Review Paper
Developments in e-Health

Oral & Maxillofacial surgery is ready for patient-centred eHealth interventions – the outcomes of a scoping review

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Abstract. Within the field of oral and maxillofacial (OMF) surgery, eHealth is expected to be a tool to improve quality of care. The aim of this study is to map the research of patient-centred eHealth interventions within OMF surgery by means of a scoping review.

After a systematic literature search, relevant studies on patient-centred eHealth interventions for OMF-surgery patients were selected. The interventions were mapped based on their key components, target population and outcome measures. To gain insight in the research phase of evaluation, the framework of the Medical Research Council (MRC) was used.

Forty-one papers were included, comprising 34 unique interventions. Nineteen interventions were designed for head and neck cancer patients, 11 interventions concernd video-teleconsultation. According to the MRC framework, 26 papers fitted into the feasibility and piloting phase of research, 8 into the evaluation phase, 7 were in the development phase. No implementation studies were found.

This scoping review can be a starting point for those who are interested in applying and evaluating eHealth in their practice. Since many feasibility and pilot studies were found on similar interventions, a more extensive collaboration with and connecting to each other is recommended to catalyze the implementation of eHealth in daily practice. Profound involvement of patients in developing and evaluating eHealth interventions is essential to achieve true patient-centred OMF surgery.

The introduction of internet for citizens in 1993 disruptively changed daily life and thereby healthcare. Not only the general use of internet is common ground, also for health and sickness the internet has become an indispensable source of information. The field of medical informatics referring to the organisation and delivery of health services and information using the

internet and related technologies is called eHealth.[1] eHealth interventions can concern various levels of interaction between and within the different stakeholders e.g. patient, healthcare professional, caregivers, health insurance etc.[2] Examples of eHealth can range from electronic health records used by healthcare professionals, to mobile apps for consumers to track their health and online platforms for patients to share their health related experiences. Since it concerns the delivery of prevention, education, diagnostics and therapy through digital technology, which is independent of time and place, it has the potential to meet the big global challenges in healthcare such as the increasing demand and limited resources.[3,4]

Within the field of oral and maxillofacial (OMF) surgery, eHealth is expected to be a tool to improve the quality of care, in particular to support patients. As certain patient groups, such as head and neck oncology patients and patients with craniofacial abnormalities and their parents, endure high emotional and psychological impact of their condition, one could expect support and information in the form of eHealth to be helpful.[5-7] Numerous studies demonstrated the effectiveness of eHealth in education, monitoring and self-management support.[4] However, systematic and robust empirical evidence of its effectiveness and economic benefits is not yet available.[4,8] Despite its potential, many eHealth interventions linger in the pilot-phase, without being (fully) implemented in daily practice.[4,8] Difficulties with implementation are explained by the multi-level complexity of implementing eHealth interventions.[9] It is a dynamic process of change in which people, organizations and technology continuously interconnect and develop. Furthermore, these processes are interdependent.[4,10]

The aim of this study is to systematically map the research of patient-centred eHealth interventions within OMF surgery in its full extent. A scoping review is the most appropriate approach for this.[11-13] Scoping reviews involve the synthesis and analysis of a wide range of research aiming at summarizing findings and indentifying research gaps rather than aiming at estimating effectiveness or quality of the included studies.[11,14] Specific objectives are to (1) assess the detailed composition of these interventions; and (2) to assess the way in which these interventions were evaluated by producers and users. With these results, integration of patient-centred eHealth interventions in OMF surgery can be facilitated and failure of implementation processes can be prevented by learning from available accomplishments.

Materials and methods

For this scoping review, the methodological framework of Arksey and O'Malley was used, following the five described stages.[11]

Stage I. Identifying the research question

The aim of this scoping review was to map the research of patient-centred eHealth interventions within OMF surgery in its full latitude. To be able to construct a search strategy, both patient-centred eHealth interventions and the field of OMF surgery were defined.

