

5-15-2019

A SMARTPHONE HEALTH APPLICATION TO FACILITATE FALLS PREVENTION PRACTICES FOR OLDER ADULTS

Seyedezahra Shadi Erfani
University of Technology Sydney, shadi.erfani@uts.edu.au

Seyyede Maryam Erfani
free land scholar, seyyedehmaryamerfani@gmail.com

Kimiya Ramin
Freeland Scholar, kimiya.ramin@students.mq.edu.au

Follow this and additional works at: https://aisel.aisnet.org/ecis2019_rip

Recommended Citation

Erfani, Seyedezahra Shadi; Erfani, Seyyede Maryam; and Ramin, Kimiya, (2019). "A SMARTPHONE HEALTH APPLICATION TO FACILITATE FALLS PREVENTION PRACTICES FOR OLDER ADULTS". In Proceedings of the 27th European Conference on Information Systems (ECIS), Stockholm & Uppsala, Sweden, June 8-14, 2019. ISBN 978-1-7336325-0-8 Research-in-Progress Papers. https://aisel.aisnet.org/ecis2019_rip/20

This material is brought to you by the ECIS 2019 Proceedings at AIS Electronic Library (AISeL). It has been accepted for inclusion in Research-in-Progress Papers by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

A SMARTPHONE HEALTH APPLICATION TO FACILITATE FALLS PREVENTION PRACTICES FOR OLDER ADULTS

Research in Progress

Erfani, Seyedezahra (Shadi), University of Technology Sydney, Sydney, Australia,
shadi.erfani@uts.edu.au

Erfani, Seyyede Maryam, free land scholar, Tehran, Iran,
seyyedehmaryamerfani@gmail.com

Ramin kimiya, free land scholar, Sydney, Australia, kimiya.ramin@students.mq.edu.au

Abstract

Falls pose a serious threat to older adults' health and their quality of life. Web-based technologies such as smartphones have emerged as vital tools for health-related behavioural interventions, but little is known about the potential benefits of a smartphone health application (app) in applying falls prevention practices for older adults. The research presented in this paper sought to answer the question: what are the key features needed in a smartphone health app intended to support falls prevention practices for older adults, increase their autonomy and improve their quality of life?

A comprehensive literature review of studies conducted in public health, aged care, mobile health and mobile app design disciplines was undertaken and a conceptual framework for a smartphone app was proposed. The framework depicts the features of a smartphone app that can facilitate the implementation of falls prevention practices, including exercise programs; establishing a healthy diet and falls prevention education. Translation of the conceptual framework into a practical app will reduce falls in older adults, improve their sense of belongingness, and consequently enable better autonomy and quality of life.

Keywords: smartphone, health application, app, falls prevention practices, older people

1 Introduction

Falls pose a serious threat to older adults' health and their quality of life. Consequences of falls including injury, fear of delaying or failing at life activities, loss of independence and restricted movement, and cost of care make falls in the elderly a significant public health concern (Stubbs et al., 2015; Ehn et al., 2018). Studies have shown that complex biological, environmental, social and psychological factors can lead to falls (Ganz et al., 2008; Markle-Reid et al, 2015). Evidence-based falls prevention (FP) practices play a vital role in falls reduction among older adults.

Numerous FP practices are recommended for community-living older adults: individual fall risk assessment, exercise programs, home assessments and safety improvements, healthy diets, medication reviews, assessment of vision impairment, and fall prevention education (Droller 1995; Laing et al., 2011; Gillespie et al., 2012; Markle-Reid et al, 2015; Ehn et al., 2018).

- Fall risk assessment involves checking medical history, a physical exam, and functional and environmental assessments.
- Exercise programs include evidence-based appropriate physical activities designed to improve strength, gait and balance.
- Home safety assessment is performed using a validated tool for assessing a home's safety for clients at high risk of falls and suggesting environmental modifications.
- Establishing a healthy diet typically refers to recommending vitamin supplements and/or high-calcium foods.
- A medication review includes review and adjustment of medications that may increase risk of falls (e.g., sleeping pills).
- Vision impairment is common in the elderly for several reasons (e.g., cataracts, macular degeneration, so assessment and referral for possible correction are important preventative measures.
- Falls prevention education refers to providing and delivering appropriate and validated falls prevention education at the individual or community level.

The challenge is to motivate and support older adults to adopt FP practices, accordingly, evidence about tools and technologies that can facilitate the implementation of FP practices would be a major advance (Ehn et al., 2018).

