International Journal of Operations & Production Management

157

Unpacking patient engagement in remote consultation

Zhening Liu, Alistair Brandon-Jones and Christos Vasilakis
School of Management, University of Bath, Bath, UK

Received 8 April 2023
Revised 17 October 2023
6 December 2023
Accepted 15 January 2024

Abstract

Purpose – The purpose of this paper is to examine patient engagement in remote consultation services, an increasingly important issue facing Healthcare Operations Management (HOM) given the significant expansion in this and other forms of telehealth worldwide over the last decade. We use our analysis of the literature to develop a comprehensive framework that incorporates the patient journey, multidimensionality, antecedents and consequences, interventions and improvement options, as well as the cyclic nature of patient engagement. We also propose measures suitable for empirical assessment of different aspects of our framework.

Design/methodology/approach – We undertook a comprehensive review of the extant literature using a systematic review approach. We identified and analysed 63 articles published in peer-reviewed scientific journals between 2003 and 2022.

Findings – We conceptualise patient engagement with remote consultation across three key aspects: dimensions, process, and the antecedents and consequences of engagement. We identify nine contextual categories that influence such engagement. We propose several possible metrics for measuring patient engagement during three stages (before service, at/during service and after service) of remote consultation, as well as interventions and possible options for improving patient engagement therein.

Originality/value – The primary contribution of our research is the development of a comprehensive framework for patient engagement in remote consultation that draws on insights from literature in several disciplines. In addition, we have linked the three dimensions of engagement with the clinical process to create a structure for future engagement assessment. Furthermore, we have identified impact factors and outcomes of engagement in remote consultation by understanding which can help to improve levels of adoption, application and satisfaction, and reduce healthcare inequality. Finally, we have adopted a "cyclic" perspective and identified potential interventions that can be combined to further improve patient engagement in remote consultation.

Keywords Healthcare operations management, Remote consultation, Telehealth, Healthcare, Customer engagement, Patient engagement, Service operations

Paper type Literature review

1. Introduction

In recent years, as the healthcare industry has experienced explosive growth in emerging technologies, the delivery of healthcare has changed dramatically (Bavafa *et al.*, 2018; Dai and Tayur, 2019). Remote consultations, facilitated by telehealth technologies, have emerged as an effective alternative to traditional face-to-face visits. The adoption of telehealth technologies, particularly remote consultations, offers the potential to empower physicians and enhance patient care in myriad ways (Ferrand *et al.*, 2018; Mukherjee and Sinha, 2020; Rajpurkar *et al.*, 2022). However, for remote consultation to become established as an integral part of healthcare operations models, various challenges and influencing factors need to be identified and evaluated (Heim *et al.*, 2021; Stevens and van Schaik, 2020). Patient engagement is one of the crucial issues in this context.

International Journal of Operations & Production Management
Vol. 44 No. 13, 2024
pp. 157-194
Emerald Publishing Limited
0144-3577
DOI 10.1108/IJOPM-03-2023-0188

The idea of engagement has been studied extensively in service industries but defined with little consistency (Brodie *et al.*, 2011; Van Doorn *et al.*, 2010; Verhoef *et al.*, 2010). In the management domain, engagement frequently refers to a sense of involvement, of being connected with or attached to something (Verhoef *et al.*, 2010) with a particular focus on customer engagement (Chandler and Lusch, 2015). In Healthcare Operations Management (HOM), these ideas resonate strongly in efforts to deliver more effective and efficient service to patients. Terms such as patient adherence, patient involvement, patient participation and patient engagement (Barello *et al.*, 2016) all refer to the goal of making patients more active in the healthcare setting, yet each has a distinct meaning (Menichetti *et al.*, 2016). For example, patient adherence describes the patients' behavioural patterns, whilst patient involvement or participation focuses more on the interactions between patients and healthcare professionals (Gambetti and Graffigna, 2010; Hardyman *et al.*, 2015). In slight contrast, patient engagement – the focus of our research – is often viewed as an "umbrella" term that takes a more extensive view of a patient's role in dealing with their own healthcare (Barello *et al.*, 2016; Hardyman *et al.*, 2015; Menichetti *et al.*, 2016). The term has its origins in the consumer health paradigm and treats patients as subjects in a socio-cultural setting (Gambetti and Graffigna, 2010; Hardyman *et al.*, 2015).

Engagement provides patients with relevant medical information, allowing them to contribute to decisions on their treatment options (Prey *et al.*, 2014; Tang and Lansky, 2005). In addition, greater patient engagement can improve medication adherence, patient satisfaction and overall health outcomes (Barello *et al.*, 2016; Tobiano *et al.*, 2019). So, whilst the nature of HOM varies significantly, from chronic disease to acute accident, from primary care to secondary care, and from developed countries to developing ones, increasing patient engagement and improving patient health outcomes are critical issues faced by healthcare organisations worldwide.

Although health systems have been striving for increased participation from patients, a more in-depth understanding and investigation of patient engagement in remote consultation is needed (Grey *et al.*, 2023). The acceptance and effective adoption of remote consultation and other telehealth technologies by physicians and patients are directly related to the effectiveness of implementation, making patient engagement an essential issue that needs to be addressed in this setting (Jussupow *et al.*, 2021).

Clearly, the COVID-19 pandemic acted as a major catalyst in propelling face-to-face healthcare services towards technology-mediated care, and the speed of this change has generated significant challenges for patient engagement within remote consultation contexts (Cadel *et al.*, 2021). For instance, many stakeholders have been reluctant to embrace remote consultation (Galle *et al.*, 2021). Even as patients and clinicians have gained familiarity with such services, many patients would still prefer to see healthcare professionals in person and perceive remote consultation as second best, which could consequently impact patient interactions, experiences, and outcomes (Tyler *et al.*, 2021). Yet, in many healthcare settings, national or local policy points to the retention and further expansion of remote consultation. One of our previous works shows, in a regional hospital in the UK, a dramatic increase in the remote outpatient appointment rate following the outbreak of the COVID-19 pandemic (from 4.01% to 34.51%) which, whilst dropping back to some extent after the first phase of the pandemic (21.76%), remained five times higher than its pre-pandemic level. According to these early post-pandemic signs, remote consultation will form a major part of evolving hybrid models of care delivery. The rapid adoption and the disparity between policy directions and patient preference may affect the service quality and overall patient satisfaction, and underscore the need to understand the definition and determinants of patient engagement, viable strategies to bolster it, and contextually relevant metrics to assess patient engagement in remote consultations.