Defining patient-centred eHealth interventions

A patient-centred eHealth intervention was defined as ''an healthcare intervention delivered over the internet designed and developed for patients''.[15] The intervention always has a two-way interaction component, i.e., patient − care professional, patient − patient, patients − people in their personal environment (e.g. family members and friends) and patient − others (e.g. health insurance companies or patient organizations).[2] Consequently, studies on online patient information were for example excluded, as sending information to patients is an unidirectional process.

Defining the field of OMF surgery

For the definition of OMF surgery the definition published by the International Association of Oral and Maxillofacial Surgeons in 2015, was used[16]:

''Oral and Maxillofacial Surgery is the surgical specialty that includes the diagnosis, surgical and related treatments of a wide spectrum of diseases, injuries, defects and aesthetic aspects of the mouth, teeth, jaws, face, head and neck.''

The scope of this specialty is extensive and concerns the diagnosis and treatment of diseases affecting the oral (mouth) and maxillofacial (face and neck) regions, including the following:

- Preprosthetic surgery (bone augmentation)
- Oral and dentoalveolar surgery (removal of impacted and buried teeth, cysts, etc.)
- Dental implant surgery and associated bone grafting
- Orthognathic surgery (dentofacial deformities)
- Facial trauma surgery (facial bone fractures and related soft tissue injuries)
- Reconstructive surgery of the face
- Cleft lip and palate surgery
- Congenital craniofacial surgery
- Facial plastic surgery (rhinoplasty, rhytidectomy, blepharoplasty, facial implants, etc.)
- Temporomandibular joint (TMJ) surgery
- Snoring and sleep apnea correction surgery
- Tumor/Cancer surgery

Added to this definition were oral pathology and pathology of the salivary glands, since benign oral pathology and pathology of the salivary glands was not completely covered by these topics.

Stage 2. Identifying relevant studies

The literature was systematically searched to identify studies on the use of patient-centred eHealth interventions in OMF surgery (see Fig. 1 for the syntax), published up to September 13th 2017. Five electronic databases were included in the search, i.e., PubMed, PsycINFO, EMBASE, Cochrane Database of Systematic Reviews and CINAHL.

Stage 3. Study selection

The retrieved titles were first manually checked for duplicates. Next, two of the authors independently screened all titles and abstracts (SCB and NEMV) using predefined in- and exclusion criteria (Table 1). Study methodology was not restricted in any way in order to avoid the omission of relevant data in a rapidly changing and expanding field. This was in accordance with the scoping review criteria.[11,17] Finally, full-text articles of the selected studies were screened. If the relevance of the study was unclear from the abstract, the full article was examined. In all stages, a third reviewer (MJF) solved conflicts in the assessment of studies. The bibliographies of all included studies were checked for relevant titles, to avoid missing relevant publications.

Stage 4 and 5. Charting data and collating, summarizing and reporting the results

In both stages, a descriptive analytical method was used, in which two authors (SCB and NEMV) independently collected information of each study on the following topics:[11]

- To create an overview of the studies, study characteristics such as aim of the

Oral & Maxillofacial Surgery
"Head and Neck Neoplasms"[Mesh] OR "Oral Surgical Procedures"[Mesh] OR "Surgery, Oral"[Mesh] OR "Oral Medicine"[Mesh] OR "Oral Health"[Mesh] OR "Cleft Palate"[Mesh] OR "Cleft Lip"[Mesh] OR "Temporomandibular Joint"[Mesh] OR "Craniofacial Abnormalities"[Mesh] OR "Sleep Apnea, Obstructive" [Mesh] OR "Facial Injuries" [Mesh] OR Stomatognathic Diseases [Mesh] OR saliva*[tiab] OR facial [tiab] OR oral health care [tiab] OR TMJ [tiab] NOT ear[tiab] NOT laryng*[tiab] NOT nose [tiab] NOT parathyroid[tiab] NOT thyroid [tiab] NOT trachea*[tiab]