The web is increasingly becoming a viable platform for delivery of health care services and improving individuals' quality of life (Hong et al., 2012; Erfani et al., 2016). Consumers of health services, including patients and their carers, increasingly use web-based services to improve their ability to communicate with others, and to obtain health-related information, emotional support, products, and services. Electronic health tools, such as static health-related web applications (Web 1.0), enable health service users to obtain health-related information. Dynamic health-related, web-based applications (Web 2.0), such as SNSs, blogs, and forums, enable patients to exchange health-related information and experiences, make sense of the information they acquire, and promote changes in health-related behaviours (Erfani et al.,2017a). Web 3.0 extends current Web 2.0 applications using Semantic Web technologies and graph-based, open data (Barassi and Treré 2012). A new generation of Web 3.0 technologies, supported by smarter technologies, powerful mobile devices, and fast internet speeds has the potential to facilities new ways of quick interactions between consumers of health care services and healthcare providers (Erfani et al., 2018). The use of smartphone technology for health service provision has a range of potential benefits. These include engaging users with multimedia tools to provide instructions to facilitate engagement, self-management and empowerment; allowing users to record moods and perform therapist activities at

relatively low cost; and providing support that is always easily accessible (Steinhubl et al., 2013; Bakker et al., 2016).

Smartphones are usually used privately, hence smartphone apps can be extremely flexible and attractive to users, who are empowered by the confidentiality of their engagement (Everett et al., 2018). Mobile health technologies have the potential to deliver FP interventions on a large scale. While the adoption of smartphones has emerged as a vital tool for health-related behavioural interventions and reducing barriers to help seeking (Bakker et al., 2016; Quanbeck et al., 2018), little is known about the potential benefits of smartphone health apps in applying FP practices for older adults. The aim of this study is to establish the features of a smartphone app that can facilitate the implementation of some FP practices among older adults.

The research in this paper sought to answer the following question: what are the key features needed in a smartphone health app intended to support FP practices for older adults?

2 Theoretical underpinnings, app modules and hypotheses

Recent studies have highlighted the lack of appropriate theoretical underpinnings and rigorous experimental testing to guide the development of smartphone health apps. There is little trial-based evidence for many of the available smartphone health apps (Bakker et al., 2016; Ehn et al., 2018). Accordingly, recent studies have called for the establishment of a theory-based guide for development and testing of smartphone health apps (Bakker et al., 2016). Drawing on evidence from research across diverse fields, including public health, aged care, mobile health and mobile app design, and applying a multi-theory perspective (Kelders et al., 2012; Markle-Reid et al., 2015; Bakker et al., 2016; Argent et al., 2018; Ehn et al., 2018; Erfani et al., 2017b), we developed a conceptual framework that depicts the features needed for a smartphone health app to effectively facilitate FP practice implementation and improve older adult's autonomy and quality of life. A persuasive system design framework approach was used to inform the design of the conceptual framework (Kelders et al., 2012). Concepts of belongingness theory, sociocultural theory, social cognitive theory and self-determination theory were applied to support the appropriateness of the proposed modules of the app's framework (Lantolf, 1994; Baumeister et al., 1995; Tee, 2012; Leary et al., 2017).

The model proposed in Figure 1 will be refined based on workshops and focus groups we will conduct with older adults and health care professionals. We aim to conduct workshops and focus groups with the older adults to gain insights about the necessary features and content of the app. The content of the modules will be informed by evidence based and reliable materials available in the literature and confirmed by conducting interviews and focus groups to obtain consensus from health care professionals. The updated conceptual model will be applied to design a prototype of the app. Feasibility studies will be conducted to test the prototype of the app prior to a large-scale evaluation.

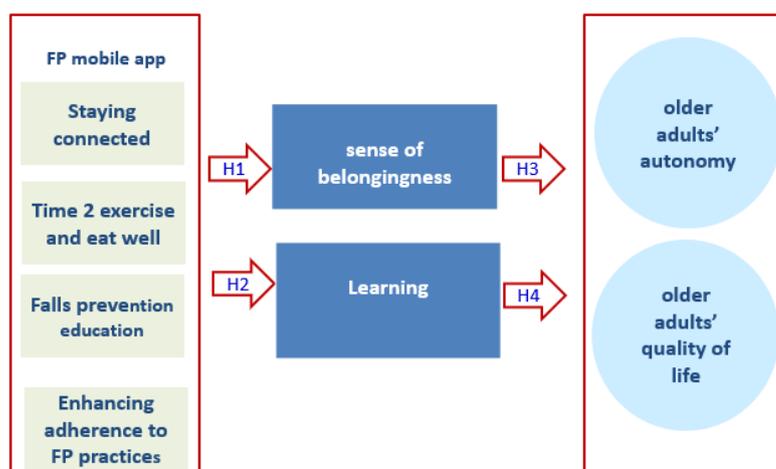


Figure 1. A conceptual model of a proposed mobile health app for implementing FP practices and improving older adults' autonomy and quality of life

