



Sexual rehabilitation after myocardial infarction and coronary bypass surgery: Why do we not perform our job?

Seksualna rehabilitacija posle infarkta miokarda i bajpasa na koronarnim arterijama. Zašto ne obavljamo svoj posao?

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Abstract

Background/Aim. There is a perception that in patients with heart diseases in Serbia sexual rehabilitation does not exist. Why do we not perform our job? A kind of resistance to sexual rehabilitation is common for heart disease patients. Prejudices regarding patients' sexuality, fear and limited knowledge are not rare among the members of medical staff. The aim of this study was to assess knowledge on sexual rehabilitation, inner sense during conversation on sexual rehabilitation and quality of sexual life in patients with myocardial infarction (MI) and bypass surgery (BPS). Also, we wanted to assess an opinion of the medical staff members about that. **Methods.** We performed a prospective nonrandomized clinical study, which involved 40 participants: ten patients, six partners and twenty four medical staff members. All participants were tested by the self-created questionnaires. The main issues of observation were: knowledge about sexual rehabilitation, quality of sexual life and inner sense during conversation on sexual rehabilitation. The data were analyzed by the Shapiro-Wilk test, Kolmogorov Smir-

nov test, Mann Whitney Exact test and Fishers Exact test. Statistical significance was set up to $p < 0.05$. **Results.** There was a statistically significant difference among the participants regarding an attitude when sexual activity should be resumed after MI or BPS. The members of medical staff had a significantly different opinion about the most important team members responsible for sexual rehabilitation performance. There was a statistically significant difference ($p = 0.01$) in quality of patient's sexual life after MI or BPS (score: 14.2 ± 5.5) in relation to conditions before them (score: 21.3 ± 3.1). The members of medical staff had significantly ($p = 0.05$) worse inner sense (score: 3.8 ± 0.7) during and after fulfilling the questionnaires than the patients (score: 4.6 ± 0.5). **Conclusion.** Ignorance and prejudices are reasons why we do not perform our job.

Key words:

myocardial infarction; coronary artery bypass; postoperative period; rehabilitation; sexual dysfunctions, psychological; sex education; quality of life.

Apstrakt

Uvod/Cilj. Zapazili smo da u Srbiji ne postoji seksualna rehabilitacija bolesnika sa srčanim oboljenjima. Zašto mi ne obavljamo svoj posao? Izvestan otpor prema seksualnoj rehabilitaciji zajednički je za sve bolesnike sa srčanim oboljenjima. Predrasude u vezi sa seksualnošću bolesnika, strah i ograničeno znanje nisu retka pojava ni kod članova medicinskog tima. Cilj ove studije bio je da proverimo unutrašnji osećaj za vreme razgovora o seksualnoj rehabilitaciji i o kvalitetu seksualnog života kod bolesnika sa infarktom miokarda, kod bolesnika posle bajpasa (BPS) na koronarnim arterijama, kao i kod članova medicinskog tima procenimo znanje o seksualnoj rehabilitaciji.

Metode. Sproveli smo prospektivnu nerandomiziranu kliničku studiju, koja je uključila 40 učesnika: 10 bolesnika, 6 partnera i 24 člana medicinskog tima. Svi učesnici bili su testirani popunjavanjem posebno sastavljenih upitnika. Najvažnije tačke opservacije bile su: znanje o seksualnoj rehabilitaciji, kvalitet seksualnog života, unutrašnji osećaj za vreme razgovora o seksualnoj rehabilitaciji. Podaci su analizirani pomoću Shapiro Wilk testa, Holmogorov Smirnov testa, Mann Whitney Exact testa i Fishers Exact testa, a statistička značajnost prihvaćena je na nivou $p < 0,05$. **Rezultati.** Pronađena je statistički značajna razlika između učesnika u vezi njihovog mišljenja u kom razmaku posle infarkta miokarda, odnosno koronarnog bajpasa seksualna aktivnost treba da bude obnovljena. Članovi medi-

cinskog tima imali su veoma različita mišljenja koji članovi tima su najodgovorniji za seksualnu rehabilitaciju. Ustanovljena je statistički značajna razlika ($p = 0,01$) u kvalitetu seksualnog života bolesnika posle infarkta miokarda ili BPS (skor: $14,2 \pm 5,5$) u odnosu na kvalitet pre ovih okolnosti (skor: $21,3 \pm 3,1$). Članovi medicinskog tima imali su značajno ($p = 0,05$) lošiji unutrašnji osećaj (skor: $3,8 \pm 0,7$) za vreme i posle popunjavanja

upitnika nego bolesnici (skor: $4,6 \pm 0,5$). **Zaključak.** Neznanje i predrasude razlozi su zbog kojih mi ne obavljamo svoj posao.

Ključne reči:

infarkt miokarda; a.a. coronariae, premošćavanje; postoperativni period; rehabilitacija; seksualni poremećaji; obrazovanje, seksualno; kvalitet života.

