



Original article

Depressive symptoms are associated with in-hospital complications following acute myocardial infarction



Mohannad Eid AbuRuz^{a,*}, Fawwaz Alaloul^b, Ghadeer Al-Dweik^a

^a College of Nursing, Applied Science Private University, Amman, Jordan

^b College of Nursing, University of Louisville, Louisville, KY, USA

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ABSTRACT

Aim: To examine the effect of depressive symptoms on in-hospital complication rates after Acute Myocardial Infarction (AMI).

Background: Coronary Heart Disease (CHD) is the primary cause of death worldwide. AMI is the most common consequence of CHD. Depressive symptoms are an important risk factor for CHD and increased risk of AMI. Understanding the relationship between depressive symptoms and short term complications for patients with AMI is important for determining their needs, developing interventions, and evaluating the outcomes of interventions.

Methods: A prospective observational study was conducted with 175 patients who were admitted to the Intensive Care Units (ICUs) of four large hospitals in Jordan. During the interview, within 72 h (mean, 38 ± 16 h) of admission to the hospital, participants completed the sociodemographic and clinical questionnaire and the Beck Depression Inventory Scale.

Results: The mean age was 66.9 ± 11.0 years. The number of patients with mild, moderate, and severe depressive symptoms who developed complications was significantly higher than those with minimal depressive symptoms, $p < 0.001$. Patients with mild, moderate, and severe depressive symptoms had longer lengths of stay in the ICU and in hospital than patients with minimal depressive symptoms. Patients with mild, moderate and severe depressive symptoms were at 1.22 times higher risk for developing complications than patients with minimal depressive symptoms. Moreover, previous AMI history increased the risk for developing complication by 150%.

Conclusions: Depressive symptoms were an independent predictor of complications and increased length of stay after AMI. Interventions to control depressive symptoms early after AMI are necessary.

1. Introduction

Heart disease is a major public health problem in industrialized nations (Roger ASG et al., 2012). Acute myocardial infarction (AMI) is the first leading cause of death in many countries including Jordan (Jordanian Ministry of Health DolaR, 2007; Roger ASG et al., 2012). According to the Jordan Ministry of Health statistics, acute myocardial infarction (AMI) was found to have a significant prevalence in Jordan (Jordanian Ministry of Health DolaR, 2007). In Jordan, according to latest World Health Organization report, Coronary Heart Disease (CHD) deaths reached 18.80% of total deaths, and the death rate per 100,000 due to CHD is 131 of population ranks Jordan number 46 in the world (WORLD HEALTHRANKINGS, 2016).

Worldwide, approximately every 25 s, an American will have a CHD event, and approximately every minute, someone will die of one (Roger

ASG et al., 2012). Coronary Heart Disease remains the number one cause of death in the United States (US) despite marked improvement in treatment and killed approximately 360,000 individuals in 2014 (Mozaffarian, Benjamin, Go, et al., 2016). Coronary Heart Disease caused one of every six deaths in the US in 2008 (Roger ASG et al., 2012). It is expected to be the number one cause of death worldwide by the year 2020 (Chockalingam, Balaguer-Vintro, Achutti, et al., 2000). Coronary Heart Disease leads to approximately 50,000 hospitalizations per year in Australia and 1.76 million per year in the US (McKinley, Fien, Riegel, et al., 2012). The mortality rate after a major coronary event, mostly attributable to out-of-hospital cardiac arrests, decreased from 53% to 40% in a decade in Australia; (McKinley et al., 2012) however, in-hospital death remains an important risk after AMI (Welfare AIOHa, 2008).

Acute Myocardial Infarction is the most common consequence of

* Corresponding author at: Po box 142, Shafa Badran, Amman 11934, Jordan.

E-mail addresses: mohannadeid@yahoo.com, m_aburuz@asu.edu.jo (M.E. AbuRuz).

CHD. An estimated 1.495 million Americans will have a new or a recurrent AMI each year (Roger ASG et al., 2012). Of these, 195,000 have their first silent myocardial infarction, and 340,000 will die before hospitalization or in the emergency department (Roger ASG et al., 2012). For the remaining 960,000 who initially survive, the risk of long-term morbidity or death may exceed 15 times the risk in healthy persons (Roger ASG et al., 2012). Therefore, interventions to improve outcomes after AMI are needed.

Accumulating evidence strongly suggests that psychological factors affect morbidity and mortality among individuals with CHD (Du, Zhang, Yin, et al., 2016; Martens et al., 2010; Smith & Ruiz, 2002). Depressive symptoms were frequently reported with AMI patients, especially women (Burkauskas et al., 2016; Tajfard, Ghayour Mobarhan, Rahimi, et al., 2014; Vural, Satiroglu, Akbas, Goksel, & Karabay, 2009). These symptoms were considered as a critical risk factor for CHD as more traditional risk factors such as smoking, hyperlipidemia, or hypertension (Goldston & Baillie, 2008; Nicholson, Kuper, & Hemingway, 2006; Steptoe & Brydon, 2009). After controlling for sex differences and other confounding variables it has been shown that every one point increase in the depressive symptoms scores was associated with an average 5% to 6% increase in abnormal coronary angiographic findings or definitive coronary artery disease, respectively (Vural et al., 2009).

Moreover, depressive symptoms were associated with increased risk of myocardial infarction (Wu & Kling, 2016). The impact of depressive symptoms on the development of acute cardiac events, mortality, and morbidity among patients with cardiovascular disease has been well-studied (Hoen et al., 2010; Linke, Rutledge, Johnson, et al., 2009; Martens, Hoen, Mittelhaeuser, de Jonge, & Denollet, 2010). However, almost all of these studies focused on long-term complications, mortality, and morbidity. Limited studies (Grewal et al., 2010) investigated the effect of depressive symptoms on in-hospital complications (i.e. ventricular tachycardia or ventricular fibrillation). Understanding the relationship between depressive symptoms and short-term complications for patients with myocardial infarction is important for determining patients' needs, developing interventions, and evaluating the outcomes of interventions.