2.1 Proposed modules of the app

Staying connected. This module enables users to create an online profile and see the profiles of other users of the app and communicate and develop connections with health care professionals as well as with other older adults. Users will be able to create and share content in their own profiles (videos and commentary, in their own languages) and consume content available on other users' profiles. This feature allows users to communicate with social workers and health care professionals and obtain advice and feedback regarding the actions they perform to prevent falls. This module will empower users and assist clinicians to know what users are doing and provide tailored and proactive recommendations. Users will be able to record their performance of exercises using inertial measurement units, then share the information with clinicians and receive real-time feedback. This module will support health care professionals to coach users in more visually stimulating ways and provide audio and visual feedback to users on their physical activity and exercise frequency. Users will be able to engage with other adults, exchange their experiences about the strategies that they apply to reduce the risks of falls, and also encourage others in applying those strategies.

Time 2 exercise and eat well. Regular exercise is one of the key FP practices in the literature (Gillespie et al., 2012; Ehn et al., 2018). Exercise – including balance-based, weight-bearing, endurance and aerobic activities – improves strength, gait and balance (Caspersen et al., 1985). This module will facilitate engagement in healthy levels of established physical activities for older adults; the proposed physical activities program will be created by health professionals in collaboration with fitness experts to ensure it progresses in a safe and achievable manner. Periodic reminders will alert users to be physically active.

To sustain exercise programs and healthy diets, the app will use machine learning to automatically translate various raw smartphone data streams into insights about the user's life habits and will presents personalized, contextualized, just-in-time, just-in-place recommendations. As an example, the app will use a passive assessment approach to provide tailored recommendations advising the user to conduct activity only when the user's calendar indicates available time and inform users about local physical activity engagement opportunities such as walking paths and public parks using their location data and the geographical positioning system.

This module will recommend appropriate diet, such as high-calcium foods and vitamin supplements designed to maintain bone strength and balance, and the consumption of fewer foods that limit calcium absorption. Validated, healthy recipes, designed in consultation with health care professionals and nutritionists, will be delivered through this module. Video demonstrations, text and images will be used to support performance of physical activities as well as food preparation.

Falls prevention education: This module will provide passive information and a guide to preventing falls for older adults. It will provide ideas about how to reduce any falls risks older adults may have, and suggestions for sources of help or further information. Older adults will be informed about the falls risk relating to them as individuals, as well as extrinsic risks relating to the environment, and how these risks can be avoided or reduced. Older adults will learn what to do in the event of a fall. Information in this module includes how to minimize injury from a fall, making a plan to get help if you fall, and how to get yourself and others up in the event of a fall. It will offer a validated tool for assessing home safety for clients at high risk of falls and suggesting environmental modifications.

Enhancing adherence to FP practices: This module seeks to improve adherence to the FP practices discussed above. The extent to which a person's behavior corresponds with agreed recommendations from a health care provider is important (World Health Organization, 2003). This module will support a series of activities designed to enhance users' self-efficacy and consequently their adoption of and adherence to FP practices. Self-efficacy, a central part of social cognitive theory, refers to people's judgements of their ability to perform certain actions; it influences many aspects of individual behaviour, such as the acquisition of new behaviors, inhibition of existing behaviors and disinhibition of behaviors (Baumeister et al., 1995). A series of games based on the concepts of self-determination theory will be applied. The games will encourage autonomy and allow opportunities for building mastery. Reminding users that they have completed a task will maximize user engagement, boost motivation to pursue an existing goal and motivate users to repeat tasks until new habits are formed that promote positive feelings of self-efficacy. In addition, users' self-efficacy will be promoted through motivational quotes and material, such as asking users to post photos of the ways that they perform physical activities to their profiles, and by using visual storytelling to share their experiences about the ways they prevent falls.

People who experience anxiety are less likely to adhere to their exercise program. This module will help users to minimize anxiety, enhance their sense of mastery and enable them to create contexts suitable for adopting FP practices. The module will offer relaxation exercises and meditation activities to enhance users' ability to learn attention change skills, such as blocking distractions, and to focus attention on relevant non-distressing stimuli and adopting FP practices.

