness and smoking, but he refused to give the latter up because he was able to manage his tension with it.

Two years after the first chest symptoms, early one morning Zoltán woke up to feeling pain behind his sternum around 4 a.m., which also radiated to his back and upper jaw. He was really scared, and very sweaty. He reassured himself that he might have just got a stomach bug, so he drank a glass of milk, but that didn't really help either. There was a growing fear inside him. "Is there still a problem with my heart? Is the situation really as serious as it feels now? Should he call an ambulance?" But still, it would only be embarrassing if they didn't find anything serious in the end, as had happened before in the emergency room. Maybe it will get better on its own and go away. Nothing wrong has ever happened before.

The pain was hard on Zoltán, but he tried to hold on. He walked up and down in the apartment, trying to divert his attention. Then he lit a cigarette, as he used to do

in stressful situations, but his pain didn't go away. "I'm only going to see my GP in the morning," he thought. Since the situation hadn't improved by 7.30, he did actually go there.

He collapsed in the GP waiting room. The ECG showed an increase in ST-segment, signs of posterior wall infarction, and an intermittent grade 3 AV block. His GP immediately called the ambulance and took him to the Heart Center, where he was immediately catheterized: the large occluded coronary artery was opened and a mesh ("stent") was inserted. After the successful intervention, Zoltán was placed in the intensive care unit.

After cardiac catheterization and vascular network implantation, Zoltán was relieved and his pain disappeared. His doctor informed him about his extensive heart attack. Although the worst was fortunately prevented, it is likely that his heart's pumping performance was impaired. In addition, there may be additional moderate stenoses in his coronary arteries that may need to be treated in the future. The doctor emphasized that Zoltán should also take heart medication regularly and make radical changes to his lifestyle: he should stop smoking immediately, eat healthier, exercise regularly, and avoid stressful situations.

Zoltán's doctor is very busy, so he had to continue to rush to the next procedure. During the five-minute conversation, Zoltán could neither come up with his own questions nor tell his difficult feelings about the whole story. Thoughts swirled in his head: what does he have to do now? Which medications should he take? Why does he need them?

Are there any possible side effects? Hopefully he will be able to stop taking the medication soon. And what about eating, playing sports, and "avoiding stress"? He understood that he really had to quit smoking now. The overnight stay in the hospital was a good opportunity not to light a cigarette. And what happened was so frightening for him that he even decided he wasn't going to smoke anymore. In the following days during time-tight doctoral visits, there was no opportunity to question doctors or express his own insecurities. However, he agreed to go on a hospital rehabilitation treatment in the future. He was told in the last conversation that, after all, he was lucky to have survived a heart attack, but his heart pump function was performing only at 40%, so he would need to take medications for the rest of his life. This news upset him, because he had had no complaints since catheterization.

During the rehabilitation, Zoltán had a short conversation with his doctor, which was difficult to follow here and there, leaving little time for questions, so many things remained unclear for him. What does 40% pump performance mean for his everyday life and work? It sounds pretty low. He couldn't even remember which medicine was meant for what symptom. Moreover, he heard from fellow patients that medications could cause muscle pain, erectile dysfunction, and other unpleasant side effects. Can these symptoms occur to him? How would his girlfriend react if they would have

"problems"? And how would he survive in the long run without his smoking rituals? He had tried to quit several times, but never managed to keep it up for more than a few days. When his daughter was born, he decided to stop smoking. A lot of his money was spent on packs of cigarette and it gave him a bad feeling that he was taking it away from his children. But after half a year, as he had more and more arguments with his wife, he fell back and has not tried harder since then. Ever since he became divorced and broken spiritually, he smoked even more.

Rehabilitation treatment was much more organized than he thought. On weekdays, they participated in programs according to a pre-arranged schedule. After a medical visit, the morning was always full of exercise. In the afternoon, they took part in a group session. For example, there was a dietary recommendation every week, and on one occasion they even prepared healthy meals together. Although Zoltán did not have much confidence in the food excempt from meat, the meal cooked by the group was really delicious, although he had a hard time imagining trying out similar recipes on the weekends.

In the group program they focused one week on stress management; another week they spoke about disease treatment and lifestyle changes. The latter groups were led by a psychologist, which caused mixed feelings in Zoltán. He had never been to a psychologist before, and the psychologist or psychiatrist characters he saw in movies were often pretty negative figures for him. However, here in the groups the psychologist mostly talked about coronary heart disease and heart disease, and nothing that would have felt "dangerous" happened. He was relieved to find that the psychologist in the department was friendly and attentive. Should he go in with her? Although the psychologist in the group looked nice, she may not have time for him either.

