

Original

A Literature Review of the Efficiency of Psychological Approaches in Comprehensive Cardiac Rehabilitation after Acute Myocardial Infarction in Comparison to USA and UK Practices

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Comprehensive cardiac rehabilitation (CCR) helps to improve the condition of patients with acute myocardial infarction (AMI). Since emotional difficulties that develop after AMI, such as anxiety or depression influence cardiac mortality and morbidity rates, the importance of psychological approaches in CCR has been recognized. The purpose of this study was to evaluate the effectiveness of psychological approaches in CCR in Japan, in the United States of America (USA), and the United Kingdom (UK). A literature review demonstrated the following results. Psychological approaches in CCR after AMI had the tendency to benefit men more than women in terms of mortality and morbidity rates during the 2 year this study period in the USA and the UK. Thus far a meta-analysis regarding the efficacy of psychological approaches in CCR after AMI has not been carried out in Japan. The effectiveness of psychological approaches in CCR was evaluated through assessment of psychological conditions and in psychological treatments such as cognitive behavioural therapy. Compared to the USA and the UK, the CCR implementation rate was significantly lower in Japan. A mixed method approach based on a bio-psychosocial model in health care may enhance the development of studies regarding psychological approaches to CCR in Japan. Initiatives aimed at increasing physicians' understanding of the usefulness of psychological approaches in CCR would improve the implementation rate of CCR in Japan.

Key Words: comprehensive cardiac rehabilitation, psychological approach, gender difference, bio-psychosocial model

Introduction

Acute myocardial infarction (AMI) is the main cause for ischemic heart disease (IHD). Although advanced treatments such as percutaneous coronary intervention (PCI) have decreased mortality rates and allowed both women and men to live longer, IHD continues to yield high morbidity and mortality rates in the United States of America (USA) and the United Kingdom (UK)¹.

Consequently, the secondary preventive measure of comprehensive cardiac rehabilitation (CCR) which includes psychosocial support, physical exercise, nutritional education, and weight control after AMI, is highly recommended in these countries^{1)~3)}.

In Japan, however, although the IHD-associated mortality and morbidity rates are lower than those of the USA and UK, the application of CCR is a common secondary preventive measure for IHD because of the rapid increase in our elderly population⁴⁾. Moreover, there is the problem of physical disability and psychosocial difficulties of the elderly, particularly elderly women, caused by the high cost of treatments in Japan⁴⁾. Thus, many of the problems experienced by patients involved in CCR programs are acknowledged to consist of physical and mental difficulties in Japan as well as in the USA and UK^{2)4)~6)}.

The effectiveness of psychological approaches in

the treatment of chronic diseases such as arthritis and diabetes mellitus has been recognized in the USA and UK because patients with psychological problems comprise the overwhelming majority⁷⁾. Mental and emotional difficulties such as anxiety and depression are prevalent in patients with chronic IHD, and the proportion of such patients is 3 times larger than in the general population¹⁾⁸⁾. These facts clearly call for highly desirable psychological treatment for patients with chronic IHD or AMI leading to chronic IHD⁸⁾.

However, there are only a few Japanese quantitative and qualitative studies of the effectiveness of psychological approaches in CCR and the analysis of patients' emotional conditions after AMI⁴⁾. This field is developing with regard to the efficacy of evaluating gender differences in psychological approaches in CCR after AMI such as analysis of gender differences in the results, in their psychological status, and in the awareness toward the disease⁴⁾. Moreover, psychological treatments based on several psychological theories were mainly developed in the USA and UK, cultures in which individualism is highly valued. Accordingly, there is the possibility that it might be problematic to introduce these psychological treatments to a culture such as Japan, where collectivism is cherished. In addition, it is most important that the health care provider understands the effectiveness of psychological approaches in CCR after AMI; this applies not only to Japan but also to both the USA and UK.

The purpose of this literature review is to clarify the efficacy of psychological approaches in CCR after AMI in Japan, in the USA, and the UK. One purpose here in is to compare the effectiveness of psychological approaches in CCR after AMI between Japan and the USA and UK. Another purpose is to evaluate gender differences in the outcome of psychological interventions in CCR.

