Correlation between depression and health related quality of life in myocardial infarction patients in Hong Kong

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SUMMARY

- The onset of myocardial infarction (MI) affects patients' depression and health related quality of life (HRQoL). The purpose of this study was to identify the correlation between depression and HRQoL in 66 MI patients during a three-month period after the cardiac event.
- The depression subscale of Hospital Anxiety and Depression Scale (HADS-D) and the Seattle Angina Questionnaire (SAQ) were used to measure their depression and HRQoL at three different points of time: the first 72-hour (T1), 1-month (T2) and 3-month (T3) after MI.
- The level of depression was highest at T1, and gradually reduced at T2 and T3. During the 3-month period, patients also demonstrated decrements in physical limitation and improvements in symptom burden, disease perception, and treatment satisfaction.
- Depression was negatively correlated with physical limitation and disease perception during the whole study period (all p values < 0.05), negatively correlated with treatment satisfaction at T1 and T2 (both p values < 0.05), and negatively correlated with angina stability at T3 ($p < 0.05$).
- Nurses should notice the psychological needs of MI patients. Early identification of depressed patients and effective nursing interventions may help them to obtain better HRQoL during the recovery and rehabilitation.

INTRODUCTION

Coronary heart disease (CHD) has been the leading cause of death worldwide and caused 7.4 million of deaths globally in 2012 (World Health Organization, 2014). In Hong Kong, heart disease caused 13.4% of all deaths in 2013, and CHD accounted for the mortality of 68.7% in heart disease (Department of Health, 2015). As the most fatal and acute episode of CHD, myocardial infarction (MI) has imposed a heavy disease burden to individuals and the society.

The onsets of MI impose a great impact on daily activities and social activities, which adversely affect patients' health related quality of life (HRQoL) (Benyamini et al., 2013). Since an episode of MI can be sudden and traumatic, the HRQoL of MI patients is likely to be affected. Following MI, patients may also suffer from depression. A high prevalence of depression was reported among patients after MI (Zuidersma et al., 2013). The high level of depression was associated with increased mortality and morbidity in this group of patients (Zuidersma et al., 2012). One study among 206 patients with first onsets of MI reported the highest prevalence of depression occurred during the first month after MI (Strike et al., 2004). It was revealed that depression was independent from underlying disease severity (Pelletier et al., 2014). These results indicated that most MI patients suffered from depression during the early period of disease.

Depression was associated with poor HRQoL in MI patients, and could significantly predict poor patient outcomes (symptomatic, psychological and social indicators) after MI (Benyamini et al., 2013; O'Neil et al., 2013). Fauerbach et al. (2005) reported that depressed patients had significantly poorer physical and psychological health than those who were not depressed. After controlled the baseline level of HRQoL, anxiety, gender, and race, a significant relationship between depression and mental domain of HRQoL was revealed among post MI patients. Since the level of HRQoL before MI was assessed retrospectively during hospitalization following MI in that study, the recall bias may exist and diminish the reliability of the results.

As a major component of heart disease, it is important to understand the impact of MI during the early recovery and rehabilitation stage, so that appropriate and effective nursing care could be provided. However, most studies were conducted in western population. Limited studies on HRQoL and depression were conducted among Chinese patients during their early post-discharge period. The purpose of this study was to investigate the longitudinal change of depression and HRQoL among MI patients in Hong Kong in the 3-month period after the onsets of cardiac events, and to explore their relationships.

METHODS

Study design and setting

A longitudinal, correlational design was used in this study. The study was conducted in two acute general regional hospitals in Hong Kong Island.

Sampling and participants

Convenient sampling was used to recruit participants. Patients who admitted to the coronary care unit (CCU) or acute medical wards of the study hospitals and met the study criteria were recruited. The inclusion criteria of the participants were: (1) with confirmed diagnosis of MI; (2) with stable condition to complete questionnaires; (3) being able to communicate with Cantonese; and (4) being mentally capable to give informed consent. Those with any known history of psychiatric disorders were excluded from the study.

Data collection

Ethical approval was received from the Survey and Behavioural Research Ethics Committee of The Chinese University of Hong Kong and the Ethics Committee of the two studying hospitals. Patients who met the inclusion criteria were invited to participate in the study. Details of the study were introduced to potential participants. Principles of voluntary participation, confidentiality, and anonymity were ensured for all participants. Written consent was obtained from each participant before data collection.