The issue of patient engagement in remote consultations sits at the evolving interface of Healthcare and Service Operations in OM. It involves the discussion of a timely exploration into how the service delivery process of remote consultation, patient behaviour, engagement, and experience are being reshaped, especially in an era marked by increasing reliance on remote healthcare delivery (Dai and Tayur, 2019; Johnston, 1999). However, to date, there remains a relative paucity of research focused on creating a comprehensive understanding of patient engagement in remote consultation services (Barello *et al.*, 2016; Fox *et al.*, 2021; Kc *et al.*, 2020).

Therefore, the aim of our paper is to conduct an extensive review of extant literature to establish a more comprehensive understanding of the concept of patient engagement in healthcare settings, with a specific focus on remote consultation services. By more fully understanding the nature of engagement and properly measuring and monitoring it, it becomes possible to identify improvements in patient outcomes and overall experience. Thus, we seek answers to the following research questions:

RQ1. How can we conceptualise and define patient engagement in the context of remote healthcare consultation?

RQ2. What factors influence patient engagement in remote consultations, and how do they function as barriers, facilitators, or potential intervention points, and how do they drive outcomes?

RQ3. What are the key metrics that can effectively assess patient engagement in remote consultations?

To examine these questions, it was crucial to ground our understanding in the foundational theoretical/conceptual works of the management discipline. This was essential to establish a firm theoretical base, define the core concepts of engagement, and provide context for our subsequent analyses. Following this foundational exploration, we systematically reviewed the empirical evidence specifically for patient engagement in remote consultation, adhering to the protocol set by Tranfield *et al.* (2003). Within this review process, we carried out *quantitative* descriptive analyses to categorise and quantify the articles and data within. Meanwhile, we undertook *qualitative* thematic analyses to discern patterns and insights from the content of the articles. This analytical approach facilitated our development of a comprehensive framework for patient engagement in remote consultation, enabling us to identify potential enablers, inhibitors, interventions for improvement, outcomes, and measurement approaches.

Over the past decade, HOM has flourished as a distinct and important area within OM (Dai and Tayur, 2019). Publications in leading OM journals have covered a wide array of healthcare topics, reflecting the growing interest and diversity within this domain (Alexander *et al.*, 2022; Dobrzykowski and Tarafdar, 2015; Green, 2012; Guha and Kumar, 2018; Lee *et al.*, 2011). What has been less represented, however, is the rapid emergence and integration into routine clinical practice of telehealth, particularly remote consultation, within HOM (Queenan *et al.*, 2011 offering a rare exception to this). Our research seeks to address this gap, highlighting how remote consultation, turbo charged by events such as the COVID-19 pandemic, is transforming healthcare delivery. This shift in practice is mirrored by a corresponding uplift in academic interest, as evidenced by an increase in telehealth-related articles in leading OM conferences and special issue calls (For example, Journal of Operations Management, 2023). Given the clear shift in practice and scholarly attention, our paper presents timely insights into patient engagement in remote consultations. It aligns with the OM community's focus on adapting to and shaping these new digital healthcare paradigms. As such, we believe this research not only contributes to the theoretical advancement of HOM but also resonates strongly with the current interests and future direction of the OM field.

The primary contribution of our research is in linking patient engagement concepts with operational approaches for managing remote consultations effectively. Firstly, our comprehensive framework, grounded in interdisciplinary insights, offers a structured approach to understanding patient engagement. This framework not only integrates the patient journey but also captures the multifaceted nature of engagement, thus addressing the complexity inherent in healthcare operations management. Secondly, by synthesising a broad literature base, we provide a tool tailored for HOM academics and practitioners to systematically identify operational bottlenecks and opportunities, particularly in remote consultation processes. This directly contributes to the dual concerns of effectiveness and efficiency in Operations Management. In addition, linking the three dimensions of engagement with clinical processes introduces a unique structure to monitor, assess, and enhance engagement at every stage of clinical consultation. This structured approach allows for more precise intervention and resource allocation in healthcare delivery, enabling improved service quality and patient satisfaction. Moreover, by identifying key impact factors and outcomes, our research equips healthcare decision-makers with a strategic edge. Leveraging these insights, decision-makers can develop strategies to boost adoption rates, ensure consistent service application, elevate patient satisfaction levels, and significantly mitigate healthcare inequalities. Finally, we adopt a "cyclic" perspective on engagement, as conceptualised by O'Brien and Toms (2008), which outlines phases of *point of engagement*, *engagement*, *disengagement*, and *re-engagement*. This offers healthcare scholars a useful perspective, emphasising engagement as a recurring cycle, to examine strategies for sustained patient interaction, retention, and loyalty. With these articulated contributions, our research aims to advance the field of healthcare operations management, especially in the context of remote consultations.

The remainder of the article proceeds as follows. First, we provide a brief theoretical background of customer engagement. We then outline the process and methodology of our review work. In the results section, we examine engagement in remote consultation in relation to three key aspects: dimensions; process; antecedents and consequences. We then outline possible metrics of engagement, as well as potential interventions for its improvement. To set a direction for future investigations and bridge gaps with conceptual insights, we conclude by discussing our findings and presenting an agenda for future research.

