



Fatemeh Behrouzi

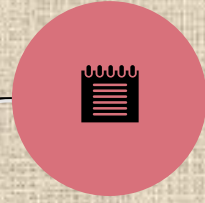
Journal Club 1401/09/28

**Usability and Preliminary Effectiveness
of a Preoperative mHealth App
for People Undergoing Major Surgery:
Pilot Randomized Controlled Trial**

کاربردپذیری و اثربخشی اولیه برنامه سلامت همراه قبل از عمل برای افرادی که تحت عمل جراحی ماژور قرار می گیرند: کارآزمایی تصادفی کنترل شده آزمایشی

**Be Prepared
App**





Name

Journal of Mhealth and Uhealth



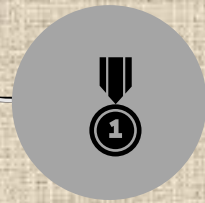
Indexing

ISI – SCOPUS – PubMed – DOAJ



Category

Health Informatics Q1



2021 Impact Factor

4.95

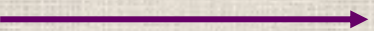


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Suggestion

- **CeHRes:** Centre for eHealth Research
- **CONSORT:** Consolidated Standards of Reporting Trials of Electronic and Mobile Health Applications and Online Telehealth
- **IQR:** interquartile range
- **mHealth:** mobile health
- **PROMIS-PF:** Patient-Reported Outcomes Measurement Information System physical functioning 8-item short form
- **RCT:** randomized controlled trial
- **SUS:** System Usability Scale



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Smoking

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Alcohol

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Physical inactivity

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Poor nutritional status

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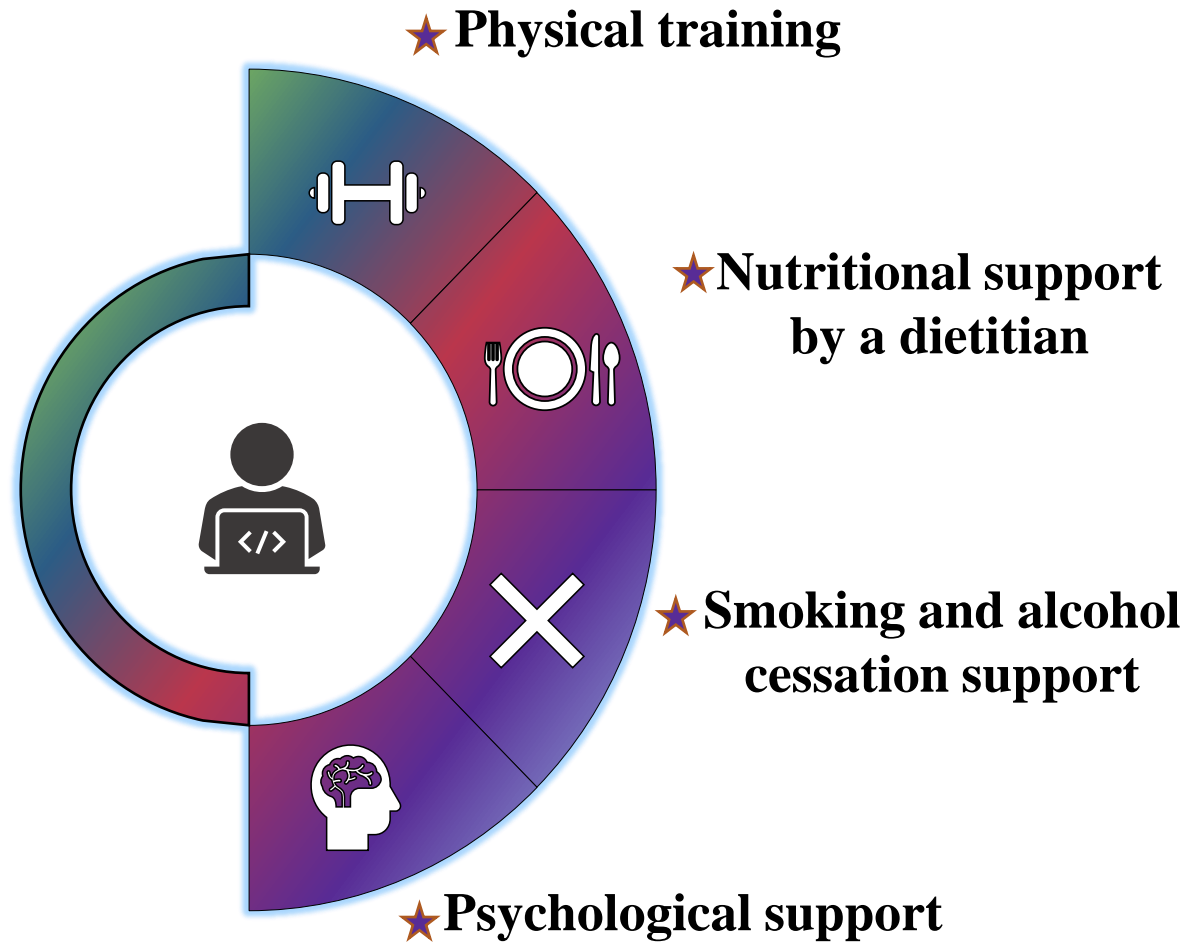
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Prehabilitation programs



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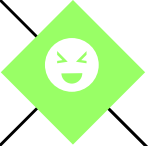
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Behavior change techniques



First version of the Be Prepared mHealth app

App

Enhance patients' health



Better postoperative functional recovery

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Suggestion



Evaluate the usability of the Be Prepared app prototype

Change in risk behaviors in people undergoing major surgery

Estimate a preliminary effect of the Be Prepared app on functional recovery after major surgery

