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Home Haemodialysis and Gamification – A new approach to information mediation

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Abstract

Chronic kidney failure (CKF) is a medical condition that is becoming more prevalent worldwide. Home haemodialysis (HHD) thereby presents a treatment option that can provide substantial benefits over other dialysis methods, for medical professionals as well as for patients. It contributes to better quality of life, can empower patients, and results in a lower mortality risk. Additionally, HHD is comparatively economical, compared to hospital treatment, and relieves the pressure on professional caregivers. Despite these advantages, patients do not choose this treatment due to several hindrances, mainly related to knowledge, attitude and skills. Among others, timely provision of clear information on treatment and its effects is necessary for informed decision making.

This article sets out to introduce gamification as a concept and tool in providing patients with information on HHD. After discussing the HHD information process and the concept of gamification in the first section, the second section investigates three cases of HHD information platforms in relation to existing possibilities and the potential for introducing gamification elements. Section three discusses benefits and disadvantages of gamification for HHD information. Section four describes potential impacts of gamification in information systems for healthcare and indicates possibilities. Section five summarizes the findings of this research and suggests topics of investigation. The results of this research aim to contribute to the development of better HHD information platforms for people with CKF, to allow them to make knowledgeable decisions.

Keywords: Home haemodialysis; gamification; information mediation; chronic kidney failure; design approach

Introduction

Western society faces an increasing number of chronically ill people, which is partly due to the growing population of elderly (Rørslett and Kolberg, 2014) and lifestyle related diseases (Smith *et al*, 1999). These circumstances challenge current healthcare systems. Reconsidering where care takes place can help to keep healthcare systems sustainable in future.

Chronic kidney failure (CKF) is one medical condition that is becoming more prevalent (Nierstichting, 2015) and for which home treatment is possible, if a patient is ineligible for kidney transplantation. Home haemodialysis (HHD) is a treatment method that has substantial benefits over other dialysis methods, for both medical professionals as patients. For patients, HHD results in a better quality of life (Chanouzas *et al*, 2012), it can empower them (Ageborg *et al*, 2005), and it results in a lower mortality risk (Curtin *et al*, 2004). Additionally, HHD is more economical than hospital treatment (Pike *et al*, 2013), and relieves the pressure on professional caregivers (Lehoux *et al*, 2004). Despite these advantages, patients do not choose this treatment due to several hindrances, mainly related to knowledge, attitude and skills (McLaughlin *et al*, 2003). Among others timely provision of clear information on treatment and its effects is necessary for informed decision making (Little *et al*, 2001).

The Norwegian Patients' Rights Act (Helse- og omsorgsdepartementet, 1999) states that patients have a right to be informed about their medical condition, the content of the health care, possible risks and side effects and to participate in treatment discussions. The provided information should be understandable for the individual patient. However, whether this is done properly for people with CKF is debated (Morton *et al*, 2010). Best practices for patient information platforms for people with CKF are not defined yet (Murray *et al*, 2009).

This paper examines three current patient information platforms in order to analyse their presentation of information concerning CKF. Further the paper discusses the possibility of enhancing the current patient information platforms by creating gameful experiences. The goal of this paper is to contribute to the development of better patient information platforms, and to facilitate decision-making of people with CKF and their relatives.

The concept of Gamification

Gamification is the design strategy of introducing game-elements into a non-game context (Deterding *et al*, 2011). Examples of game elements are challenges, levels, themes, badges, and leaderboards (Hamari *et al*, 2014). Health related gamified applications are becoming more prevalent and can be categorized into activities, e.g. preventive, therapeutic, assessment, educational and informative (Sawyer, 2008).

Virtual Conversations by Syandus is an example of a gamified application for patient education. By joining a virtual, personal support group, patients engage in a conversation related to their

informational and emotional challenges with their situation (Syandus, 2015). According to Fox (2009) interactive, computer-based patient education programs can increase interest and response among users, might positively influence health outcomes, can support medical professionals in patient education, and might reduce contact hours. Table 1 presents an overview of the advantages and disadvantages of the use of gamified computer-based programs for patient information platforms, compared to more traditional products such as folders, leaflets and consults with nurses.