2. Theoretical background

Before diving into the specifics of our comprehensive literature review on patient engagement in remote consultation services, it is essential to establish a foundational understanding of the broader "engagement" concept. While some may anticipate this discussion within the main literature review, we believe that prefacing our focused review with a discussion of seminal works offers readers a robust theoretical lens through which to interpret and understand subsequent findings. Thus, in this section, we outline seminal works that address the concept of engagement in different service sectors, highlighting the development of its definition, influencing factors, and metrics. These seminal works were selected from leading journals in the management discipline based on the criteria that the journal is either included on the University of Texas at Dallas (UTD) list or has a ranking of four (or four-star) on the Chartered Association of Business Schools (ABS) Academic Journal Guide. Restricting searches to elite field journals is common orthodoxy in management reviews (Tranfield *et al.*, 2003; Durach *et al.*, 2017) and aligns to recent review papers in this journal (for example, Matinheikki *et al.*, 2022).

Engagement is a complex and multifaceted construct that needs an in-depth exploration. After an extensive review of seminal works on engagement and customer engagement, three aspects – *dimensions* of engagement, *process* of engagement, and the combined, yet interrelated, aspects of *antecedents and consequences* of engagement – consistently emerged

as prominent themes that collectively inform the understanding and conceptualisation of engagement across various disciplines. These seminal works are mostly from three different service types – general service, remote service and remote healthcare service. In the rest of this section, we describe the relevant theoretical works and frameworks that speak to these three aspects.

2.1 Dimensions of engagement

A priority for any research that tries to fully understand customer engagement is to deconstruct the concept. The definition of customer engagement in various disciplines can be divided into unidimensional views and multidimensional views (Brodie *et al.*, 2011). For example, Van Doorn *et al.* (2010) describe engagement as a behavioural manifestation, implying a unidimensional view. Kumar *et al.* (2010) counter, arguing that merely evaluating customer transaction behaviours is insufficient as a measure of customer engagement. Based on this, Mollen and Wilson (2010) propose a more holistic perspective that also incorporates cognitive and emotional dimensions. In a similar vein, O'Brien and Toms (2008) identify attributes of engagement relating to the user, the system, and user–system interaction by combining four related theories – flow theory (Csikszentmihalyi and Csikzentmihaly, 1990), aesthetic theory (Wreen and Callen, 1982), play theory (Stephenson, 1967) and information interaction theory (Toms, 2002) – with attributes then divided into three dimensions: behaviours, emotions and cognitions. The behavioural dimension concerns a user's activities relating to participation and transaction; the emotional dimension considers the user's experience and feelings; while the cognitive dimension involves the user's beliefs and knowledge in relation to the system or service (Vargo and Lusch, 2016; Pachankis, 2007).

However, whilst a multidimensional perspective on engagement has gained traction with scholars, the precise dimensions and application settings vary considerably from one study to another. For instance, to further develop the engagement dimensionality model, Brodie *et al.* (2013) apply it to online brand communities, while Vivek *et al.* (2012) leverage interviews with a series of executives to present four dimensions of engagement, adding a social dimension to the three mentioned by O'Brien and Toms (2008). To test their proposition, Vivek *et al.* (2014) develop a 10-item Customer Engagement Scale for measuring customer engagement, which has been validated across several brand and retail contexts.

Beyond traditional marketing settings, there exists a small body of work exploring engagement in other industries and sectors, from single-channel to multi-channel businesses and from offline to online services. In healthcare specifically, the extent of research is very limited. Notable exceptions include Carman *et al.* (2013), who demonstrate that the forms of engagement can be various, including consultation, involvement and partnership, and shared leadership, and that these forms can occur through different healthcare activities, at the levels of direct care, organisational design, and governance and policymaking. Meanwhile, Shippee *et al.* (2015) include patient and service user initiation, reciprocal relationships, co-learning, and re-assessment and feedback as components of engagement in healthcare.

2.2 Process of engagement

Two critical phenomena have triggered the emergence of the customer engagement concept: the development of internet technology and the shift in management mindset – from a goods-dominant to a service-dominant (S-D) logic (Sawhney *et al.*, 2005). Customer engagement is also deemed a key criterion that can reflect customers' experience of and involvement in service, and has a further effect on a firm's business profit and brand impression (Lim *et al.*, 2022). However, these conceptions have not indicated whether engagement is a one-time perception that happens at a certain point, or an iterative process that waxes and wanes at different times.

Most of the related studies posit engagement to be a closed process with various phases. For example, O'Brien and Toms (2008) are the first to critically deconstruct the term engagement and identify it as involving four phases – point of engagement, period of sustained engagement, disengagement, and re-engagement – by performing interviews with the users of web searching, online shopping, webcasting, and gaming applications. However, such engagement process models have not been applied in a healthcare context. Sashi (2012) also assumes customer engagement to be a closed cycle, but involving six phases of development – connection, interaction, satisfaction, retention, loyalty and advocacy – leading to engagement itself as the "final" stage of the loop because it can expand the value obtained by a user through co-creation. Meanwhile, Bowden (2009) interprets the process of engagement as an iterative psychological pathway whereby new customers become repeat customers through the build-up of calculative commitment, affective commitment, involvement and trust.

2.3 Antecedents and consequences of engagement

Of the different aspects of engagement, significant emphasis has been laid on factors that influence engagement ("antecedents") and the potential outcomes of being engaged ("consequences"). Van Doorn *et al.* (2010, p. 254) describe engagement as a behavioural manifestation in which "customers may have a brand or firm focus, beyond purchase, resulting from motivational drivers", and they develop a conceptual model of the antecedents and consequences of customer engagement behaviour, divided into customer, firm and societal aspects. Verhoef *et al.* (2010) share the same view but argue that the consequences for the firm should form the focal point, and the impediments to engagement should also be considered.