1. Development of CCR in the USA and UK

CCR has been applied since the 1960s for managing patients with AMI⁶⁾⁹⁾. The earliest definition of CCR was "the art and science of restoring a person to that level of physical and mental activity compatible with the functional capacity of his heart"⁹⁾. At

that time, the main recommended therapy for AMI was "bed rest", thus the purpose of CCR was focused on the improvement of physical impairments and the evaluation of physical work ability. In other words, CCR was primarily recognized as a physical reconditioning program⁹⁾. As a result, assessment of physiological therapy in CCR became the major study content in the 1980s¹⁾⁵⁾¹⁰⁾¹¹⁾.

Due to the introduction of PCI as an advanced treatment for patients with coronary heart disease (CHD), the concept of CCR changed from "exercise-only program" to a comprehensive multidisciplinary program and a means of secondary prevention in the 1990s⁵⁾⁶⁾¹¹⁾¹²⁾. CCR has been defined by the World Health Organization (WHO) as:

"The sum of activities required to influence favorably the underlying cause of the disease, as well as the best possible, physical, mental and social conditions, so that they [people] may, by their own efforts preserve or resume when lost, as normal a place as possible in the community. Rehabilitation cannot be regarded as an isolated form or stage of therapy but must be integrated within secondary prevention services of which it forms only one facet."³⁾

CCR was discussed in the 1990s in the USA and UK. The ultimate goal of CCR as stated by the American Heart association (AHA) as to "restore and maintain an individual's optimal physiological, psychological and vocational status"¹⁾. The authors stated that outpatient CCR should include 3 elements: exercise training, risk factor reduction, and psychosocial and vocational evaluation and counseling.

Moreover, the concept of CCR was demonstrated in the UK. Thompson et al²⁾ reported the blueprint of a clinical guideline for CCR. They argued that CCR should consist of the following components: medical diagnosis and intervention, psychosocial care, and education.

2. Psychological approaches in CCR (Table)

1) Psychological approaches in CCR in the USA and UK

Until recently, the effectiveness of psychological treatments in terms of lower mortality and morbidity rates in AMI patients was examined; in case-

Table Summary information about study characteristics

Author	Intervention	Method	Outcome measure	Patients	Results
In the USA and the UK					
Frasure-Smith et al (1997)	Home-based psychological nursing intervention	RCT, 1 y	Mortality, anxiety, depression	After MI 903 men, 473 women	Higher cardiac and all-cause mortality among women in intervention group, no effect on mortality among men
Jones&West (1996)	Counselling, relaxation training, stress management without exercise based rehabilitation	RCT, 1 y	Anxiety, depression, QOL, morbidity, use of medication, mortality	After MI 2,328 (unknown sex distribution)	No effect on mortality and morbidity. Use of medication, frequency of angina were reduced,
Berkman et al (2003) (ENRICHED)	CBT with usual care	RCT, 6 months	Death or recurrent MI depression, anxiety	After MI 1,084 women, 1,397 men	Not increase event-free survival, improved depression and social isolation
Rees et al (2004)	Stress management, and other psychological treatment in CCR	Meta-analysis	Mortality, cardiac mortality, anxiety, depression etc	36 RCTs, 12,841 included MI, AP, CHD (unknown sex distribution)	No effect on total and cardiac mortality, beneficial effects on anxiety and depression
Linden et al (2007)	CBT, BT, stress management without other CR	Meta-analysis	Mortality, cardiac mortality, recurrent CHD, CHD risk factors, psychological well being	43 RCTs, total 9,856 (unclear sex distribution) for mortality in gender difference 1,190 women 2,042 men	OR for All-cause mortality at follow-up 2 y or less 0.72 (95% CI 0.56-0.94), the mortality benefits appeared only on men
In Japan					
Izawa et al (2004)	CR without stress management	Case-control, 3 months	Physical function, psychological function	Case 82 (63 men), control 42 (33 men)	Soecific effects on improvement health related QOL and physical outcome
Suzuki st al (2005)	CCR without active psychological intervention	Prospective longitudinal, 3 months	Physical function related QOL, psychosocial/mental aspect-related QOL	After MI 44 (37 men) no control	Physical QOL score was improved, mental QOL improved in patioent with impaired anxiety and depression, or exercise tolerance.
Komastu et al (2009)	No intervention	Cross-sectional	Psychological assessment, compare MI vs AP, Male vs Female	MI: 89 men, 12 women, AP: 94 men, 30 women	No difference between MI and AP in strait-anxiety was found
Hasegawa et al (2009)	No intervention	Cross-sectional	Conpare stress coping style	CHD 90 men, 22 women normal control 57 men, 45 women	The mental health incex of CHD was low. Intervention favoring stress-coping skills is necessary
Moriyama et al (2008)	CCR with acquisition self-management skills	Prospective longitudinal, 6 months	QOL, CHD risk factors, depression, self-efficacy	After MI and AP 39 (31 men), no control	Retifying coronary risk factors, improvement of QOL

