

RETURN TO WORK AFTER MYOCARDIAL INFARCTION: A RETROSPECTIVE STUDY

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Abstract

Objectives: To evaluate the occupational functioning and identify health-related determinants of the continuation of occupational activity in workers with a recent myocardial infarction. **Material and Methods:** The project was a retrospective study concerning 183 male workers, aged 39–65 years, who had suffered a primary uncomplicated myocardial infarction approximately three years prior to the study. The study group comprised both the persons who returned to work after the incident and those who did not. The subjects' mental health as well as quality of life and occupational functioning were evaluated using NHP scale, Beck Depression Inventory, STAI questionnaire by Spielberger et al., WAI, and own questionnaire "My work". **Results:** Data analysis revealed that the persons who returned to work after myocardial infarction were characterized by a younger age and a higher level of education, self-rated health and quality of life than the persons who did not resume their occupational activity. The occupationally active individuals showed a varying degree of readaptation to work. In the maladapted group, such disturbances occurred as depression, anxiety and lowered work ability. **Conclusions:** The study results indicate that in workers with a recent myocardial infarction, the current procedure for assessment of work ability, which is based solely on the evaluation of physical health, is insufficient and should be supplemented with the assessment of their mental health. The employers should also undertake activities for a better adjustment of working conditions to the abilities of workers who have experienced a cardiac incident.

Key words:

Myocardial infarction, Work ability, Return to work

INTRODUCTION

Cardiovascular diseases (CVDs), including myocardial infarction (MI), pose a serious social problem. They have been the subject of multidisciplinary studies in many countries. Two main streams of research can be distinguished: the studies focused on the etiology and risk factors of CVDs, and those investigating the factors that may have influence on the course of the disease and the effectiveness of treatment and rehabilitation.

Among the well recognized risk factors for myocardial infarction, the most prevalent are atherosclerosis, arterial

hypertension, obesity, tobacco smoking, low physical activity [1] and work-related stress. The latter refers particularly to the professions characterized by a high rate of such psychosocial factors as low level of control over work, low influence on the planning of work, its timing, work tempo, and monotony [2–4]. Empirical evidence has pointed to a number of psychological characteristics that can either predispose an individual to or prevent him from myocardial infarction. These include, among others, stress coping strategies, personality traits (e.g. Type A behavior, sense of coherence) and lifestyle factors [5–8].

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The studies focused on the assessment of the late effects of myocardial infarction and the effectiveness of treatment and rehabilitation reveal that the factors determining the quality of life after the incident include administration of thrombolytic drugs in acute MI, early mobilization of patients, improvement of their physical capacity and introduction of cardiac rehabilitation [9–11].

The psychological effects of myocardial infarction and the effectiveness of treatment and rehabilitation have been considered in the context of the patient's emotional problems and his/her attitude towards the disease, the world in general and oneself. The patients who have experienced myocardial infarction are frequently characterized by a lowered mood, depression, fear of a future cardiac incident (reinfarction), and concentrating solely on the disease [12].

In most of the studies, the patient's return to occupational activities has been considered to be the measure of effectiveness of the medical therapy and cardiac rehabilitation. Work has not only been regarded as the source of income that provides financial means to cover one's living expenses, but it also allows meeting the interests and ambitions of an individual, determines his/her social position and prestige, contributes to high self-assessment and is an essential element in the therapy that is conducive to improving health condition or maintaining good mental and physical health. It was found that the individuals returning to work after MI not only had a longer lifetime span, but they were also less likely to develop recurrent cardiac incidents or cardiovascular abnormalities. Among the postinfarction patients who resumed their occupational activities, the rate of neuroses and depression was five times as low as among those who did not continue their employment. This refers particularly to the patients with good or moderate prognosis i.e. who had not more than one mortality risk factor [1–4].

However, these findings point only to a better functioning of the people who returned to work after MI, compared to those for whom the disease meant the end of occupational activity. They add little to the knowledge on the late effects, such as the psychological effects, or the influence on work ability. These problems are usually not addressed in

scientific research. Consequently, the work capability assessment in cardiac patients is focused on their somatic health (mostly the cardiovascular function), as it is in Poland where the assessment is conducted both by health insurance institutions and occupational health services.