eHealth
"Telecommunications"[Mesh] OR "Telemedicine"[Mesh] OR "Cellular Phone"[Mesh] OR "Electronic Mail"[Mesh] OR "Internet"[Mesh] OR ehealth[tiab] OR e-health[tiab] OR health 2.0[tiab] OR mhealth[tiab] OR medicine 2.0[tiab] OR web 2.0[tiab] OR internet[tiab] OR information communication technolog*[tiab] OR web based[tiab] OR online[tiab] OR world wide web[tiab] OR website[tiab] OR teleconsultation[tiab] OR email[tiab] OR e mail[tiab] OR telecare[tiab] OR telemedicine[tiab] OR tele care[tiab] OR tele medicine[tiab] OR website[tiab] OR online[tiab] OR new media[tiab] OR virtual communit*[tiab] OR virtual consultation[tiab] OR wiki*[tiab] OR cell phone[tiab] OR PDA[tiab] OR personal digital assistant[tiab] OR iphone[tiab] OR smartphone[tiab] OR electronic health[tiab] OR ipad[tiab]

Fig. 1. Syntax eHealth and OMF surgery.

study, design, study population, aim of the eHealth intervention were collected.
- To map the different types of eHealth interventions, they were classified in one of the six subtypes of eHealth interventions according to the categorization of Barak et al.: web-based education interventions, self-help web-based therapeutic interventions, human supported web-based therapeutic interventions, online counselling, internet-operated therapeutic software and other online activities.[18]
- To obtain a full understanding of the interventions, the defined key components of each intervention, also according to Barak et al., were recorded. The key components are: 1. program content, indicating the nature of the information disseminated within the intervention, 2. multimedia use, indicating the use of other options than text to disseminate program content, such as pictures, graphics, animations, video and audio, 3. interactive online activities, indicating whether the intervention offers patients the opportunity to participate interactively within the program and 4. feedback support provision, indicating a mechanism (automated or by human support) whereby patients can obtain external information about themselves and their progress.[18] With this

information the main characteristics of the interventions could be mapped.
- To gain insight into the research phase in which the interventions were evaluated, the framework of the UK's Medical Research Council (MRC) was used.[19,20] In this framework four phases of research regarding complex interventions are defined: development, feasibility & piloting, evaluation and implementation.
- The intended effectiveness measures and outcomes on usability evaluation of interventions were extracted. Intended effectiveness measures were defined as the main outcome of the intervention, for example the change in quality of life.

Differences in data extraction were discussed until the two authors were confident that all data were coded in the appropriate categories.

Results

Stages 1, 2 and 3. Literature search and study selection

The literature search provided 7356 unique citations. Screening titles and abstracts yielded 95 relevant citations, of which 41 remained after assessing the full-

texts.[5–7,21–58] No additional relevant citations were identified from the reference lists of included citations (Fig. 2).

Stage 4 and 5. Charting data and collating, summarizing and reporting the results

An increasing amount of publications from 2000 up until 2017 was found on patient-centred eHealth interventions in OMF surgery (Fig. 3). An overview of the interventions is presented in Table 2. Tables 3 and 4 (online appendix) present the detailed data extracted from the studies in this review.

Categorization of patient-centred eHealth interventions

The 41 papers presented 34 unique eHealth interventions. The interventions concerned twelve different patient groups. The majority, 19 out of 34, were designed for head and neck oncology patients.[5,6,22–25,28,29,31–34,38,40,42–46,48,52,55–58] Three interventions focused on cleft patients[26,39,41], three on patients with oral lesions[49,51,54] and two on trauma patients.[21,47]

The search revealed a rich pallet of interventions, ranging from teleconsultation via video and online gaming, to self-management platforms. Most interventions, 21 out of 34, concerned online counselling interventions of which eleven concerned teleconsultation via video.[21–30,39,44,47–49,51–56] All of these teleconsultations took place at a local health facility where a connection was made to a remote specialised health centre.