CCR: comprehensive cardiac rehabilitation, MI: myocardial infarction, AP: angina pectoris, CR: cardiac rehabilitation, CHD: coronary heart disease, BT: behavior therapy, QOL: quality of life, RCT: randomised controlled trial, CBT: cognitive behavior therapy

control studies and multi center studies only a small effect was reported^{13,14}. Jones and West¹⁴ evaluated the effectiveness of a psychological intervention in CCR without an exercise program using a case-control and longitudinal study method. The authors observed that CCR programs based on psychological treatments alone had little influence on mortality, morbidity, anxiety, depression, medication use, or disability¹⁴.

However, early detection of emotional difficulties after AMI became a vital issue for cardiovascular disease treatment in the 1990s^{11,15}. The prevalence of anxiety and depression in patients with AMI ranges from 15% to 30%, a rate that is 3 times

higher than in the general population. Mayou et al⁸ claim that it is necessary to identify and treat patients with depression or anxiety after AMI because these symptoms are predictors of the final post-AMI outcome.

Therefore, clinical guidelines in both the USA and UK recommend the use of psychosocial approaches in CCR^{1,2}. The AHA¹ states that the CCR program components should highlight 3 fields, including "exercise training and activity prescription, risk factor modification, and psychosocial and vocational evaluation and counseling." In addition, Thompson et al² recommend that the goal of psychological care in CCR be focused on the improving

quality of life (QOL), performing psychological assessment within 72 hours of admission, and carrying out cognitive behavioral-therapy in counseling sessions. In spite of the AHA guideline¹⁾ and the recommendation of Thompson et al²⁾, divergent results were reported regarding the efficacy of psychological approaches in CCR^{12)15)~19)}.

Berkman et al¹⁶⁾ conducted a randomized clinical trial with 2,481 AMI patients. They concluded that psychological CCR intervention did not reduce the cardiac morbidity and mortality rates during a 29-month follow-up period. However, significant improvements were observed with respect to depression and social isolation in the psychological intervention group¹⁶⁾. The meta-analysis carried out by Rees et al. also reported that stress management and other psychological treatments in CCR did not affect the total and cardiac mortality rates¹⁷⁾. Therefore, psychological intervention in CCR deemed effective, because the most important goal of CCR is to improve mental well-being and QOL²⁾¹⁸⁾.

Recently, evidence supporting the efficacy of psychological approaches in CCR in terms of reducing mortality was reported by Linden et al¹⁹⁾. A meta-analysis of patients with AMI demonstrated reduced mortality and morbidity rates as a result of the additional psychological treatment¹⁹⁾.

2) Psychological approaches in CCR in Japan

Thus far, no systematic review or meta-analysis regarding psychological assessment and psychosocial treatment in CCR has been carried out⁴⁾. Izawa et al²⁰⁾ argued that exercise-only CCR moderately improved physiological and psychological outcomes. Consequently, the authors highly recommend the introduction of counseling and stress management into the CCR programs. Suzuki et al²¹⁾ argued that CCR with individual counseling improves the QOL of patients with impaired baseline exercise capacity, such as women and elderly patients with AMI²¹⁾.

A psychological analysis was conducted to clarify the characteristics of stress coping in patients with CHD using the case-control study method²²⁾. The results of this study showed that the mental health scores for patients with CHD were lower than those of control groups²²⁾.