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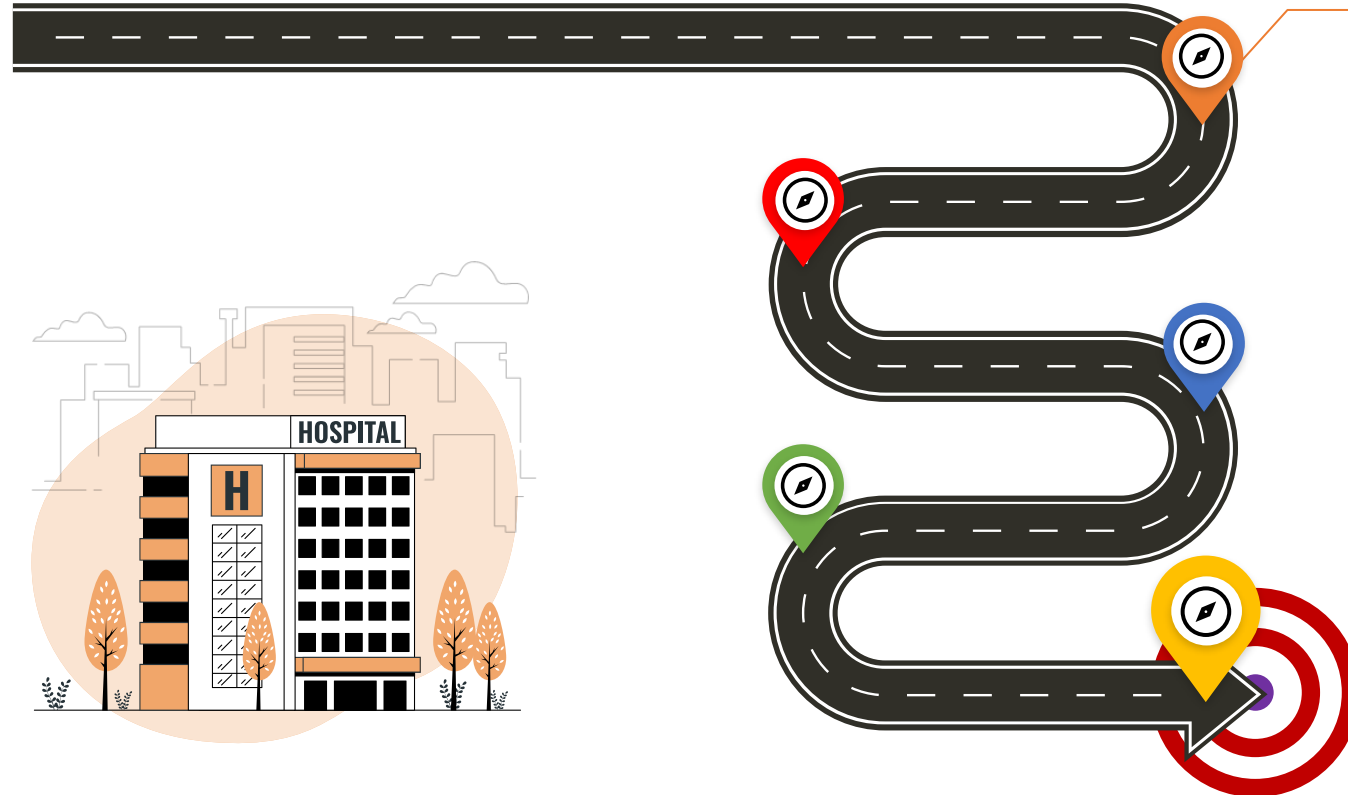
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Suggestion



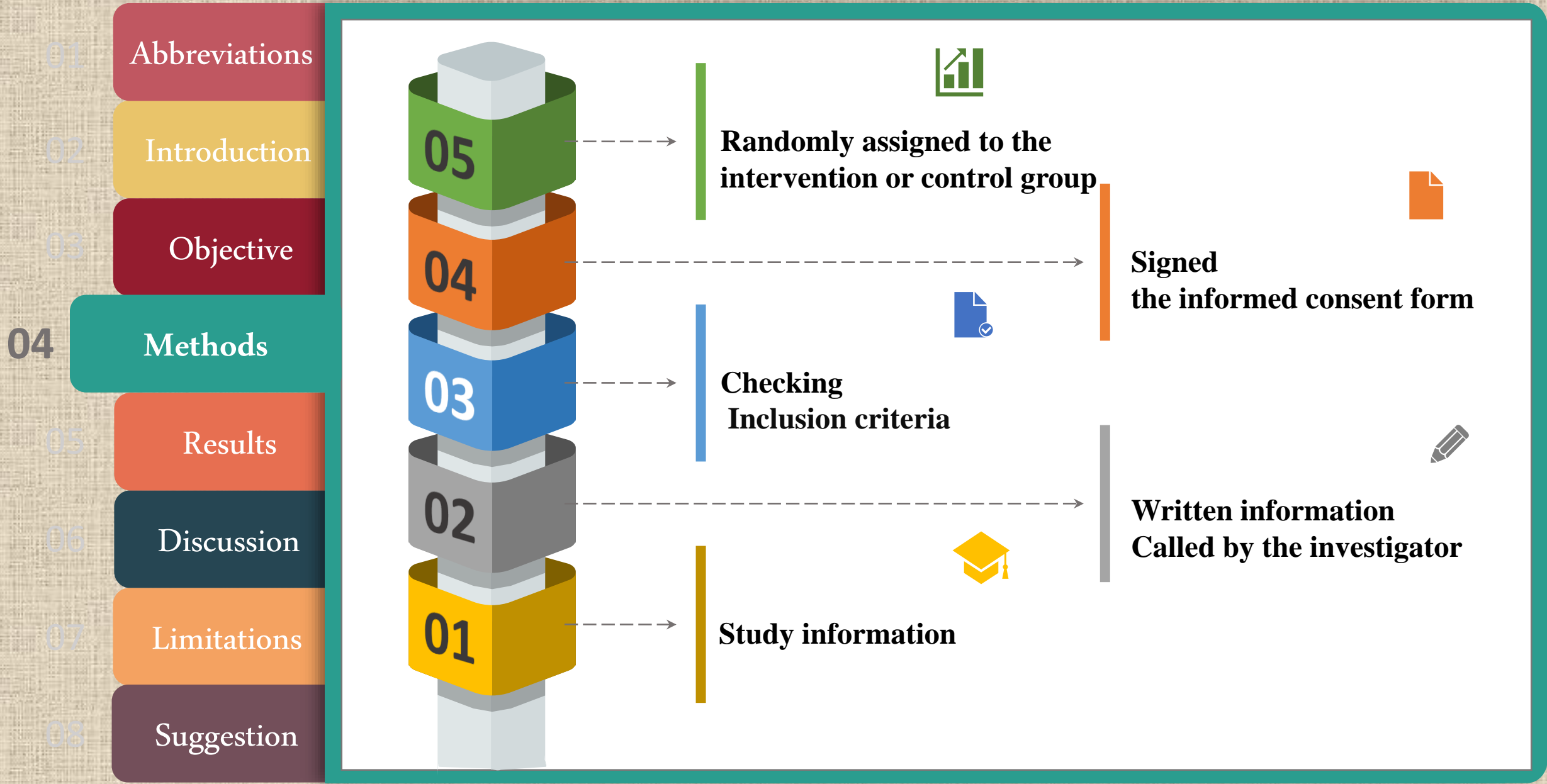
Preoperative assessment outpatient clinic of two academic hospitals in the Netherlands between November 2018 and March 2019