It should be noted that the patients after MI incidents who have no medical contraindications to continue their job and who are motivated to work, do return to their vocational activities, but their capability for work may be lower due to the changes in their health status. However, the working conditions remain the same as they were before the incident. This may lead to the development of stress and mental overload of the patients, resulting in further deterioration of their health condition. This relationship is explained by the person-environment fit (P-E fit) theory developed by Van Harrison [13,14]. According to this theory, the person-environment fit can be defined as the integrity of the following elements:

- the environment, including working conditions; the type, quantity and complexity of job tasks and operations, work organization scheme, job demands, remuneration and social benefits;
- the person (worker); this covering his/her skills, competence, perception of the world, and general needs.

If there is a relative balance between job demands and work-related benefits on the one hand, and the needs and capacities of an individual on the other, then the person-environment fit is good. In other words, the level of fitting depends on the individual's skills and abilities to satisfy job demands, and the other way round, on the extent to which the job performed satisfies the worker's needs.

Actually, it is impossible to reach a perfect person-environment fit. We usually observe a higher or lower level of fitting of the elements specified above, which may lead to different consequences. A slight inconsistency in the fitting of an individual and his/her work may be a factor stimulating the development; the examples being an improvement of the working conditions or the development of professional skills and abilities. However, when the fitting discrepancies are considerable, some disturbances in the functioning of an organization, or in the workers' health, may result.

In our opinion, returning to work after MI does not correspond to regaining good health condition and optimal vocational functioning. Both the illness itself and the therapeutic procedures may impair the physical and mental capabilities needed to satisfy the unchanged job demands, thus having impact on the goodness of the P-E fit.

The aim of the present study was to evaluate the occupational functioning and identify the health-related determinants of successful vocational rehabilitation in workers with a recent myocardial infarction. We have adopted a working hypothesis that the postinfarction patients who continue their occupational activity will present a better health condition and quality of life than the persons who do not return to work after the incident. However, we also expected that the level of their adaptation to work and work capability will vary, which may lead to disturbances in their mental health.

MATERIAL AND METHODS

Subjects

The study was conducted among the patients of the II Clinical Department of Cardiology, Medical University of Lodz, who satisfied the following enrolment criteria: male gender, age range 25–65 years, an incident of primary uncomplicated myocardial infarction, and being employed prior to the incident. In total, 168 patients aged 39–65 years (mean 53.7) were selected as the study group. In this group, 73 patients had primary education (general/vocational) 63 secondary-level education (grammar school/technical college) and 32 higher education (college/university). They were employed at workposts that differed with respect to the level of physical or mental workload: for 57 subjects, it was mostly the mental workload, for 52 the physical workload, and for 59 the tasks they performed involved both the mental and physical workload. Of the total 168 subjects, 80 (40.7%) reported returning to occupational activity after the cardiac incident. Most of the subjects, 72 persons, were employed on a full-time basis. All the subjects had revascularization performed during the therapy. The persons who resumed work after MI had no medical contraindications to continue their occupational activity.

Methods

The study addressed a number of important problems including (a) the quality of life of the workers after MI in the context of their physical, mental and social functioning; (b) the occupational functioning measured in terms of the level of adaptation to working conditions (subjective assessment of work ability and the capacity to satisfy job demands), satisfaction from work, and the level of perceived work-related stress; and (c) the emotional state expressed as the level of fear and depression.

To evaluate the quality of life, the Polish adaptation of the Nottingham Health Profile (NHP) was used [15]. Part I of the questionnaire consists of 38 statements regarding the current problems with performing physical, psychological and social functions that the respondent may have in relation to his/her health condition. Part II includes seven statements reflecting the influence of one's health condition on the seven following spheres of life: occupational activity, housework, social life, family life, sexual life, interests and hobbies, and leisure time. Since no norms have been established for this questionnaire, we have considered the mean values of results in the analysis.

The subjects' mental health condition was assessed using the Polish version of the Beck Depression Inventory [16,17]. The questionnaire makes it possible to determine the level of depression and to differentiate between the healthy and affected individuals. The score of 0–9 denotes no depression, 10–19 a mild depression, and of 20 and above a severe depression. Large-scale studies performed on the Polish population confirmed the reliability and validity of the Inventory as a research instrument.