During the physical training, Zoltán's performance was much weaker than that of older patients, which he was quite ashamed about. "I'm like an old man," he thought. He was thinking a lot about how he would perform in his workplace like this. Luckily, he didn't lose his job; his boss was waiting for him to come back, but probably only because he was always a reliable and well-performing employee. If he was out of work for weeks and unable to perform at his usual level, holding his job may come under risk.

At the disease treatment group, the psychologist said that worries and uncertainties about the future were completely normal, and she reassured patients that their mental state would have a good chance of settling down as they slowly get accustomed to their new life routine with heart disease and deal with everyday problems. She also said that if things were not going so well, their worries wouldn't diminish, and their mood would be permanently depressed; she suggested visiting a psychologist, and she also would offer help to find one. One day the psychologist gave him a short questionnaire on these topics.

During one of the morning visits, smoking as a risk factor was mentioned. Zoltán replied proudly that he had not lit up since his infarction and was seriously determined

to put down his cigarettes permanently. The chief physician agreed, although he offered that the psychologist in the department would happily discuss the problem of quitting smoking with him. It was a little bit embarrassing not to be trusted for Zoltán, so he wondered what such a conversation would bring. On the other hand, he was afraid that it would turn out that he had little willpower. However, the psychologist was friendly and she mainly asked questions about his previous experiences with quitting. She praised his performance for not smoking for more than a week. As a homework assignment, she asked him to think through the situations in which his determination could be shaken and what kind of strategies he would apply to avoid it. It was reassuring for Zoltán that this possibility of "tripping up" was being considered. Honestly, he was unsure how solid he would be if he felt the waves crash over his head again. For the next time he also reconsidered that the most difficult situation for him would be when he felt overwhelmed again with his ex-wife's aggressive stubbornness. In addition to smoking, other issues were discussed during their second meeting. The psychologist said the completed questionnaires suggested that he had more severe depressive problems.

When the details of this came up, Zoltán cried, which he hadn't done since his divorce. He was grateful for the psychologist's patience and understanding, which allowed him to tell how miserable he had felt since the heart attack, and that he often felt that his illness had "cut" his life in half. They discussed how his reluctance and fatigue, which had been particularly characteristic since his infarction, could actually be interpreted as symptoms of a moderate depressive disorder. They also talked about the fact that this problem could not be solved in the short time left in his rehabilitation, and that he would have to visit a psychologist near his place of residence with whom he could continue to work to solve his depressive problems. Based on his good experience so far, he would like to take advantage of such an opportunity.

On the third weekend, Zoltán was able to go home from the hospital. He was already looking forward to being with his girlfriend and he was quite disappointed when it turned out she had a program with her son for Saturday night. He had a hard time occupying himself at home alone. He was intensely craving to smoke again. Somehow he didn't expect this situation; he felt confident about his girlfriend's support since his illness. The next day (Sunday) he smoked cigarettes one after the other in the morning. Before lunch, to which his girlfriend had invited him, he did not light up any more because he did not want anyone to be worrying about him. Returning to the final week of rehabilitation treatment on Monday, he didn't tell anyone about his relapse, and he himself was surprised when it seemed quite natural to share his "experience of failure" during his last conversation with the psychologist.

Despite his anticipation, there was nothing like "well, well" and the psychologist said what happened was not uncommon; she was primarily interested in exactly how it happened, and encouraged him that "a slip is not a setback yet". For the rest of the conver-

sation, he was given the opportunity to ask questions about his heart disease. Zoltán felt that he finally had the chance to reflect on his uncertainties and doubts. The psychologist was also very knowledgeable about medical issues, but she mostly steered the conversation toward discussing what and how Zoltán would do differently if he returned to his usual everyday life. In conclusion, he was advised to continue to boldly ask his doctors about his possible uncertainties. In the end, the visit to a psychologist close to his home was discussed again, and he was encouraged that a deeper processing of depressive problems would prevent him from falling back into similar ups and downs in the coming difficult times. This would also improve his chances of solving the problems caused by his heart disease and overcoming the difficulties he faces.

Zoltán pondered a lot about life during the three weeks of his rehabilitation. The group sessions were good, where many of his fellow patients shared their experiences, and everyone seemed to be struggling with their illness in their own way. These topics often continued in a congenial atmosphere in evening conversations. He spent a lot of time with one of his roommates, a "grandfather" 20 years older than him, whom he told almost his entire life story. Zoltán received a lot of encouragement from him. Zoltán realized that he hadn't cared much about his health so far. He had somehow never caught up with this topic before. For example, if an expert talked about something on a TV channel, he quickly got bored and flipped between channels. Now he felt he understood why it was important to deal with this, but he was bothered that what he had learned about heart disease in three weeks was often too complicated for him. He wasn't even sure what applied to him either. Overall, however, his rehabilitation treatment was a useful and good experience.

