



Original Research

“Let the patient decide” – Person-centered postoperative follow-up contacts, initiated via a phone app after day surgery: Secondary analysis of a randomized controlled trial

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ABSTRACT

Background: Patients undergoing day surgery are expected to manage their recovery on their own. Follow-up routines differ, but many patients have expressed a need for more professional support during recovery. The aim of this study was to describe how many follow-up contacts were initiated, and when and why, via a digital solution. Also, we wanted to compare postoperative recovery and characteristics between patients requesting, and patients not requesting, contact.

Materials and methods: This was a secondary analysis of a multicenter, two-group, parallel randomized controlled trial. Participants used a digital solution called “Recovery Assessment by Phone Points (RAPP)” for initiating follow-up contacts after day surgery. The quality of postoperative recovery was measured with the Swedish web-version of Quality of Recovery.

Results: Of 494 patients, 84 (17%) initiated contact via RAPP. The most common reasons for initiating contact were related to the surgical wound and pain. Contacts were initiated across the 14-day assessment period, with 62% (62/100) in the first postoperative week. The RAPP contact group had significantly poorer postoperative recovery on days 1–14 compared to those not requesting contact via RAPP ($p < 0.001$). There was a significantly higher proportion of patients who had undergone general anesthesia in the RAPP contact group (85% [71/84]) compared to the non-RAPP contact group (71% [291/410]), $p = 0.003$.

Conclusion: Letting the patient decide him/herself whether, and when, contact and support is needed during the postoperative period, is possible and does not increase the frequency of contacts. This study investigates a digital solution, RAPP, as one example of a person-centered approach that can be implemented in day surgery follow-up.

1. Introduction

During the past few decades day surgical procedures have expanded [1,2]. After discharge from the day surgery unit, patients are expected to manage their own postoperative recovery [3–5]. Routines for follow-up after day surgery in Europe vary. The most common routine is to perform a follow-up call on one of the first postoperative days (PODs) to all patients or to specific groups of patients. However, many day surgery units lack a routine for systematic follow-up [6–8]. Patients have expressed that they find it hard to get in contact with health care for professional support [4,9–11] as well as feelings of being abandoned after discharge [12]. There is no consensus on when a follow-up call should be performed [13], and the patient is his or her own expert and

should be treated as an equal partner and be involved in his/her health decision making [14].

Against this backdrop, a digital solution, called “Recovery Assessment by Phone Points (RAPP),” has been developed with the aim of empowering patients in their postoperative recovery. This is a novel digital solution with a person-centered approach, allowing the patient to be in charge of whether, and when, a follow-up contact with the day surgery unit is needed [13].

The aim of this study was to investigate, in a patient population discharged from day surgery, when and why RAPP contacts were initiated, as well as number of contacts initiated. Also, we wanted to compare postoperative recovery and characteristics between patients requesting contact and patients not requesting contact via the RAPP.

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2. Materials and Methods

2.1. Study design, setting, and sample selection

This was a secondary analysis of a prospective follow-up study in a multicenter, two-group, parallel, randomized controlled trial with the primary outcome of evaluating RAPP regarding its cost-effectiveness [15]. The patients were randomly allocated to the intervention group (provided with the RAPP app for follow-up after day surgery including no changes regarding follow-up appointments) or control group (provided with standard information regarding postoperative recovery, i.e., standard care that was routine at the specific day surgery unit including no changes regarding follow-up appointments). The work has been reported in line with Consolidated Standards of Reporting Trials (CONSORT) Guidelines.

The present study included only patients allocated to the intervention group because initiating contact via RAPP was only possible in those who received the intervention. The study was approved by the Ethical Review Board in Uppsala, Sweden (reference number: 2015/262), and registered in Clinicaltrials.gov (NCT02492191). Randomization was performed using sealed envelopes with computerized random numbers in permuted blocks, and stratified by center. At each center a research nurse was responsible for inclusion of participants [15]. Data collection was performed from October 2015 to July 2016 at four day surgery units in Sweden. Inclusion criteria were: having undergone day surgery; > 17 years of age; ability to understand spoken and written Swedish; access to a smartphone; and allocation to the intervention group in the main study. Exclusion criteria were: visual impairment; alcohol and/or drug abuse; cognitive impairment; and having undergone surgical abortion.

