

Content and quality of smartphone apps for bariatric surgery: a protocol for a review and content analysis

Authors

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Contributions

IH, JB and NK designed the work. IH drafted the protocol. NK, AW and JB revised the protocol substantially. AW created the search strategy. All authors read and approved the final protocol.

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Introduction

Rationale

Obesity is a serious public health problem and has been declared a global epidemic by the World Health Organization [1]. Over 4 million deaths worldwide were attributed to obesity in 2017 and the prevalence rate continues to rise [1]. In relation to weight change, bariatric surgery has been shown to be more effective compared to non-surgical interventions [2]. Although sleeve gastrectomy and Roux-en-Y bypass are most common, there is still a great variation in surgical methods [3]. Bariatric patients face greater information needs, since different questions arise with regard to surgical methods [4]. However, several barriers can impede information seeking for bariatric patients which may result in unmet information needs [4]. Since smartphone ownership is common in bariatric patients and mobile applications (apps) are well accepted by dietitians, the use of technology might address this issue [5]. Digital health applications (DHA) are digital medical devices including apps that address diagnosis and management of disease and are primarily used by patients [6].

However, DHA must fulfil high quality requirements to obtain approval by the Federal Institute for Drugs and Medical Devices in Germany [6].

The use of smartphone apps in the field of bariatric surgery has previously been reported and a lack of medical professional involvement in their creation was indicated [7, 8]. However, the content and quality of bariatric smartphone apps has so far only been described roughly. Therefore, it is desirable to depict the current landscape, content and quality of smartphone apps in relation to bariatric surgery.

Objective

The review and content analysis aims to identify smartphone apps related to bariatric surgery and to analyse their content and quality.

Methods

This protocol was written in accordance with PRISMA-P [9].

Eligibility criteria

Smartphone Apps addressing obese patients who undergo bariatric surgery (preoperative or postoperative period) will be included if they are available in German. Apps that address patients who might undergo or would like to get information about bariatric surgery will also be included. Apps will also be included, even if they only relate partially to bariatric interventions. No age and gender restrictions and no limitations on costs of apps will be applied. Apps that do not specifically focus on bariatric interventions (e.g., general dietary or health promoting apps) or that address health professionals only will be excluded.

Information sources

Google Play and Apple app store will be searched for smartphone apps and Medline/Embase will be checked for further studies on apps.

Search strategy

In the first step, the two most popular smartphone app stores (German Google Play and German Apple App store) will be searched using the following bariatric surgery-related terms: bariatric, bariatric surgery, obesity, obesity surgery, weight loss surgery, gastric band, gastric sleeve, gastric balloon and gastric bypass (terms will be searched in German). Proposed apps under the “similar apps” tab in the app stores will also be checked for eligible apps. In addition,

the German DHA registry will be screened. In the second step, a systematic literature search will be performed using Medline (via Ovid) and Embase (via Elsevier) to identify further bariatric apps from scientific literature. The search strategy will combine two search strings using keywords and subject headings (see Appendix). One search string will be related to bariatric surgery and the other search string will be based on a validated search filter for health apps [10]. Apps identified in the second step will be searched in Google Play and Apple App Store. Apps that are not available on these platforms will be excluded.

Selection process

In the first step, two reviewers will check the titles and overview pages of smartphone apps in the app stores and in the German DHA registry. Potentially relevant smartphone apps will be downloaded and retrieved. Further, two reviewers will check downloaded apps for their eligibility. These screening steps will not be conducted independently for reasons of limited resources, since this is not a funded project. If the same app is available on different platforms, only one version of the app will be included into analysis. In the second step, two independent reviewers will conduct title and abstract screening with Rayyan [11] for records identified by database searches. Potentially relevant studies will be screened in full text. Reasons for exclusion will be documented. The review process will be presented in a flow diagram based on PRISMA [12].

Data items and data extraction

Two reviewers will collect data from included studies and apps into an a priori developed data extraction form, which might be extended as necessary during data extraction. Disagreement will be resolved by discussion or by consulting an additional reviewer. Data will be collected from apps and corresponding overview pages. The following general information will be extracted from smartphone apps: name of the app, app store/platform, developer, version of app, date of release/update, app rating (number of ratings), available languages, price and date of extraction. Further, the following general information will be extracted from included studies: title, author(s), year of publication of the study, country, title of smartphone app, intervention and control. Initially we will extract whether the apps contain information on diet, physical activity, medication intake, supplementation, surgical procedures, behaviour change techniques, risks/contraindications, assumption of costs, pregnancy or whether they

address preoperative/postoperative care and social/psychosocial aspects. Further, we will extract information on these aspects to depict the content of apps.

Quality assessment and data synthesis

A quality assessment of included apps will be conducted using the “Checklist for the use of health apps” developed by the German Coalition for Patient Safety [13]. The app quality will be assessed independently by two reviewers regarding the following criteria: purpose and functionality, quality and evaluation, ratings by other users, quality certificates and certification marks, data privacy notice, access to functionality and data, imprint, funding and financial background. No risk of bias assessment will be performed for included studies due to the nature of the review question. To describe the app content, data will be synthesised narratively and will be presented in tabular form.

