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In search of computer-aided social support in non-communicable diseases care

Henrique Damasceno Vianna *, Jorge Luis Victória Barbosa

Applied Computing Graduate Program (PIPCA) of University of Vale do Rio dos Sinos (UNISINOS), Av. Unisinos, 950 – Bairro Cristo Rei – CEP: 93.022-750, São Leopoldo, RS, Brazil

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ABSTRACT

Non-communicable diseases burden is well-known and care for these diseases goes beyond patients' engagement, extending to their family, friends, and acquaintances. The ability of social relations in alleviating the harmful effects of health risks is known as social support. Computing can be used to promote social support to enhance the care of non-communicable diseases. However, it is unclear how computing obtains such enhancement. This paper presents a systematic review, in the form of a mapping study, aiming to answer how computing enhances non-communicable diseases care by using social data and by promoting social support. It also looks for available computing models focused on social support promotion in non-communicable diseases care. The study was guided by a two-phase process review, resulting in 38 reviewed papers from journals, conferences, and chapters in the period from 2010 to 2016. In general, the reviewed papers focus on controlled trials, frameworks and systems, knowledge discovery, simulation models or social media usage analysis. Knowledge discovery was the predominant subject, followed by social media usage analysis, and frameworks and systems.

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Contents

* Corresponding author.
E-mail addresses: hdvianna@gmail.com (H.D. Vianna), jbarbosa@unisinos.br (J.L.V. Barbosa).

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1. Introduction

In 2014, the World Health Organization (WHO) defined the *noncommunicable diseases (NCDs)* as one of the greatest challenges of the twenty-first century health (WHO, 2014). Among other factors that led WHO to make this decision is the high death rate of those conditions. Only in 2012, the NCDs accounted for 68% of global deaths, and 40% of these deaths are considered premature. That is, deaths of individuals under 70 years old.

Most chronic diseases are caused by habit, such as a sedentary lifestyle, smoking, among others, that result in "metabolic/physiological changes", such as high blood pressure, over- weight and obesity. Both habits and the results of these habits make up the risk factors that must be controlled in order to prevent cases of those diseases (WHO, 2005).

Treatment of *NCDs* should be continuous, since most of these diseases have no cure. Thus, patients must be aware of their condition, follow the treatment determined by their physician and learn how to act when necessary. Even so, just the engagement of patients is not enough to cope with the challenges related to their care. Sometimes, patients may not have the confidence to perform certain activities and need someone experienced to aid in their care (Wagner et al., 2001; Wagner and Grove, 2002; Bodenheimer et al., 2002). In this case, the participation of healthcare organizations, family, and community members in the assistance activities of these diseases is fundamental. These entities form the *network of social relations of the patient (social network)* (Barnes, 1954).

Social network has an important role in health as it regulates access to resources and opportunities to its members, as well as models their behavior, which may be of higher or lower risk. Hence, *social support* is the ability of that social network in alleviating the harmful effects caused by stress and other health risks through the provision of material, emotional and informational resources, and in the influence of behaviors such as eating, practicing physical activities, drug use and seeking medical follow-up (House et al., 1988).

Researches about the influence of the social environment on health are not new, being already addressed by *Emile Durkheim* in the nineteenth century. Durkheim contributed significantly with his studies on the weight of the social effect on individuals' morbidity. In his study on suicide, Durkeheim analyzed particularly the influence that society has on the decision of an individual to commit suicide (Durkheim, 1897; Berkman et al., 2000). More recently, Christakis and Fowler used Framingham Heart Study (Framingham Heart Study, 2016) data to investigate the influence of social networking in individuals health. They found evidences of social network influence in weight gain (Christakis and Fowler, 2007), smoking cessation (Christakis and Fowler, 2008) and in the feeling of happiness (Fowler and Christakis, 2008).

Computing has been applied to support health care for decades. However, it is not clear how computing can aid and improve social support in NCDs care. Hence, the goal of this paper is to clarify this matter by the conduction of a mapping study that aims at understanding the current state of *computer aided social support in NCDs care*. Thus, this paper is organized as follows: in Section 2 we show how the mapping study was assembled and executed. Results regarding the study are presented in Section 3. In Section 4 we discuss about the obtained results. Finally, in Section 5, we present our final remarks about this work.

2. Material and methods

As a way to investigate how computing can aid social support on NCDs care, this paper will use systematic mapping study as methodology for its literature review (Budgen et al., 2008; Petersen et al., 2015; Cooper, 2016). Systematic mapping study, as systematic literature review (SLR), are types of systematic review. Even though systematic reviews are not frequently used in computing, they are widely recognized and applied in other areas such as medicine (Cooper, 2016) and social sciences (Petticrew and Roberts, 2006). In general, the main purpose of reviews is identifying the existence of evidences and trends in collections of literary works related to a set of topics of interest as a way of reducing the bias present when single references are used.

Based on the guidelines proposed by Petersen et al., 2015, this paper will use the following steps for its systematic mapping study:

1. Define the research questions;
2. Define the search process;
3. Define the criteria for text selection;
4. Execute the analysis and classification of the selected texts.

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