2.2. Recovery Assessment by Phone Points

To enable an easy way to get in contact with a nurse at the day surgery unit, the RAPP app includes the question: *Do you want to be contacted by a nurse?* If a patient has answered *Yes*, he or she will receive a follow-up call within 24 h on weekdays. This possibility to initiate contact was possible daily for 14 days [11,13]. The RAPP also includes a psychometrically evaluated questionnaire called the “Swedish Web version of Quality of Recovery (SwQoR)” assessing postoperative recovery [16] and discussed below.

2.3. Outcomes

The number of contacts initiated via RAPP and reasons for contacts were documented at all four day surgery units. Postoperative recovery was assessed daily for 14 days with the SwQoR. This questionnaire includes 24 items assessing postoperative symptoms such as pain, nausea, anxiety, sore throat, sleeping difficulties, and is scored on an 11-point numeric visual analog scale, from 0 = none of the time, to 10 = all of the time. The SwQoR has a possible total score of 0 = excellent quality of postoperative recovery, to 240 = extremely poor quality of recovery, with cutoff values of < 31 at day 7 and < 21 at day 14 indicating good recovery [17]. Baseline data, such as age, gender, American Society of Anesthesiologists (ASA) class, type and length of surgery, and type of anesthesia, was collected from the medical records.

2.4. Data collection

Before discharge from the day surgery unit, the patients were assisted by a research nurse to download the RAPP onto their own cell-phone and were trained in how to use and navigate RAPP. All patients received contact information in case of need for help after hours. The follow-up calls that were requested via RAPP were performed by the registered nurse (RN) working at the day surgery unit. All day surgery

units documented the contact reason in a research protocol. In addition, one unit also chose to document what type of advice was given and whether the RAPP contacts differed from routine follow-up calls.

2.5. Statistical analyses

Data is presented as frequency, percent, mean, and standard deviation (SD) as appropriate. Reasons for requesting a follow-up via RAPP, and on what POD the participant wanted contact, were analyzed with descriptive statistics. Differences between the groups were analyzed regarding postoperative recovery, type of surgery, type of anesthesia, age, and gender. The data was analyzed with independent *t*-test for continuous data, Mann-Whitney *U* test for ordinal data and continuous data that were not normally distributed, and chi-square test for nominal data. The significance level was set at $p < 0.01$. Analyses were performed using IBM SPSS statistics version 23 for Windows (IBM Corp., Armonk, NY, USA).

3. Results

The main study included 1027 patients who were randomized to the RAPP group ($n = 513$) and the control group ($n = 514$). Of the 513 patients allocated to the RAPP group, 19 were excluded due to technical issues ($n = 1$), because they declined to participate ($n = 3$), or because they canceled the operation ($n = 15$). Consequently, 494 patients were included in the present study. Of them, 88 patients requested a contact call via RAPP. Four of the requests were accidentally initiated contacts, meaning that no contact was needed, giving a total of 84 (17%) patients needing contact via RAPP (Fig. 1), 48 (57%) women and 36 (43%) men with a mean age of 43.1, range 19–80 years (Table 1). In total, 100 contacts were made.

3.1. Contacts via Recovery Assessment by Phone Points

The RAPP contact group had a mean contact rate of 1.2 (range 1–3) RAPP contacts. A contact could be made for a single or several reasons (range 1–3). Contacts via RAPP were made on all 14 PODs; 62% (62/100) of contacts were made on PODs 1–7 and 38% (38/100) on PODs 8–14 (Fig. 2). The two most common reasons for requesting a contact were related to the surgical wound (43/119; 36%) and pain and/or pain medication (33/119; 28%). Four contacts were not related to surgery or anesthesia, but were nevertheless relevant as they included questions about whether the symptoms or medications could affect the postoperative recovery (Table 2).