Introduction

A large number of patients with cardiovascular diseases have different sexual problems. In the USA, 18 million male patients with hypertension have erectile dysfunction¹. Since 1976 there have been recommendations about necessity of sexual counseling which, as a part of cardiac rehabilitation, must begin already at the hospital phase². But still, there are authors who completely neglect sexual education as a part of cardiac rehabilitation³⁻¹¹. It is obvious that the majority of them are domestic authorities⁷⁻¹¹. Some authors, who deal with sexual rehabilitation, do not mention sexual rehabilitation of heart disease patients¹²⁻¹⁴. When some authors mention sexual rehabilitation of cardiac patients, then they do it imprecisely or too broadly¹⁵⁻¹⁷.

Sexual rehabilitation of patients with myocardial infarction (MI) or bypass surgery (BPS) is a process that implies several components: exercise, dietary and sexual education, smoking cessation, weight management and psychological support^{15, 18-20}. Obviously, this process is performed by a multidisciplinary rehabilitation team¹⁶. The central part of this team has been always occupied by patients and their partners²¹⁻²³. Considering that many medical workers make up this team, the question is which of these authorities concretely deal with cardiac patients and their partners in the process of sexual rehabilitation. Rehabilitation postulates demand that clients and their partners should be informed about sexual issues by their physicians or other appropriate professionals¹⁶. Besides the fact that psychological support and sexual education are a kind of rehabilitation therapy, there are attitudes that the certified sexual therapists are the most competent for sexual rehabilitation of patients with heart disease^{20, 24}. But, is it possible to engage this kind of authorities in routine rehabilitation service? Persons with cardiac problems mostly act according to their limited knowledge, fears, opinions or superstitions about their own sexuality². But prejudices regarding patients sexuality, a fear and limited knowledge are not also a rare phenomenon among the members of medical staff. When some authors precisely speak about sexual rehabilitation after heart disease, they do not state concrete roles of medical staff members^{2, 18, 19, 25}. In the available literature we have not found anybody who deals with the knowledge of sexual rehabilitation shared by team members.

During sexual rehabilitation a kind of resistance and a sense of discomfort among medical staff members is understandable. Unfortunately, it looks that this inner sense of

who treats patients with MI and BPS is not a subject of physicians' interest^{1, 18-20, 26-30}. The fact that in Serbia, in the last ten years, only one trial on sexual rehabilitation after MI has been carried out confirms this statement in the best way³¹. Because all of that, it is obvious that sexual rehabilitation of heart disease patients in our conditions does not exist.

The aim of this study was to assess knowledge on sexual rehabilitation, inner sense during reflection about sexual rehabilitation and quality of sexual life of the patients with MI and BPS, among patients, their partners as well as the medical staff members.

Methods

This prospective nonrandomized control clinical study included patients after MI and BPS, their partners and the members of medical staff involved in the cardiac rehabilitation process. The inclusion criteria for the patients were: age between 45-55 years; MI and BPS without complications; education as minimum at high school level; written consent of participating in the study; absence of any sexual diseases or disturbances before MI and BPS; minimum 15 years of working experience for the medical staff members. The participants who did not fulfill the questionnaires correctly and those who did not answer to all questions were excluded from the study.

A study protocol, besides setting common demographic characteristics of participants, included measuring of depression and anxiety of the patients by the Zung self-rating depression scale and the Zung self-rating anxiety scale³². The main issues of observation were: knowledge about sexual rehabilitation; quality of sexual life; inner sense during and after fulfilling the questionnaires. The self-created questionnaires were used (Appendix 1-3). Multiple choice questions and dichotomous questions were the base of the sexual knowledge questionnaires. Inner sense of the participants and their quality of sexual life were assessed by the questionnaire with the scaled questions^{33, 34}.

All participants were tested in hospital conditions. The patients and their partners fulfilled the questionnaires a day before patients discharge. The members of medical staff were tested separately toward their specialist affiliation.

The data were assessed by the statistical package R (the R foundation for statistical computing – 2007). The analysis included Shapiro Wilk test, Kolmogorov Smirnov test, Mann Whitney Exact test and Fishers Exact test. Statistical significance was set up to $p < 0.05$.

Results

A total of 40 participants were included in the study: 10 patients, 6 partners (spouses) and 24 members of medical staff. Six patients had myocardial infarction and 4 had bypass. The members of medical staff were: three cardiologists, three psychiatrists, three cardio-surgeons, three psychologists, six physiotherapists and six nurses. Before forming a definitive sample, 10 persons refused to participate in the study: 4 partners and 6 members of the medical staff. Among the members of medical staff those were one cardiologist and five nurses. None of the patients were excluded after forming definitive sample. There was a statistically significant difference ($p < 0.01$) among the patients, their partners and the members of medical staff regarding a sex. All of the patients were males. All of the partners were females. The majority of the medical staff members were females (66.6%) (Table 1).

There was a statistically significant difference ($p = 0.01$) among the members of medical staff regarding the attitude toward sexual activity after MI or BPS rehabilitation. The time period was between the first to the fourth month. The psychologists thought that sexual activity should be resumed earlier (1.67 ± 2.82 months), and nurses thought that sexual activity should be resumed later (4.0 ± 0.0 months) (Figure 2).

No significant differences were found between the patients and their partners in the opinion about the most important members of the medical staff responsible for sexual rehabilitation. For the majority of them ($> 60\%$) they were a cardiologist and a psychologist (Table 2).