In addition, this module will enable users to record and reflect on their thoughts, feelings and behaviours. Users will be able to monitor and track their reports and thereby increase their emotional awareness and improve their emotional self-regulation. Understanding personal emotions plays an important role in preventing out-of-control distress and decreasing anxiety.

2.2 Hypotheses

Social connectedness is described as emotional connectedness and an individual's sense of belonging to a group (Pearson et al., 2010) that is formed through social connections and positive relationships (Abubakar et al., 2014). It is closely related to belongingness theory, as first posited by Baumeister and Leary (1995), which states that individuals develop meaningful relationships to experience a sense of belonging and consequently experience greater quality of life. Accordingly,

we propose that the use of an FP mobile app will support older adults to develop satisfying relationships with other people and health care professionals, to apply FP practices and experience social connectedness, a sense of belongingness and ultimately experience improved quality of life. Accordingly, we propose the following hypotheses (that will be tested in the next phase of our study and will be reported in our future publications):

H1. Using the proposed FP mobile app will enhance older adults' sense of belongingness.

H2. Experiencing a sense of belongingness will enhance older adults' autonomy and quality of life.

Sociocultural theory states that learning is a social process that occurs through conducting interactions or observing interactions (Lantolf, 1994). According to sociocultural theory, successful learning involves moving from object and other regulation to self-regulation that is positively linked to uptake of autonomy and improved quality of life. Object regulation is the stage at which learners start to learn by observing an object in a social environment. Another regulation stage is when learners learn by obtaining assistance and receiving feedback from peers or mentors in a social environment. The self-regulation stage is when a learner becomes competent enough to perform independently (Lantolf, 1994). We propose older adults who use the FP app will learn how to implement FP practices and will experience more autonomy and better quality of life. Accordingly, we propose the following hypotheses:

H3. The use of the FP mobile app will enhance older adults' learning about and performance of FP practices.

H4. Older adults who learn to perform FP practices will increase their autonomy and quality of life.

3 Research plan

This research will involve a mixed-methods approach.

3.1 Phase 1. Qualitative study

Before designing the framework for the app, we explored the FP practices suggested in the literature and identified modules that can facilitate their implementation for older adults (see section 2).

3.2 Phase 2. Qualitative study of older adults' opinions about the modules and content of the app

The user-centred design (UCD) approach will be applied to garner the insights and requirements of older adults regarding a smartphone health app that would facilitate FP practice implementation and increase their autonomy and quality of life.

3.2.1 Participants

Inclusion criteria: age ≥ 65 years, able to understand English, Australian residents.

Exclusion criteria: physically or mentally incapable of participating in the study (Having any medical condition that prevented adoption of moderate intensity physical activity and participating in workshops and focus groups). In March 2019, participants (20) will be recruited through clinician referral, chart review, advertisements in retirement villages and aged care facilities, flyers and posters, and advertisements in social media.

3.2.2 Ethical considerations

Informed consent will be obtained from participants before involving them in our research. Participants will be assured that their participation is voluntary, that they have the freedom to withdraw

from the study at any time without any unfavourable consequences and they will not be harmed because of their participation or non-participation in the study. All participants will receive a copy of plain language statement that clearly describes their rights. Data will be secured in the project database and will only be accessible by the research team.

3.2.3 Data collection procedure

We will conduct workshops and focus groups to identify users' insights into the modules of the app. Each workshop will last 1 hours and include a 5-minute introduction, individual brainstorming, prioritizing ideas, and sketching prototypes based on the ideas. The workshops will be audio and video recorded. All input (post-it notes, flip charts, prototypes, digital records) will be collected and categorized by theme.

3.2.4 Data analysis

Thematic analysis will be used to identify themes in the workshop transcripts and analyse the relationships between them. The analysis will comprise familiarisation with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report.

The final list of themes will be applied to update the proposed conceptual framework and modules of the app.

3.3 Phase 3. Qualitative study (Exploring professionals' insights on content provided in the proposed modules of the app)

This phase of the study will use a qualitative approach to identify and validate content for implementing FP practices that will be delivered through modules.

3.3.1 Participants

Health care professionals (4), aged care experts (4), fitness experts (2), nutritionists (2), social workers (3) and psychologists (3) age ≥ 25 to 70 years, Australian residents.

