



ORIGINAL ARTICLE

Evaluation and implementation of behavioral and educational tools that improves the patients' intentional and unintentional non-adherence to cardiovascular medications in family medicine clinics



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Abstract *Objective:* There are limited number of studies describing the reasons and interventions of non-adherence to cardiovascular medications in United Arab Emirates (UAE). We aimed to implement and evaluate the behavioral and educational tools that indicate the reasons of

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Cardiovascular diseases;
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non-adherence in patients with cardiovascular diseases and improve patient's adherence to their cardiovascular medications. *Methods:* In this prospective interventional study, we recruited patients ($n = 300$) with cardiovascular diseases from three family medicine clinics in Al Ain, UAE in 2010. We assessed patients' responses to a validated brief medication questionnaire (BMQ). *Results:* At the end of the study, we observed a significant improvement in adherence. When we compared pre- and post-interventions, the mean (\pm standard deviation, SD) score for non-adherence to current regimen were 4.1 ± 0.2 vs. 3.0 ± 0.3 ($p = 0.034$); indication of negative beliefs or motivational barriers scores was 1.8 ± 0.4 vs. 0.9 ± 0.1 ($p = 0.027$); the indication of recall barrier scores was 1.6 ± 0.1 vs. 0.8 ± 0.1 ($p = 0.014$); and the indication of access barrier scores was 1.6 ± 0.2 vs. 0.7 ± 0.2 ($p = 0.019$). Mean blood pressure, fasting blood glucose, glycosylated hemoglobin, low density lipoprotein and postprandial blood glucose decreased significantly ($p < 0.01$) post-intervention. *Conclusion:* We reported that implemented multifaceted tools targeting patients, provider and healthcare system have improved the adherence to cardiovascular medications. Our interventions managed to improve patients' clinical outcome *via* improving adherence to prescribed cardiovascular medications.

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1. Introduction

“Cardiovascular disease (CVD)” is an umbrella term referring to any disease affecting the heart and blood vessels. These diseases include hypertension, heart failure, coronary heart diseases and stroke. CVDs remain paramount cause of mortality globally (World Health Organization, 2003). Several risk factors, including physiological, psychological, behavioral and social habits, are associated with CVDs. Hypertension remains the major risk factor associated with a progressive rise of blood pressure, myocardial infarction (MI), heart failure, chronic kidney disease, cognitive decline and premature death. Hence, the cardiovascular drugs are currently the most used group of drugs in the geriatric populations.

A major challenge in treating CVD is patients' lack of understanding of their health condition and adherence to the treatment. Besides, patients are resistant to modify their lifestyle and pharmacological regime that further leads to the development of vascular diseases, (Al-Qasem et al., 2011). Therefore, adherence describes all behaviors influencing patients' outcomes, such as medication-taking behavior, following dietary and lifestyle advice, vaccinations and obeying follow-up visits (LaFleur and Oderda, 2004; Osterberg and Blaschke, 2005; Munger et al., 2007; Corrao et al., 2008; Thom et al., 2006). The additional term persistence is applied to describe the duration of time from initiation to discontinuation of drug therapy. Adherence and persistence are classified as two dimensions of medication-taking behavior.

Non-adherence can indicate a variety of conditions, such as not following the prescribed medical plan in general or can be related to non-adherence with medications, diet, medical appointments or refusal to stop a dangerous habit (smoking, illicit drug or alcohol use). WHO stated that treatment non-adherence is as a major public health problem that may result in disease persistence (Rasmussen et al., 2007). A report by WHO estimated that average rate of adherence to medication is around 50% among patients suffering from chronic diseases in developed countries and it is assumed to be lower in developing countries (World Health Organization, 2003). A recent review confirmed the existence of non-adherence to medication

as a serious problem among patients with chronic diseases in the Middle East (Jackevicius et al., 2002). However, reported rates of non-adherence varied greatly, probably due to differences in definitions, measuring tools, study population, study design and predictors of adherence/non-adherence. Some barriers and predictors of non-adherence among patients in Middle East region were identified. However, the 19 studies included in this review did not provide consequential conclusions regarding the level of adherence (Jackevicius et al., 2002). Hence, there is need for further research on the prevalence of non-adherence and barriers to medication adherence in order to identify type of interventions needed to improve treatment adherence, particularly in patients with complex chronic diseases.

On average, approximately half of patients do not adhere to prescribed treatment regimens (Beardon et al., 1993). Studies have shown that poor adherence to beta-blockers or statin in post-MI patients can lead to an increased risk of morbidity and mortality (Kirking et al., 1995; Fincham and Wertheimer, 1988). After MI, several strategies including early follow up and sending printed reminders to patients were proposed to improve adherence (Jackevicius et al., 2002). Studies on non-adherence found that 1–21% of prescriptions were unfilled or not claimed from hospital pharmacies (Craghead and Wartski, 1991; Skutnik and Katsanis, 1997). In other studies, non-adherence to medications has been shown to increase mortality and hospitalizations (Jackevicius et al., 2007; Jackevicius et al., 2008).

The issue of adherence to cardiovascular medications is unique as most patients with CVDs were concomitantly having co-morbid conditions with evident poly-pharmacy. The problem of non-adherence to cardiovascular medications is of particular interest as it has direct impact on the disease management, prognosis and patient's quality of life. Medication adherence is not part of the electronic system neither incorporated in daily routine care in the United Arab Emirates (UAE).

To our knowledge, there is no any study which may provide insights on the adherence to cardiovascular medications in UAE. In the absence of relevant literature in our region, we aimed to conduct a study on the adherence of patients to

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