Schizophrenia Research 168 (2015) 514–522

Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres

Mobile phone text message reminders: Measuring preferences of people with antipsychotic medication

Kaisa Kauppi [a,*], Kati A. Kannisto [a,b], Heli Hätönen [a], Minna Anttila [a], Eliisa Löyttyniemi [c], Clive E. Adams [d], Maritta Välimäki [a,e]

[a] Department of Nursing Science, University of Turku, Turku, Finland
[b] Satakunta Hospital District, Pori, Finland
[c] Department of Biostatistics, University of Turku, Turku, Finland
[d] Institute of Mental Health, Division of Psychiatry and Applied Psychology, University of Nottingham, United Kingdom
[e] Turku University Hospital, Turku, Finland

ARTICLE INFO

Article history:
Received 30 January 2015
Received in revised form 10 June 2015
Accepted 24 July 2015
Available online 17 August 2015

Keywords:
Mobile phone
Text message
Reminder
Psychosis
Preference
Sub-sample

ABSTRACT

Mobile technology use, including Short Messaging Service (SMS) text messaging, has increased in health care services. Preferences regarding the type or timing of text messages sent by healthcare providers to people with antipsychotic medication have not yet been fully investigated. This study examines the relationship between patients' demographic characteristics and the tailored messages they select. The study ("Mobile.Net", ISRCTN: 27704027) includes a structured analysis of a random sub-sample of participants who received messages for 12 months. The data were collected in 24 sites and 45 psychiatric hospitals in Finland and analyzed with descriptive statistics and Poisson regression models. The study sample involved 562 people on antipsychotic medication, and a total of 2 112 text messages (2 to 25 monthly) were analysed. Regarding message content, there was no significant variation in the proportions relating to 'medication', 'treatment appointments' or 'free time'. Monday was the most popular day to receive messages and morning was preferred to later in the day. Age was most closely associated with 'number of messages' and 'time of messages'. Older women and younger men preferred higher numbers of messages ($p = 0.0031$). Participants preferred positive, encouraging and slightly humorous messages. The findings suggest that messages may be acceptable for difficult to access groups in follow-up. This type of intervention may be useful for various types of patients especially for younger males. To further support the evidence about factors related to message utilization and use, it is important to evaluate the effectiveness of text messages in psychiatric care.

1. Introduction

Treatment of people with serious mental health problems may not always run smoothly (Gibson et al., 2013). For example, half of those suffering from schizophrenia do not take medication as needed (Goff et al., 2010) and 40% miss their health care appointments (Killaspy et al., 2000). A lack of adherence may lead to poor health outcomes (Lindenmayer et al., 2009), repeated hospitalizations (Morken et al., 2008) and increased costs of health care (Ascher-Svanum et al., 2010). According to Finnish statistics, the average duration of psychiatric hospitalization was 36 days in 2013 (NIHW, 2015). Illness may also cause emotional burdens for patients (Novick et al., 2010) and their families (Papastavrou et al., 2010; Chan, 2011).

Demographic characteristics of patients can be a predictor of adherence or nonadherence to medication (Kane et al., 2013; Wheeler et al., 2014), although results are conflicting. For example, an older person may stick to a medication regimen more consistently than a younger person (Rolnick et al., 2013), although adherence may decrease after the age of 70 (Krueger et al., 2005). Furthermore, a lack of social support or the existence of memory problems may decrease treatment adherence with age (Wheeler et al., 2014). Neither gender nor marital status has been found to influence medication adherence (Krueger et al., 2005) or appointment non-attendance (Zeber et al., 2009).

Modern information technology, such as the use of text message services (Short Message Service or SMS), is a promising tool to support patient adherence (Foreman et al., 2012; Granholm et al., 2012; Branson et al., 2013). Mobile phones are acceptable (Alvarez-Jimenez et al., 2014), easy to use (Nundy et al., 2013), cost effective (Sims et al., 2012), have a low-start-up investment (Kaplan, 2006), and are widely accessible (Chen et al., 2008; OECD, 2012). Globally, penetration of mobile phones is almost 100% (ITU, 2013), and 6.1 trillion SMS-messages are sent every year (ITU, 2010). Around 83% of adults own a mobile telephone and 73% send text messages regularly. The most active message users are young adults: 95% of 18–29 year olds sent and 87.7% received messages daily (Smith, 2011). Rates of mobile phone use among people

* Corresponding author at: Department of Nursing Science, University of Turku, Lemminkäisenkatu 1, Turku, 20014, Finland.

http://dx.doi.org/10.1016/j.schres.2015.07.044
0920-9964/

with severe mental illnesses vary from 73% (Miller et al., 2014) to almost 100% (Ennis et al., 2012), text messaging being the second most popular communication mode right after calling (Proudfoot et al., 2010). Women seem to be less confident when using mobile phones than men (Ennis et al., 2012).

Although text messaging has already been used in treatments in a variety of fields of health care (Klasnja and Pratt, 2012), it has been less frequently implemented in psychiatric services, especially with people having serious mental health problems (Harrison et al., 2011). Messaging has been used as a reminder for daily medication (Granholm et al., 2012; Montes et al., 2012), follow-up visits, daily life goals (Pijnenborg et al., 2010), or to improve appointment attendance (Sims et al., 2012; Branson et al., 2013). Montes et al. (2012) evaluated message use among patients with schizophrenia and concluded that it is a promising method in supporting medication compliance. Ainsworth et al. (2013) also suggest that messages could be used in monitoring and assessing psychotic symptoms. It has been shown that, in terms of the style and content of messages, patients without mental health problems seem to prefer positive, short (Gold et al., 2010), encouraging, and motivational messages (Bock et al., 2013). However, there is a lack of corresponding research regarding patients with antipsychotic medication.