Data collection was conducted at the first 72-hour (T1), 1-month (T2), and 3-month (T3) after MI by the researcher. Given that the MI patients had cardiac monitoring during hospitalization and were not allowed to walk around during the first 72-hour after MI, the first set of data was collected by face-to-face interviews at patients' bedside. Privacy was maintained during the interview with the bedside curtain closed. The second and third sets of data after discharge were collected by the researcher through telephone interviews.

Study instruments

A set of structured questionnaires was utilized for data collection. Demographic characteristics (age, gender, education, financial, marital, working, and living status) and clinical information (current condition and treatment of MI, and medical history of diabetes mellitus, hypertension, and hyperlipidemia), were collected from patients at baseline only.

The depression subscale of the Hospital Anxiety and Depression Scale

The Chinese version of depression subscale of the Hospital Anxiety and Depression Scale (HADS-D) was used to measure the depression level. The 7-item HADS-D has a total score ranging from 0 to 21, and a higher score indicates a higher level of depression (Zigmond & Snaith, 1986). A cut-off score of 8 or above had revealed a good sensitivity (0.71 - 1.0) and specificity (0.71 - 0.95) for screening depression, which was also employed in the current study (Abiodun, 1994; Silverstone, 1996). Test-retest reliability coefficient for the HADS-D is 0.86 (Spinhoven et al. 1997). The Chinese version of HADS-D also demonstrated good validity with a Cronbach's alpha coefficient of 0.82 (Leung et al., 1999).

The Seattle Angina Questionnaire

The Chinese version of the Seattle Angina Questionnaire (SAQ) was used to measure the HRQoL of MI patients. The 19-item SAQ consists of five sub-scales: physical limitation (9-item), stability of angina (1-item), frequency of angina (2-item), treatment satisfaction (4-item), and disease perception (3-item). The score of each subscale ranges from 0 to 100, and a higher score indicates better HRQoL. The SAQ has a Cronbach's alpha greater than 0.70 in all subscales, and the Chinese version has a Cronbach's alpha of 0.78, indicating the good validity of the instrument (Dougherty et al., 1998).

Data analysis

The Statistical Package for Social Science for Windows, Version 20.0 was employed for data analysis. Descriptive statistics of mean, standard deviation (SD), frequency, and percentage were used to describe the data. Possible correlations between depression and HRQoL were examined by Pearson's coefficient (r). Repeated-measures Analysis of Variance (RM-ANOVA) was used to test the longitudinal changes of depression and HRQoL during the study period. The level of significance was set at 0.05.

RESULTS

A total of 101 patients with MI in the study settings were approached, and 31 were excluded due to critically ill conditions (n = 21), language barriers (n = 8), and severe hearing impairment (n = 2). Four patients refused to participate due to personal reasons. Finally, 66 subjects were recruited and provided written consents. All 66 subjects completed the first set of data during hospital admission. At T2 and T3, 64 patients completed the data collection via telephone. Two patients died before T1 data collection, with an attrition rate of 3.0%.

The baseline characteristics of the participants were presented in Table 1. The age of the participants ranged from 29 to 90 years old, with a mean of (64.9 ±13.9). There were 49 (74.2%) males and 17 (25.8%) females, and more than half of the patients (39, 59.1%) were married. Sixty four patients were admitted for the first onsets of MI and 2 subjects had history of MI before. Most patients (49, 74.2%) received percutaneous coronary intervention (PCI) during the first 3-month following MI. For medical history, 23 (34.8%) had diabetes mellitus, half (33, 50.0%) had hypertension, 16 (24.2%) with hyperlipidemia, and 9 (13.6%) with ischemic heart disease.

Depression

At T1, 16 (24.2%) subjects had depression with a HADS-D score ≥ 8. The depression level revealed a decreasing trend over the study period. The mean score of HADS-D changed from 4.5 (SD = 4.6) at T1 to 3.8 (SD = 4.0) at T2, and to 2.8 (SD = 3.5) at T3. The RM-ANOVA revealed significant time effects in the changes of depression levels (p = 0.027). The depression levels of the participants during the study period were summarized in Table 2.

Health related quality of life

Table 3 presents the scores of SAQ during the study period. The patients reported a mean score of 85.7 (SD = 15.9) on the subscale of physical limitation at T1, while the mean scores increased to 90.4 (SD = 12.9) and 94.0 (SD = 9.0) at T2 and T3, respectively. For angina stability, subjects had a lower mean score of 18.6 at T1. The scores improved to 92.2 at T2 and 90.8 at T3. For angina frequency, subjects reported a mean score of 60.3 at T1 which indicated weekly angina according to SAQ. After discharge, the patients reported less frequent angina with a mean score of 92.5 and 94.8 at T2 and T3, respectively. The scores of angina frequency indicated improved symptom burden during the 3-month period.