The patient's anxiety was assessed using the State-Trait Anxiety Inventory (STAI) developed by Spielberger, Gorsuch and Lushene, which was adapted in Poland by Wrześniewski et al. [18]. The Inventory measures the level of anxiety, both as the state (X1) and trait (X2) of an individual.

Two methods were used to evaluate the occupational activity of the postinfarction patients: the Work Ability Index (WAI), adapted by Pokorski [19], and own questionnaire entitled "My work". WAI is a self-assessment questionnaire regarding capability for work at present and

in the nearest future, taking account of the job demands and the worker's health condition and mental resources. The numerical value that WAI yields makes it possible to classify the worker's ability to perform occupational task and to define the objectives for preventive activities. The score of 7–27 denotes poor work ability, 28–36 moderate ability, 37–43 good work ability, and 44–49 excellent work ability [20].

„My work” questionnaire was developed at the Department of Work Psychology, Nofer Institute of Occupational Medicine, Łódź, Poland [21]. It comprises 23 items regarding different aspects of occupational functioning that are described on the 5-point Leikert scale. The validation of the questionnaire revealed its high psychometric parameters. The internal consistency reliability, assessed using alpha-Cronbach coefficient, amounts to 0.92 for the whole test and 0.82 to 0.89 for particular scales; and the test-retest reliability is 0.75 for the whole test and 0.89 and 0.76.9 for particular scales. Apart from the above methods, a structured interview concerning occupational activity, financial condition, non-occupational activities and self-rated health was conducted with each subject.

Statistics

To evaluate the significance of differences in the psychosocial variables between the subjects who returned to work after MI and those who did not, one-way analysis of variance (ANOVA) was used for continuous variables and the Welsch test for non-homogenous variance, as well as the Chi² test for discrete variables. To assess the relationship between the psychological variables and the level of adaptability to work, Pearson's correlation coefficient (*r*) was used. The frequency of health complaints among the patients well-adapted and maladapted to work after the cardiac incident was examined using the Chi² test.

RESULTS

The analysis of results was a two-step procedure. At first, the study population was divided into two subgroups: those who continued occupational activity after MI and those who did not. These subgroups were compared to

define the sociodemographic characteristics and psychosocial parameters which prevailed among the persons who returned to work. The findings revealed that the two subgroups differed significantly with respect to several socio-demographic parameters, described below.

Age

The workers who decided to continue employment were younger than those who resigned from further occupational activity (mean age 51.2 and 55.4 years, respectively; $F = 13.8$, $p < 0.01$). This age difference may be due to the fact that in the subgroup who did not return to work after MI, the proportion of persons who were approaching the age of retirement and received compensation before the incident was higher than among the subjects who did not quit their job.

Education

Among the subjects with primary education, as much as 81.3% belonged to the subgroup who did not return to work after MI. In the group with higher education, the proportions of the working and non-working patients were 82.6% and 17.4%, respectively. Among the patients with secondary-level education, these values were relatively similar and amounted to 36.1% and 38.8%, respectively. A statistical analysis of employment structure, performed using the chi² test, in both groups yielded the value of 19.12 which was statistically significant at $p < 0.01$. It may thus be assumed that the level of education higher than secondary is a factor that can be associated with the continuation of employment after the cardiac incident.

Workload

With regard to the patients who had performed work requiring mental effort prior to the incident, as much as 63.2% returned to occupational activity after the infarction. In the group performing mostly physical work, this proportion was much lower and amounted to 25% (Chi² = 19.8, $p < 0.01$). Therefore, the chances for taking up work after the incident are much higher among the patients whose occupational tasks before the incident involved mental workload.

Self-rated health

Almost half of the working subjects (48.3%) assessed their general health condition as good or even very good. In the group of non-working patients, the percentage of such assessment was lower and amounted to 22.2%. Poor health condition was reported by every five subjects (22.4%) in the subgroup of non-working patients and by every six subjects (15.3%) in the working subgroup. Health condition was more frequently assessed as moderate by the non-working subjects (62.4%) than the working subgroup (36.5%) ($\chi^2 = 29.8$, $p < 0.01$). No significant differences in self-rated health could be found between the two subgroups during the period immediately preceding myocardial infarction.