There was a statistically significant difference ($p = 0.04$) among the members of medical staff in the opinion about the most important members of medical staff responsible for sexual rehabilitation. As for the patients and partners,

Demographic characteristics of participants in the study

Characteristics	Patients (n = 10)	Partners (n = 6)	Medical staff (n = 24)	p^*
Age (years) $\bar{x} \pm SD$	49.6 \pm 6.82	49.5 \pm 6.16	phy: 49.7 \pm 6.26 psy: 47.0 \pm 4.36 pht: 32.6 \pm 6.53 n: 49.5 \pm 5.47	
sex [n (%)]				
male	10 (100)	0 (0)	8 (33.3)	< 0.01
female	0 (0)	6 (6)	16 (66.6)	
Time following AMI (months) $\bar{x} \pm SD$	16.7 \pm 38.8			
Time following bypass (days) $\bar{x} \pm SD$	17.2 \pm 8.17			
Number of bypasses $\bar{x} \pm SD$	3.0 \pm 0.71			
Depression after AMI/bypass $\bar{x} \pm SD$	29.4 \pm 5.32			
Anxiety after AMI/bypass $\bar{x} \pm SD$	29.8 \pm 6.34			
Work experience of the medical staff members (years) $\bar{x} \pm SD$			17.6 \pm 10.65	

*Fisher exact test; phy – physicians; psy – psychologist; pht – physiotherapist; n – nurse; AMI – acute myocardial infarction; $\bar{x} \pm SD$ – mean and standard deviation

The partners thought that sexual activity after MI or BPS should be significantly ($p = 0.02$) earlier resumed (1.67 ± 2.88 months) in relation to the patients opinion (3.67 ± 4.49) (Figure 1).

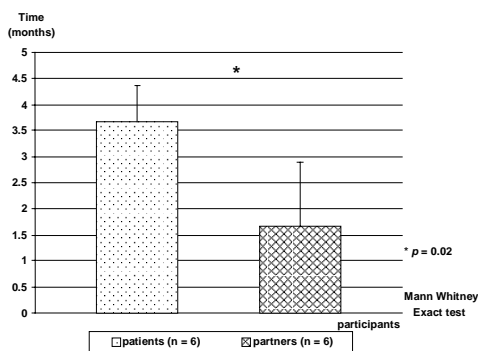


Fig. 1 – Time of resumption of sexual activity after myocardial infarction/bypass surgery: patient’s and partner’s opinion

a cardiologist and a psychologist were on the first place (Figure 3).

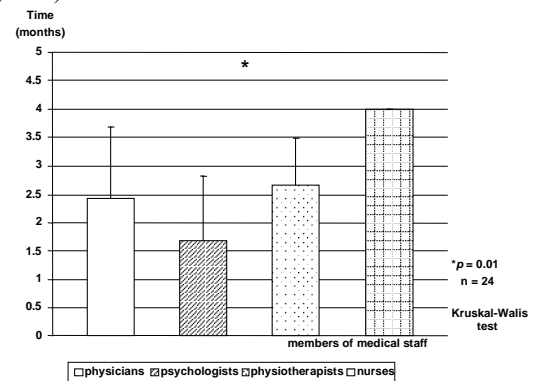


Fig. 2 – Time of resumption of sexual activity after myocardial infarction/bypass surgery: opinion of the medical staff members

Table 2
The most important members of medical staff responsible for sexual rehabilitation: patients' and partners' opinion

Members of the medical staff	Participants [n (%)]		p*
	patients (n = 10)	partners (n = 6)	
Cardiologist	6 (60)	4 (6.66)	ns
Psychologist			
Cardio-surgeon			
Physiatrist	4 (40)	2 (3.33)	
Physiotherapist			
Nurse			

*Fisher exact test; ns – no significant

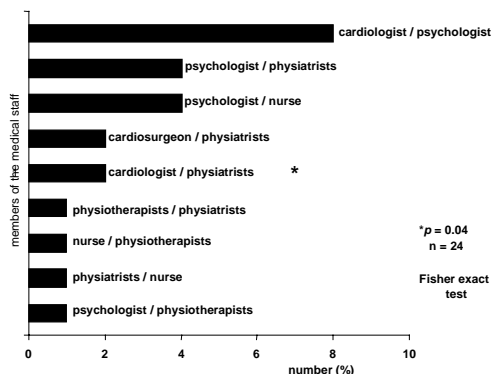


Fig. 3 – The most important members of medical staff responsible for sexual rehabilitation: opinion of medical staff members (mean score)

There was a statistically significant difference ($p = 0.01$) between the patients and their partners in assessment of the quality of sexual life before MI or BPS. The partners' mark of the quality of sexual life was significantly lower (16.0 ± 3.16), than that of patients (22.3 ± 3.8) (Figure 4).