In more recent years, to validate the practicability of previous frameworks, research has tended to apply models to practice and modify them according to the given context. For example, when examining customer engagement marketing, Harmeling *et al.* (2017) demonstrate two pathways that drive long-term customer engagement: enhancing the experience of the core offering, and increasing ownership and self-transformation. Although no scientific/empirical testing was used to validate the model, they introduced a marketing case to illustrate and investigate the effects of an engagement initiative. In a similar vein, Pansari and Kumar (2017) argue that the antecedents of customer engagement are satisfaction and emotion, and the consequences include tangible and intangible outcomes, with convenience, firm's nature, industry type, brand value and involvement level acting as moderating variables. Based on these works, Kumar *et al.* (2019) propose four moderating factors for customer service experience – offering-related, value-related, enabler-related and market-related.

Within a healthcare context, the factors leading to engagement in remote consultation services, or the "antecedents", have recently started to attract attention (Tyler *et al.*, 2021), especially with the advent of COVID-19 and the "forced" transition to remote consultation. By utilising the Delphi method, Greenhalgh *et al.* (2021) propose a framework for Planning and Evaluating Remote Consultation Services (PERCS) in healthcare, and identify eight key antecedents: the patient, staff, the home and family, the reason for consulting, the clinical relationship, technologies, the organisation, and wider system. These are dynamic over time and interrelated.

2.4 Summary

By revisiting seminal works on engagement and customer engagement, we found that *dimensions*, *processes*, and *antecedents and consequences* emerge as the three most extensively discussed themes. The "Dimensions" of patient engagement refer to the range

of patient behaviours and attitudes towards healthcare, including behavioural, emotional, and cognitive aspects. "Processes" indicates the dynamic and iterative sequence of interactions between patients and healthcare providers. Finally, "Antecedents and Consequences" encompass factors that influence engagement and the respective outcomes. Together, these three elements collectively shape the concept of engagement (see Table 1).

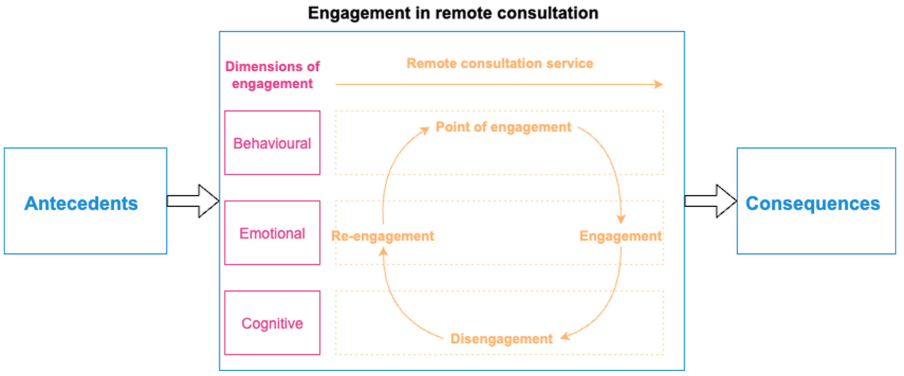
However, many of the foundational studies tend to only address one or two of these elements. Therefore, we proposed an *ex ante* framework (Figure 1) to present a more comprehensive perspective by integrating all three elements, offering a holistic view of engagement, which we believe is potentially applicable to patient engagement in remote consultations.

Carman *et al.* (2013) develop a comprehensive Multidimensional Framework for Patient and Family Engagement in Health and Health Care, which serves as the starting point for our example framework. The framework highlights a continuum of patient engagement, ranging from consultation to involvement and partnership. This framework also describes levels at which engagement can manifest within the healthcare system, including direct care, organisational design, governance, and policy-making. Additionally, the authors also explore the factors that influence the extent and success of patient engagement. While Carman *et al.*'s (2013) framework significantly contributes to patient engagement research, it has also been

Service type	Elements		
	Dimensions	Processes	Antecedents and consequences
General service	Brodie *et al.* (2011), Kumar *et al.* (2010), Vivek *et al.* (2012), Vivek *et al.* (2014)	Bowden (2009)	Harmeling *et al.* (2017), Kumar *et al.* (2019), Pansari and Kumar (2017), Van Doorn *et al.* (2010), Verhoef *et al.* (2010)
Remote service	Brodie *et al.* (2013), O'Brien and Toms (2008), O'Brien and Toms (2010), Sawhney *et al.* (2005)	Brodie *et al.* (2013), O'Brien and Toms (2008), Sashi (2012)	Mollen and Wilson (2010)
Remote healthcare service	Carman *et al.* (2013), Shippee *et al.* (2015)	Carman *et al.* (2013)	Greenhalgh *et al.* (2021)

Source(s): Created by the authors

Table 1. Overview of seminal theoretical work on engagement by aspects and service type



Source(s): Created by the authors

Figure 1. *Ex ante* framework for engagement in remote consultation

subject to criticisms. For example, Cadel *et al.* (2021) point out challenges in categorising engagement at the direct care level due to a lack of differentiation among activities.

To address this, our adapted framework narrows its focus to patient engagement at the direct care level, while offering a multidimensional approach to differentiate and categorise it. Additionally, we retain the concept of the continuum of patient engagement but emphasise its relevance from a service process perspective. Furthermore, while we integrate the factors that influence engagement, we've expanded the discussion by encompassing the consequences or outcomes of patient engagement.

Firstly, in constructing the dimension aspects of our engagement framework, we drew extensively from O'Brien and Toms (2008), who are pioneers in explicating behavioural, emotional, and cognitive dimensions of customer engagement with technology. This suggests that engagement can manifest across a spectrum, from behaviour and emotion to cognition. Secondly, to outline the process of patient engagement, we combined O'Brien and Toms (2008)'s four phases of engagement with the typical remote consultation process. Inspired by Lemon and Verhoef (2016), we framed this journey similarly to a customer's engagement with a firm: prepurchase (Before service), purchase (At/during service), and postpurchase (After service). Lemon and Verhoef's conceptualisation of the customer journey reinforces our understanding, especially when considering remote consultation as a service touchpoint in healthcare operations. Each stage of the remote consultation process may exhibit different manifestations of engagement across the dimensions of behaviour, emotion, and cognition. Each manifestation of engagement goes through four phases: point of engagement, engagement, disengagement, and re-engagement. This integration brings together the process and dimensions of engagement. Lastly, to provide a concrete understanding of patient engagement in remote consultations, we incorporated Carman *et al.* (2013)'s discussion on factors influencing engagement. Additionally, Van Doorn *et al.* (2010)'s work helped us address the question of why engagement is necessary by highlighting the consequences of patient engagement.

