

The patient journey application in hip and knee arthroplasty – Providing important information at the right time

Eberhard von Rottkay MD, MA^{a, b}, Viktor Wesselsky MD^a, Ulrich Nöth MD, MHBA^a

^a Department of Orthopaedic and Trauma Surgery, Evangelisches Waldkrankenhaus Spandau, Stadtrandstraße 555, 13589, Berlin, Germany

^b Department of Sports medicine, Helios Klinikum Bad Saarow

Correspondance to:
Eberhard von Rottkay, MD MA MBA
Pieskower Str. 33
15526 Bad Saarow
Germany

Mail: eberhard.von-rottkey@helios-gesundheit.de Phone: 00493363173413 Fax:

00493363173312

This study was conducted in accordance with the Declaration of Helsinki (1964).

Abstract

Purpose: The aim of this study was to evaluate the use of an information application (PatientJourney App®) designed for patients undergoing total hip and knee arthroplasty.

Methods: Between November 2017 and January 2018 a total of 329 patients underwent primary total hip and knee arthroplasty. A survey was initiated to assess the practicality of the App. The

quality of provided information, user satisfaction and the serviceability were documented pre- and post surgery by using an app survey and a questionnaire consisting of 10 items.

Results: We recruited a total of 189 patients (48.2%) to take part in the survey of which 99 (52.4%) patients were in possession of a smartphone. Seventy-three (38.7%) survey participants used apps on their

smartphone and 36 (19%) used our EndoApp to retrieve further information. Nineteen (26.0%) patients regularly used just one app daily. Twenty-three patients (31.5%) regularly used two or three apps while 22 (30.1%) patients used four to six apps a day. Just nine (12.3%) patients used more than seven apps daily. The apps mostly used were related to navigation, entertainment and gaming. Fifty-six (76.7%) smartphone users got in contact with and were informed about the EndoApp during their initial consultation. The In-App Evaluation showed that 33 users (91.7%) gained a better understanding of their treatment by using the EndoApp. Thirty-one (86.1%) felt generally better informed when using the app and all 36 (100%) patients would recommend the app.

The app chapter mostly used pertained to recommend exercises at home (36 patients, 100%) followed by recommendations for the first three postoperative months (32 patients, 88.8%) patients.

Sixty-three (49.3%) patients strongly agreed that the app is useful in addition to the information provides by the doctor. Fifty (38.8%) patients strongly agreed that the app provides enough information to be well prepared for surgery, and 67 (52.3%) patients strongly agreed the app provides comfort and trust as all relevant information are accessible anywhere and anytime. Sixty-eight (52.8%) patients strongly agreed on the push messages to be a useful reminder.

The question of how information was provided was answered by 68 patients. Twenty-eight (77.1%) patients wanted a combination of print and digital information.

Conclusion: In summary our short-term results show a strong increase of information dissemination and - as an effect - a high patient satisfaction and benefit mediated by the app.

Key words: Fast track, smartphone, arthroplasty, application, hip, knee

1. Introduction

Multimedia communication, the availability of information and its retrieval has become increasingly important in the health system [1, 2]. As a result a variety of medical and health related applications (apps) are available. In 2007, the Mobile Health Market Report estimated that 500 million people would use medical apps by 2015 [3].

There is a considerable demand for detailed information regarding elective orthopaedic surgeries. Smartphone apps have been advocated as the contemporary modality to convey such information [3]. In order to meet the requirements of a modern information policy and to provide patients an opportunity to get thoroughly informed regarding their disease, treatment options, the course of treatment and the hospital, our department has released a smartphone app for patients undergoing total knee and hip replacement (EndoApp). The EndoApp was designed to serve as a patient guide

from the time point of surgical indication to postoperative rehabilitation.

The present study aimed to quantify the frequency of use, the information gain and the practicality of a hospital-specific app. The most commonly used information was assessed in order to be able to offer tailored and targeted support for the patient.

2. Materials and methods

Between November 2017 and January 2018 a number of 392 patients underwent total hip and knee arthroplasty of which 189 patients took part in the initiated survey. The inclusion criteria were osteoarthritis of the hip or knee, an elective surgery and the use of the information app.

The Patient Journey App® (Interactive Studios©, Amsterdam Netherlands) was adapted to meet the requirements of the Rapid Recovery program (Zimmer Biomet) and individualized for the orthopaedic department of our clinic.