CeHRes roadmap 



Evaluation





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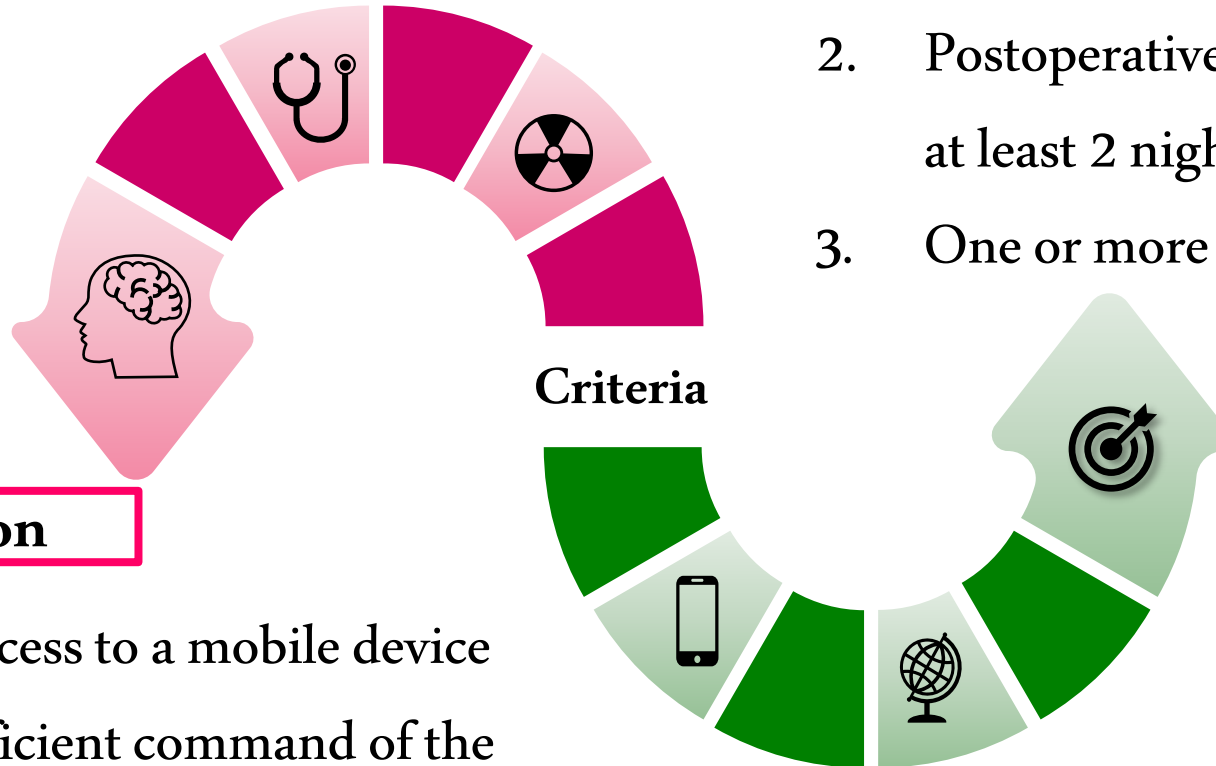
Limitations

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Suggestion

Inclusion

1. Aged 18 years or older
2. Postoperative hospital stay at least 2 nights
3. One or more risk behaviors



Exclusion

1. No access to a mobile device
2. Insufficient command of the Dutch language

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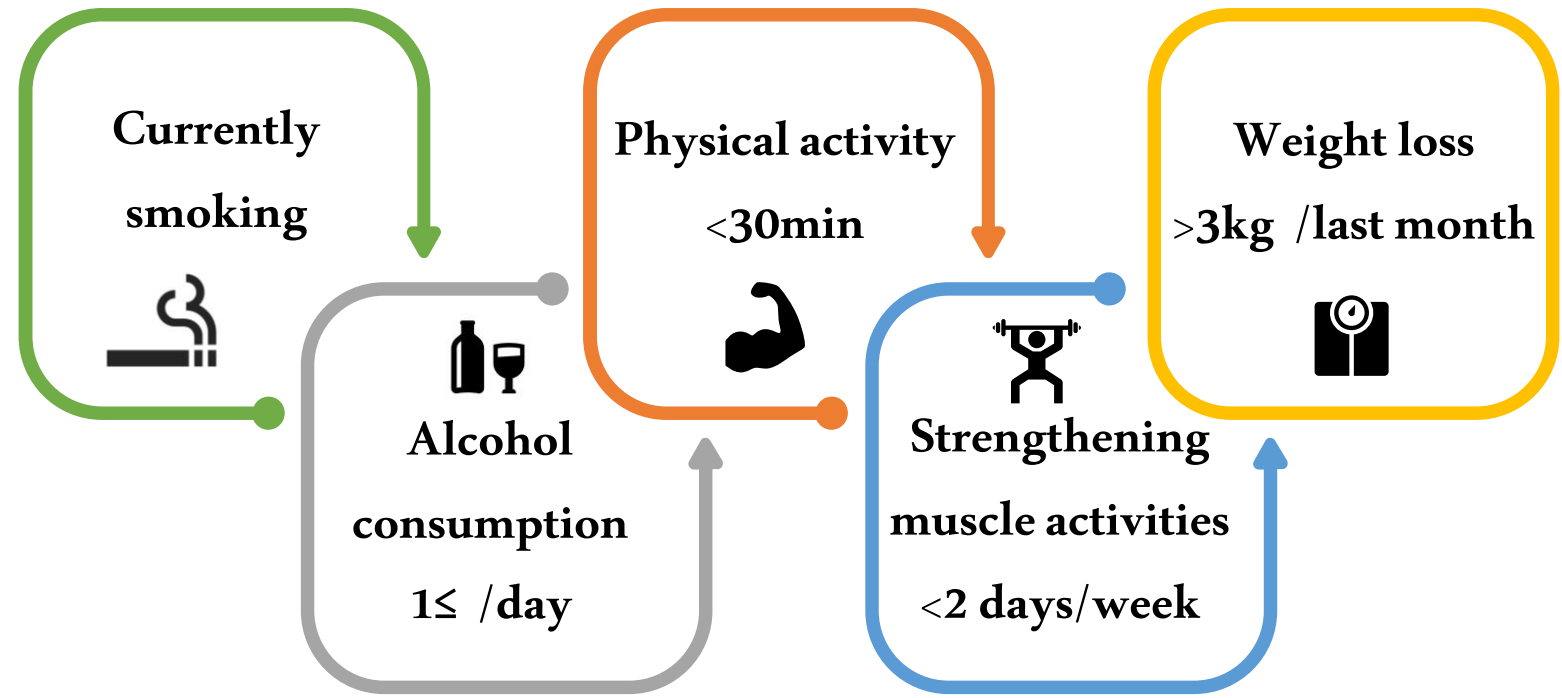
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Dutch Health Council and evidence