Twenty-three out of 41 papers collected data from patients in the actual evaluation

Table 1. In- and exclusion criteria for study selection.

| Inclusion criteria	The study had to be written in English.
	The study had to concern patient-centred eHealth interventions.
	The study had to concern patients with an OMF surgery related condition.
Exclusion criteria	The study concerned patients with strict dental conditions.
	The study concerned patients with thyroid gland conditions.
	The study concerned students or healthcare professionals.
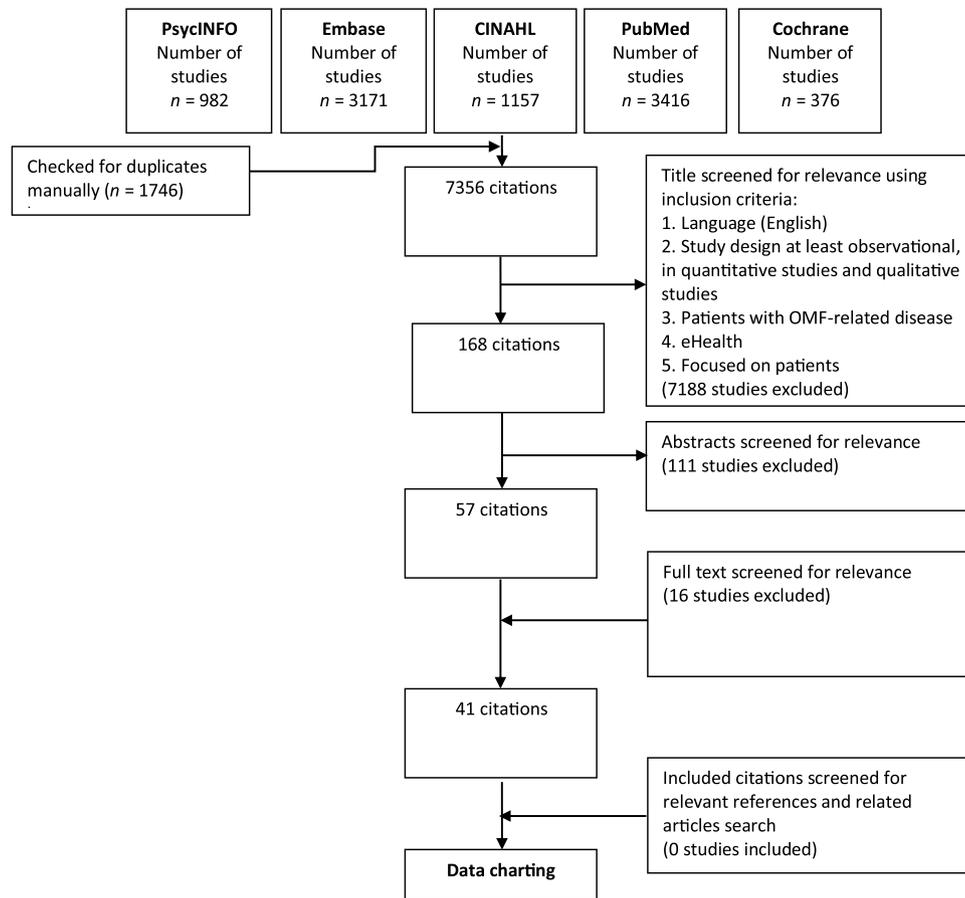
Fig. 2. Literature Search and study selection.

of the eHealth interventions, 24 out of 41 involved health care professionals in the evaluation. Thirteen out of 41 papers took both patients' and professionals' perspectives into account in the evaluation.

The level of interaction was mainly between patients and healthcare professionals (28 out of 34). Only five interventions reported on the involvement of family members or caregivers.[22,23,28,43,49]

In four interventions, all for head and neck cancer patients, peer support was taken into account.[5,23,31,32,38,43] All of these interventions facilitated interaction with fellow sufferers, in one case by means of a peer joining a teleconsultation session.[23]