Rapid Recovery is an innovative fast track program for hip and knee patients having

joint replacement surgery. A central aspect of this program is to prepare the patient for the operation with as much information as possible.

One way to drive patient education relies on apps. The app applied in the present study describes the treatment pathway in detail. It introduces all departments of the clinic that are involved in the treatment and care of a patient undergoing knee or hip arthroplasty. The app provides general information on the disease of osteoarthritis also depicting conservative and surgical treatment options. In addition, the different joint replacement procedures and their indications are explained.

The patient gets introduced to the nursing staff of the ward and the surgical team while important information about the surgery and other procedures that take place during the stay in hospital such as blood collection, radiography etc. is provided. Push messages represent another feature of the EndoApp and remind the patient about important facts and/or treatment steps (medication, blood

collection, clinical examination etc.). This information flow is structured in form of a chronological timeline to ensure the patients to be always up to date and appropriately informed.

It also includes an evaluation tool consisting of two questionnaires (pre- and postoperative). The objective of the EndoApp is to involve the patient as an active part in his/her treatment and disease process serving as a tutor along the different treatment stages starting at the first consultation ending with rehabilitation. The EndoApp is free of charge and available for OS and Android based smartphones in online app stores. Prior to surgery, patients get informed about the app via the clinic homepage, a provided flyer or during consultation in the outpatient department.

For privacy protection, there is no necessity to provide personal data. To enter the date of surgery is sufficient to receive push messages containing the relevant information.

The use of the EndoApp was additionally evaluated using a specially developed questionnaire. The survey consisted of 10 questions and was handed out to all patients undergoing total hip and knee arthroplasty. It comprised of two parts, a general part, which included questions about smartphone usage, demographic information such as age, gender, race and the socioeconomic status, and an app related part. Patients received a survey the day before demission and could return the completed surveys to the clinic staff or anonymously at the front desk at discharge. All surveys were anonymous and voluntary, and no monetary incentive was provided for survey completion.

3. Results

Between November 2017 and January 2018 392 primary hip and knee replacement surgeries were performed at our department. We could recruit 189 patients to take part in the survey representing a response rate of 48.2%. In 59.8% survey participants were female while 40.2% were

male. The participants had an average age of 69.6 years.

Results of the questionnaire

A total of 99 patients (52.4%) were in possession of a smartphone and 73 (38.6%) of these generally used apps on their smartphone. The other 26 (13.7%) subjects used their smartphone for phone calls only (Figure 1A).

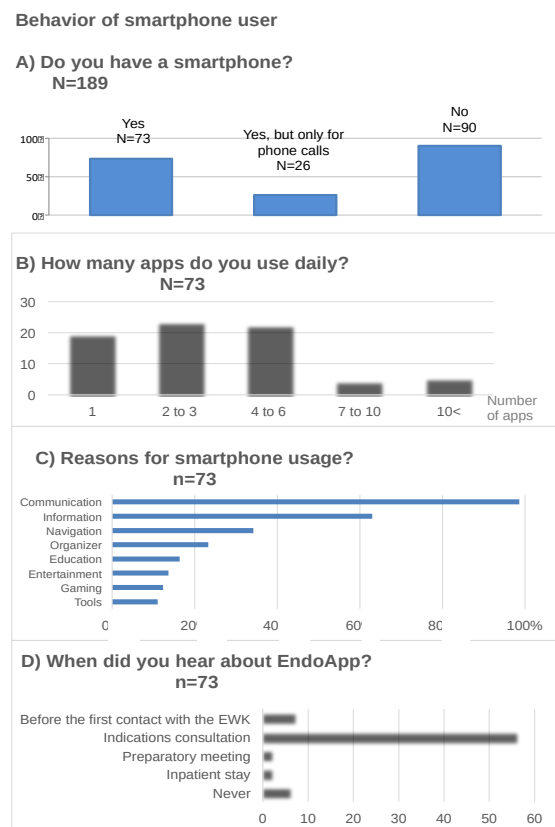


Figure 1: General information on the use of smartphones within the cohort under investigation depicting the percentage of people in possession of a smartphone (A), the number of apps used daily (B) general reasons for smartphone usage (C), and first contact with the EndoApp (D)

Taking a look at the general use of smartphone apps a total of 19 (26.0%) patients reported to use one a day whereas 23 (31.5%) patients used two or three apps daily. Twenty-two (30.1%) patients used four to six apps daily, 4 (5.5%) patients used seven to 10 apps and 5 (6.7%) patients used more than 10 apps daily (Figure 1B).