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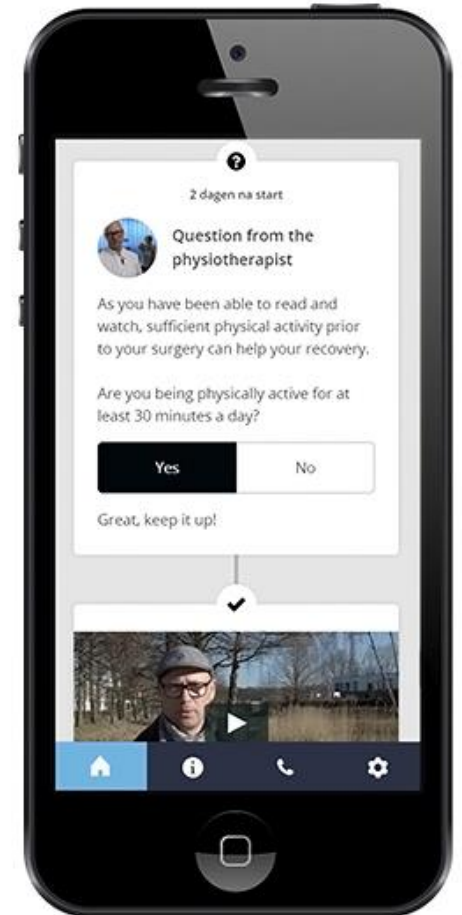
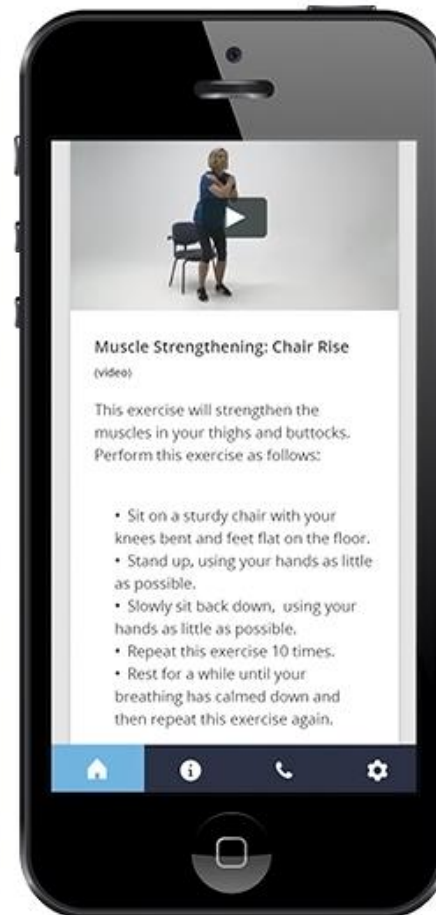
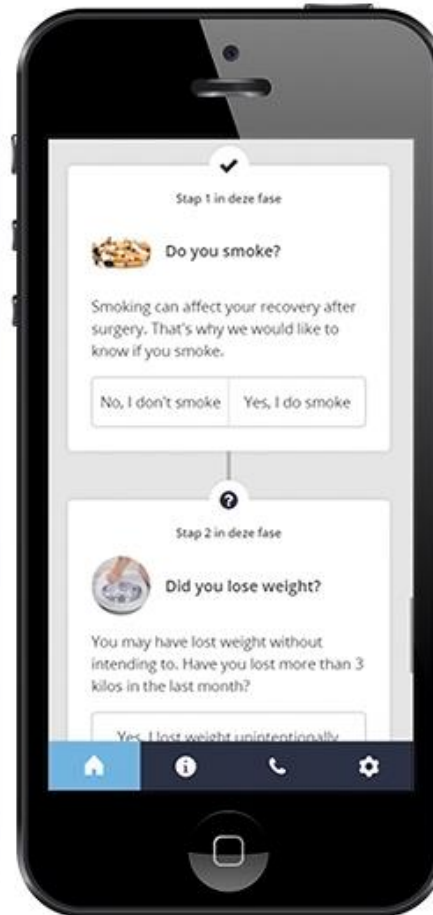
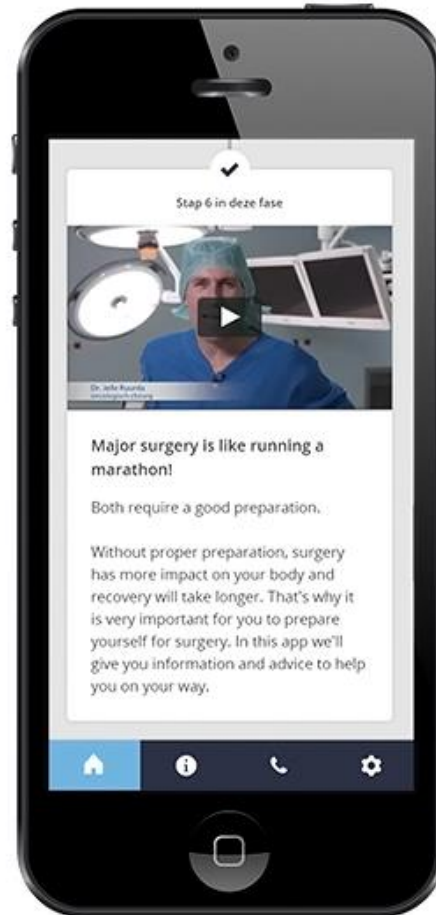
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Suggestion

● **Data Collection**

- Usability
- App Use
- Quantitative Data
- Qualitative Data
- Risk Behaviors
- Functional Recovery

● **Data Analysis**

- Usability
- Quantitative Data
- Qualitative Data
- Risk Behaviors
- Functional Recovery

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» **Data Collection**

»» **Usability**

Mix methods (quantitatively and qualitatively)

» **App Use** » activated app with personal code + Online questionnaire

»» **Quantitative Data** » Participants completed the SUS, 3 days before surgery
» The total SUS score ranges from 0 to 100 (min=62.7)

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Suggestion



Qualitative Data

Semi-structured telephone interviews, 20 to 30 minutes,
Nielsen: efficiency, satisfaction, learnability, memorability,
and tolerance for errors



Risk Behaviors

Risk behaviors were assessed through self-report at baseline
and 3 days before surgery



Functional Recovery

The short form consists of 8 questions which can be
scored on a 5-point Likert scale from 1 to 5.
The PROMIS-PF has a high reliability and validity

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» Data Analysis

»» Usability

Descriptive statistics + SPSS Statistics version 25.0

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»» Quantitative Data SUS: learnability, efficiency, and satisfaction

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Discussion

»» Qualitative Data Qualitative : compiling, disassembling, reassembling, interpreting, and concluding

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Risk Behaviors

Chi-square tests or Fisher exact tests were used to test the difference of self reported change

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Functional Recovery

Between-group differences in functional recovery were analyzed using multivariable linear regression.

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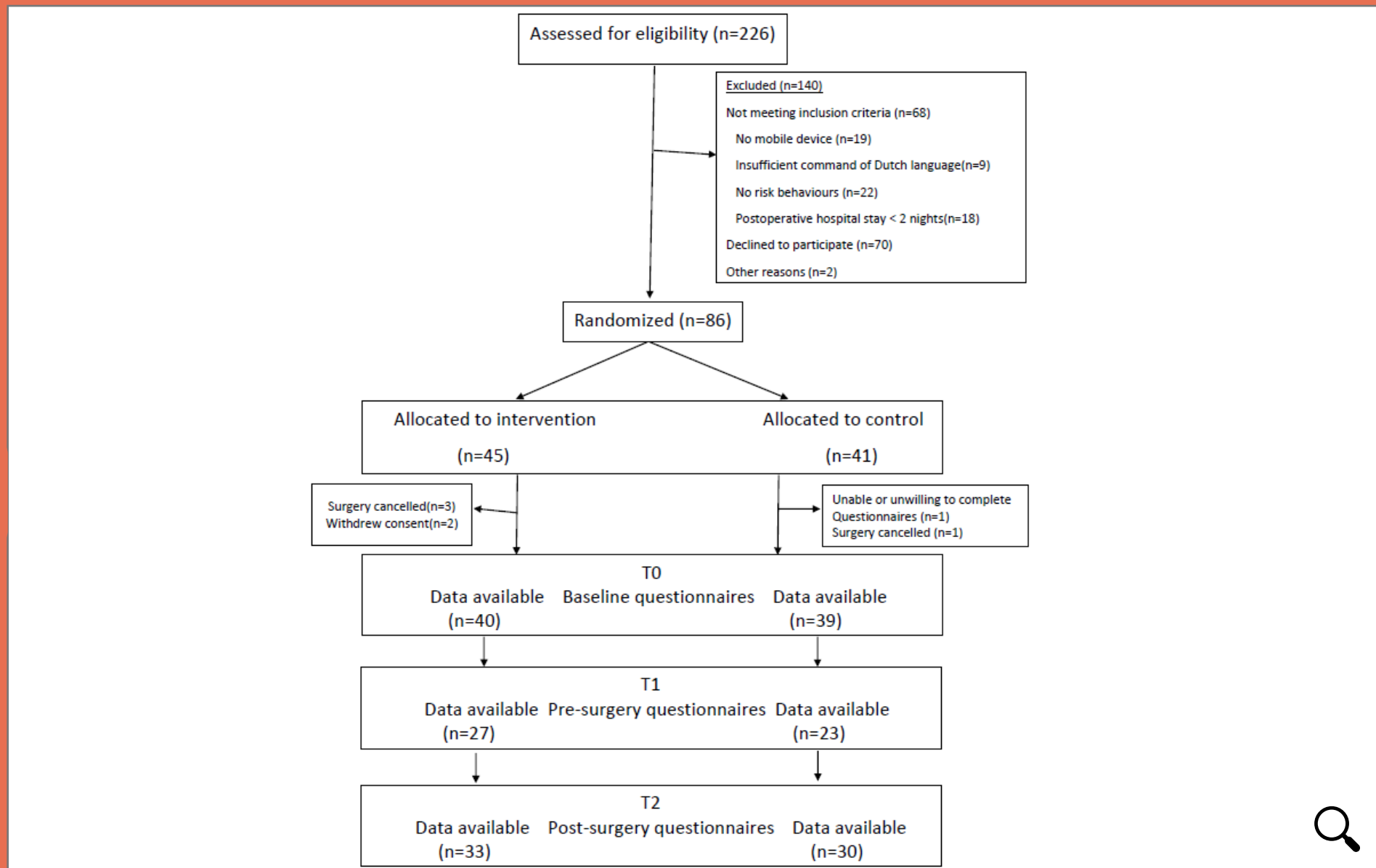
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Suggestion