Evaluation type of patient-centred eHealth interventions

According to the MRC framework, the majority of the papers (27 out of 41) fitted into the feasibility and piloting phase.[6,22–26,28–30,32,34,35,39,41,44–54,56,57] Seven papers reported on the development of interventions.[7,21,31,33,38,40,43] Seven papers assessed the effectiveness of interventions and were thereby evaluation phase studies.[5,27,36,37,42,55,58] Two of these, however, presented a study-protocol for the evaluation study, no results were published yet.[37,58]

The feasibility and piloting studies mainly evaluated the satisfaction, usability and level of concordance of the intervention. For example a telehealth messaging device for head and neck cancer patients was satisfactory to 95% of the
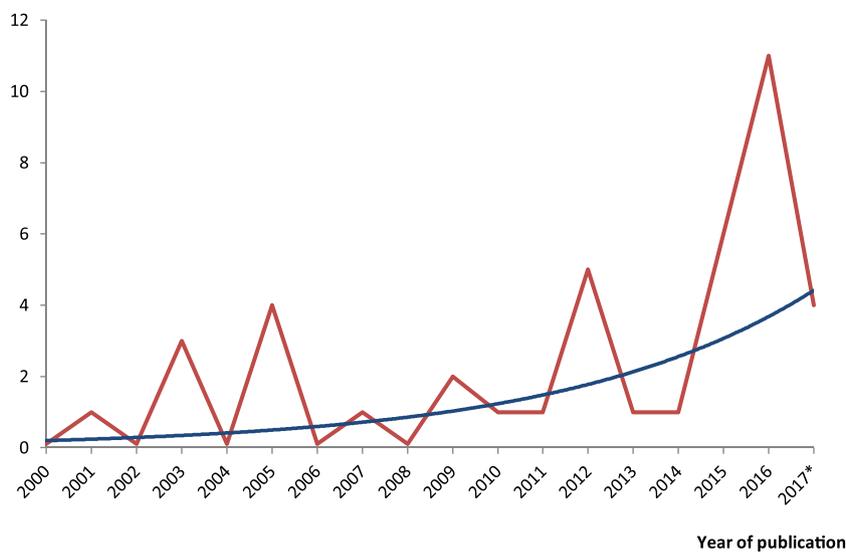

Fig. 3. Number of publications on patient-centred eHealth interventions in OMF surgery per year.
*For 2017 publications until September 13th are included.

Table 2. Overview of population and interventions.

Target patient population	Aim interventions	Characteristics interventions
Online counselling interventions - Children with cleft lip and/or palate (n=2) - H&N cancer patients (n=9) - Patients with facial injury (n=2) - Patients with oral lesions (n=3) - Patients with queries (n=1) regarding OMF surgery - Patients with TMJ disorders (n=1) - Pre-operative OMF patients in prison (n=1) - Surgeons & nurses in H&N cancer care (n=1)	- Communication with caregivers, patients & family - Empower appropriate patient self-care and decompress provider schedules - Peer support - Providing information for patients - (Psychosocial) support - Facilitate faster diagnosis and therapy by removing geographic distance - Improve access to (specialist) healthcare - Increase efficiency - Avoid travel - Reduce time and cost - Reduce the waiting time for patients by specific patient selection for referral	Teleconsultation via video (n=11) - Patient consultations and examination by specialist in remote location - Remote post-operative monitoring of patients - Patients participating in multidisciplinary meetings via videoconferencing - Education of patients and family and local health care providers - Peer support for family and patients, consultation and education for clinicians - Case discussions between clinicians - Review of clinical, pathological and imaging data at tertiary centre Teleconsultation via text-messaging (n = 6) - Online medical consultation service on which patients can post questions - E-mail contact of patients and family members with surgeons and nurses - Mobile messaging apps to provide motivational support and communication with care providers after hospital discharge Web-based and mobile screening and referral tools (n = 3) - Radiographs and clinical date are sent to specialist at distant location - Specialist reviews the data and provides input on diagnosis and management - Patient reports information - Tool creates summary report of data and identifies areas of concern
Web-based education interventions Children (5-7yr) undergoing general anaesthesia for tooth extractions (n = 1) - H&N cancer patients (n = 1) - Orthognatic patients (n = 1) - Parents of children with cranial abnormalities (n = 1)	- Facilitate communication for patients with professionals and fellow-sufferers - Facilitate early detection of problems by monitoring - Improve coping behaviour - Improve quality of information - Providing information and education	Website for parents (n = 1)