3.2. Advice and outcome of the Recovery Assessment by Phone Points contacts at one day surgery unit

The day surgery unit that documented the type of advice given had made 38 contacts. Of these, 18 had related to questions and issues that were solved directly by the RN at the follow-up call, regarding pain, swelling, the dressing, constipation, and diarrhea, as well as insufficient information. Thirteen of these 18 contacts resulted in self-care advice; three had been made to get information about the surgery, when to take out stitches, or how to get in contact with the outpatient clinic. One was about wanting reassurance that symptoms were normal, and one was made by a patient who had meanwhile contacted the caregiver via another method.

Additionally, five contacts led to the RN consulting a physician on the phone before giving the patient advice. The remaining contacts (15/38) resulted in a visit to the outpatient clinic or primary care. Examples of issues that required referrals were: dressings that needed to be changed due to bleeding, the need for prescription of pain medication, rehabilitation, and tachycardia.

The RNs reported that the contacts via RAPP concerned issues that they were confident to handle and, further, that contacts via RAPP did

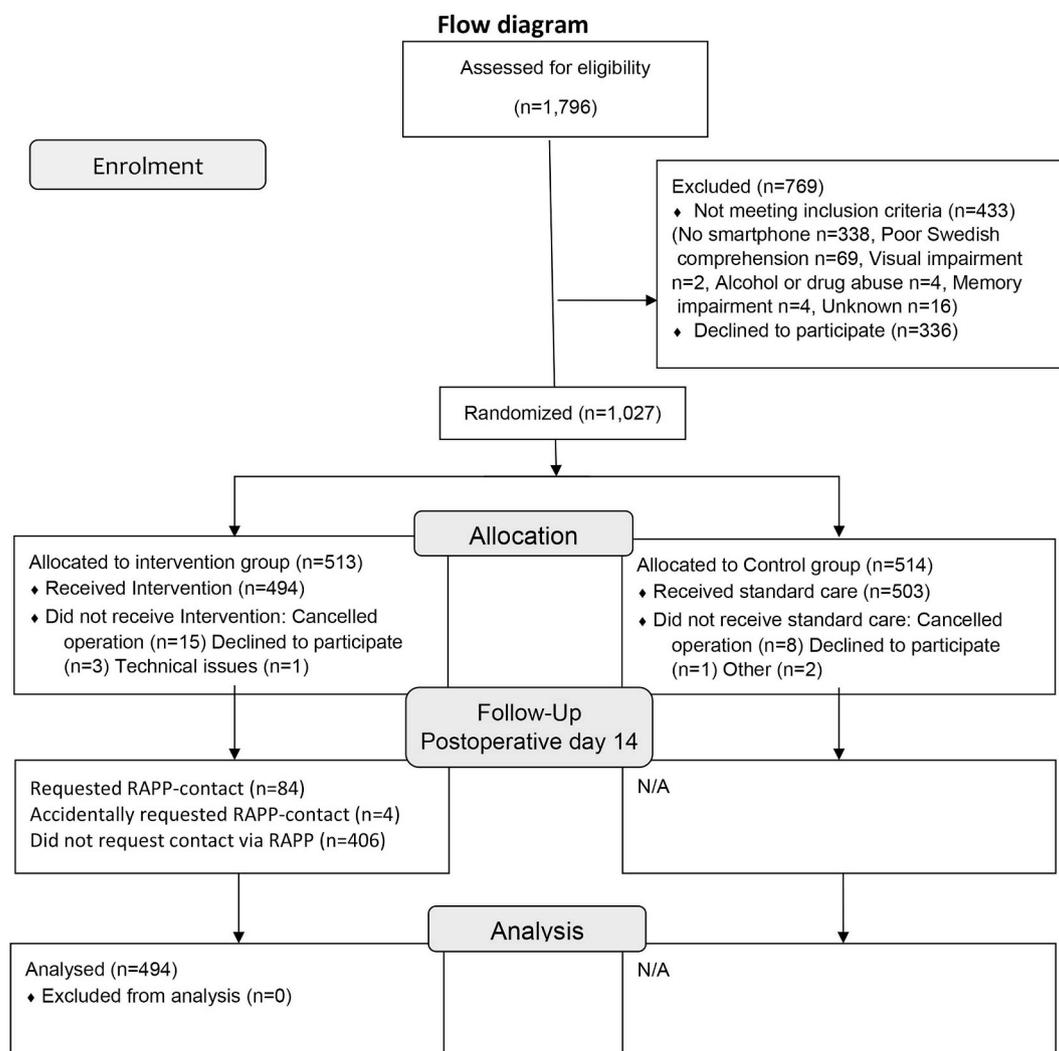


Fig. 1. Flow diagram of participants flow in the study. Initiating RAPP-contacts were only possible in intervention group.

not take more time compared to routine follow-up calls.

3.3. Postoperative recovery and characteristics

The SwQoR global score decreased over time. Compared to the non-RAPP contact group, the RAPP contact group reported significantly poorer recovery, i.e., more symptoms and discomfort, during all 14 PODs, $p < 0.001$. The RAPP contact group did not reach the cutoff values for a good recovery either at POD 7 or at POD 14. By contrast, the non-RAPP contact group had a mean global score > 29 at POD 5 and a mean global score > 20 at POD 10, indicating good recovery (Fig. 3). A significantly higher proportion of patients who had undergone general anesthesia, compared to patients who had undergone regional/local anesthesia, requested contacts via the RAPP, 85% (71/84) vs. 71% (291/410), $p = 0.003$. No significant differences were found between the groups regarding sex, ASA class, and type and duration of surgery (Table 1).

4. Discussion

To our knowledge, this is the first study evaluating postoperative follow-up contacts after day surgery initiated via a phone app. Our results show that patients after discharge from day surgery initiated contacts during all 14 PODs, 62% during the first postoperative week. These results are supported by previous studies showing that symptoms,