Zoltán was sent home from rehabilitation and declared fully fit for work with a light to medium workload. Despite this, he was quite worried about whether he would be able to endure the workload. The phrase that there may be more narrowed coronary arteries hit him very hard. What if he gets sick again at work? If it turns out he wouldn't be reliable? His fears, fortunately, proved unfounded. His reassurance was also due to the fact that he had some meetings with his GP, where in addition to prescribing medication, he was able to talk for a few minutes about the difficulties of lifestyle change. And at the cardiology clinic, he met his therapist, who made a good impression on him: he was attentive, calm, and seemed knowledgeable in his field. The relatively good results of the control laboratory and ECG tests also helped Zoltán's worries to disappear and inspired him to take his medication regularly.

However, his mood was still not very good. He felt stressed to spend evenings alone; on weekdays, and on the other hand, he was afraid of being with his girlfriend because he was unsure how things "would work out". He was trying to occupy himself and had already changed his lifestyle in a few things. For example, he decided to go to a local team football game regularly. The football field was far away, but he always went on foot so he could have at least one beer with his friends after the match. He tidied

up his dusty old bike kept in the cellar and went shopping by bike regularly. Although he felt he was less able than before, the move still felt good for him. He was determined to buy himself a cool new bike.

After a few weeks of procrastination, he called the psychologist who had been recommended to him during rehabilitation.

Two more weeks passed before he first met him. During the treatment, his current depressive problems were first addressed. Zoltán was initially reserved and distant talking to the psychologist. It was unusual for him to talk to a man about his mental difficulties. However, the therapist always listened carefully and, surprisingly, did not give advice to Zoltán, but helped him to think and understand more deeply the important problems of his life.

The therapist listened to Zoltán's life story with interest and compassion: as a child, he lost his mother at the age of 11, from whom he had received lots of love (she died of breast cancer). His father, a very emotional man who overworked himself, suffered a heart attack at the age of 50. He did not give up his lifestyle after that, still working constantly, until his second heart attack proved to be fatal for him a year later.

Dealing with these losses deepened the therapeutic relationship, and in the meantime his mood began to improve. This laid the groundwork for problems that Zoltán would never have discussed with anyone else, such as his doubts about his manhood and how long his relationship would last. Zoltán managed to let himself go into these "difficult" topics as well. A couple consultation also helped him and his girlfriend to talk more openly about their problems. It turned out that he and his partner both approached the other very cautiously, but at the same time it is clear that this relationship, which they are thinking about in the long term, is important for each of them indeed. It also came up as an idea that they would live together soon after his girlfriend's son moved into a high school dormitory.

At the end of the therapy, Zoltán saw his future more hopefully. The heart attack was a shocking experience for him, but since then positive changes had taken place in his life that he had not thought of before.

From a cardiological point of view, it is important that Zoltán trusts his doctors and despite the sometimes difficult circumstances of the care, he feels he receives comprehensive help in treating his heart disease.

He takes his medication regularly, which is reflected in a favorable changes in his lab values and blood pressure. He had managed to remain smoke-free for four months now and realized that regular exercise was good for him, which he could sustain over the long run.

However, despite the good therapeutic results, it is still questionable whether the results achieved so far will be maintained in his everyday life in the long term.

3. Conclusion

Lessons learnt from this case

Psychological, social, and behavioral factors also contribute to the development of cardiovascular disease. If these can be identified and altered in time, the risk of the disease can be reduced. If an acute cardiac event occurs nevertheless, there are often psychological and relational factors behind the patient's late appointment with a physician.

Heart disease is a very significant stressor through psychosocial and biological processes, not infrequently leading to further psychiatric disorders that also impair the quality of life and prognosis of the heart patient concerned. A significant proportion of patients experience difficulties in understanding the complex causes and treatment options for heart disease. Lifestyle changes can usually be the result of long-term efforts. Slippages are common in this process, and sometimes more permanent relapses can occur.

Clearly related, uncontroversial, empathetic communication with the patient is important at all stages of treatment. The psychologist working in the rehabilitation team has the important role to recognize on time the comorbid psychiatric disorders and maladaptive behaviors (e.g., non-adherence) and use an adequate treatment for them.

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