Table 2 (*Continued*)

Target patient population	Aim interventions	Characteristics interventions
		Electronic health information support system (n = 1)
		- Communication with professionals via messages within the system - Information via specially developed website - Forum for contact with fellow sufferers - Monitoring via electronic questionnaires after discharge with automated e-mail alerts to 2 nurses
		Online game (n = 1)
		- Contains information, cartoons and videos on general anaesthesia, role modelling, fasting instructions and oral health messages
		Mobile app (n = 1)
		- Animations on pre-surgical, surgical and post-surgical information on orthognatic surgery
Human-supported web-based interventions - H&N cancer patients (n = 3)	- Increase patient self management of symptoms by daily education, guidance, encouragement - Remote monitoring - Improving interaction with the specialists	Telehealth messaging device (n = 1) - Encourages self-management by daily questions for patients to answer - Automated feedback and nurse feedback Online platform (n = 1) - Collecting self-reported outcomes via questionnaire - Collecting outcomes of home based sensors for weight, blood pressure, and pulse Mobile app for outpatient support (n = 1) - Education: information on diagnosis and treatment - Peer support: map with all registered users and useful locations - Monitoring: QoL and symptom questionnaires - E-mail function which automatically sends report of the monitored data to the physician and by which patient can contact the physician
Self-help web-based therapeutic interventions - Individuals with visible differences (n = 2) - H&N cancer patients (n = 4) - Children with cleft lip and/or palate (n = 1)	- Facilitate communication - Improve access to care on distance - Improve self-management and quality of life - Reduce anxiety and appearance related distress - Support patients post-discharge	Web-based cognitive behavioural therapy intervention for individuals with visible differences (n = 2)

Table 2 (*Continued*)

Target patient population	Aim interventions	Characteristics interventions
		Online self-management (n = 2)
		- QoL questionnaire
		- Tailored feedback, information and advice as result from the outcomes in QoL questionnaire
		- Personalized supportive care options based on outcome
		- Access information; text, quizzes, visual cues and video's
		- Skill-building by action planning, behavioural monitoring tools, reminders, exercises, relaxation techniques, identify and challenge irrational thoughts
		- Offer support to peers and each other
		Mobile app with interactive speech game (n = 1)
		- The game facilitates at home practice
		Mobile app for augmentative and alternative communication (n = 1)
		- Provides a communication solution for patient with difficulty speaking in the immediate post-operative setting
		Mobile app to support swallowing practice (n = 1)
		- Assist patients to complete home-practice
		- Instructional videos, images and text
		- Capacity to record repetitions
		- Clinicians were able to customise patient profiles, remotely monitor therapy adherence, and receive communication from the patient

In this table the interventions are displayed per category according to Barak et al.[18].

patients. 65% of patients were even more satisfied with the communication and experienced better care as result of the device.[6,33,58] An example of usability outcome can be found in a paper describing the feasibility of a mobile messaging app for post-operative head and neck cancer patients after hospital discharge. It was assessed to be extremely easy to use by 89% of the participants. 95% of them stated that the app helped them to deal more effectively with their health. Three out of five non-enrollers in this study stated that they were concerned about privacy issues.[56] Finally, pilot and feasibility studies reported on the level of concordance, for example by comparing diagnostic agreement between oral lesions that were assessed via Whatsapp versus clinicopathologic assessment: in 82% of the cases (n = 96) assessments were concordant.[49]

Evaluation studies (n = 7) applied a wide range of measures to demonstrate the effectiveness of the intervention. Three of the seven studies reported on the quality of life.[5,36,42] For example an electronic health information support system for head and neck cancer patients improved 5 out of 22 quality of life subscales after 6 weeks of using the system. After 12 weeks follow-up, this effect sustained in one out of 5 subscales.[5]