Subjects were satisfied with their treatment during the study period, with the score of treatment satisfaction of 84.8 at T1, 79.3 at T2, and 81.1 at T3. Subjects also perceived good quality of life (disease perception) at T1 with a mean score of 61.5. After discharge, the patients perceived better HRQoL, with the mean score of 72.7 at T2 and 79.8 at T3.

Each subscale of SAQ revealed significant differences among the three data collections in the RM-ANOVA (all p values< 0.01).

Table 1. Baseline characteristics of participants (n = 66)

Characteristics		n (%)
Gender	Male	49 (74.2%)
	Female	17 (25.8%)
Education	Illiterate	8 (12.1%)
	Primary School	20 (30.3%)
	Secondary School	28 (42.4%)
	Tertiary education or above	10 (15.2%)
Marital status	Married	39 (59.1%)
	Single	8 (12.1%)
	Divorced	3 (4.5%)
	Widow	16 (24.2%)
Employment status	Employed	23 (34.8%)
	Unemployed	5 (7.6%)
	Retired	31 (47.0%)
	Housewife	7 (10.6%)
Living status	Live with family	53 (80.3%)
	Live alone	8 (12.1%)
	Live in old aged home	1 (1.5%)
	Others	4 (6.1%)
Financial status	Supported by self	37 (56.1%)
	Supported by family	21 (31.8%)
	Supported by public allowances	8 (12.1%)
Myocardial infarction	First onset	64 (97.0%)
	Recurrence	2 (3.0%)
Medical history	Diabetes mellitus	23 (34.8%)
	Hypertension	33 (50.0%)
	Hyperlipidemia	16 (24.2%)
	Ischemic heart disease	9 (13.6%)

Table 2. Depression levels of the participants during the study period

Time points	Depressed n (%)	Score of HADS-D mean ± SD	RM-ANOVA
T1 (n = 66)	16 (24.4%)	4.5 ±4.6	F = 3.96 p = 0.027
T2 (n = 64)	9 (14.1%)	3.8±4.0	
T3 (n = 64)	6 (9.4%)	2.8±3.5	

HADS-D: The depression subscale of Hospital Anxiety and Depression Scale; SD: Standard deviation; RM-ANOVA: Repeat measurements analysis of variance; T1: Within 72-hour after myocardial infarction; T2:1-month after myocardial infarction; T2:3-month after myocardial infarction.

Table 3. Scores of Seattle Angina Questionnaire during the study period

Sub-scales	T1	T2	T3	RM-ANOVA	
	Mean ± SD			F	p
Physical limitation	85.7 ±15.9	90.4 ±12.9	94.0 ±9.0	7.70	0.002
Angina stability	18.6 ±14.1	92.2 ±13.8	90.8 ±20.9	435.53	<0.001
Angina frequency	60.3 ±26.4	92.5±14.0	94.8 ±14.6	71.50	<0.001
Treatment satisfaction	84.8±11.5	79.3 ±13.2	81.1 ±10.6	6.84	0.002
Disease perception	61.5 ±21.5	72.7 ±17.9	79.8 ±13.5	18.62	<0.001

SD: Standard deviation; RM-ANOVA: Repeat measurements analysis of variance; T1: Within 72-hour after myocardial infarction; T2: 1-month after myocardial infarction. T2: 3-month after myocardial infarction.

Correlations between depression and HRQoL

Depression was negatively correlated with physical limitation (all p values < 0.05), and disease perception (all p values < 0.01) during the whole study period. Depression was also negatively correlated with treatment satisfaction at T1 (r = -0.295, p < 0.05) and T2 (r = - 0.366, p < 0.01). And at T3, depression was negatively correlated with angina stability (r = - 0.276, p < 0.05). The correlations between depression and HRQoL were summarized in Table 4.