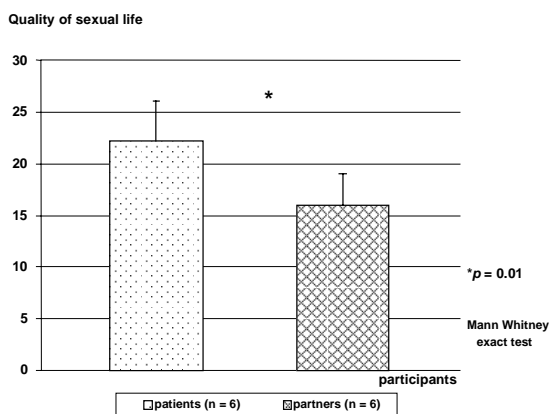


Fig. 4 – Quality of sexual life before myocardial infarction/bypass surgery: patients' vs partners opinion
 Score: 5–7 – poor quality; 8–11 – moderate quality; 12–16 – average quality; 17–21 – high quality; 22–25 – excellent quality (Appendix 2)

There was a statistically significant difference ($p = 0.01$) in mark of the quality of patients' sexual life after MI (14.2 ± 5.51) as compared to before MI (21.3 ± 3.1) (Figure 5).

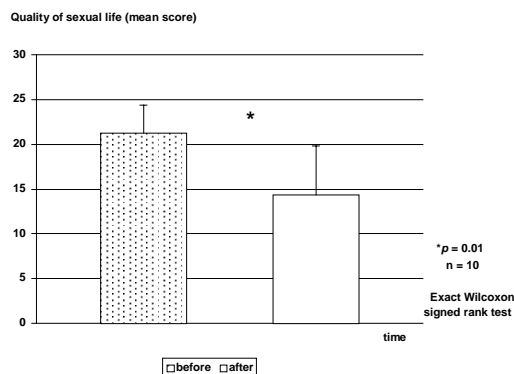


Fig. 5 – Quality of sexual life: before vs after myocardial infarction/bypass surgery (patients' opinion)
 Score: 5–7 – poor quality; 8–11 – moderate quality; 12–16 – average quality; 17–21 – high quality; 22–25 – excellent quality (Appendix 2)

No significant differences were reached in marks of sexual life quality among the members of medical staff. The physiotherapists assessed the highest quality of sexual life by the highest mark (21.8 ± 1.47) (Figure 6).

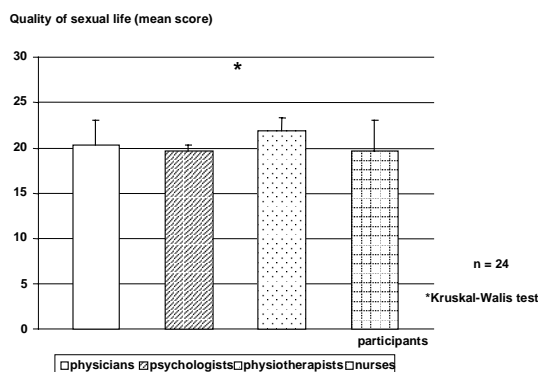


Fig. 6 – Quality of sexual life: opinion of the members of medical staff
 Score: 5–7 – poor quality; 8–11 – moderate quality; 12–16 – average quality; 17–21 – high quality; 22–25 – excellent quality (Appendix 2)

During and after fulfilling the questionnaires on the sexual rehabilitation issues and the quality of sexual life before and after MI and BPS the patients had significantly better inner sense than their partners and the members of medical staff (Table 3).

Table 3
Inner sense of participants in the study during and after fulfilling the questionnaires about sexual rehabilitation issues and quality of sexual life

Participants	Inner sense* $\bar{x} \pm SD$
Patients (n = 10)	4.62 ± 0.52
Partners (n = 6)	3.83 ± 0.75 [†]
Medical staff members (n = 24)	3.71 ± 0.86 [‡]

[†]*p* = 0.05; [‡]*p* = 0.002 vs patients (Mann-Whitney exact test);

*Score: 1 – very unpleasant; 2 – unpleasant; 3 – a little bit unpleasant; 4 – normal; 5 – pleasant (Appendix 3)

Discussion

Sexual rehabilitation of the heart disease patients is a serious issue which, particularly at the beginning, can be stressful both for patients and medical staff members. So, we can explain these results taking into consideration following reasons: prejudices and ignorance; dominantly females among the medical staff members; an average level of patients anxiety and depression; neglecting of patients sexuality by medical staff members.

Prejudices and ignorance were hardly understandable especially among the medical staff members. The nurses, for example, offered the biggest resistance to this study, besides the fact of the existing sexuality in their curricula, to spending more time with cardiac patients and, finally, to possibility that the middle age male patients in the cardiac care units can pass their sexual feelings at the nurses^{2, 24, 35, 36}. All of our patients showed an interest in the sexual rehabilitation issues. It is understandable because: they were in the middle age, without significant anxiety and depression. But 40% of them did not accept that their spouses participate in the study. This and the fact that the same percentage of these patients (not the same patients) confirmed adultery one or more time during their life tell about prejudice and our Balkan mentality. Patients resistance is not unusual in sexual rehabilitation^{2, 8}. The fact that there were more females among the medical staff members probably contributed to this resistance. Neglecting professional responsibilities regarding sexuality of disabled persons and, particularly, in heart disease patients is not a Serbian curiosity^{2, 21, 36–38}. But this level of ignorance about the basic sexual rehabilitation issues is strange and must involve all of us! The lack of education is obviously the main problem. The medical staff members disagreed mutually not only about appropriate time for resuming sexual activity and who are among them most important for sexual rehabilitation, but they also had different opinions about another important questions: methods of sexual rehabilitation; sexual rehabilitation and drugs; eating and intercourse; extramarital relationships and heart disease or sexual positions during intercourse. It seems that foreign physiatrists and nurses curricula, which were clearly predicting training in sexual rehabilitation^{24, 39–41}, had not yet arrived to our expert areas^{7, 9–11, 17}.