Thus, our *ex ante* framework provides a coherent link between dimensions, processes, antecedents and consequences of patient engagement. We leveraged this framework to guide our review and analysis of the empirical literature and inform the choice of theories that we could use, synthesise and improve upon for future study.

To provide consolidated empirical evidence of prior theoretical work and to position new contributions accordingly, we next undertook a comprehensive review of empirical work on engagement specifically in remote consultation. We outline our approach in the next section.

3. Research methods

To identify high-quality empirical works in relation to engagement in remote consultation healthcare services, we took a comprehensive discipline-based approach to our literature review, a method that has been widely used in management (Lim *et al.*, 2022). The review is guided by the seminal protocol for review works of Tranfield *et al.* (2003), and offers a structured and transparent evaluation of articles.

3.1 Article retrieval

We began the literature review by identifying four major electronic research databases: Scopus, Web of Science, Embase and PubMed. These four databases provide integrated results from both the management and healthcare academic disciplines. Whilst remote consultation is a relatively new phenomenon, we adopted a scope of the last 20 years (from 2022 back to 2003) to cast a suitably broad net for relevant publications. We used a diverse set of keywords for the literature search (title-keyword-abstract), with an initial search that

included keywords related to *patient*, *clinician*, *engagement*, *healthcare* and *remote consultation* (Table 2).

Because it is hard to evaluate the quality of grey literature and conference papers, we only considered articles written in English and published in peer-reviewed journals. After merging the results and removing duplicates, we identified a total of 276 articles across the four major databases to progress to manual abstract screening.

Screening these 276 articles, we used three inclusion criteria: (a) articles should be empirical journal papers, and the empirical approaches should involve methodologies such as surveys, interviews, case studies, conceptual theory development and other quantitative/qualitative methods; (b) articles should examine patient or clinician engagement in healthcare and include a description of engagement activities; (c) articles should study the provision of remote consultations in healthcare, rather than using telehealth technology for non-consultation services, or not conducting the consultations remotely.

We reviewed the title and abstract of each article against these criteria to determine its relevance and importance, and then conducted backwards and forwards referencing to complete the publication pool for remote consultation engagement. Following a full-text analysis and filtering, we selected 63 articles for full analysis (see Figure 2).

3.2 Analysis and coding

We adopted an inductive thematic analysis approach, which involves extracting qualitative data from a collection of documents to discover, analyse and report on themes (Agyekum *et al.*, 2019; Braun and Clarke, 2006), which we were then able to address accordingly (Lim *et al.*, 2022).

Based on Braun and Clarke's (2006) procedure, we applied a rigorous coding process to examine our data. Prior to the first round of coding, we familiarised ourselves with a small sample of articles. Then we coded all aspects of the research design, including the aims and

Research variable	Description
Databases searched	Scopus, Web of Science, Embase, PubMed
Article quality	Peer-reviewed journal papers with originality and rigour
Review scope	Articles published in the last 20 years: between 2003 and 2022
Keywords	("patient*" OR "customer*" OR "user*" OR "consumer*" OR "client*" OR "adult*") OR ("clinician*" OR "doctor*" OR "health care professional*" OR "healthcare professional*" OR "health* professional*" OR "employee*" OR "worker*") AND ("engagement" OR "engag*") AND ("Health*" OR "Care*" OR "Health care*" OR "hospital*") AND ("remote consult*" OR "econsult*" OR "e-consult*" OR "electronic consult*" OR "virtual consult*" OR "video consult*" OR "distan* consult*" OR "remote appoint*" OR "e appoint*" OR "e-appoint*" OR "electronic appoint*" OR "virtual appoint*" OR "video appoint*" OR "distan* appoint*" OR "remote visit*" OR "evisit*" OR "e-visit*" OR "electronic visit*" OR "virtual visit*" OR "video visit*" OR "distan* visit*")
Inclusion criteria	Empirical journal paper in English; involving a description of patient or clinician engagement activities; patients or clinicians are using remote consultation for healthcare service
Exclusion criteria	Non-English publication; grey literature; conference paper; no access to full text; non-consultation service; non-remote or non-online service; non-healthcare setting
Review questions	1 How is patient engagement characterised in remote consultation? 2 What are the critical factors influencing patient engagement? 3 Which metrics are commonly used to measure patient engagement? 4 What interventions have been proposed to enhance patient engagement?