Treatment

The subgroups of the working and non-working patients did not differ significantly with respect to the methods of cardiac rehabilitation; both had revascularization treatment performed. In both groups, the proportion of patients who were subjected to treatment in early cardiac rehabilitation centers as well as health resorts (sanatoria) was similar: 77% vs. 78 and 23% vs. 36%, respectively.

Moreover, the rate of recurrent myocardial infarction was also similar: 12% vs. 10%.

With regard to the other study parameters, significant differences could be noted between the group of subjects who returned to work after MI and those who did not. Although the level of anxiety expressed as the state was similar in both the subgroups, the working subjects presented a significantly lower level of anxiety assessed as the trait, compared to the non-working subjects (Table 1).

The subgroups also differed in their assessment of the quality of life; this referring to all the aspects studied (Table 2). The non-working subjects were found to have less energy for action, they more frequently and severely suffered from painfulness and experienced negative emotions, and they also felt more isolated from the society, which may have been due to their limited mobility as a consequence of the coronary heart disease.

Although the subjects who continued working after the cardiac incident presented a generally higher level of mental health than did the non-working subjects, the finding may not always correspond to good mental health condition and working capability, which has already been underlined in the Introduction. Therefore, the second part of

Table 1. Mood disturbances among working vs. non-working postinfarction patients (STAI and BDI)

Study variable	Non-working patients		Working patients		F	p
	Mean	SD	Mean	SD		
Beck Inventory (BDI)	11.21	7.42	7.96	5.96	9.87	0.01
STAI-1 (anxiety-state)	43.25	9.91	40.87	9.89	2.45	ns
STAI-2 (anxiety-trait)	44.09	9.45	40.02	7.97	9.22	0.01

ns — non-significant.

Table 2. Quality of life among working vs. non-working postinfarction patients (NHP)

Study variable	Non-working patients		Working patients		F	p
	Mean	SD	Mean	SD		
Energy	52.2	38.6	26.3	33.4	21.8	0.01
Pain	25.6	25.1	10.3	17.8	21.0	0.01
Emotional reactions	30.6	29.8	17.1	20.3	11.9	0.01
Sleep	38.4	36.0	28.0	31.5	4.0	0.05
Social isolation	15.8	26.7	5.9	15.0	8.8	0.01
Physical mobility	24.1	20.4	10.7	14.8	23.9	0.01

the analysis was devoted to assessment of the occupational functioning in the group of subjects who continued their employment after the incident and its association with the study variables.

The findings revealed that three-fourth of the subjects in this group were characterized by a high level of anxiety (trait), more than one-third had mood disturbances, and one-fourth evaluated their work ability as moderate. As much as 40% thought that their health condition had negative influence on their work (Table 3). Moreover, these subjects had a worse mean score on the NHP questionnaire assessing the quality of life, compared to the healthy respondents [17].

The group of working subjects varied with respect to the level of re-adaptation to work. It included both the subjects who had no problems satisfying job demands and felt satisfaction from their work and the persons who found it difficult to perform work tasks and who assessed their workload as very high. To answer the question whether

there might be a relationship between the level of adaptation to work, mental health condition, and work capability, the correlations between these variables were analyzed. The group of working subjects was further subdivided into those who were well-adapted or maladapted to the working conditions after the incident. They responded to "My work" questionnaire and the results of this test that were below and above the median of result distribution were the basis for classifying the subjects into the well-adapted or maladapted group.

The two groups differed with respect to the study variables (Table 4). The maladapted group had a higher frequency of mood disturbances. However, the rate of high-level anxiety was similar in both groups, which may have been due to the fact that this characteristic referred to as much as 78% of the working patients. No significant between-group differences were found with respect to the quality of life, except for the negative emotions in the group maladapted to work (Table 5).

Table 3. The number and percentage of working postinfarction patients with abnormal findings on the study variables

Study variable	Patients	
	Number	%
Subjects with a high level of anxiety as the trait	63	79
Subjects with moderate work ability	19	25
Subjects with depression		
total	29	36
mild	19	24
severe	10	12
Subjects for whom the health condition affects their occupational activity	32	40

Table 4. The prevalence of anxiety, depression and moderate work ability among patients well-adapted and maladapted to work after MI

Study variable	Patients maladapted to work		Patients well-adapted to work		Chi ²	p
	Number	%	Number	%		
	Anxiety	35	42	28		
Depression	18	23	10	13	3.93	0.05
WAI (moderate work ability)	13	18	6	8	4.00	0.05

ns — non-significant.