In June 2019 participants will be sought through mailing lists for research-interested clinicians, aged care community and services, Australian Centre for Public and Population Health Research at University of Technology Sydney and The University of Sydney School of Public Health.

3.3.2 Data collection and data analysis procedure

Content will be extracted from evidence-based materials available in the literature. Focus groups and interviews involving health care professionals, aged care experts, fitness experts, nutritionists, social workers and psychologists will be conducted to validate content. Thematic analysis will be applied to analyse the data. The final list of themes will be applied to develop an app prototype.

3.4 Phase 4. App development

A prototype app will be developed from the findings of previous phases by an IT expert at University of Technology Sydney and The University of Sydney

3.5 Phase 5. Quantitative study

The objective of this phase to determine the feasibility, usability and effectiveness of the prototype app. A 3-month, single-arm, prospective observational study will be conducted in Sydney-Australia.

3.5.1 Participants

In November 2019 participants (14) will be recruited via various methods including clinician referral, advertisements in retirement villages and aged care facilities, flyers and posters, and social media advertisements.

Participants who meet the eligibility criteria (age ≥ 65 years, able to understand English, Australian residents) will be invited to a community centre in Sydney. Their demographic information will be collected, and their level of autonomy and quality of life will be measured. Participants will be given a Bluetooth-enabled iPhone 5S with the app, and participants will be registered within the app. They will use the app for three months, and then will be invited back to the community centre for an evaluation of the feasibility, acceptability, usability, safety and effectiveness of the app. All evaluation sessions will take place in a quiet room at the research site with a moderator. The moderator will guide the participants through the testing procedure without intervening or disrupting the thinking process. Feasibility will be assessed by retention, defined as the proportion of enrolled participants who complete and adhere to the study protocol. A 5-item mobile phone usage and attitudes survey, adapted from the mobile phone domain of the Media and Technology Usage and Attitudes Scale, will be administered.

We will conduct survey to solicit responses from participants about the app's usefulness, variables related to user performance, determine the acceptance of the mobile app and its features in everyday health management, and any barriers to the use of the mobile app in the future. To assess their perceptions of usability the System Usability Scale (a robust and reliable scale consisting of a 10-item questionnaire with each item rated on a 5-point Likert scale) will be applied. Effectiveness measures will include changes in autonomy and quality of life, measured using the Older People's Quality of Life Questionnaire (OPQOL-35) and the Functional Independence Measure (We will apply scale twice, pre-using the app and after using the app).

3.5.2 Data analysis

Participant data will be analyzed using Stata statistical software (release 13, StataCorp LP). To estimate the statistical differences between the pre- and post-measurements in the intervention cohort, paired t-test and Wilcoxon matched pairs (signed-rank) test will be used for normally distributed and non-normally distributed continuous variables respectively.

4 Conclusion

The major outcome of this project will be the development of a mobile app that will help older people to learn how to reduce and prevent falls and experience improved autonomy and quality of life. The UCD approach will be used to identify and address end-user requirements and adjust system design and functionality to user's capabilities, needs, and expectations. This research will make significant theoretical and empirical contributions to our understanding of the benefits of technology interventions and smartphone health apps in aged care. It will add to a growing body of evidence supporting the use of mobile health technology for improving quality of life in older people. Most importantly, it should lead to substantial reductions in the number and severity of falls that older Australians experience, thereby reducing human suffering and healthcare costs.