Moreover, Komatsu et al²³⁾ conducted a study to evaluate the differences in trait anxiety between patients with stable effort angina pectoris and those with AMI. No significant difference was observed in trait anxiety between patients with angina pectoris and those with AMI²³⁾.

Recently, Moriyama et al²⁴⁾ reported the efficacy of self-management skills acquisition in CCR. The result of this study showed that the patient's QOL and the sense of self-efficacy were significantly improved after the intervention²⁴⁾. They observed 3 key factors: the sense of self-efficacy, an improvement in achievement rate, and enhancements in the behavioral stage²⁴⁾.

3. Gender differences in the outcome of CCR

1) Gender differences in the outcome of CCR in the USA and UK

Before the 1990s the subjects of CCR research were primarily men, although 30% of AMI patients are women¹⁴⁾. Women comprised only 3% of the total 4,500 participants in the meta-analysis of a randomized CCR trial following AMI¹⁾. Consequently, the AHA¹⁾ strongly argued that CCR for women was a vital issue in clinical practice, and that female AMI patients should be encouraged to join CCR programs because the rate of participation of eligible candidates is lower in women than that in men.

Influenced by this report, several studies of gender differences in the the outcome of CCR have been published¹³⁾¹⁶⁾¹⁹⁾²⁵⁾²⁶⁾. A meta-analysis reported that the outcomes of psychological intervention in CCR showed a significant improvement mortality rates for men in the first 2 years¹⁹⁾. However, there was no statistically significant improvement in mortality rates in women after controlling for age differences¹⁶⁾¹⁹⁾.

Despite the negative mortality outcomes of psychological treatment in CCR for women described in this meta-analysis, studies of the physical and psychological outcomes of women were continually conducted²⁵⁾²⁶⁾. Casey et al²⁶⁾ argued that women could benefit from a balanced mind/body approach in which participants are taught cognitive behavioral skills for stress management and relaxation. Moreover, Beckie and Beckstead²⁵⁾ claimed that

CCR tailored for women improved their general health perception, including psychological condition, vitality, and social function.

2) Gender differences in the outcome of CCR in Japan

CCR in Japanese women was a widely ignored theme in the past. However, limited data are available regarding gender differences in CCR^{27)~30)}.

Gender differences in CCR were first reported by Morita et al²⁸⁾ and Nagayama et al²⁹⁾ in Japan. Morita et al²⁸⁾ evaluated gender differences in the results of exercise centered CCR. The study showed that there were no differences in the improvement of exercise capacity between men and women²⁸⁾. Furthermore, Nagayama et al²⁹⁾ evaluated the gender differences in CCR implementation rate, as well as the improvement of physiological and psychological conditions. The results of this study demonstrated that the improvement of physiological measurements was smaller in women than in men, the implementation rate in women is lower than in men, and the anxiety and depression scores were higher in women than in men²⁹⁾.

Izawa et al²⁷⁾ conducted a study from another point of view into gender differences in patients with AML. In a cross-sectional study, the authors examined gender differences in clinical characteristics and physiological and psychological outcomes at entry into phase 2 of CCR²⁷⁾. The results of this study showed that the number of unmarried women, unemployment rate, and ages were significantly higher, while their education level and body mass index values were lower, than those of men²⁷⁾.

4. The efficacy of psychological therapy

As psychological therapy is a developing area in CCR, there have been numerous recent studies on the efficacy of psychosocial approaches such as group or individual counseling, stress-coping, cognitive behavioral therapy, and relaxation-spiritual therapy^{4)11)15)24)~26)31)}. Two additional CCR-related issues, the health care professionals who provide CCR and the location in which psychological therapy is performed, have been discussed^{11)32)~35)}.

Cognitive behavioral therapies using both cognitive and behavioral strategies constitute the main-

stream psychological therapeutic approach in CCR⁴⁾⁷⁾¹⁵⁾¹⁶⁾¹⁸⁾²⁵⁾³²⁾. One of the goals of CCR is to reduce risk factors such as smoking, obesity, depression, and anxiety¹⁾ for which appropriate cognitive behavioral therapies are selected⁷⁾.