Patients' daily routines vary (Strandbygaard et al., 2010) as do factors related to adherence to care. Therefore, there is a need for individually tailored approaches to increase adherence (Barkhof et al., 2012). There are some preliminary but promising results of tailored approaches compared with generic methods and interventions without tailored content (Wangberg et al., 2011; Marcano Belisario et al., 2012). Despite these favorable results, it is still unknown what kind of text messages and topics people with serious mental health problems would actually encourage adherence to treatment (Kannisto et al., 2014). In addition there is a lack of knowledge in patients' preferences of types of text messages over time and more research is needed. It is important to evaluate whether preferences vary over time, since people with serious mental illness, like schizophrenia can be inconsistent in their preferences (Gard et al., 2011; Strauss et al., 2011). On the other hand, it has been shown that people with serious mental illness are able to make requests and express their preferences about their treatment (Farrelly et al., 2014).

In the context of a randomized trial to evaluate the impact of tailored text messages to encourage patient adherence to medication and outpatient care for patients with psychosis ("Mobile.Net", ISRCTN: 27704027) (Välimäki et al., 2012), a structured analysis for a sub-sample of the participants was undertaken. Participants were from a wide geographical area in Finland; 14 out of the 21 hospital districts in the country as well as four cities providing psychiatric care were represented. In addition to treatment as usual, participants in the intervention group ($n = 569$) received semiautomatic text messages for 12 months, starting from the point of hospital discharge. They were able to select the messages they would receive, according to their preferences, from a diverse list of prefabricated messages ($n = 85$). To ensure a patient-centered approach, the intervention and content of the messages were designed in collaboration with users (Aggarwal, 2012) in focus-group interviews for patients and health care providers (a more detailed description is reported elsewhere (Kauppi et al., 2015)).

The development of the messages followed specific principles. First, the content of the messages were kept short enough to fit into one message (maximum of 160 characters). Second, no pictures or videos were included to ensure that less advanced mobile phones with only basic features could be used (Klasnja and Pratt, 2012). Third, messages were designed to have a positive tone and consist of supportive and slightly humorous content (Gold et al., 2010) (Curioso et al., 2009). This development process resulted in a large variety of text messages from which patients could select their preferences, ensuring that the content of the messages would be especially suitable for this patient group. The novelty of this study is in its large sample size. To our knowledge, this is the largest study that has focused on text messages and patients with serious mental health problems.

Patient satisfaction is a significant aspect within the field of health care (Gill and White, 2009). A patient's perception of text message reminders influences their acceptance of the message system and its integration into everyday life (Vervloet et al., 2012). Therefore, our major aim was to gain a deeper understanding of mediators for the relationship between participants' demographic characteristics and the messages selected by patients with antipsychotic medication. As part of our trial, we first explored what kind of messages patients selected. Second, we investigated how often and when patients wanted to receive these messages. Third, we tested how patients' sociodemographic information was associated to the amount of monthly messages and timing of the messages. Finally, we evaluated how patients' preferences changed over time. This analysis serves as a fidelity measure to support a later assessment of how intervention works and to gain knowledge of how intervention could be better in the future (Catwell and Sheikh, 2009).

2. Methods

2.1. Study population and patients

An analysis was performed of 569 patients with psychosis ("Mobile.Net", ISRCTN: 27704027) (Välimäki et al., 2012). Participants were randomized using a computer generated four-block random design and sealed envelopes, and written consent was given before participation. As listed in the protocol, eligibility criteria included being 18–65 years of age and having continuing antipsychotic medication (WHO, 2011). Patients admitted into psychiatric hospital wards are most often patients with depression (29%) and schizophrenia (22%), and 46% of all hospitalized patients use neuroleptic medication (NIHW, 2015). For our study, we selected participants who were close to being discharged from a psychiatric hospital (the discharge day had been agreed), who had a mobile phone, sufficient Finnish language skills and the ability and willingness to provide informed consent.

Both forensic patients and those involved in a non-acute treatment period (respite care) were excluded. Patients in forensic care were excluded because of the highly juridical nature of the treatment. For example, their treatment differs from general psychiatry regarding their outpatient care, known as a monitored outpatient period, which is a part of juridical involuntary treatment (NIHW, 2015). In addition, due to the highly vulnerable nature of forensic patients (McDermott et al., 2005), ethical issues are of most importance when considering recruiting these patients into a research study (Munthe et al., 2010). If the study does not directly benefit patients' health, their participation should be considered carefully (Medical Research Act 488/1999). Patients in respite care were also excluded because we wanted to be aware of to what extent patients were readmitted into a psychiatric hospital due to a relapse (Välimäki et al., 2012).

Out of 569 patients, seven were later excluded; two did not give informed consent, one refused to participate after giving consent but before the selection of messages, three did not fulfill inclusion criteria (cancelation of patient discharge), and one was allocated to the wrong study group by mistake. Participation was voluntary without compensation. Demographic characteristics are presented in Table 1.

2.2. Instrument and data collection

Messages were selected by participants allocated to the intervention group between September 2011 and November 2012. During a discharge process at the hospital, patients were advised to select their preferred messages from a paper booklet. The selection included a wide