Source(s): Created by the authors

Table 2.
Review protocol

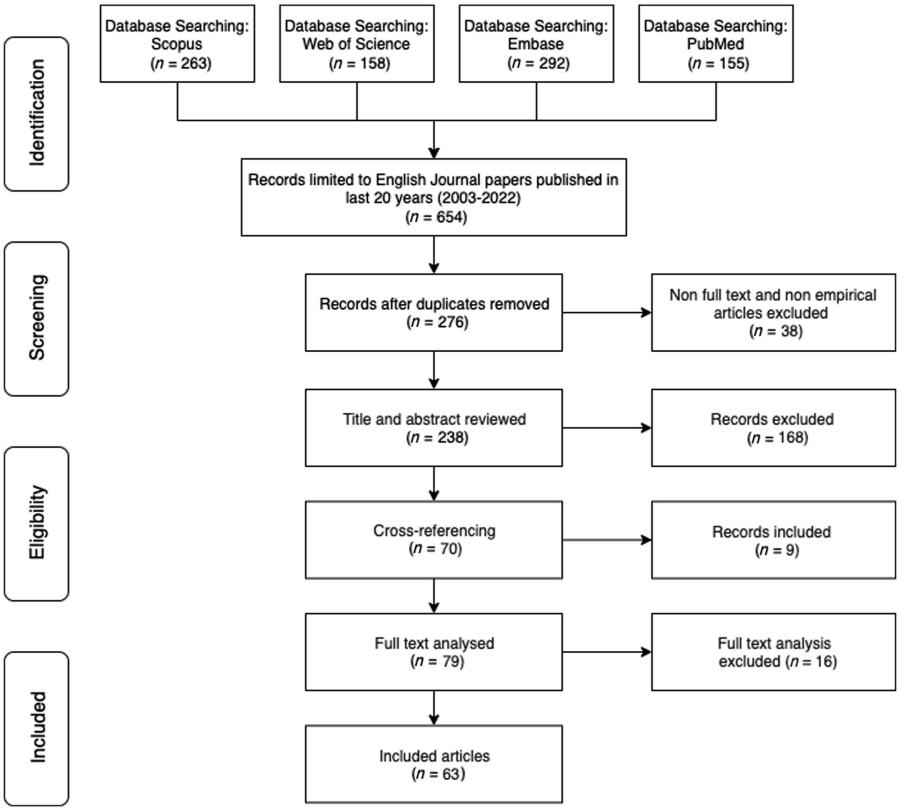


Figure 2.
Search strategy

Source(s): Created by the authors

objectives of the research, the target population, the target healthcare department, the type of remote consultation, sample size, country, research method, and the frameworks, theories or models employed. In the second round of coding, we concentrated on the reasons for adopting remote consultation, the definition of engagement, metrics of engagement, antecedents and/or consequences of engagement, and interventions aimed at improving engagement.

In the third and final stage of coding, we looked to examine the antecedents, metrics and interventions of engagement in more detail. We divided antecedents into positive facilitators and negative barriers, locating these in various categories informed by the PERCS framework (Greenhalgh *et al.*, 2021). Possible metrics were categorised according to the dimension of engagement and the process followed in the remote consultation service. We grouped interventions according to the different levels of the initiator. Finally, by categorising all codes, we identified four major themes – concept, antecedents, metrics and interventions – which served as the foundations for our analysis and the development of our conceptual framework.

4. Results

4.1 Descriptive analysis

Our final data set comprised 63 articles published between 2008 and January 2022. We observed a significant recent spike in the subject in 2020, which coincided with the outbreak

of the COVID-19 pandemic. Over half of the 63 studies (n = 39; 62%) focus on remote consultations after 2020, highlighting the way in which the pandemic has accelerated the adoption of such services.

Most articles identified in our systematic review were perhaps unsurprisingly published in healthcare and medical journals. This is primarily due to our focus on empirical evidence concerning patient engagement in remote consultations. However, the skew also indicates the nascent stage of empirical research in OM journals in this domain alongside the (relatively) longer publication lead-times in our field relative to healthcare outlets. As noted earlier in our paper, we anticipate an increase in relevant studies within OM journals, as the field responds to the evolving dynamics of remote consultations.

Our dataset involves studies from nine different countries, with most deriving from the US (n = 29; 46%) or the UK (n = 22; 35%), and in terms of the studies' informants, the largest proportion considered only patients (29%). Studies looking only at clinicians accounted for 21%, while 22% of articles included *both* patients and clinicians. Other combinations of informants, such as patients and carers, clinicians and other medical staff, were less targeted, while other stakeholders that play a critical role in remote consultation services, such as the managers of healthcare organisations, telehealth software providers, policymakers and so on, attracted little attention within our dataset.

Of the 63 articles in our dataset, 26 (41%) are qualitative studies, 16 (25%) are quantitative, and 15 (24%) are mixed methods. Case study methods (either qualitative, quantitative or mixed-method) have been used extensively in our study sample (24%). Other methodologies, including action research, randomised controlled trials and retrospective cohort studies, account for the remainder. The remote consultation services spanned a range of modes, including video, audio, messaging and various combinations of these and others. Although video-only remote consultation accounted for the most common mode (46%), the mixed-mode in which video and audio were interleaved was also popular (21%). Examples of other modes used included web-based portals and platforms.

The departments applying remote consultation were also varied. We divided our data into primary care and secondary care, which are distinguished clearly in most countries. Thus, over half of the articles (n = 35; 56%) are empirical works conducted in relation to hospital care, and over one-fifth (n = 13; 21%) concerned primary care. Consultation in relation to mental health, which does not necessarily require a physical examination, is a relatively popular setting for empirical research studies, accounting for seven studies in our dataset (11%). Further, the vast majority of the articles in our sample concerned one-to-one appointments, with only one paper studying group consultations (Raymond *et al.*, 2016).

4.2 Thematic analysis

4.2.1 The concept of patient engagement in remote consultation. Whilst remote consultation shares some features with other services considered within previous engagement literature, we noted several differences between patient engagement and "traditional" customer engagement. First, the ultimate goal of patient engagement revolves around better healthcare outcomes and experiences, rather than business profit (see, as an example, the evaluation of patient and clinician perspectives in relation to a virtual clinic for elderly patients, conducted by Joughin *et al.* (2021)).

Second, patient engagement does not focus solely on patients. Patients and clinicians are both users and clients of remote consultation software and platforms, and the effort from both sides shapes the quality of the consultation service. As already noted, over 20% of our sample articles pay attention to both patients and clinicians. The carers of patients and other medical staff also play a significant role in helping the main players get engaged. Thus, engagement in relation to remote consultation is a dynamic concept involving different, related stakeholders.