Table 1. Advantages and disadvantages of gamification vs traditions patient information platforms

Advantages	Disadvantages
Freedom of use <ul style="list-style-type: none"> - Can be used at home - Can be used anytime - Adaptable to knowledge level - Adaptable to interests 	Less personal <ul style="list-style-type: none"> - Sick persons might rather interact with medical professionals - Sick persons like to be cared for - Less empathic than nurse - Does not work for everyone in every situation
Recall is stimulated <ul style="list-style-type: none"> - Multimedia techniques to represent data - Possibility for repetition - Enjoyment stimulates knowledge uptake - Engages users and holds their interest 	Information is limited <ul style="list-style-type: none"> - Data is represented in a simplified format - Uses extrinsic rewards to stimulate intrinsic motivation for learning -
Time reduction <ul style="list-style-type: none"> - Shorter consultation time needed - More focussed consults 	Time investment <ul style="list-style-type: none"> - More difficult to update with new info (program flow, experience might be affected)

The elements (Fox, 2009, Hamari *et al*, 2014) presented in table 1 can be considered for introduction of gamification on patient information platforms. In the following section, three current patient information platforms are presented and analysed.

Method

In order to allow for a discussion of the possibility of improving patient information platforms by use of gamification, the current status quo is explored by studying three platforms. The three platforms were evaluated with help of conventional content analysis (Hsieh and Shannon, 2005). The three selected platforms were considered most relevant in relation to predefined criteria.

1. Dianet is a non-profit expertise centre for renal replacement therapies. The organization strives to deliver optimal care that matches the lifestyle of the patient, by taking a personal approach in promoting health and quality of life for kidney patients. Dianet gives freedom of choice on treatment method by communicating medical, social and technical possibilities (Dianet, 2014).

2. Njurdagboken, «The Kidney diary», is a website facilitated by the Swedish Kidney association (Njurförbundet) and produced in collaboration with the Karolinska University Hospital and the University Hospital in Linköping. The website is intended for kidney patients and their relatives. The goal of the website is to make people feel more informed, capable, confident and motivated, and to encourage people to be involved in their care (Pagels *et al*, 2014).

3. Mine Behandlingsvalg «My treatment choice», is an online platform that focusses on enabling patient participation in treatment choice. The platform is developed by the University Hospital of North Norway and Takepart Media & Science. The platform is intended to build understanding of treatment options and to support assessment in relation to the patient's lifestyle (University hospital of North Norway, 2014).

Results

None of the three patient information platforms currently incorporate gamified elements and information is presented differently on each platform. To exemplify this, figure 1 shows the page with information on HHD of each of the three platforms, which is followed by a brief summary of the main characteristics of each page.

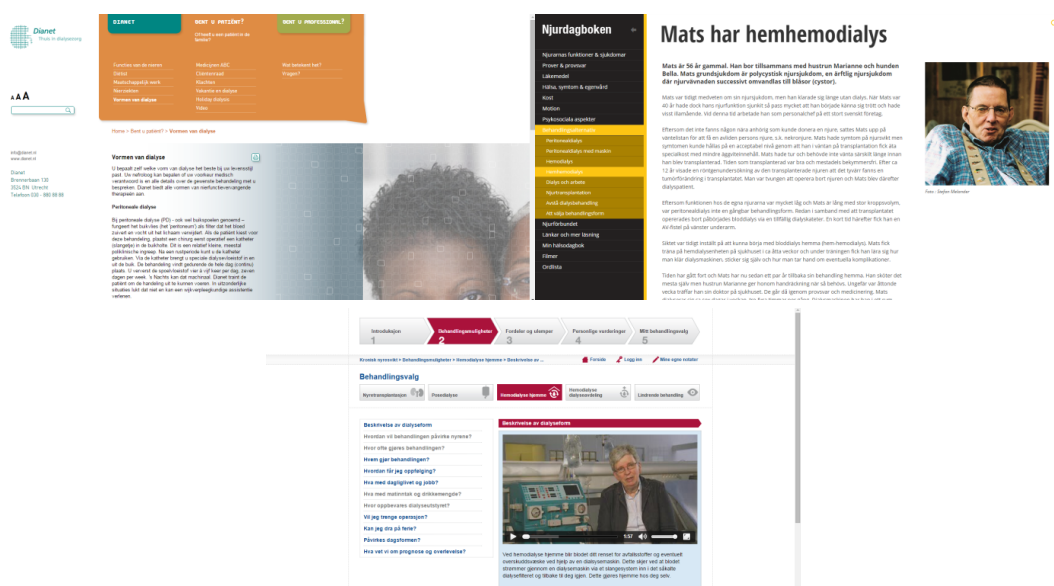


Figure 1: Homepages Dianet, Njurdagboken and Mine Behandlingsvalg

On Dianet information is mainly presented in text with a personal writing style. The website has a separate section with videos in which patients talk about their motivation to choose a specific treatment method or about their experiences with the treatment. Dianet is the only platform that

provides information about dialysis for children. The videos on this topic focus specifically on the parents, not on the children.