However, newer CCR approaches based on various psychological theories have been reported. For example, Chang et al³¹⁾ suggested that "the conceptual model that spiritual well-being is a pathway that might explain some of the improvement in psychological outcomes associated with relaxation response practice" in CCR. The CCR participants were taught several techniques such as yoga, meditation, mindfulness, and visualization, which were extracted from the relaxation response³¹⁾. In addition, Beckie and Backstead²⁵⁾ demonstrated the effects of tailored CCR programs using motivational interviews based on a Trans-theoretical model of behavior change.

There is 1 report regarding cognitive behavioral therapy in Japan²⁴⁾. The authors conducted their original study on modified cognitive behavioral therapy in CCR²⁴⁾. However, the focus of other studies was individual counseling for physical and mental distress, an exercise prescription, and daily life activity²¹⁾³⁴⁾.

With regard to the health professionals in the UK and US who provide psychological therapy in CCR, it is debated whether clinical psychologists, clinical nurse specialists, social workers, behavioral specialists, cardiac rehabilitation educators, or cardiac rehabilitation coordinators should be employed in specific programs¹⁾¹¹⁾¹²⁾¹⁵⁾²⁵⁾²⁶⁾³¹⁾³³⁾³⁵⁾. In addition, Lawson³³⁾ suggested that the main staff of outpatient CCR should include cardiac rehabilitation specialists or cardiac rehabilitation case managers, and patients with severe psychological distress should be referred to behavioral health specialists.

Nevertheless, physicians and nurses in Japan are the main providers of psychological assessment and counseling in CCR rather than clinical psychologists⁴⁾²⁰⁾²¹⁾²⁴⁾³⁴⁾. The Japanese Circulation Society (JCS)⁴⁾ recommends that CCR staff members should include trained physicians, nurses, physical therapists and other health professionals. Interestingly,

clinical psychologists were not mentioned in this guide line.

Discussion

Although the evidence of the effectiveness of psychological intervention in CCR is recognized in meta-analyses carried out both the USA and UK, there is no meta-analysis of psychological approaches in CCR in Japan. The reason that Japan lags behind the USA and UK in psychological approaches in CCR may be due to cultural differences. According to Barkway⁷⁾, the psychological theories regarding behavior might need to be re-examined for East Asian cultures, because such theories were developed in Europe and America and are thereby based on individualistic cultures. Hasegawa et al²²⁾ suggested that the socio cultural contexts and personalities should be considered for psychological approaches in CCR in Japan to be deemed effective. Furthermore, Komatsu et al²³⁾ recommended a deliberation of social and cultural contexts such as personalities, past history, backgrounds, and life styles of CCR participants to produce satisfying results of psychological approaches in CCR.

The shortage of psychologists in the CCR field in Japan could be the cause of Japan lagging behind the USA and UK in this area. Izawa et al²⁷⁾ discussed that individual counseling and stress management programs led by clinical psychologists are most effective for the improvement of mental conditions in patients with AMI. However, the Ministry of Health, Labor and Welfare in Japan has no strict rules that require a degree or specific qualifications for approval to perform psychological treatment and assessment. Thus, the same CCR task could be performed by nurses with appropriate training⁴⁾.

In the present study on patients with AMI, there was a lower CCR implementation rate in women than in men in Japan, the USA, and the UK. Solar and Iwan⁷⁾ claimed that most women throughout the world underuse health resources, which influenced their QOL and health condition. According to Ades¹⁰⁾, a low physician referral rate for involvement of women in CCR programs was responsible for the lower participation rates of women relative to than those of men.

The present study showed that psychological treatment in CCR did not result in statistically significant improvement in mortality and morbidity rates in women during in the 2 year study period. Therefore, gender difference of CHD patients might be due to both biological and social differences. According to Vacek et al and that cited in the report of Thompson and Bowman³⁵⁾, the biological difference between men and women is mainly observed in the female tendency toward CHD only after menopause. CHD development occurs 10 years later in women than in men³⁵⁾. On the other hand, the social determinants of health are recognized as the main factors of the social model of health⁷⁾. The Social Health Atlas of Australia⁷⁾ reported "there is now a 20-year mortality difference between those individuals in the highest socioeconomic group and those in the lowest." Furthermore, Linden et al¹⁹⁾ discussed the urgent development of psychological programs in CCR that enable female cardiac patients to meet their own needs, such as emotional processing and, being listened to, particularly about family role issues.