The remaining four evaluation studies differed widely in their outcome measures, typically closely related to the intervention itself. For example, the efficacy of a teleconsultation intervention between a patient with a local speech pathologist and a speech pathologist at a tertiary centre, time of referral to response, time of response to initial clinical management, the number of contact events per referral and technical difficulties were evaluated.[55] Whereas the efficacy of an online self-management app for head and neck cancer patients was measured in terms of patient activation, self-efficacy, personal control, perceived patient-physician interaction, mental adjustment to cancer, need for supportive care, health related quality of life and cost-utility outcomes.[58]

Discussion

eHealth is a promising remedy for global health challenges and has the potential to improve health systems, safety, quality, accessibility and efficiency in healthcare.[3,4,59] Since the World Health Assembly resolution in 2005 endorsed these potential benefits and urged the member states to make long-term strategies to develop and implement eHealth services, an

increase in eHealth applications and thereby publications is seen.[59] As scientific results are not merely in favour of the benefits of eHealth, robust evidence is needed to live up to these high expectations.[4,8,10] An evidence based overview about the current landscape might decrease unrealistic expectations which hinder long-term progress, and can help to identify areas with the greatest potential of benefit.[8] This could be useful for clinicians, researchers and policy-makers. Added to this, performing a scoping review reduces duplication of research and guides future research.[14] This study provides an overview of the available research of patient-centred eHealth interventions within OMF surgery. The detailed composition of these interventions and the evaluation of these interventions are mapped.

The vast majority of the interventions was designed for head and neck oncology patients and aimed at supporting these patients. This can be understood by the long lasting and high impact character of this specific care. Consequently, one would expect that other patient groups who require chronic care with high impact, such as patients with congenital craniofacial deformities, would also benefit from eHealth. Especially since this concerns children, adolescents and their (young) parents, whom are very active on online platforms in their daily life. Our review, however, did not confirm this expectation: we retrieved only four interventions that targeted younger populations suffering from deformities requiring long-lasting care. It might be concluded that this is a hiatus in the available scientific output and possibly the care we provide to our patients and their parents.

Video-teleconsultation is by far the most studied type of intervention. Eleven out of 34 interventions concern teleconsultation via video. Notably, most of these teleconsultations were used to enhance or provide access to specialist care. Hence, these teleconsultations did not take place at the home of the patient, but at a local healthcare facility. Both patients and professionals were satisfied with the use of these teleconsultations. Travel time, CO_2 emission reduction and financial cost savings were assessed by six papers. But strikingly, no real cost-effectiveness analyses have been performed. There is a need for thorough research to determine whether teleconsultation in OMF surgery is cost-effective, as for example was done for online paediatric asthma management and an internet-based peri-operative care programme for gynaecological patients.[60,61] In these future cost-effectiveness analyses, the evaluation of the macro economic effects such as less lost working hours for patients and caregivers and less lost school hours for children are of great importance.

Concerning the level of interaction of the interventions, remarkably only five interventions reported on the involvement of family members or caregivers of head and neck oncology patients in the intervention. This involvement concerned joining teleconsultations, having email contact with health care professionals, having a tailored content in an online platform for oral cancer survivors and their caregivers and being able to upload a photo in a mobile messaging app for patients with oral lesions. In two of these five studies family members and caregivers were involved in evaluation of the interventions.[28,43] Since it is known that support by family members and caregivers is of great importance to head and neck oncology patients, increasing this support to patients might be a real opportunity to improve care.[62–64] Stronger involvement of family members and caregivers in future eHealth interventions should be considered.

Four papers also incorporated contact with other patients, but this was the least used function within an electronic health information support system.[5] A needs assessment for an online platform for self-management after oral cancer revealed that 77% of survivors and 75% of caregivers would use the intervention to learn about other survivors' and caregiver's experiences.[43] It is questionable however, whether head and neck oncology patients do have the need to get in contact with fellow sufferers. Lang et al. and Bressan et al. did report that support from head and neck oncology peers is of importance.[62,63] Oskam et al. however found that there was little need for and use of peer contact.[65] Further research to the needs and actual use of peer support is needed to be able to tailor future eHealth interventions to the specific needs of patients with head and neck cancer.