References

- Abubakar, A., van de Vijver, F. J., Mazrui, L., Murugami, M., & Arasa, J. (2014). Connectedness and psychological well-being among adolescents of immigrant background in Kenya. In *Global perspectives on well-being in immigrant families* (pp. 95-111). Springer, New York, NY.
- Argent, R., Daly, A., & Caulfield, B. (2018). Patient Involvement With Home-Based Exercise Programs: Can Connected Health Interventions Influence Adherence? *JMIR mHealth and uHealth*, 6(3).
- Bakker, D., Kazantzis, N., Rickwood, D., & Rickard, N. (2016). Mental health smartphone apps: review and evidence-based recommendations for future developments. *JMIR Mental Health*, 3(1).
- Bandura, A. (2009). Social cognitive theory of mass communication. In *Media effects* (pp. 110-140). Routledge.
- Barassi, V. and Treré, E., (2012). Does Web 3.0 come after Web 2.0? Deconstructing theoretical assumptions through practice. *New media & society*, 14(8), pp.1269-1285.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public health reports*, 100(2), 126.
- Droller, H. (1955). Falls among elderly people living at home. *Geriatrics*, 10(5), 239.
- Ganz, D. A., Alkema, G. E., & Wu, S. (2008). It takes a village to prevent falls: reconceptualizing fall prevention and management for older adults. *Injury Prevention*, 14(4), 266-271.
- Gillespie, L. D., Robertson, M. C., Gillespie, W. J., Sherrington, C., Gates, S., Clemson, L. M., & Lamb, S. E. (2012). Interventions for preventing falls in older people living in the community. *Cochrane Database of Systematic Reviews*, (9).
- Ehn, M., Eriksson, L. C., Åkerberg, N., & Johansson, A. C. (2018). Activity monitors as support for older persons' physical activity in daily life: qualitative study of the users' experiences. *JMIR mHealth and uHealth*, 6(2).
- Erfani, S. S., Blount, Y., & Abedin, B. (2016). The influence of health-specific social network site use on the psychological well-being of cancer-affected people. *Journal of the American Medical Informatics Association*, 23(3), 467-476.
- Erfani, S. S., Abedin, B., & Blount, Y. (2017). The effect of social network site use on the psychological well-being of cancer patients. *Journal of the Association for Information Science and Technology*, 68(5), 1308-1322.
- Erfani, S. S., Lawrence, C., Abedin, B., Beydon, G., & Malimu, L. (2017). Indigenous people living with cancer; developing a mobile health app for improving their psychological well-being.

- Erfani, S. S., & Abedin, B. (2018). Impacts of the use of social network sites on users' psychological well-being: a systematic review. *Journal of the Association for Information Science and Technology*.
- Everett, E., Kane, B., Yoo, A., Dobs, A., & Mathioudakis, N. (2018). A novel approach for fully automated, personalized health coaching for adults with prediabetes: pilot clinical trial. *Journal of Medical Internet Research*, 20(2).
- Hong, Y., Pena-Purcell, N. C., & Ory, M. G. (2012). Outcomes of online support and resources for cancer survivors: a systematic literature review. *Patient Education and Counseling*, 86(3), 288-296.
- Lantolf, J.P. (1994). Sociocultural theory and second language learning: Introduction to the special issue. *Modern Language Journal*, 78(4), 418-420
- Kelders, S. M., Kok, R. N., Ossebaard, H. C., & Van Gemert-Pijnen, J. E. (2012). Persuasive system design does matter: a systematic review of adherence to web-based interventions. *Journal of Medical Internet Research*, 14(6).
- Laing, S. S., Silver, I. F., York, S., & Phelan, E. A. (2011). Fall prevention knowledge, attitude, and practices of community stakeholders and older adults. *Journal of aging research*, 2011.
- Leary, M. R., & Baumeister, R. F. (2017). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. In *Interpersonal Development* (pp. 57-89). Routledge.
- Markle-Reid, M. F., Dykeman, C. S., Reimer, H. D., Boratto, L. J., Goodall, C. E., & McGugan, J. L. (2015). Engaging community organizations in falls prevention for older adults: moving from research to action. *Canadian Journal of Public Health*, 106(4), 189-196.
- Pearson, J. C., Carmon, A., Tobola, C., & Fowler, M. (2010). Motives for communication: Why the millennial generation uses electronic devices. *Journal of the Communication, Speech & Theatre Association of North Dakota*, 22(1), 45-55.
- Quanbeck, A., Gustafson, D. H., Marsch, L. A., Chih, M. Y., Kornfield, R., McTavish, F., ... & Shah, D. V. (2018). Implementing a mobile health system to integrate the treatment of addiction into primary care: a hybrid implementation-effectiveness study. *Journal of medical Internet research*, 20(1).
- Stubbs, B., Brefka, S., & Denking, M. D. (2015). What works to prevent falls in community-dwelling older adults? Umbrella review of meta-analyses of randomized controlled trials. *Physical Therapy*, 95(8), 1095-1110.
- Steinhubl, S. R., Muse, E. D., & Topol, E. J. (2013). Can mobile health technologies transform health care?. *Jama*, 310(22), 2395-2396.
- Tee, J., & Kazantzis, N. (2011). Collaborative empiricism in cognitive therapy: A definition and theory for the relationship construct. *Clinical Psychology: Science and Practice*, 18(1), 47-61.
- World Health Organization. Geneva: World Health Organization; 2003. Adherence to long-term therapies: evidence for action URL: <http://apps.who.int/iris/bitstream/10665/42682/1/9241545992.pdf> [accessed 2018-10-12]