With regard to gender differences, it is also necessary to consider the cultural differences between Japan and the Anglophone world. Japan from a western perspective traditionally functions as a hierarchical society that stresses on collectivism and a patriarchal family structure³⁶⁾. Although the modern Japanese society has been influenced to a certain degree by the USA ideology since 1945 when Japan was occupied, most female AMI patients in Japan were born before 1945. Thus, they might simply follow the "orders" of physicians who feel superior to female patients, and they might face difficulties in explaining their own problems. As a result, the psychological difficulties of female patients may be exacerbated by these circumstances.

The introduction of a reliable mixed method in the bio psycho social health model, which extends the cause of disease to social disadvantages linked to the environment and the social, cultural, and political structures of society⁷⁾ might be useful in clarifying the emotional difficulties of post-AMI patients because the interviews and questionnaires of a

qualitative study will reflect the patients' subjective view of their condition in the best way possible. Data that are collected in this way will enable the fine-tuning of appropriate individual treatment strategies. In other words, the psychological approach is necessary from the beginning to the end of the treatment if it is to be efficient.

This study has several limitations, as it is based on limited secondary sources found while browsing through the University of Melbourne's databases in which each database has its own limitations. In addition, the secondary sources are limited with regard to the language diversity of peer-reviewed journals. The sources of this research paper are in English and Japanese only. This research project comprises a review of only 6 Japanese articles. In addition, this research has a time limitation: it was conducted in the half-year period from July 2010 to January 2011.

Conclusion

In this literature review, we found that the use of a psychological approach, particularly psychological assessments, accompanying CCR in the US, UK and Japan is highly valuable. Psychological treatments alone are not actually effective in improving survival outcomes, but a combined approach using other rehabilitation programs results in alleviating anxiety and depression outcomes. Nevertheless, the degree to which CCR is actually applied in Japan is low, clinical experiments on a large scale have not been performed, and its study is still in its very initial stages. Gender differences in CHD have also been observed with regard to the degree CCR application and prognosis. It seems that these points will be important issues in Japan as well. A study using the bio psycho social model may be promising approach for solving the various CCR-related problems. Physicians' deep understanding as well as interdisciplinary efforts of nurses, clinical psychologists, and physical therapists while participating in research programs will be the rule in future team approaches toward psychological approaches in CCR.

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急性心筋梗塞後の包括的心臓リハビリテーションにおける心理学的アプローチの効果に関する文献的考察
—日本と英米の研究の比較より

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ヨコタ ジンコ ウチダ ケイコ カモトシコ
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包括的心臓リハビリテーション（包括心リハ）は急性心筋梗塞（acute myocardial infarction：AMI）後患者の状態を改善する手助けとなる。不安や抑うつなど情動的困難はAMI後の予後に関係するとされ、包括心リハにおける心理学的アプローチの重要性は一般的に認識されつつある。本研究の目的は、包括心リハでの心理学的アプローチの有効性を日本と英米の研究の比較により評価することである。文献的考察により以下の結果が得られた。米英においては、包括心リハにおける心理学的アプローチは2年間の追跡で、死亡率、罹病率ともに男性のほうが女性よりも改善がみられた。日本においては、AMI後の包括心リハにおける心理学的アプローチの効果の大規模研究は行われていなかった。包括心リハにおける心理学的アプローチはAMI後の心理状態の判定において有効性が評価され推奨されつつあり、心理療法に関しては認知行動療法などが認められつつあった。英米と比較して日本では包括心リハの実施率が明らかに低かった。この文献的考察により、日本における包括心リハにおける心理学的アプローチの効果の研究はヘルスケアでの生物心理社会的モデルを基盤にした質的および量的研究手法が研究をより促進させる可能性があることが示唆された。加えて、医師が包括的心リハにおける心理学的アプローチの有用性をより深く認識することおよび医師以外の医療関係者（看護師、理学療法士、臨床心理士）などの研究への積極的参加が包括心リハの実施率を改善させる可能性が示唆された。