Third, the manifestations of being engaged are various and can be interpreted from different dimensions. For example, in the *behavioural* dimension, service uptake or attendance is the most common proxy for engagement (Morrison *et al.*, 2021; Yang *et al.*, 2020; Yue *et al.*, 2021). Many other studies argue that completion of a series of visits is a key indicator of being engaged because attendance cannot guarantee accomplishment, especially for healthcare services that may play out over a long period (Darrat *et al.*, 2021; Kalwani *et al.*, 2021; Willman, 2021). In the *cognitive* dimension, belief is widely used to represent engagement and demonstrate the stakeholder's confidence in and understanding of the concept (Hoffmann *et al.*, 2020; Raymond *et al.*, 2016; Viers *et al.*, 2015). In the *emotional* dimension, experience and satisfaction act as proxies of engagement. Many studies deem feedback from different stakeholders on their inner feelings to be synonymous with engagement (Finkelstein *et al.*, 2021; Lackey *et al.*, 2021; Rose *et al.*, 2021). In addition, some of the studies attempt to characterise engagement at a deeper level, such as how effective was the communication during the consultation (Shaw *et al.*, 2020) or the level of involvement in co-design of the service plan (Papoutsi *et al.*, 2021).

4.2.2 The antecedents of engagement in remote consultation. When examining antecedents, we were interested in factors that influence engagement both positively or negatively (Van Doorn *et al.*, 2010). The PERCS framework for planning and evaluating remote consultation services, developed by Greenhalgh *et al.* (2021), is amended and used to guide the analysis of our dataset, because it provides a comprehensive structure with which to deconstruct antecedents of remote consultation engagement into different categories among various stakeholders (see Table 3). (Note: For more information on each enabler or inhibitor, please refer to the supplementary reference list.)

The patient. The circumstances and characteristics of the patient appear to be an important factor influencing remote consultation. For example, those who live in rural areas and thus may have difficulty getting (to) face-to-face consultations are more likely to be offered remote ones (Chrapah *et al.*, 2021; Hoffmann *et al.*, 2020). On the other hand, age- and disease-related issues, such as impairments of cognition, vision or hearing as well as some physical impairments, are commonly noted factors that may inhibit the ability to engage effectively in remote consultation (Chu *et al.*, 2022; Tuijt *et al.*, 2021; Wherton *et al.*, 2021). Another critical barrier identified in our dataset is low technology literacy. Whilst younger adults typically have better knowledge of technology, inequality in education means that low technology literacy can span a wide range of ages (Joughin *et al.*, 2021; Touson *et al.*, 2021).

The staff. Our dataset suggests that staff characteristics are also a factor in remote consultation, shaping choices accordingly. Thus, a personal interest in using new technologies to deliver care services emerges as a key influence on the level of staff acceptance of such an approach (Bele *et al.*, 2021; Deeds *et al.*, 2019; Yang *et al.*, 2020). Our data also suggest that remote consultation enables healthcare practitioners to obtain more support from both internal colleagues and external experts with relevant healthcare expertise (Chrapah *et al.*, 2021; Cowie *et al.*, 2018; Wherton *et al.*, 2021). However, staff also report or imply that remote consultation increases their workload and extends their working time owing to, for example, unstable connections that make individual sessions longer than usual (Gifford *et al.*, 2021; Williams *et al.*, 2021).

The home and family environment. Technology devices, such as computers, smartphones and tablets, are essential for conducting remote consultations. However, they are not affordable to every family, which acts as a major barrier to service adoption (Braune *et al.*, 2021; Joughin *et al.*, 2021; Stewart *et al.*, 2021). Lack of internet access or poor internet connection has a similar effect (Derbyshire *et al.*, 2021; O'Donovan *et al.*, 2020). The availability of a private space to avoid distractions is another frequently mentioned factor because healthcare consultation is a personal/private activity; an appropriate environment

	The patient	The staff	The home and family environment
Enabler	Familiar with the technology (Viers *et al.*, 2015; Wherton *et al.*, 2021) Difficulty in accessing face-to-face consultation (Cheung *et al.*, 2019; Chrapah *et al.*, 2021; Cowie *et al.*, 2018; Hoffmann *et al.*, 2020; Kasckow *et al.*, 2015) Personal interest in remote consultation (Braune *et al.*, 2021; Verma *et al.*, 2020) Lack of mobility (Elson *et al.*, 2018; Hoffmann *et al.*, 2020) Gender difference (women) (Cheung *et al.*, 2019; Sosa *et al.*, 2017; Viers *et al.*, 2015) Confidence in using technology (Viers *et al.*, 2015) Confidence in healthcare professionals (Viers *et al.*, 2015) Insurance can cover the expense (Viers *et al.*, 2015) Younger age (Viers *et al.*, 2015) Higher educational attainment (Viers *et al.*, 2015)	Interest in remote consultation (higher acceptance) (Bele *et al.*, 2021; Chrapah *et al.*, 2021; Deeds *et al.*, 2019; Eppler, 2021; Hassan *et al.*, 2018; Nilsen and Moen, 2008; Pappas and Seale, 2010; Yang *et al.*, 2020) Supported by colleagues or organisations (Chrapah *et al.*, 2021; Cowie *et al.*, 2018; Keely and Liddy, 2021; Maarop and Win, 2012; Moloczij *et al.*, 2015; Wherton *et al.*, 2021; Yang *et al.*, 2020) Protect patients for different reasons (*e.g.* travelling) (Yang *et al.*, 2020) Patient's consulting behaviour (Wu *et al.*, 2021) Respected by the patient (Wu *et al.*, 2021) Enough visual cues (Chang *et al.*, 2021) Private and professional environment (Finkelstein *et al.*, 2021) Confident in platform/programme (Bele *et al.*, 2021; Cowie *et al.*, 2018; McConnochie *et al.*, 2016) More information about the patient (Maarop and Win, 2012; Verma *et al.*, 2020) Experienced with technology (Donaghy *et al.*, 2019; Miner *et al.*, 2021) Optimised usage of skill set/professional fulfilment (Keely and Liddy, 2021)	Family support/help (Chu *et al.*, 2022; Greenhalgh *et al.*, 2018; Morrison *et al.*, 2021; Seuren *et al.*, 2020) Opportunity for increasing family involvement (Frankel and Beckman, 2020; Yue *et al.*, 2021) Stable network connection (Hoffmann *et al.*, 2020) Group support (Raymond *et al.*, 2016) Other support (*e.g.* interpreter) (Greenhalgh *et al.*, 2016)

(*continued*)

Table 3.
Antecedents of engagement

Table 3.