concerns, and questions may arise later than during the first PODs [12,18]. Our study shows that 67/100 (67%) of all RAPP contacts were initiated between POD 3 and POD 14, with a maximum of three contacts per patient. To only perform a follow-up call on PODs 1 or 2, which has been described as the most common routine in Scandinavia and many European countries [6–8], is therefore not sufficient.

The most common reasons for requesting a contact were related to the surgical wound, 36%, and pain and/or pain medication, 28%. Earlier studies describing telephone follow-up described pain and swelling as the most common issues during follow-up after orthopedic [12,19] and hand surgery [20]. It has also been reported that day surgery patients have many misconceptions about pain and pain management and require follow-up support, and that questions may develop over time as the patients recover [18]. Furthermore, unexpected post-operative pain, or pain at unexpected times, is perceived to be worse than expected pain [21].

In the present study, we found that several requests for contacts were related to issues that patients should have been informed about before the surgery or before discharge from the day surgery unit. Insufficient information has been demonstrated in several studies [9,10,22,23] and it has been reported that lack of information has a negative impact on recovery [24] and satisfaction [25,26]. It is possible that some of the contacts could have been avoided if the patients had been given sufficient information.

In the present study, only 17% of the patients initiated contact via

Table 1
Differences between patients requesting contact and patients not requesting contact via RAPP.

| | RAPP contact group n = 84 | Non-RAPP contact group n = 410 | P-value |
|--|---------------------------|--------------------------------|--------------------|
| Sex female/male, n (%) | 48 (57)/36 (43) | 226 (55)/184 (45) | 0.73 ^a |
| Age, mean (SD), yrs | 43.1 (14.5) | 45.3 (15.1) | 0.23 ^b |
| ASA class I/II/III, n (%) ^c | 46 (55)/25 (30)/0 | 196 (48)/122 (30)/11 (3) | 0.26 ^a |
| General/regional or local anesthesia, n (%) ^d | 71 (85)/8 (10) | 291 (71)/99 (24) | 0.003 ^a |
| Type of surgery, n (%) ^e | | | 0.66 ^a |
| Hand | 18 (21) | 98 (24) | |
| Orthopedic | 28 (33) | 132 (32) | |
| General | 27 (32) | 99 (24) | |
| Gynecologic | 3 (4) | 23 (6) | |
| ENT | 7 (8) | 45 (11) | |
| Oral | 0 (0) | 2 (0.5) | |
| Urology | 0 (0) | 3 (0.7) | |
| Eye | 0 (0) | 5 (1) | |
| Duration of surgery, min | 40.6 (30.3) | 40.4 (29.5) | 0.96 ^b |