We expected better knowledge about time of resuming sexual activity. Resumption of sexual activity is recommended in 3–6 weeks after stabilization¹⁸. The previous prohibitions of 8–12 weeks between MI and sexual intercourse are unneces-

sary¹⁹. In the early rehabilitation stage a simple two-flight stair test can help. If patients rapidly ascends and descends two flight of stairs without cardiac symptoms, than sexual intercourse could be resumed^{15, 18, 20}. Our medical staff was completely out of these basic sexual rehabilitation principles. An interesting difference was detected between the patients and their partners: the partners expected an earlier start of intercourse than the patients. Could this be a source of certain matrimony problems? The patients' quality of sexual life decline after MI or BPS is easy to understand. Very intriguing for us was a significant difference in quality of sexual life assessment between patients and their partners before patients' MI or BPS, confirming a possibility of a "charmed circle" in which the problems in sexual life can worsen the cardiac conditions as the same as these conditions can disturb quality of sexual life². Toward inner sense during fulfilling the questionnaires the patients were significantly better than their partners and the medical staff members. This result is in contradiction to opinion of some authors who claim that patients resistance to sexual rehabilitation is common^{8, 19}. Surprisingly, the medical staff members had bigger problem although they had more than 17 years of working experience.

As regards the most important members of medical staff responsible for sexual rehabilitation, our results were expected. Toward the opinion of our participants these are cardiologist and psychologist. However, the medical staff members had different ideas. They considered that a combination psychologist/physiatrist or psychologist/nurse could be successful, as well.

The issues to address in sexual counseling with heart disease patients can be divided into: biological issues as well as behavioral, emotional, cognitive, personality, relationship and sensory factors²⁹. The issues in terms of a sexual technique and appropriate sexual position had the same importance for the patients as well as the issues of emotional support or religious commitment^{42, 43}. Some authors dispute a value of sexual education for resuming sexual activity of heart disease patients^{26, 27, 36, 44}, but others support it^{2, 45–47}. Sexual education or counseling is the base of sexual rehabilitation for patients after MI and BPS. This education means giving a patient an accurate written material about the effects of heart disease on sexual functioning; supporting the marriage relationship by encouraging open communication of feelings and fears about the illness; describing permissible sexual behaviors; informing about drug effects on sexual capability; demonstrating possibilities of sexual rehabilitation for several sorts of sexual disturbances^{18, 19, 25, 48}. This counseling is performed by two famous models, which are known throughout their acronyms: "PLISSIT" and "ENIGMA" models^{20, 24, 39, 49}. A clear attitude of an expert who should perform sexual rehabilitation with cardiac patients does not exist^{15, 18–21, 35, 36}. According to some authors, these are mostly physiatrists among physicians, physiotherapists and psychologists as well^{3, 18, 20, 39, 40}. On the other hand, not physiatrists but cardiologists and cardio-surgeons lead medical staff in the acute stage after MI and BPS. What about nurses? They are capable for sexual education^{24, 35}, but they do not do this job or do it with a high resistance and a low efficiency³⁶. In our opinion, PLISSIT coun-

seling model gives the best answers to these questions^{10, 13, 19}. PLISSIT means – P (permission), LI (limited information), SS (specific suggestion) and IT (intensive therapy). This attitude toward sexual rehabilitation makes a clear difference, in terms of guarding responsibilities, between sexual education (PLISS) and sexual therapy (IT). Toward this widely accepted counseling model, sexual education as a part of cardiac rehabilitation can be performed by all medical staff members. This kind of sexual support will be sufficient for the majority of heart disease patients. Only cardiac patients with serious sexual problems must be treated by the specially trained professionals or the professional sexual therapist⁴⁹.

All our patients thought that a detailed talk with the medical staff members before discharging was the most important thing for resuming sexual activity without risk. This opinion is in accordance with the results of some clinical trials. Dhabuwala et al.⁴⁵ found that some kind of sexual education significantly diminished a degree of apprehension in 50 MI patients⁴⁵. Drory et al.⁴⁶ established that sexual education was among the major contributors to sexual activity in sense of frequency by 276 patients after MI. Two-thirds of 134 patients after BPS, who were investigated by Papadopulos et al.²⁶ received the useful sexual instructions, but in only 20% of them instructions were initiated by a physician. However, there are different results and quite opposing thoughts. In the study performed by Rosal et al.²⁷ with 63 male post MI patients, sexual education was not a significant predictor of safe sexual activity. In a large randomized control trial, which involved 2 328 participants after MI, Jones et al.⁴⁴ established that a rehabilitation program based on psychological support and sexual counseling had no desired effect. Resistance of our medical staff members (especially nurses) toward sexual rehabilitation and an objection of our patients that there was nobody with whom they could talk about own sexuality in the hospital conditions, were particularly important results of this study. They are in accordance with the results of two trials that have been published in the literature in the span of more than ten years. Vidakovic et al.³¹ assessing sexual behavior of 43 male post MI patients, concluded that their wish of talking about own

sexuality during early stage of rehabilitation could not be fulfilled. Pineiro Lunelli et al.³⁰ performing the most recent clinical trial with 96 post MI patients, pointed out suboptimal recommendations which the patients received during hospitalization, claiming that nursing staff was the most responsible for it³⁶.

