
Family Support to Improve Physical Activity in COPD: Game as a Research Tool

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Abstract

Games provide an effective research tool to investigate the interactions and responses among research subjects in a prospective situation. This research investigates the scope of involving family in goal setting, feedback and persuasion to improve physical activity of COPD patients by enhancing their self-efficacy. In this paper, we present a research context that can benefit from using game as a research tool.

Author Keywords

COPD; Self-Efficacy; Physical Activity; Family; Game

ACM Classification Keywords

H.5.m [Information interfaces and presentation]:
Miscellaneous; K.8.0 [General]: Games.

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a group of respiratory diseases characterized by breathing problems like dyspnea (shortness of breath) due to inflammation of respiratory tract and limited airflow. According to World Health Organization[1], COPD is the third leading cause of death in the world. Behavior change is an important element in daily self-management of COPD. Family is often recognized as an important influence that supports or impedes behavior change but

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there is insufficient evidence for utilizing family support in interventions for behavior change. This research focuses on COPD patients in the Northern Netherlands. It is worthwhile to note that the Dutch government plans to involve the family in chronic healthcare to tackle the economic burden of ageing and chronic diseases on healthcare system.

Although COPD is irreversible, recommended physical activity improves symptoms and quality of life of the patient. Unfortunately, COPD patients, majorly elderly and less educated, have a sedentary lifestyle. Lack of physical activity creates a loop of worsening symptoms and further reduces physical activity level of the patient. Apart from clinical characteristics, lower self-efficacy is an important psychological barrier to adhere to physical activity routine[7]. Self-efficacy refers to 'a persons belief regarding whether or not they feel they can successfully execute particular behaviors in order to produce certain outcomes'[4].

According to Bandura[3], family support affects self-efficacy but there is limited research about the scope of family in improving self-efficacy or behavior change among COPD patients. In context of other chronic illnesses, results indicate mixed outcomes (support or hindrance to self-management activities) for family involvement in patient's daily self-management activities[11]. Therefore, there is an acute need to explore the scope of family support in COPD population for behavior change and self-efficacy improvement. Hence, this research investigates the scope of involving family in goal setting, feedback and persuasion through gaming technology to improve physical activity and self-efficacy among COPD patients in the Northern Netherlands.

Scope of Family support

Family in Goal-setting

Goal setting is a well-known strategy to achieve behavioral changes in combination with feedback[13]. Recent research in chronic disease management encourages family engagement in goal setting for self-management behaviors and achievement of those goals[12]. There is lack of knowledge about role of family in goal setting for physical activity among COPD patients.

Family in Self-efficacy

According to Bandura[3], self-efficacy can be achieved through various sources. Family could play a role in two of them:

- By providing motivational feedback for 'mastery experiences'. Mastery experience refers to experiences followed by successful completion of a task. Multiple aspects of the motivational feedback, such as, timing, frequency, presentation of the feedback by family to support physical activity requires further research.
- By verbal persuasion, that refers to encouraging someone about his/her capability to perform a particular task. The technique of persuasion in this context requires further research as it sometimes leads to negative outcomes[2].

Aim and Key Questions

The aim of this study is to investigate, if and how family could be involved in goal setting, motivational feedback and persuasion through gaming technology to improve physical activity and self-efficacy among COPD patients. Refer to Figure 1. The key questions this research investigates:

- What is the influence of family involvement on patient's physical activity and associated self-efficacy?
- To what extent family can be involved in goal setting, motivational feedback and persuasion to achieve physical activity targets?
- What are the patient-family relationship factors that influence the achievement of physical activity targets through this collaboration?
- How do variations in timing, frequency and presentation of motivational feedback and persuasion affect patient's self-efficacy and goal achievement?

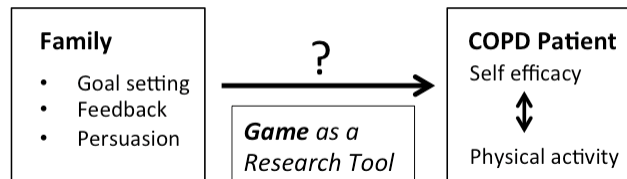


Figure 1: Research Overview

Research Plan

This research uses game technology as a research tool in combination with traditional research methods to investigate the scope and influence of engaging family on daily physical activity among COPD patients. For instance, we could make use of existing physical activity games that use goal setting, motivational feedback and persuasion. 'Ubifit'[5] and 'Fish'n'steps'[8] that use visual metaphors of a garden and a fish respectively are examples of such games. In the game, the patient and family member would collaboratively play and use

persuasion and feedback to achieve the physical activity goal, for example- number of steps/day set in consultation with the healthcare provider.

Participants (COPD patients and their family member) would be invited for pre-game, game-play and post-game sessions. During the pre-game session, information about how to play and access the game will be provided to the players. Additionally, a pre-game questionnaire will be used to collect the information about demographics and relevant relationship factors between the patient and the family member. The pre-game session will be followed by game-play at home. The patient and the family member will play the game in their home settings. The game-play will incorporate variations in motivational feedback and persuasion within the game. For instance, different timings, frequencies and presentations of feedback and motivation would be incorporated in the game to be used by the family member. The logged information during the game play will provide information about the physical activity level and the interactions between the patient and family. The post-game session will consist of an interview session and a post-game questionnaire. The post-game session would evaluate the experience of engaging family in physical activity improvement and player feedback on different variations of goal setting, feedback and persuasion used in the game. This research process would help in investigating the key research questions (mentioned earlier).

Related Works

There is very limited research that use game as a research tool to investigate behavior change among COPD patients. Our approach gathers support from research in different research domains like spatial planning [9] and Information interface and presentation[6] that have

implemented games as a research and a data-gathering tool. In context of COPD, there are few serious game interventions like 'mCOPD'[14] and 'Airflow'[10] that support and train for breathing exercises.

Discussion

Previous research has attempted to integrate healthcare provider and peer support through technology to facilitate individual behavior change. There is a lack of research that investigates the same through family support. Use of game as a research tool is a very recent approach that opens new possibilities in research. Digital game is an excellent tool for data collection and could be structured to provide unobtrusive observation of participant behavior. Game provides a safe environment to investigate scenarios by eliciting human behavior, like, interactions and responses. In this research, game would create a reference experience to reflect upon interactions and responses in a prospective situation where family is involved through game technology to facilitate behavior change.

Conclusion

This position paper presented a research context, which utilizes game as a research tool. This research investigates the scope of involving family in goal setting, feedback and persuasion to improve physical activity and self-efficacy among COPD patients. This research approach would provide a greater insight into our key research questions.

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