ASA = American Society of Anesthesiologists (see below); ENT = ears, nose, and throat; POD = postoperative day; RAPP = Recovery Assessment by Phone Points.

ASA class: I = normal, healthy patient; II = patient with mild systemic disease; III = patient with severe systemic disease; IV = patient with severe systemic disease that is a constant threat to life.

- ^a Chi-square test.
- ^b *t*-test.
- ^c Missing, RAPP contact group n = 14; missing, non-RAPP contact group n = 80.
- ^d Missing, RAPP contact group n = 5; missing, non-RAPP contact group n = 20.
- ^e Missing, RAPP contact group n = 1; missing, non-RAPP contact group n = 3.

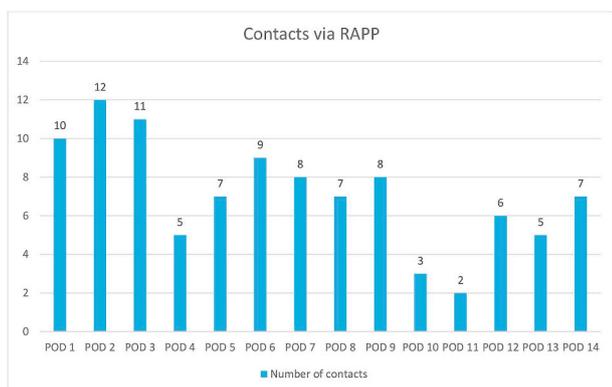


Fig. 2. Number of contacts initiated via the Recovery Assessment by Phone Points (RAPP) app on postoperative days (PODs) 1–14.

RAPP. Almost half of their issues could be solved directly by the nurse; in 13% of the contacts, the nurse was able to help after consulting a physician. The remaining contacts resulted in a visit to the outpatient clinic or primary care. Notable is that no RAPP contact resulted in an emergency room visit, suggesting that the level of care and information provided via RAPP was sufficient.

In the present study, the patients who requested contact via RAPP had significantly more discomfort and symptoms, i.e., poorer recovery, throughout the 14 PODs. These 84 patients (17%) seem to represent a vulnerable group of persons needing higher frequency of professional support in their postoperative recovery. No differences regarding age, gender, type of surgery, or length of surgery were found. However, data on the patients' educational level, which may have explained these results, was not collected. On the other hand, in another study, functional health literacy (i.e., individuals' capacity to gain access to, and to

Table 2
Reasons for contact (one RAPP contact can have multiple reasons).

| | PODs 1–7 n | POD ≥ 8 n | Total n |
|---|------------|-----------|---------|
| Wound-related n = 43 | | | |
| Questions related to the dressing/plaster/wound/stitches | 16 | 9 | 25 |
| Swollen surgical wound | 5 | 4 | 9 |
| Reddened surgical wound | 0 | 2 | 2 |
| Exuding surgical wound | 1 | 1 | 2 |
| Bleeding | 1 | 1 | 2 |
| Numbness related to surgery or regional/local anesthesia | 3 | 0 | 3 |
| Pain and/or pain medication n = 33 | | | |
| Postoperative symptoms n = 9 | | | |
| Trouble breathing | 2 | 0 | 2 |
| Dizziness | 1 | 1 | 2 |
| Nausea | 1 | 1 | 2 |
| Fever | 2 | 1 | 3 |
| Bowel elimination n = 3 | | | |
| Diarrhea | 1 | 1 | 2 |
| Constipation | 1 | 0 | 1 |
| Mobilization n = 7 | | | |
| General n = 15 | | | |
| Certificate for sick leave or sickness remittance/prescriptions | 5 | 1 | 6 |
| Information about surgery/anesthesia | 5 | 0 | 5 |
| Questions about how to reach the outpatient clinic/surgeon | 2 | 2 | 4 |
| Not surgery or anesthesia-related n = 4 | | | |
| Other medication | 2 | 0 | 2 |
| Other diagnoses or symptoms: tachycardia and erysipelas | 0 | 2 | 2 |
| Other n = 5 | | | |
| Questions about RAPP | 0 | 1 | 1 |
| Reasons unknown | 2 | 2 | 4 |