Njurdagboken uses personas (a written personal story of a patient) in which the motivation for selecting a specific treatment by the persona is mentioned, followed by a brief, formally written explanation of the treatment itself. Links to external webpages for further reading are sometimes included. On Njurdagboken a pdf-file can be downloaded. This is a diary for CKF patients which they can use to make a record of their medical condition.

Mine Behandlingsvalg use videos involving medical professionals and patients, and short texts with a personal style of writing. The patients talk openly about their experiences with the treatment. Additionally, it has a page with FAQs related to the different treatment methods. Mine behandlingsvalg is the only platform of the three that has an interactive element. After log-in one can evaluate the information about the treatment methods in relation to one's personal values and lifestyle as a means to support in treatment decision making. Furthermore, notes can be taken.

Discussion

Conventional content analysis is an appropriate method for obtaining knowledge and understanding of a phenomenon and describing it. However, this analysis method could fail in recognition of key categories. This can result in findings that do not accurately represent the data (Hsieh and Shannon, 2005). To omit this risk, the criteria were formulated separately by the authors and compared and reformulated afterwards. Conventional content analysis is similar to the initial analysis phase of Ground Theory, but it does not go as far as theory development. However, that theory formulation is not the intention of this paper.

The analysis showed that none of the platforms currently incorporates gamified elements. Yet, gamifying elements of patient information platforms can possibly lead to beneficiary outcomes, if implemented correctly (Allam *et al*, 2015).

Making use of interactive elements enables adaption of the platforms to eventual visual, auditory, memory and ambulatory hindrances, so that elderly can also make use of them (Fox, 2009). Regardless of age, people should be given the opportunity to choose the treatment method (Little *et al*, 2001) and with the larger part of the CKF population being elderly, design including this group is relevant. Additionally, personalisation can be realized more easily with a digital solution than with traditional paper leaflets.

Despite its advantages, gamified platforms can and should not replace the entire information service. People that deal with a serious illness should have the opportunity to discuss questions concerning their illness and treatment methods with a healthcare professional. Especially since gamification does not work for everyone in every situation (Hamari *et al*, 2014). Consequently,

other alternatives should also be accessible, even as gamification seems to be an effective alternative.

The authors see several possibilities for introduction of gamified elements to the current patient information platforms. The information on CKF and its possible physical and psychosocial effects could, for example, be communicated via an interactive story, where players go around in a virtual, animated world. The same goes for the discussion of different treatment methods and their consequences for diet, associated benefits and risks, and practicalities. This would change the information flow and involve the user more actively than is the case with the current platform designs.

Regarding the explanation of the process, users could for example 'try' each treatment on a virtual patient, so they can learn how a treatment is executed and which aspects need to be considered. Such a game-like exercise could possibly raise insight into the effects on their daily practises with a specific treatment. Another possibility is to redesign the decision support tool that is used in Mine Behandlingsvalg. This is now based on questions that need to be answered by the user, but one could also think of representing similar questions in a quiz-like setting or let users evaluate treatment methods by allocating points to aspects of each treatment.

The downloadable pdf-file on Njurdagboken, which is a diary on the medical condition for CKF patients, can be made more attractive by transferring it to an online platform and including game-elements. It consists of tables that patients can fill out and they can make notes below. If transferred to an online environment, these tables can be translated to graphs, in which one could indicate goals, for example.

Conclusion

The increasing number of chronically ill people challenge the healthcare system. HHD is a treatment method for CKF that has multiple benefits for both patients and medical professionals. However, choosing self-care can be a difficult decision due to hindrances related to knowledge, attitude and skills (McLaughlin *et al*, 2003). A patient information platform can be an important stepping-stone in overcoming these barriers (Pipkin *et al*, 2010).

Gamification has the advantage over plain information supply in that it engages users and motivates their participation (Hamari *et al*, 2014). Therefore, it is assumed that by gamifying elements, knowledge intake by patients is stimulated. Based on this literature study, the idea of introducing gamification seems promising. However, more research and development would be beneficial too adapt the gamification elements to these specific users groups (Allam *et al*, 2015). Before a gamified information platform can successfully be introduced, topics such as HHD follow up by healthcare professionals are important

issues that need consideration. Furthermore, attention must be paid to the storage of probable private data.

This paper has given an introduction of the potential impact of implementing gamified elements in patient information platforms. Results are meant to contribute to the development of better information platforms for patients and their relatives. This is important, since no matter which treatment option the patient chooses, it will have a significant impact on their life, as well as on the lives of their family.

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