Limitations of this study were both methodological and certain professional issues. The sample was small because the study was planned as the pilot one. That sample of the patients and their partners did not allow any kind of scientific generalization. The self-created questionnaires, which were used in the assessment of the observation marks, had their own shortages. There are the standard clinical tools for the assessment of sexual rehabilitation effects⁵⁰. All ethical assumptions were not resolved before starting the study. Finally, the lack of specific information regarding the attitudes of the medical staff members toward sexual rehabilitation of cardiac patients was a limiting factor of this study, too. There was a good reason for planning and performing the study but, in the same time, a burden to our intention to place the study results in the frame of the rehabilitation science.

Conclusions

Knowledge about sexual rehabilitation of patients with MI and BPS, as well as their partners and the medical staff members was deficient. All of the patients were interested in sexual rehabilitation issues. The biggest resistance to carrying out this study was given by the nurses. The quality of patients' sexual life after MI and BPS declined significantly. The members of medical staff had significantly worse inner sense than the patients during thinking about sexual rehabilitation and fulfilling the questionnaires about it. Ignorance and prejudices are the reasons for not performing our job correctly.

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R E F E R E N C E S

1. *Sevin E, Burnett AL, Platz EA*. Prevalence and risk factors for erectile dysfunction in the US. *Am J Med* 2007; 120(2): 151–7.
2. *Garner WE, Allen HA*. Sexual rehabilitation and heart disease. *J Rehabil* 1989; 55(1): 69–73.
3. *Pavlovic M*. Kinesitherapy in the rehabilitation process for the patients with cardiovascular diseases. Belgrade: Viša medicinska škola; 2002. (Serbian)
4. *Boone RA*. Physical therapy in cardiopulmonary conditions. In: *Pagliariulo MA*, editor. Introduction to physical therapy. 2nd ed. St. Louis: Mosby; 2001. p. 195–231.
5. *Maciejko JJ*. The ABCs of coronary heart disease. Paperback; 2001.
6. *Meyer T*. Physical therapist examination review. 9th ed. Slack Incorporated; 2000. p. 352.
7. *Ilic S*. Rehabilitation of patients with coronary disease. In: *Nedeljkovic SI, Kanjub VI, Vukotic MR*, editors. *Cardiology*. 3th ed. P Belgrade: PO Publishing House, 2000. pp. 2112–9. (Serbian)
8. *Eric Lj, Sulovic V, Manojlovic D*. Medical sexology. Belgrade-Zagreb: Medical book; 1988. (Serbian)
9. *Jentic MR*. Physical medicine and rehabilitation. Kragujevac: School of Medicine; 1999. (Serbian)
10. *Matanovic D*. Rehabilitation after acute myocardial infarction. In: Abstract Book VIII Congress of physiatrists of Serbia, Ivanjica, 21–24.05.2008. Association of physiatrists of Serbia and Society of physicians of Serbia: 2008. p 18-22. (Serbian)
11. *Lazovic M*. Rehabilitation of the patients with myocardial infarctions In: Proceedings of the 10th Yugoslav Physiatric Days, Banja Koviljača, 17–20.05.2000. Banja Koviljača: Special Hospital for Rehabilitation; 2000. p. 33–5. (Serbian)
12. *Myerscough PR, Ford M*. Talking with patients. Keys to good communication. 3rd ed. Oxford, UK: Oxford University Press; 1996. p. 264.
13. *Kaplan N*. Disturbances of sexual desires. Belgrade-Zagreb: Medical book; 1986.