Keywords

Digital health, eHealth, Apps, bariatric surgery, obesity, content analysis

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Appendix – Search strategies

Medline (via Ovid), search date: 11.11.2022

#	Query	Results
1	exp Bariatric Surgery/	32151
2	exp Obesity/su [Surgery]	24669
3	((bariatric or weight loss or weightloss or obesity or obese or anti obesity or antiobesity or restrictive or metabolic) adj4 surg*).ti,ab,kw.	30050
4	bariatric patient?.ti,ab,kw.	1327
5	(sleeve gastrectom* or gastric sleeve* or gastric balloon or roux-y or roux-en-y or omega-loop* or gastroplast* or gastric band* or duodenal switch* or gastric bypass or jejunoileal bypass or biliopancreatic bypass or biliopancreatic diversion* or gastrointestinal diversion*).ti,ab,kw.	28580
6	exp Biliopancreatic Diversion/	1092
7	or/1-6	56289
8	mobile applications/	10697
9	exp Internet/	94635
10	exp cell phone/	21263
11	exp computers, handheld/	12238
12	medical informatics applications/	2550
13	therapy, computer-assisted/	6966
14	(app or apps).ti,ab.	39527
15	(online or web or internet or digital*).ti.	127915
16	((online or web or internet or digital*) adj3 (based or application* or intervention* or program* or therap*)).ab.	72295
17	(phone* or telephone* or smartphone* or cellphone* or smartwatch*).ti.	25377
18	((phone* or telephone* or smartphone* or cellphone* or smartwatch*) adj3 (based or application* or intervention* or program* or therap*)).ab.	15473
19	(mobile health or mhealth or m-health or ehealth or e-health or emental or e-mental).ti.	7727

20	((mobile health or mhealth or m-health or ehealth or e-health or emental or e-mental) adj3 (based or application* or intervention* or program* or therap*)).ab.	5232
21	(mobile* adj3 (based or application* or intervention* or device* or technolog*)).ti,ab.	19735
22	or/8-21	320307
23	7 and 22	300

Embase (via Elsevier), search date: 11.11.2022

#	Query	Results
24	#23 NOT [medline]/lim	319
23	#8 AND #22	619
22	#9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21	424913
21	(mobile* NEAR/3 (based OR application* OR intervention* OR device* OR technolog*)):ti,ab	24350
20	((('mobile health' OR mhealth OR 'm-health' OR ehealth OR 'e-health' OR emental OR 'e-mental') NEAR/3 (based OR application* OR intervention* OR program* OR therap*)):ab	5876
19	'mobile health':ti OR mhealth:ti OR 'm-health':ti OR ealth:ti OR 'e-health':ti OR emental:ti OR 'e-mental':ti	6484
18	((phone* OR telephone* OR smartphone* OR cellphone* OR smartwatch*) NEAR/3 (based OR application* OR intervention* OR program* OR therap*)):ab	20723
17	phone*:ti OR telephone*:ti OR smartphone*:ti OR cellphone*:ti OR smartwatch*:ti	30807
16	((online OR web OR internet OR digital*) NEAR/3 (based OR application* OR intervention* OR program* OR therap*)):ab	98881
15	online:ti OR web:ti OR internet:ti OR digital*:ti	159962
14	app:ti,ab OR apps:ti,ab	56161
13	'personal digital assistant':de	1772

12	'text messaging':de	7060
11	'mobile phone'/exp	42620
10	'internet':de	127602
9	'mobile application'/exp	22119
8	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7	91024
7	'sleeve gastrectom*':ti,ab,kw OR 'gastric sleeve*':ti,ab,kw OR 'gastric balloon':ti,ab,kw OR 'roux-y':ti,ab,kw OR 'roux-en-y':ti,ab,kw OR 'omega-loop*':ti,ab,kw OR gastroplast*':ti,ab,kw OR 'gastric band*':ti,ab,kw OR 'duodenal switch*':ti,ab,kw OR 'gastric bypass':ti,ab,kw OR 'jejunoileal bypass':ti,ab,kw OR 'bilippancreatoc bypass':ti,ab,kw OR 'biliopancreatic diversion*':ti,ab,kw OR 'gastrointestinal diversion*':ti,ab,kw	51061
6	'bariatric patient\$':ti,ab,kw	2836
5	((bariatric OR 'weight loss' OR weightloss OR obesity OR obese OR 'anti obesity' OR antiobesity OR restrictive OR metabolic) NEAR/4 surg*):ti,ab,kw	54388
4	'jejunoileal bypass'/exp	750
3	'gastric bypass surgery'/exp	30194
2	'obesity'/dm_su	12491
1	'bariatric surgery'/exp	53861