Table 5. Quality of life among subjects well-adapted vs. maladapted to work after MI

NHP subscale	Patients maladapted to work		Patients well-adapted to work		t	p
	Mean	SD	Mean	SD		
Energy	30.7	33.2	23.4	34.1	0.9	ns
Pain	13.5	17.3	8.8	19.3	1.1	ns
Emotional reaction	21.9	23.0	12.3	16.1	2.1	0.04
Sleep	27.4	33.0	25.4	28.9	0.3	ns
Social isolation	9.5	20.6	3.2	7.5	1.7	ns
Physical mobility	13.8	15.0	8.4	15.3	1.5	ns

ns — non-significant.

It may thus be assumed that the group of postinfarction patients who remained occupationally active after the incident is fairly homogenous with respect to the quality of life. However, the maladapted patients were found to have a higher frequency of moderate work ability. In the maladapted group, the proportion of subjects with this characteristic was more than twice as high as in the group of patients who adapted well to working after the incident.

DISCUSSION

The main goal of the present study was to evaluate the mental health condition and occupational functioning of workers after myocardial infarction. Although performed on a rather small, non-representative population, the study has revealed that the continuation of occupational activity by postinfarction patients is associated with age, level of education and workload. The findings are consistent with the results of other studies conducted in Poland and abroad [12] which indicate that the persons returning to work after cardiac incident are younger, have a higher than primary education and perform work involving mental tasks. Our results have confirmed earlier reports on a relatively low percentage of patients in Poland who decide to continue their employment after MI. This trend has remained rather stable for the last ten years; the percentage of postinfarction patients returning to work approximates 50–60%, while in the western European countries

it ranges from 70% up to 95% [11]. Considering the fact that the subjects experienced uncomplicated myocardial infarction and that a substantial progress has been made in the methods of MI treatment and cardiac rehabilitation, this trend should be alerting and needs further research and analysis.

Our findings revealed that the patients who continue their professional activities after MI are characterized by a higher quality of life in general, compared to the patients who do not undertake such activities after the incident. However, a large proportion of these workers were found to have disturbances in mental health, and moderate work ability.

It is difficult to define the direction of the relationship between their health condition and returning to work. It can safely be assumed that in such patients, the health condition does not constitute a contraindication to work and, consequently, the work capability will be satisfactory enough to continue their job.

The patients who take up occupational activity after the infarction satisfy mostly the cardiological and internal medicine criteria for returning to work. It can, however, be expected that not all of these patients will maintain a similar or improved health condition and ability to work. The performance of work tasks, as well as the working conditions and the type of job, have a significant influence on the worker's health and may affect his/her capability for work. When the job demands are on the verge of or exceed the worker's capacity to satisfy them, his health condition

is likely to deteriorate. To investigate these relationships, it would be necessary to conduct prospective longitudinal studies with repeated measurements both of the psychological variables and health-related parameters.

The findings of our study revealed that the patients who continued working after MI showed a varying level of readaptation to work and work capability as well as had emotional problems. Therefore, such workers should be subject to special medical and psychological care which should not be confined only to medical check-ups and treatment of the medical causes of the cardiac incidence, but should also cover comprehensive psychiatric and psychological care and assistance. These activities should be carried out particularly during the cardiac rehabilitation and re-adaptation to work. The occupational health services also have an essential part to play in the process of preparing the postinfarction patients to continue their occupation after the incident. In particular, during the worker's prophylactic and control examinations, more attention should be paid to assessment of the mental health condition and capability for work at a given workpost with well-defined job demands. While the worker may not be exposed at work to any hazardous agents that may aggravate his health condition, the tasks to be performed may involve high mental workload that will exceed the worker's capacity to satisfy job demands. At the same time, actions should be undertaken in cooperation with the employer for adjusting the workposts and work tasks to the actual abilities and capacities of the worker who experienced a cardiac incident. These should comprise various modifications in work environment, organization of work, type of job and the actual tasks to be performed. Such an approach would certainly contribute to increasing the number of workers who will decide to continue their occupational activities after an incident of myocardial infarction.

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