Table 4: Pearson correlations between depression and health related quality of life (HRQoL) during the study period

Subscales of HRQoL	Depression		
	T1 (n = 66)	T2 (n = 64)	T3 (n = 64)
Physical Limitation	-.251*	-.289*	-.408**
Angina Stability	-.037	-.017	-.276*
Angina Frequency	-.057	.071	-.041
Treatment Satisfaction	-.295*	-.366**	-.197
Disease Perception	-.373**	-.495**	-.350**

T1: Within 72-hour after myocardial infarction. T2: 1-month after myocardial infarction. T2: 3-month after myocardial infarction. * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

Similar to the findings in a previous study (Mayou et al., 2000), this study also revealed that depression level was the highest during the early post-MI period, since the patients may have concerns over treatments, as well as more worries about the possibility of recurrence, death and financial matters (Bakalis & Bundy, 2001). When patients' conditions were stabilized, the incidence of depression gradually dropped from 24.4% at T1 to 9.4% at T3. However, the overall prevalence of depression in the current study was relatively lower than that reported in previous studies (Lane et al., 2000; Lauzon et al., 2003). In general, the Chinese populations are reluctant to express mental symptom due to social stigma and cultural background. Moreover, different from the symptoms in the Western patients, the Chinese patients usually experience depressive symptoms in the formats of somatic complaints (Parker et al., 2001). Therefore, nurses should be aware the cultural differences when assessing depression among the Chinese MI patients.

Overall, there is an improvement of HRQoL of MI patients over the study period in the aspects of physical limitation, symptom burdens like angina frequency and stability. and disease perception. Subjects had high levels of HRQoL in physical limitations (85.7 - 94.0) during the study period, indicating they were free from cardiac symptoms (e.g. angina) when performing physical activities. This was different from what had been reported previously that MI patients usually reported lower level of physical health just after MI (Chan & Parker, 2001). One possible explanation may lie in the scoring system of SAQ. When a patient reports no performance of any intensive physical activities, the scoring system will treat the response as a missing item and assign the item the mean value of moderate activities. Thereby, there may be a higher mean score for physical limitation for those who did not perform intensive physical activities. Hence, the levels of physical limitation in the current participants may be underestimated due to the limitation of the SAQ.

Subjects were satisfied with the treatment all along the study period, with a higher level of treatment satisfaction (79.3 - 84.8) during the hospitalization compared with the scores after discharge. This may due to patients' different expectations at different stages of the disease. Patients may rate a higher level of treatment satisfaction when they just survived from a life threatening disease. But after discharge, the patients may have more expectations to resume their normal daily activities. However, as reported in previous studies, it

actually required five months or longer for the patients to resume a normal level of physical health after MI (Brink et al., 2002).

Depression was significantly associated with poor HRQoL over the study period. Similar to the findings in previous studies, this study revealed that those depressed patients were likely to report more physical limitations, to be less satisfied with their treatments, and to perceive a poorer quality of life (Ruo et al., 2003). Consistent with the current findings at T3, previous studies also indicated that depressed patients usually report more cardiac symptom like angina (De Jonge et al., 2006; Mayou et al., 2000; Ruo et al., 2003)..Depression was also negatively correlated with treatment satisfaction at T1 and T2. This was in line with a previous study that those depressed patients may report a lower level of treatment satisfaction (Bakalis & Bundy, 2001).

From T1 to T3, poor physical limitation and worse angina frequency were associated with poor self perceived quality of life (disease perception). This indicated that failure to manage daily life activities and frequent angina may impair patients' HRQoL. This was in line with a previous study (Brink et al., 2002), in which those patients with a high degree of health complaints were at greater risks for lower HRQoL during the early recovery stage of MI.

There were also some limitations in this study. Firstly, different methods were employed for data collection. Face-to-face interviews were used for data collection during hospitalization while telephone interviews were employed after discharge. Given the possible reporting bias in telephone interviews, the study results should be interpreted with cautions. Secondly, the study excluded those clinically unstable patients who may have a higher level of depression and poor HRQoL. The participants in this study may only represent those MI patients with more stable conditions. Therefore, the study findings may not be generalized to the whole MI population. Thirdly, since 74.2% of subjects received PCI, the effects of this intensive intervention on depression and HRQoL could not be eliminated.

CONCLUSION

The MI patients had a common prevalence of depression during the early post-MI period. Their levels of depression gradually decreased with the improvements of cardiac conditions. The patients also experienced significant improvements in HRQoL, in terms of physical limitation, angina frequency and stability, and disease perception. Those patients with higher level of depression were more likely to perceive a lower level of HRQoL.

This study provides valuable information on depression and HRQoL of Hong Kong Chinese MI patients during the early 3-month post discharge period and gives important implications for nursing care. During the early post MI period, nurses should notice the psychological needs of the patients and pay special attentions to those depressed patients. Early identification of depressed patients and effective nursing interventions may help them to obtain better HRQoL during the recovery and rehabilitation.

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