The majority of the smartphone owners (98.6%) used their electronic devices for overall communication and 63% for informative purposes. Furthermore, 34.2% of the patients used their phones for navigational tasks, 23.3% as an organizer, 16.4% for education, 13.7% for entertainment, 12.3% for gaming and 11.0% as a tool for other purposes (Figure 1C).

Of the 73 smartphone users who downloaded the EndoApp, 56 (76.7%) reported to have gained knowledge of the app during the preoperative consultation in the outpatient department. Seven patients (9.6%) already had heard of the app prior to their first contact with our

department, six (8.2%) did not remember hearing about the app at all, and two (3%) were informed about the app during their admission interview, another two (2.7%) during their stay in hospital (Figure 1D).

In-App Evaluation

Overall, 33 out of 36 (91.7%) EndoApp users strongly agreed that the app helps to better understand the treatment while three users (8.3%) stated not to benefit from the app at all.

The EndoApp's level of information was assessed by 31 patients with "strongly agree" (86.1%), by four (11.1%) with "agree" and one individual (2.8%) found it "neutral". All users would recommend the EndoApp, however (Figure 2A).

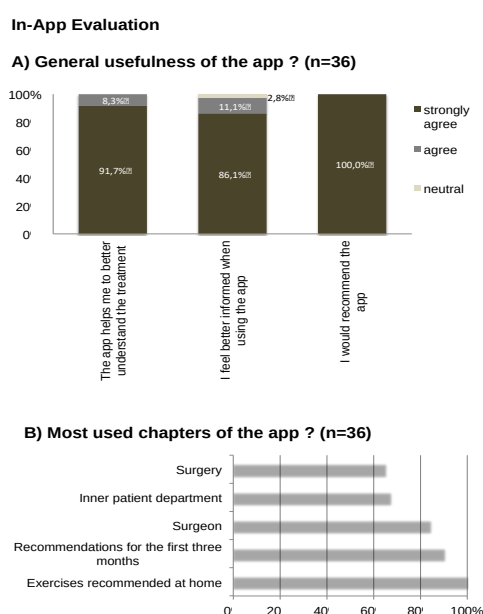


Figure 2: Outcomes of the in-app evaluation concerning patients' increase in knowledge and information related to their disease (A), most relevant app subdivisions (B), and the apps general usefulness (C, D).

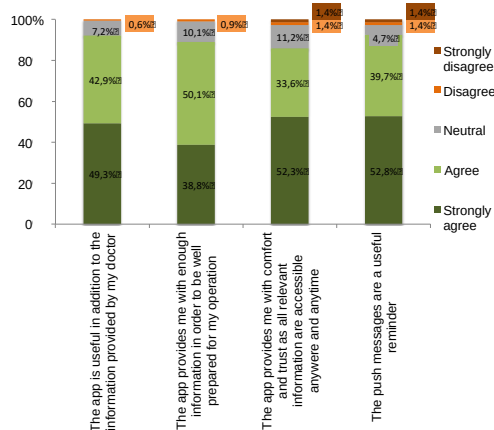
The most frequently used chapter of the EndoApp related to exercises recommended for at home (100%), followed by advises for the first three months after surgery (88.8%), details on the department's surgeons (83.3%), about the procedures in the in-patient department (66.7%) and 63.8% collected information about the surgery (Figure 2B).

The app integrated questionnaire was completed by all surveyed users (n=129) 111 (86%) of which reported to be the actual patient, while 18 (14%) were relatives or friends of the treated patients. Sixty-three patients (49,3%) strongly agreed on the additional usefulness of the app apart from the information provided by the treating doctor, 55 agreed (42.9%), 9 felt neutral (7.2%) and one disagreed (0.6%). Fifty patients (38.8%) strongly agreed that the app provides sufficient information to be well prepared for surgery, sixty-six patients agreed (50.1%), 12 felt neutral (10.1%) and one disagreed (0.9%). Sixty-seven patients strongly agreed (52.3%) on the app to provide comfort and trust as all relevant information is accessible anywhere and anytime, 43 individuals (33.6%) agreed, 14 felt neutral (11.2%), two disagreed and two strongly disagreed (1.4%).