14. *Presti JC, Stoller ML, Carqoll PR.* Urology. In: *Tierney LM, McPhee SJ, Papadakis MA*, editors. Current medical diagnosis and treatment, 1999. 38th ed. Stamford: Appleton & Lange; 1999. pp. 894–931.
15. *Davis AM.* Cardiac rehabilitation. In: *Frontera WR, Silver JK*, editors. Essentials of physical medicine and rehabilitation. Philadelphia: Henley and Belfus; 2002: pp. 488–98.
16. *Fijfield B, Esmail S.* Sexuality in rehabilitation: options and alternatives. In: *Kummar S*, editor. Multidisciplinary approach to rehabilitation. Woburn: Butterworth Heinemann; 2000. p. 4.
17. *Lovic B.* Methodological aspects of rehabilitation of the cardiovascular patients. In: *Nedeljkovic SI, Kanjub VI, Vukotic MR*, editors. Cardiology. 3th edition. Belgrade: PO. Publishing House; 2000. pp. 2102–5.
18. *Shah SK.* Cardiac rehabilitation. In: *DeLisa JA, Gans BM, Walsh NE*, editors.. Physical medicine and rehabilitation: principles and practice. 4th edition. Philadelphia: Lippincott Williams and Wilkins; 2005. p. 1811–41.
19. *Kottke TE, Haney TH, Doucette MM.* Rehabilitation of the patients with heart disease: Krusen's handbook of physical medicine and rehabilitation. 4th ed. Philadelphia: WB Saunders; 1990. pp. 874–903.
20. *Stiens SA, Westbheimer RK, Young MA.* Sexual satisfaction despite disablement. In: *O'Young BJ, Young MA, Stiens SA*, editors. Physical medicine and rehabilitation secrets. 2nd ed. Philadelphia: Henley and Belfus; 2002. p. 369–78.
21. *Lones PY.* The transition to adult life. In: *Wilson BA, McLellan DL*, editors. Rehabilitation studies handbook. Cambridge: Cambridge University Press; 1997. p. 225–52.
22. *Warschawsky S, Evans JE, Bradley A.* Rehabilitation psychology and neuropsychology consultation. In: *Bramer CM, Spires MC* editors. Manual of physical medicine and rehabilitation. Philadelphia: Hanley and Belfus; 2002. p. 271-9.
23. *Goodman CC.* The cardiovascular system. In: *Goodman CC, Fuller KS, Boissonnault WG*, editors. Pathology implications for the physical therapist. 2nd ed. Philadelphia: WB Saunders Company; 2003. p. 367–76.
24. *Carmine H.* Sexuality. In: *Derstine B, Drayton Hargroove S*, editors. Comprehensive rehabilitation nursing. Philadelphia: WB Saunders Company; 2001. p. 170–2.
25. *Grimm RH, Grandits GA, Prineas RJ, McDonald RH, Lewis CE, Flack JM*, et al. Long-term effects on sexual function of five antihypertensive drugs and nutritional hygienic treatment in hypertensive men and women. Treatment of Mild Hypertension Study (TOMHS). Hypertension 1997; 29(1 Pt 1): 8–14.
26. *Papadopoulos C, Shelley SI, Piccolo M, Beaumont C, Barnett L.* Sexual activity after coronary bypass surgery. Chest 1986; 90(5): 681–5.
27. *Rosal MC, Downing J, Littman AB, Abern DK.* Sexual functioning post-myocardial infarction: effects of beta-blockers, psychological status and safety information. J Psychosom Res 1994; 38(7): 655–67.
28. *Arruda-Olson AM, Mahoney DW, Nebra A, Leckel M, Pellikka PA.* Cardiovascular effects of sildenafil during exercise in men with known or probable coronary artery disease: a randomized crossover trial. JAMA 2002; 287(6): 719–25.
29. *American Association for Cardiovascular and Pulmonary Rehabilitation.* Guidelines for cardiac rehabilitation and secondary prevention programs. 4th ed. Champaign, Ill: Human Kinetics Publishers; 2004.
30. *Hillegass EA, Temes WC.* Therapeutic interventions in cardiac rehabilitation and prevention. In: *Hillegass EA, Sadowsky HS*, editors. Cardiopulmonary physical therapy. Philadelphia: WB Saunders Company; 2001. p. 676–26.
31. *Vidakovic P, Dejanovic N, Tomanovic S, Karadzic A, Vesovic - Potic V.* Importance of sexual counseling for the patients with acute myocardial infarction. In: Abstract book from Yugoslav Congress of Physical Medicine and Rehabilitation, Zlatibor, 13-17.10.1997. Belgrade: School of Medicine. Society of physicians of Serbia and Society of physicians of Montenegro; 1997. p. 467–8. (Serbian)
32. *McDowell I, Newell C.* Measuring health. A guide to rating scales and questionnaires. 3rd ed. London: Oxford University Press, 2006.
33. *French S, Reynolds F, Swain J.* Practical research: a guide for therapists. 2nd ed. Oxford: Butterworth-Heinemann; 2001.
34. *Polgar S, Thomas SA.* Introduction to research in the health sciences. 5th ed. Churchill Livingstone; 2008.
35. *Kozier B, Erb G, Olivieri R.* Fundamentals of nursing: concepts, process and practice. 4th ed. Philadelphia: Addison Wesley; 1991.
36. *Lanelli RP, Rabello ER, Stein R, Goldmeier S, Moraes MA.* Sexual activity after myocardial infarction: taboo or lack of knowledge? Arq Bras Cardiol 2008; 90(3): 172–6.
37. *Drory Y, Kravetz S, Hirschberger G.* Long - term mental health of women after a first acute myocardial infarction. Arch Phys Med Rehabil 2003; 84(10): 1492–8.
38. *Lindau ST, Schumm LP, Laumann EO, Levinson W, O'Muirheartaigh CA, Waite LJ.* A study of sexuality and health among older adults in the United States. N Engl J Med 2007; 357(8): 762–74.
39. *Tan JC, Horn SE.* Psychological medicine and rehabilitation diagnostic, therapeutic and basic problems. St Louis: Mosby; 1998.
40. *McPeak LA.* Psychiatric history and examination. In: *Braddom RL*, editor. Handbook of physical medicine and rehabilitation. Philadelphia: WB Saunders Company; 2004. p. 3–37.
41. *Gutenbrunner C, Ward AB, Chamberlain MA.* White book on physical and rehabilitation medicine in Europe J Rehabil Med 2007; 39(Suppl 45): 1–48.
42. *Vojvodic N, Kozarevic DJ, Ilic D, Bozjinovic S, Ozegovic - Jevtic J, Vukotic M.* Faith and death of the patients with cardiovascular diseases. In: *Nedeljkovic SI, Kanjub VI, Vukotic MR*, editors. Cardiology. 3th edition. Belgrade: PO Publishing House; 2000. p. 2017–25. (Serbian)
43. *Steinberg A, Rosner F.* Encyclopedia of Jewish medical ethics. Feldheim Publishers; 2003. pp. 1169.
44. *Jones DA, West RR.* Psychological rehabilitation after myocardial infarction: multicentre randomised control trial. BMJ 1996; 313: 1517–21.
45. *Dhabumala CB, Kumar A, Pierce JM.* Myocardial infarction and influence on male sexual function. Arch Sex Behav 1986; 15(6): 499–504.
46. *Drory Y, Kravetz S, Florian V, Weingarten M.* Sexual activity after first acute myocardial infarction in middle-aged men: demographic, psychological and medical predictors. Cardiology 1998; 90: 207–11.
47. *Djurovic A, Kilibarda M, Jovanovic M, Savic S, Gojkovic D.* Love between the disabled persons and their sexuality through a prism of the common percentage account. Fizikalna Terapija 2001; 24: 8–13. (Serbian)
48. Sex after a heart attack-for men. Editorial. Be careful with performance enhancing drugs [accessed 2009 Jul 15]. Available from: http://heartdisease.about.com/lw/health_medicine/conditions_and_disease
49. *Gilbert DML.* Sexuality issues in persons with disabilities. In: *Braddom RL, Peterson AT, Hornbluth I, Marcus DB, Savlino MF, Hung CH*, editors. Handbook of physical medicine and rehabilitation. Philadelphia: WB Saunders Co; 2004. pp. 399–416.
50. *Reynolds CF 3d, Frank E, These ME, Houck PR, Jennings JR, Howell JR*, et al. Assessment of sexual function in depressed, impotent, and healthy men: factor analysis of Brief Sexual Function Questionnaire for men. Psychiatry Res 1988; 24(3): 231–50.