Regarding the patient-centredness of the interventions, only 23 out of 41 papers involved patients in the evaluation of the eHealth interventions. Even more so, 13 papers considered patients' and professionals' perspectives. A profound shift to collaboration with our patient to achieve true patient-centred OMF surgery, still has to be made.

There are some limitations to this study that should be considered. First of all, the literature search was limited to the English language. This might have caused that potentially relevant papers are missed. Secondly, since technology is developing exponentially, new eHealth applications will arise every day. This might result in a publication bias, since not all eHealth experiments lead to publications, although there is an exponential growth in the amount of papers on eHealth in the last three years (Fig. 3). Thirdly, an evaluation of the quality of the included studies was deliberately not performed, since the primary aim of this study was to map all research on patient-centred eHealth interventions within OMF surgery, regardless its quality. This is in full accordance with the purpose of a scoping review.[11,14] However, assessing the MRC phase of the studies gives an idea of the quality of the studies.[19,20] Nevertheless, it has to be emphasized that caution has to be provided with generalizing findings from the particular studies.[11]

Mapping successes, failures and barriers of implementation turned out to be impossible with this scoping review, because too little evaluation and no implementation studies were found. Only for three interventions subsequent phases of research were published beyond the pilot & feasibility evaluation. Implementation in daily practice was not assessed in the studies included in this scoping review. Most of the interventions currently evaluated still fit in the feasibility and piloting phase of research. Only seven evaluation studies were identified, which can imply that implementation of eHealth interventions in daily praxis is not yet reality. However, it can also signify that eHealth interventions already become part of daily praxis after a successful pilot study and some research phases are skipped in this process. Still, it is desirable to perform evaluation studies which take patients', professionals' and family members' perspectives into account. Thereby, results are shared and eHealth implementation in OMF surgery can get to a higher level by making optimal use of each others' experiences.

As Ossebaard et al. state ''many promising projects do not survive the pilot-phase [. . .] we must shift our attention towards implementation.''[4] A systematic review of systematic reviews on factors that influence the implementation of eHealth, does give seven recommendations for implementation of eHealth interventions in general.[9] For example, the selection of an appropriate eHealth system needs careful consideration, taking into account the complexity, adaptability, compatibility with existing systems and

costs. Furthermore, key stakeholders and implementation champions should be included as early as possible in the implementation process.[9] Learning to better implement eHealth and to share the outcomes of high-quality eHealth assessments is mandatory to improve quality of healthcare.[4] For example, in 2011 an holistic framework for the development of eHealth technologies was developed which was also published as an open Wiki to foster development of sustainable eHealth by means of collaboration.[10] Unfortunately, the results of this Wiki collaboration are not yet available. Conventional controlled or randomized study designs seem less appropriate to evaluate eHealth interventions, because of the complexity and the sociotechnological dynamics. A combination of quantitative and qualitative research methods, however, can be used instead to assess the impact of eHealth.[4] The methodology that is used to evaluate eHealth interventions should be multidisciplinary and thereby capable of untangling the complex factors that may influence the results.[8]

The knowledge gained from this scoping review about patient-centred eHealth interventions within OMF surgery can be a starting point for OMF surgeons who want to use eHealth in their practice. Integration of patient-centred eHealth interventions in OMF surgery is facilitated and failure of implementation processes might be prevented by learning from available accomplishments. Sharing information and experience by collaboration with and connecting to each other will help to get the most out of eHealth interventions in an efficient manner, thereby making sustainable use of resources. Profound involvement of patients in developing and evaluating patient-centred eHealth interventions will lead to a more intensive collaboration between clinicians and patients and the inevitable cultural shift to lift up health(care) to a next level.

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Competing interest

None.

Disclosure

There are no financial conflicts of interest.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.ijom.2018.10.001.

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