Characteristic	Total (n=79)	Intervention (n=40)	Control (n=39)
Age in years, median (IQR)	61.0 (51.0-68.0)	59.0 (43.8-64.0)	63.0 (53.0-70.0)
Female, n (%)	39 (49)	22 (55)	17 (44)
BMI (kg/m ²), median (IQR)	25.8 (23.9-28.3)	25.5 (23.1-27.7)	26.5 (24.5-28.8)
ASA PS^a classification, n (%) 			
I	9 (12)	7 (17)	2 (5)
II	42 (53)	21 (53)	21 (54)
III	24 (30)	11 (28)	13 (33)
IV	3 (4)	1 (2)	2 (5)
Unknown	1 (1)	0 (0)	1 (3)
Surgical specialty, n (%)			
Neurosurgical	16 (20)	9 (23)	7 (18)
Cardiothoracic	16 (20)	7 (18)	9 (23)
Gastrointestinal	15 (19)	8 (18)	7 (18)
Oral and maxillofacial	12 (15)	4 (10)	8 (20)
Urologic and gynecologic	13 (17)	8 (20)	5 (13)
Orthopedic	3 (4)	0 (0)	3 (8)
Vascular	3 (4)	3 (8)	0 (0)
Other	1 (1)	1 (3)	0 (0)
Waiting time for surgery in days, median (IQR)	28 (16-52)	27 (16-46)	29 (16-65)



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Suggestion

Characteristic	Total (n=79)	Intervention (n=40)	Control (n=39)
Risk behaviors^b, n (%)			
Smoking	7 (9)	4 (10)	3 (8)
Alcohol consumption	12 (15)	2 (5)	10 (26)
Physical activities	64 (81)	35 (88)	29 (74)
Muscle strengthening activities	57 (72)	29 (73)	28 (72)
Unintentional weight loss	7 (9)	3 (8)	4 (10)
Number of risk behaviors, n (%)			
1	27 (34)	12 (30)	15 (39)
2	38 (48)	23 (58)	15 (39)
3	12 (15)	5 (12)	7 (17)
4	2 (2)	0 (0)	2 (5)
PROMIS-PF ^c (t score), median (IQR)	47.8 (40.8-60.1)	47.8 (42.3-60.1)	46.7 (40.1-60.1)



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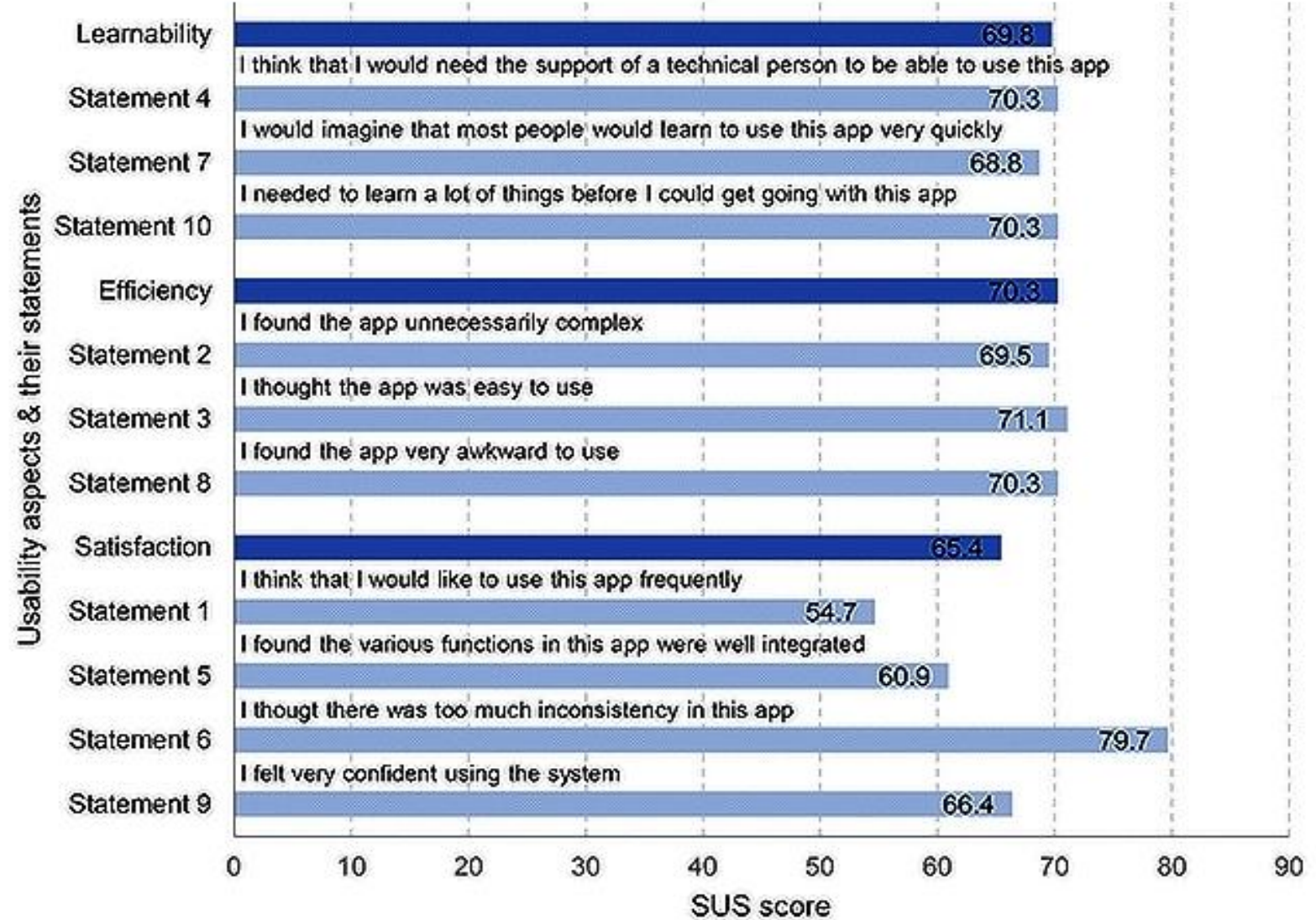
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Suggestion