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Appendix 1**Form of the questionnaire of sexual rehabilitation knowledge**

I am interested for the sexual questions after myocardial infarction/bypass surgery

YES

NO

1. Resuming of sexual activity after uncomplicated myocardial infarction is possible:
 - a) after three months
 - b) after one month*
 - c) after ten days
 - d) between one to three months
2. Drugs (diuretics, beta blockers, antifat drugs ...) have unfavorably influence on sexual function:
 - a) yes*
 - b) no
 - c) partially
3. To resume the sexual life without risk after myocardial infarction/bypass surgery it is necessary:
 - a) good function of the sexual organ
 - b) available cardiology testing
 - c) education for safely intercourse positions
 - d) detailed talk with the medical staff members before discharged*
4. "The mail on the top" intercourse position is the most secure position after uncomplicated myocardial infarction/bypass surgery:
 - a) no*
 - b) yes
5. Resuming sexual activity for the high risk patients after myocardial infarction/bypass surgery:
 - a) it is recommended with appropriate therapy*
 - b) it is recommended
 - c) it is not recommended
6. The medical staff members usually talk with the cardiology patients about their sexuality:
 - a) yes
 - b) no*
7. Six months after uncomplicated myocardial infarction intercourse with a spouse and mistress has an equal risk:
 - a) no
 - b) yes*
8. Before intercourse a cardiology patient should not eat and drink:
 - a) between 30 min – 1 hour
 - b) between 15 – 30 min
 - c) between 1 – 3 hours*
9. Chest pain during intercourse, beating heart, dizziness and fatigue are:
 - a) disturbing symptoms*
 - b) not disturbing symptoms
 - c) partially disturbing symptoms
10. Two the most important medical staff members for the sexual rehabilitation of the cardiology patients are:
 - a) cardiologist
 - b) psychologist
 - c) cardio-surgeon
 - d) physiatrist
 - e) physiotherapist
 - f) nurse

*Correct answers toward: Shah SK. Cardiac rehabilitation. In: DeLisa JA, Gans BM, Walsh NE. Physical medicine and rehabilitation: principles and practice. 4th ed. Lippincott, Williams and Wilkins, 2005: 1811-41.

Appendix 2**Quality of sexual life: method of assessment**

1. Could you estimate your self-confidence during intercourse until now?				
1	2	3	4	5
very poor	poor	average	high	very high
2. How often have you intercourse during a month?				
1	2	3	4	5
never	several time	many times	mainly	always
3. How often do you keep your erection (lubrication) during intercourse?				
1	2	3	4	5
never	several times	many times	mainly	always
4. How often do you reach orgasm during intercourse?				
1	2	3	4	5
never	several times	many times	mainly	always
5. How often are you with an completely satisfying intercourse?				
1	2	3	4	5
never	several times	many times	mainly	always

Score:	5 – 7	poor quality
	8–11	moderate quality
	12–16	average quality
	17–21	high quality
	22–25	excellent quality

Appendix 3**Inner sense during and after fulfilling the questionnaires of the sexual rehabilitation issues and quality of sexual life: method and assessment**

During and after fulfilling the questionnaires of the sexual rehabilitation issues and quality of my sexual life I fell				
1	2	3	4	5
very unpleasant	unpleasant	a little bit unpleasant	normal	pleasant