POD = postoperative day; RAPP = Recovery Assessment by Phone Points.

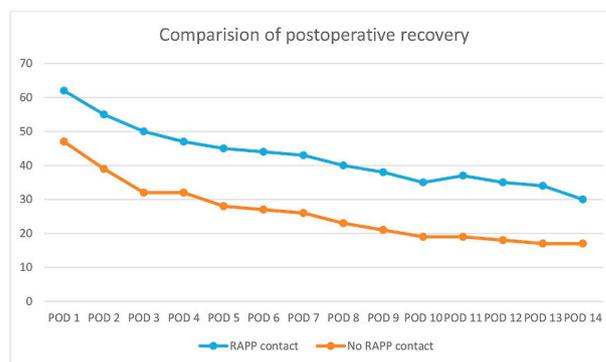


Fig. 3. Differences in global score (mean) for the Swedish Web version of the Quality of Recovery (SwQoR) questionnaire between those requesting a contact via Recovery Assessment by Phone Points (RAPP) and those not requesting contact. The SwQoR has a possible score range of 0 = excellent quality of postoperative recovery, to 240 = extremely poor quality of recovery. Differences between groups were analyzed with Mann-Whitney *U* test, *p* < 0.001, on postoperative days (PODs) 1–14.

understand and use, information in ways to promote and maintain good health) did not affect the number of contacts initiated via RAPP [27].

In the present results, a significantly higher proportion of patients having undergone general anesthesia, 85%, requested contacts compared to patients having undergone regional anesthesia, 8%. This finding is in line with earlier studies reporting poorer recovery [21] and higher risk of perioperative complications [28,29] as well as more suffering from pain and nausea [28,29] and a longer length of stay at the postanesthesia care unit [29], in patients after general compared to regional anesthesia.

This study has some limitations, such as the inclusion criterion of

ability to understand the Swedish language in speech and writing. Another limitation was that this was a secondary analysis and the sample size was calculated for the primary outcome, namely, cost-effectiveness of RAPP [15] as well as that no data regarding pre-operative preparedness or clinical conditions were collected. Furthermore, documentation about what type of advice was given, and whether the RAPP contacts differed from routine follow-up calls, was only collected at one of the four included day surgery units. This unit carried out 38 of the 100 contacts made in total. We are aware of this limitation; their documentation added valuable information and these aspects need to be investigated in further studies.

5. Conclusion

A transition, from health care staff to the patient, in who gets to make the decision regarding whether, and when, contact and support is needed during the postoperative period, is possible. Letting the patient decide him/herself does not increase the frequency of contacts. This study shows that a digital solution, such as RAPP, as one example of a person-centered approach to day surgery follow-up, can be implemented to support this transition.

Ethical approval

The study was approved by the Ethical Review Board in Uppsala, Sweden (reference number: 2015/262).

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Author contribution

Study design: All authors
 Study coordination: KD, UN
 Data analysis: KD
 Interpretation of data: All authors
 Writing: All authors.

Conflicts of interest

Örebro University Enterprise AB and Ulrica Nilsson hold shares in RAPP-AB. No other disclosures are reported.

Registration Unique Number

[Clinicaltrials.gov](https://clinicaltrials.gov) Identifier: NCT02492191.

Guarantor

Ulrica Nilsson is the principal investigator and guarantor in this research.

Data statement

The authors have no ethical permission to share data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijso.2018.11.022>.

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