Characteristics of interviewees

Code	Gender	Age (years)	App use (number of days)	Interview pre- or postoperative	Days of hospitalization
1	F	35	15	Pre	4
2	M	65	3	Pre	2
3	M	76	4	Pre	3
4	M	68	3	Pre	5
5	F	63	17	Post	4
6	M	49	42	Pre	Waitlisted
7	F	43	34	Post	3
8	F	59	16	Post	7
9	F	63	24	Post	7
10	M	36	22	Post	1
11	F	52	38	Pre	6
12	M	77	84	Post	7



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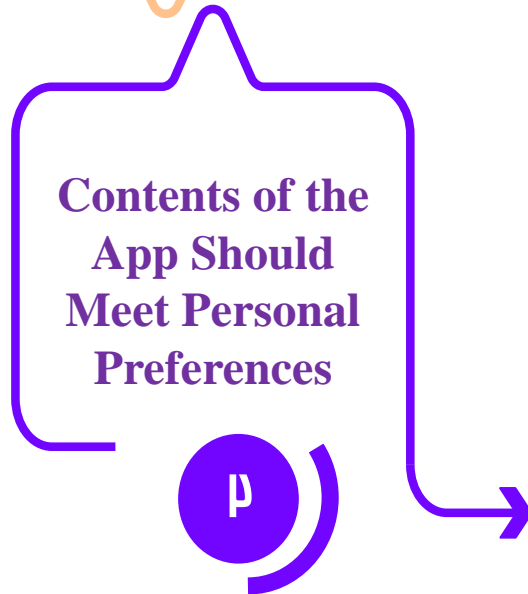
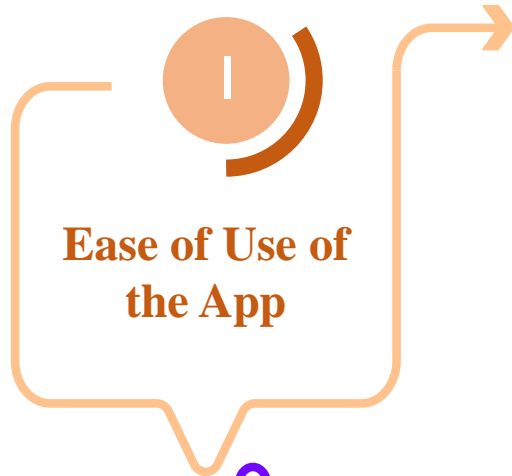
Suggestion

Interviewees

It is self-explanatory.
[Male, age 76]



Suggestions are being made in the app that I found useful. For me it was combining walking with doing groceries. I thought that was a clever one, for me as well; if you go somewhere anyway, go walking. I even did that yesterday. [Male, age 65]



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Interviewees

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App as Motivational Tool for Behavior Change

Some days I forgot or I was busy, so on those days the notifications came in handy.
[Female, age 35]

5

General Motivation for Behavior Change Before Major Surgery

I feel the need, I'm going into surgery next week. It has to stop raining, because this afternoon I have to work in my garden for at least 30 minutes as a physical activity.
[Male, age 65]

Views on What Constitutes a Good Preparation for Major Surgery

So you can manage better when you get back home.
[Female, age 59]

