Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 86 (2016) 248 – 251

Procedia Computer Science

2016 International Electrical Engineering Congress, iEECON2016, 2-4 March 2016, Chiang Mai, Thailand

Data flow diagram for developing decision support system of acute myocardial infarction screening

Jarin Meesang[a], Pichitpong Soontornpipit[a], Chukiat Vivatwongkasem[a], Prasong Kitidamrongsuk[a], Jutatip Sillabutra[a]*

[a]*Department of Biostatistics, Faculty of Public Health, Mahidol University, Bangkok, 10400, Thailand*

Abstract

The research aims to conceptualize the data flow diagram by reviewing the relevant documents. This flow diagram focuses on assessment process for screening myocardial infarction patients with ST elevation MI (STEMI). It is expected to use for developing the decision support system of acute myocardial infarction screening to help the healthcare professionals for improving their service.

Peer-review under responsibility of the Organizing Committee of iEECON2016

Keywords:

1. Introduction

The Acute Myocardial Infarction (AMI) is the symptom and participated with Cardiovascular disease. In 2012, World Health Organization (WHO) reported that cardiovascular diseases killed 17.5 million people, and out of these numbers 7.4 million people died from ischemic heart disease and 6.7 million from stroke [1]. The causes of the high mortality rate due to delay of treatment in hospital at emergency unit, including delayed to encounter for screening and delayed to report an electrocardiography (EKG) to the doctor for diagnosis and treatment, are around 52 percent[2,3]. Also, the healthcare professionals have to adjust their processes to improve the quality of service.

* Corresponding author. Tel.: +66-02-354-8530; fax: +66-02-354-8534.
E-mail address: jutatip.sil@mahidol.ac.th.

Peer-review under responsibility of the Organizing Committee of iEECON2016
doi:10.1016/j.procs.2016.05.111

Percutaneous Coronary Intervention (PCI) remains the therapy of choice for ST elevation MI (STEMI) if performed in a timely fashion. The American College of Cardiology and American Heart Association guidelines for the management of acute myocardial infarction have established a D2B times of 90 minute as a gold standard for primary PCI. The technology has been applied to reduce the duration of treatment since then. From the research of Dhruva VN., using Wireless Technology in Acute Myocardial Infarction (STAT-MI) Trial was devised to demonstrate that newer wireless technologies and software linked in a network can facilitate simultaneous transmission of high resolution ECGs to both the ED and offsite cardiologists and further improve door-to-intervention (D2I) times. The evaluation, triage, and treatment of patients with STEMI could decrease D2I times into 90 minute and had the potential to be broadly applied in clinical practice.[4] According from the research of the STAT-MI (ST-Segment Analysis Using Wireless Technology in Acute Myocardial Infarction), Trial Improves Outcomes was reported a fully automated wireless network (STAT-MI) for transmission of electrocardiograms (ECGs) and for suspecting STEMI triage with shortening of subsequent D2B times association with length of hospital stay (LOS) and mortality.[5] As above, it found that the IT application is now important to improve the process and quality of care. Improving in process to timely care for patients with STEMI, shortens D2B times or enhance the adherence for practice guidelines were taking into accounted. Moreover, IT application should be applied and started at the screen process.

The screening process in patients with acute myocardial infarction is now paper-based. Health professionals must evaluate the patient screening with electrocardiogram and report to the doctor for medical diagnosis and decision to treatment by completed open coronary heart within 90 minutes. The flow diagram for screening acute ST-segment elevation myocardial infarction is shown in Figure1.

To develop the new system, all dataset and dataflow from each stakeholder have been gathered and reevaluated. The design of data flow diagram process is important part to create the application for support users and to evaluate patients with acute myocardial infarction. Thus, this study aims to determine the data flow diagram for screening myocardial infarction patients with ST elevation MI (STEMI) through the web application by reviewing the relevant documents data flow for screening patients with myocardial infarction.

2. Methodology

The literatures were reviewed during on August 2015 to October 2015 by using “myocardial infarction” and “data flow” and “decision support systems” and “screening” or “assessment” as the searching terms. The relevant literatures were searched in online databases including PubMed, Science Direct, and Scholar, which were published between years 2011 to 2015. The lists of articles were screened following the inclusion criteria which mainly focused on two searches. First, it was using more stringent selection criteria and focused on data flow diagram. Second, it was conducted with more extensive selection criteria to include web-based interventions due to minimal results from the first search. Moreover, the decision support systems in hospitals, focused on the process working and caring of patients was included. The initial review was limited to articles that were published in English.

The first search highlighted the novelty of the decision support systems in research field. This search utilized the same keywords and similar to selection criteria. If any studies such as web-based studies or decision support systems studies detailing their recruitment processes and outcomes was published, the studies would be conducted. The second phase search gave the researchers a better understanding of data flow to develop the decision support systems in patients with acute myocardial infarction and will be applied to create the new application.

3. Result

From 32 initial publications, 4 studies were included in this review according inclusion criteria. Firstly, the study of Decision Support Tool RN-Initiated Treatment of Chest Pain or Discomfort Suggestive of Acute Coronary Syndrome in Emergency Cardiac Care was taken into account. Using decision support for nurses as a guide to make clinical decisions and assessment because cardiac ischemic symptoms should be assessed carefully which depended on ethnicities and prodromal symptoms.[6] Secondly, using an alert-based computerized decision support on prophylaxis and the subsequent 90-day incidence of symptomatic VTE in high-risk hospitalized for the cardiovascular clinician at Brigham and Women’s Hospital would improve the quality of patient safety, better outcomes, and reduces healthcare costs.[7] Thirdly, decision support system was used as the technical feasibility for acute coronary syndromes.