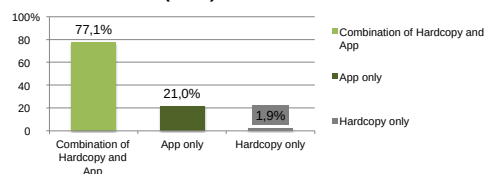
It was strongly agreed that the push messages represent a useful reminder (68 patients, 52.8%), 51 individuals agreed (39.7%), six felt neutral (4.7%) two

disagreed or strongly disagreed (1.4%)(Figure 2C).

C) Providing of the information ? (n=129)



D) Which way of information are preferred ? (n=68)



The personal preference concerning the mode of how information is provided was a combination of app and hardcopy in 50 out of 68 cases (77.1%). For 16 (21.0%) users app-supported information retrieval only was sufficient, two (1.9%) users preferred a sole hard copy (Figure 2D).

4. Discussion

Multimedia communication and online access to information become increasingly

important. Numerous medical apps (for diagnosing, treating or alleviating illnesses) and health related apps (e.g. for prevention and health monitoring) are currently available in respective online stores.

Internet use to access health information has become common in the modern era of the “e-patient.” In a study of Dattilo et al. 80% of patients reported to have access to the internet at home [1]. The availability of internet among our orthopaedic patients is slightly higher - as expected - due to an increased web usage nowadays. As a result, the use of apps in everyday life is constantly increasing [2] [4] [5] [6] [7].

In Germany, there are about 9000 health apps available that inform patients about health issues or support them over the course of a medical condition and treatment [6]. The major aim of these apps is to increase patient satisfaction and actively involve patients in their health care [1] [8].

The objective of the present study was to investigate whether the offer of a patient

information app is generally accepted and found useful/supportive thereby increasing patient satisfaction during treatment.

The 189 patients surveyed were in an age group that corresponds with the German average of patients undergoing hip or knee replacement surgery [9]. In total, 99 (52.4%) patients used a smartphone, a number that is slightly lower compared to the results of Smith et al. (64%) [2].

Among the smartphone owners, however, the use of smartphones to obtain information was equally 60% [2]. Satisfaction about the information gained and the associated independence and empowerment were calculated to be 86.9% and 88.2%, respectively. These values are higher compared to the results of Dattilo et al. who reported rates of 73%. User friendliness was also rated very high with 96.9%. That figure lies significantly above reported values in the literature [1].

As representative for a modern society 23.7% of patients prefer to obtain relevant information on their disease and the

further course treatment via an app. The majority (77.1%), however, asks for both electronically available and printed versions of info material, whereas 1.9% favour hard copies only. This observation is consistent with the results of a study by Rasche et al. who examined the habits of the elderly that were shown to use health apps on a daily basis [7].

The current study has several limitations. First, it is a single center study and therefore susceptible to flaws and bias in data acquisition and collection. However, data was prospectively collected and all patients were given the opportunity to complete the survey. This minimizes the risk of sampling bias. Second, this study was conducted in an urban hospital and thus generalizability and transfer to alternate settings may be limited. As the surveys were distributed during the clinic visit, we also limited the length to two pages to avoid delays in the daily clinical care. The survey outcome might therefore be less representative than outcomes of other study types like focus groups, which

allow follow-up questions for further clarification.

5. Conclusion

Patients seem to benefit from the EndoApp as the associated gain in knowledge results in a peace of mind actively involving the patient during the course of treatment and rehabilitation. Furthermore such apps allow direct communication to evaluate the treatment as well as the app. The app thus results in a general "patient empowerment".

The introduction of patient apps and the active integration of patients in their therapy are also accompanied by advantages for the clinic. Well-informed patients result in more efficient

counselling situations and increased patient satisfaction. Moreover, the acquired data can be used for quality management purposes.

In the near future, more and more apps will serve as medical devices and will increasingly influence everyday medical practice [4]. Even presently, patients rate the use of an app as a positive support in their disease management enhancing their role as an active partner during their course of treatment. The use of an individualized app by a hospital provides the opportunity to transmit specific informative contents and also supports patient loyalty.

6. Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

7. Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article

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