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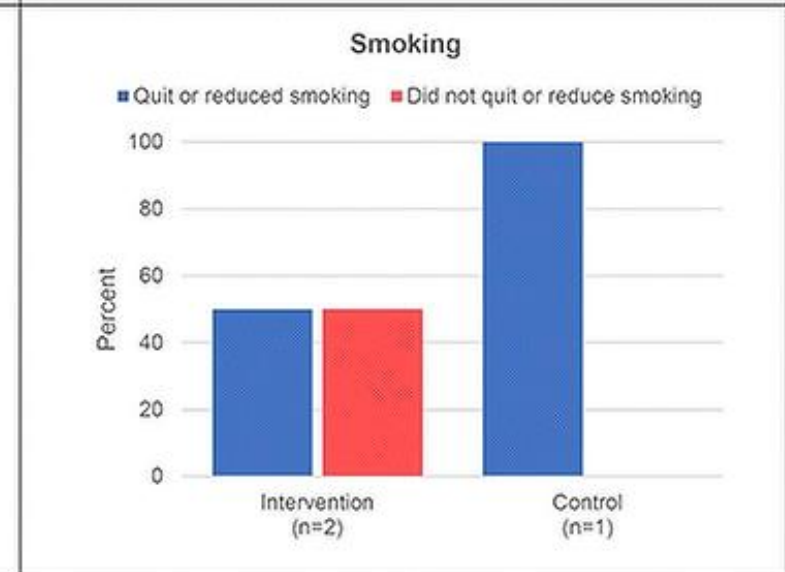
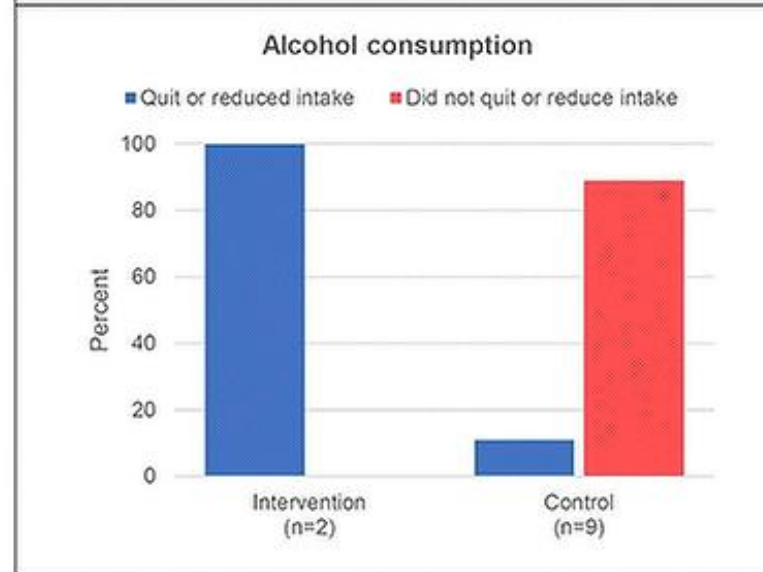
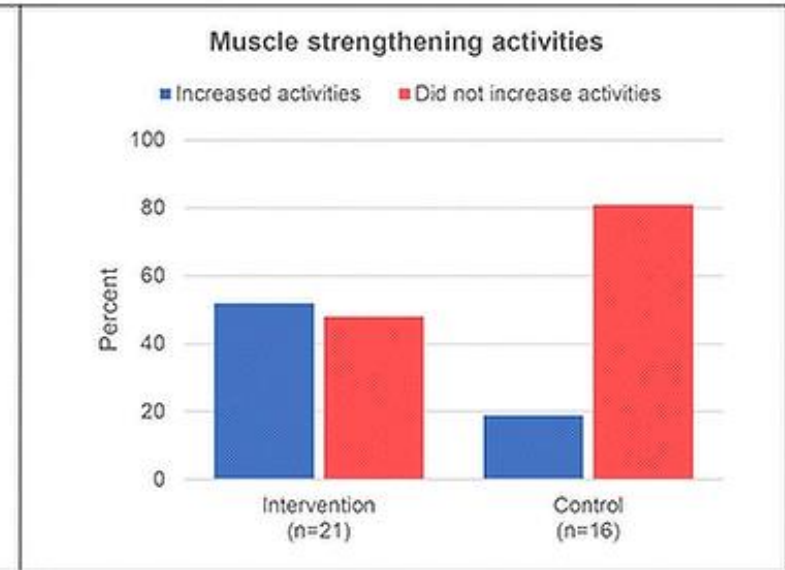
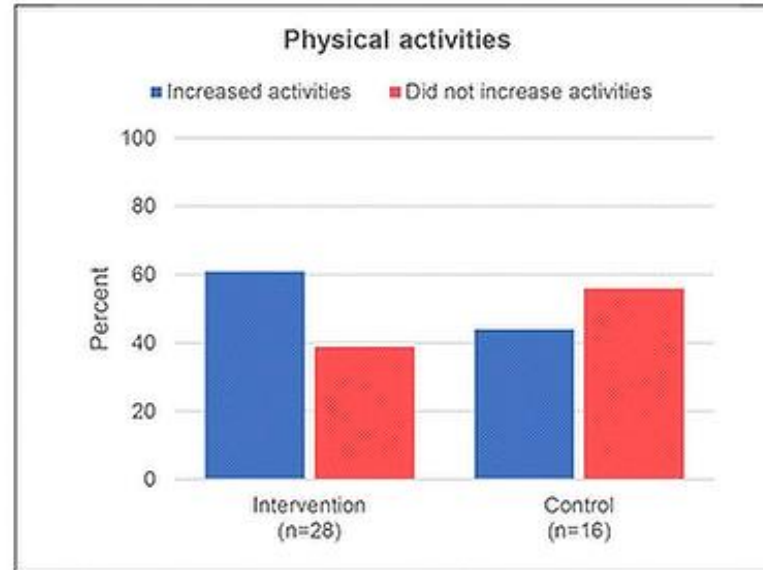
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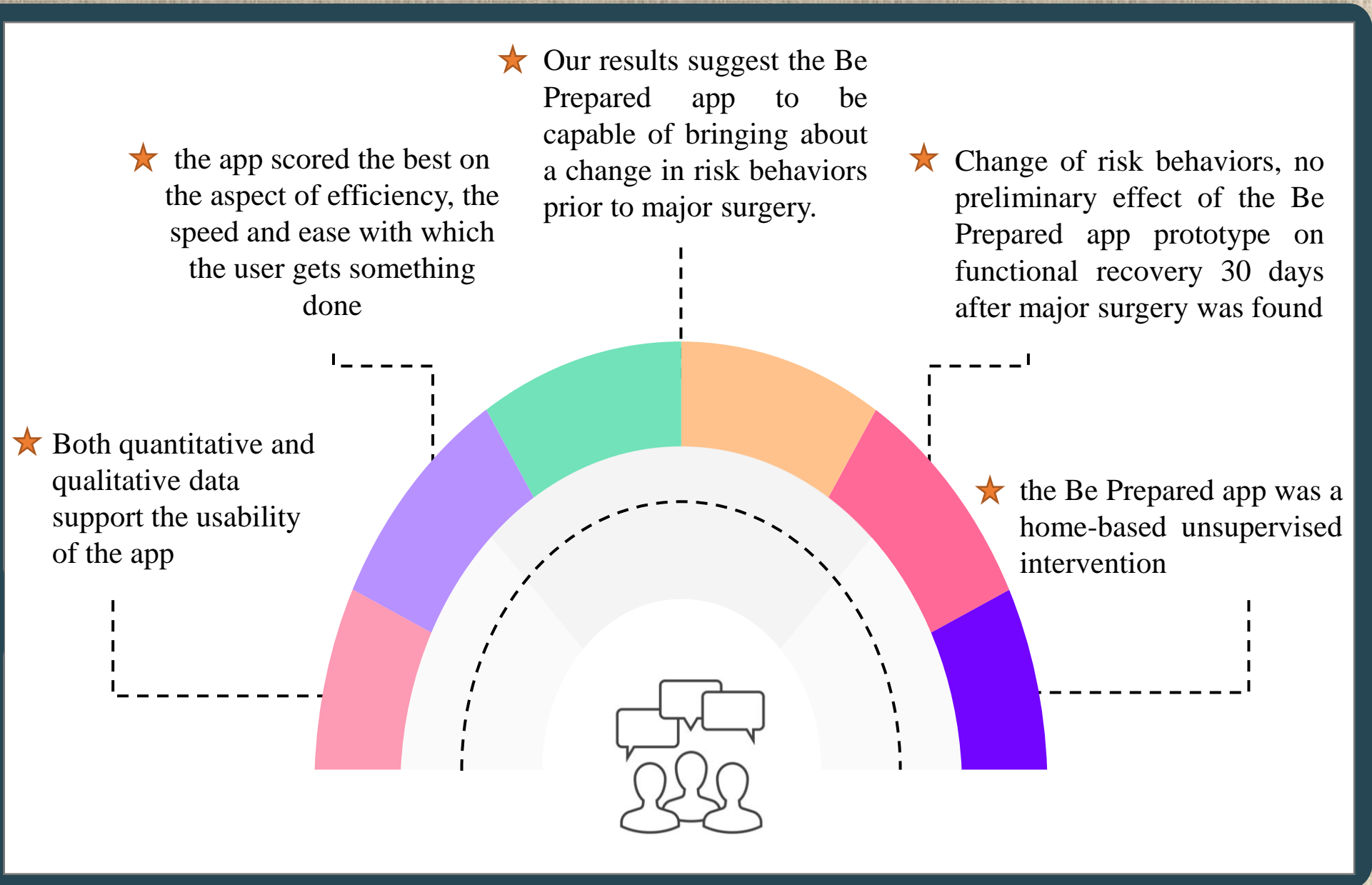
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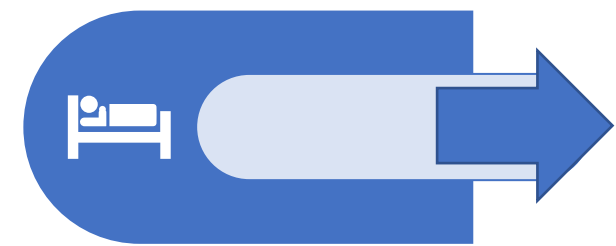
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Suggestion

Strengths of study



Explore the usability and preliminary effectiveness of an app for multimodal prehabilitation.



The proportion of patients accessing the app at least once was comparable to that of other apps

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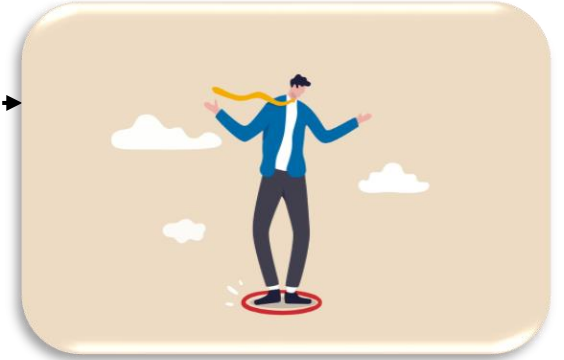
Suggestion



This study suffered from a large amount of missing data, especially at the presurgery follow-up.

Patients who had app for more than 4 weeks before surgery did not use the app during the entire preoperative period.