Depressive symptoms are common following episodes of Acute Coronary Disease, and it is associated with an increased risk of major cardiac events (Lichtman, Froelicher, Blumenthal, et al., 2014). About one in five patients has depressive symptoms post AMI (Rudisch & Nemeroff, 2003; Thombs, de Jonge, Coyne, et al., 2008). Depressive symptoms were associated with mortality and increased cardiovascular events including Ischemic Heart Disease (IHD) following myocardial infarction (Bekke-Hansen, Trockel, Burg, & Taylor, 2012; de Jonge, Spijkerman, van den Brink, & Ormel, 2006; Denollet, Martens, Smith, & Burg, 2010; Meijer et al., 2011). Depressive symptoms were a significant contributor to the development of acute cardiac events and CHD mortality. Different studies (Barefoot et al., 2000; Carney, Freedland, & Jaffe, 2001; Carney, Freedland, & Stein, 2000; Herrmann, Brand-Driehorst, Buss, & Ruger, 2000; Hesslinger, 2001) examined the effects of depressive symptoms on 5-year mortality in cardiology patients. Depressive symptoms were a strong predictor of mortality. These symptoms were responsible for reducing the ejection fraction after AMI (Bagherian-Sararoudi, Gilani, Bahrami Ehsan, & Sanei, 2013). Moreover, psychological factors led to increased morbidity and mortality among individuals with AMI in other studies (Meijer et al., 2011; van Melle, de Jonge, Spijkerman, et al., 2004).

Depressive symptoms post-myocardial infarction were a major cause of incomplete recovery (Lesperance, Frasere-Smith, Juneau, & Theroux, 2000). Furthermore, depressive symptoms following AMI leads to poor quality of life (Beck, Joseph, Belisle, Pilote, & Investigators, 2001; de Jonge et al., 2006), delayed return to work (Soderman, Lisspers, & Sundin, 2003), non-adherence to instructions and medications (Lin, Katon, Von Korff, et al., 2004) as well as risk factor management instructions (Leifheit-Limson, Kasl, Lin, et al.,

2012), and non-attendance rehabilitation programs (Lane, Carroll, Ring, Beevers, & Lip, 2001). Therefore, it is important for health care providers to pay more attention to depressive symptoms assessment and management for patients with myocardial infarction to improve their quality of life and health outcomes.

In summary, there is evidence that depressive symptoms were associated with the development of CHD and long-term mortality and morbidity after the development of the cardiac events. Almost all of the previous studies focused on the long-term complications like morbidity and mortality. Limited studies described the effect of depressive symptoms on in-hospital complications after AMI. Therefore, the purpose of this study was to examine the effect of depressive symptoms on in-hospital complication rates and length of stay (LOS) after AMI.

2. Methods

2.1. Design, sample, and setting

A prospective observational study was conducted at the intensive care units (ICUs) of four large hospitals located in Jordan. Over a three months period, 275 participants were screened among which 175 accepted to participate. Those who participated in the study met the following inclusion criteria: (a) age 18 or older; (b) persistent ST-segment ischemic ECG changes with disposition as AMI including non-Q wave and Q-wave infarction; (c) not known to have a chronic illness (e.g., AIDS, cancer, chronic renal failure); and (d) not known to have major psychiatric disorders and/or taking anti-depressants.

We hypothesized that: (Roger ASG et al., 2012) hospitalized post-AMI patients with mild, moderate, and severe depressive symptoms will have a higher in-hospital complications rate than those with minimal depressive symptoms; (Jordanian Ministry of Health DoIaR, 2007) patients with mild, moderate, and severe depressive symptoms will have longer LOS than those with minimal depressive symptoms; (WORLD HEALTHRANKINGS, 2016) depressive symptoms scores will be an independent predictor of in-hospital complications after controlling for demographic (i.e., age and gender) and clinical factors (i.e., history of hypertension, diabetes mellitus, previous AMI, and use of beta blockers).

2.2. Measures

2.2.1. Demographic and clinical characteristics

Socio-demographic data (age, sex, marital status, working status, smoking status, educational level, and yearly income) were obtained using patient interviews and medical record review (see Table 1). Medical records were used to obtain data on clinical characteristics of the patients (see Table 1).

2.2.2. Beck Depression Inventory II (BDI II)

Depressive symptoms were measured with the Beck Depression Inventory II (BDI II) (Beck, Steer, & Brown, 1996). Beck Depression Inventory II is one of the most widely used self-reported instruments for measuring the severity of depressive symptoms. It is a 21-item questionnaire that assesses severity of depressive symptoms. Participants rated their level of depressive symptoms on a scale of 0 to 3 for occurrence of each item during the past two weeks. The total score then was compared to a key to determine the severity of the patients' depressive symptoms. The standard cut-offs are: (Roger ASG et al., 2012) 0–9 indicates minimal depressive symptoms (the normal category); (Jordanian Ministry of Health DoIaR, 2007) 10–18 indicates mild depressive symptoms; (WORLD HEALTHRANKINGS, 2016) 19–29 indicates moderate depressive symptoms; and (Mozaffarian et al., 2016) 30–63 indicates severe depressive symptoms. Higher total scores indicated more severe depressive symptoms. This measure has been translated into and validated in Arabic. It has excellent psychometric properties (Al-Musawi, 2001).

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