Participants were invited to complete the presurgery follow-up questionnaire 3 days preoperatively



Solution: Changing the timing of this measurement to 1 week after discharge from hospital

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Suggestion

Clipboard content:

-  Patients have not yet functionally recovered within 30 days of discharge from hospital. Solution: include a longer follow-up with multiple time. 
-  The difficult log-in procedure and differences in patient (digital) health literacy => nonusers in the intervention group 
-  Solution: Altering the log-in procedure and providing support during installation and first use of the app could increase initial app use 

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Suggestion

My viewpoint

1

Be prepared prototype

2

Reducing the average age of patients

3

Decreased type of surgery

4

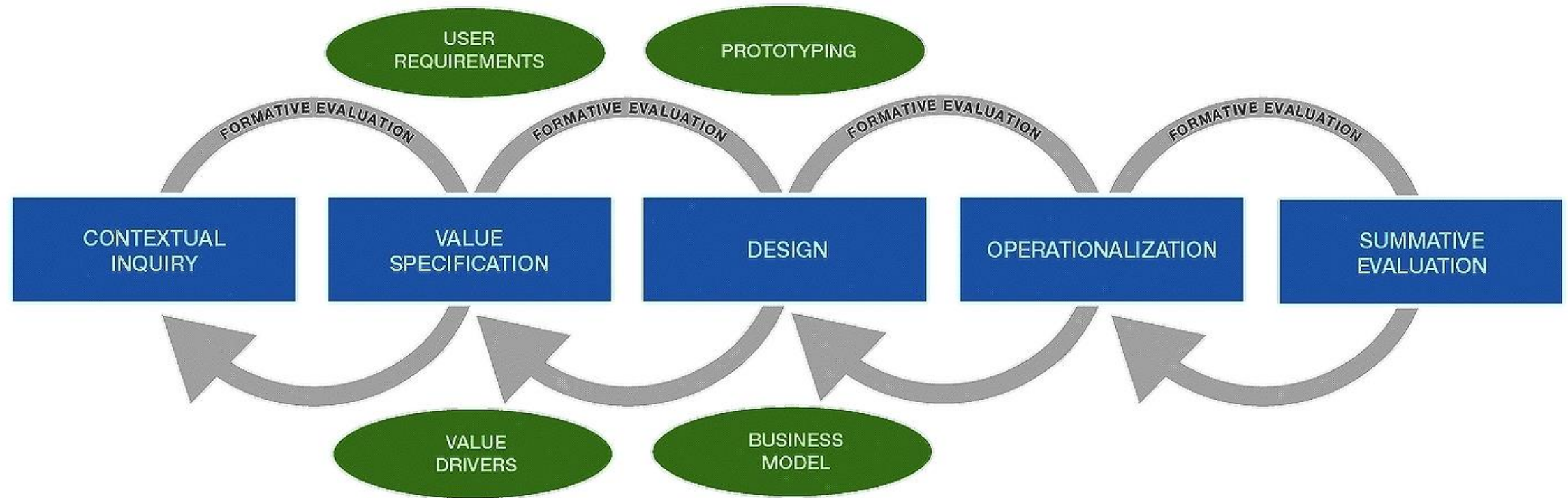
More development in app

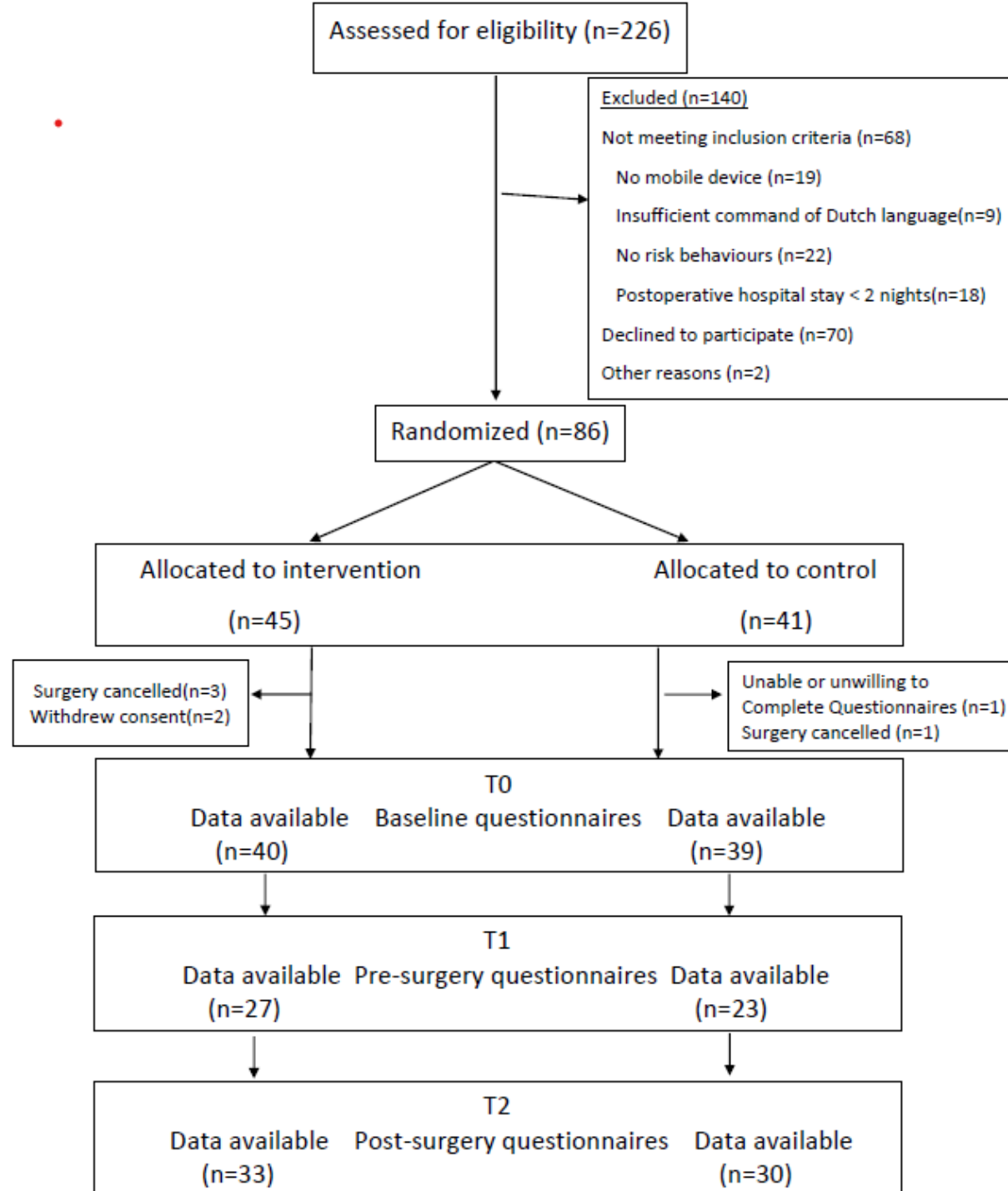





Thank you for paying attention







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ASA PS Classification**Definition**

ASA I

A normal healthy patient

ASA II

A patient with mild systemic disease

ASA III

A patient with severe systemic disease

ASA IV

A patient with severe systemic disease that is a constant threat to life



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3	M	76	4	Pre	3
4	M	68	3	Pre	5
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10	M	36	22	Post	1
11	F	52	38	Pre	6
12	M	77	84	Post	7