	The patient	The staff	The home and family environment
Inhibitor	Prefer face-to-face rather than remote consultation (lower acceptance) (Chang *et al.*, 2021; Chu *et al.*, 2022; Greenhalgh *et al.*, 2016; Joughin *et al.*, 2021; Moloczij *et al.*, 2015; Morrison *et al.*, 2021; O'Donovan *et al.*, 2020; Tuijt *et al.*, 2021) Age-/disease-related issues (Chu *et al.*, 2022; Greenhalgh *et al.*, 2016; Harris *et al.*, 2021; Joughin *et al.*, 2021; Lackey *et al.*, 2021; O'Donovan *et al.*, 2020; Stewart *et al.*, 2021; Tuijt *et al.*, 2021; Wherton *et al.*, 2021; Yue *et al.*, 2021) Low educational attainment (Yue *et al.*, 2021) Low technology literacy (Bele *et al.*, 2021; Chrapah *et al.*, 2021; Elawady *et al.*, 2020; Finkelstein *et al.*, 2021; Hoffmann *et al.*, 2020; Joughin *et al.*, 2021; O'Donovan *et al.*, 2020; Olayiwola *et al.*, 2018; Sosa *et al.*, 2017; Touson *et al.*, 2021; Wherton *et al.*, 2021; Williams *et al.*, 2021; Yue *et al.*, 2021) Lack of confidence in using a new tool (Chang *et al.*, 2021; Haynes *et al.*, 2021; Touson *et al.*, 2021; Wherton *et al.*, 2021; Williams *et al.*, 2021) Language difficulties (Gifford *et al.*, 2021; McConnochie *et al.*, 2016; O'Donovan *et al.*, 2020; Olayiwola *et al.*, 2018; Tuijt *et al.*, 2021; Willman, 2021) Financial/insurance limitations (Darrat *et al.*, 2021; Gifford *et al.*, 2021; Hyun *et al.*, 2020; Yue *et al.*, 2021) Lack of awareness/basic understanding (Bele *et al.*, 2021; Hyun *et al.*, 2020; O'Donovan *et al.*, 2020; Verma *et al.*, 2020) Lack of confidence in healthcare professionals (Mammen *et al.*, 2018; Moloczij *et al.*, 2015)	Less acceptance (Greenhalgh *et al.*, 2016) Challenge from the patient (Wu *et al.*, 2021) Lack of training/guidance (Atherton *et al.*, 2013; Bele *et al.*, 2021; Elawady *et al.*, 2020; Willman, 2021) Increased workload/longer working hours (Atherton *et al.*, 2013, 2020; Chang *et al.*, 2021; Cowie *et al.*, 2018; Deeds *et al.*, 2019; Elawady *et al.*, 2020; Finkelstein *et al.*, 2021; Gifford *et al.*, 2021; Nilsen and Moen, 2008; O'Donovan *et al.*, 2020; Olayiwola *et al.*, 2018; Tuijt *et al.*, 2021; Willman, 2021) Feel greater fatigue (Tuijt *et al.*, 2021) Run out of capacity (Lackey *et al.*, 2021) Less professional fulfilment (Wherton *et al.*, 2021) Fewer non-verbal cues (Donaghy *et al.*, 2019; Elawady *et al.*, 2020; Eppler, 2021; Hoffmann *et al.*, 2020; Lackey *et al.*, 2021) Lack of technology literacy (Bele *et al.*, 2021; Finkelstein *et al.*, 2021; Shaw *et al.*, 2020) Uncomfortable working environment (*e.g.* sitting at the computer for a long period, noisy) (Derbyshire *et al.*, 2021; Eppler, 2021) Less confidence (more stress) (Bele *et al.*, 2021; Eppler, 2021; Moloczij *et al.*, 2015) Less connection with patients and colleagues (Eppler, 2021) The patient does not pay attention (Eppler, 2021) Cannot perform certain procedures (Chrapah *et al.*, 2021; Elawady *et al.*, 2020; Hassan *et al.*, 2018; Mammen *et al.*, 2018; O'Donovan *et al.*, 2020; Pappas and Seale, 2010; Seuren *et al.*, 2020; Shaw *et al.*, 2020)	Technology devices unavailable (Braune *et al.*, 2021; Chang *et al.*, 2021; Chu *et al.*, 2022; Donaghy *et al.*, 2019; Joughin *et al.*, 2021; Stewart *et al.*, 2021) Lack of or poor internet access (Chang *et al.*, 2021; Darrat *et al.*, 2021; Derbyshire *et al.*, 2021; Gifford *et al.*, 2021; Harris *et al.*, 2021; Joughin *et al.*, 2021; O'Donovan *et al.*, 2020; Sosa *et al.*, 2017; Stewart *et al.*, 2021; Wherton *et al.*, 2021) Lack of companion (Darrat *et al.*, 2021) Lack of private space (more distractions) (Chang *et al.*, 2021; Finkelstein *et al.*, 2021; Greenhalgh *et al.*, 2018; Harris *et al.*, 2021; Stewart *et al.*, 2021; Wherton *et al.*, 2021)

(*continued*)

Table 3.

	The reason for consulting	The clinical relationship	Technology and software provider
Enabler	For routine follow-up of chronic, stable conditions (Atherton *et al.*, 2013; Davis *et al.*, 2020; Stewart *et al.*, 2021; Tuijt *et al.*, 2021; Wherton *et al.*, 2021) To convey test results (Wherton *et al.*, 2021) Access a wider range of clinical conditions (Moroz *et al.*, 2020; Wherton *et al.*, 2021) Improving access/inequity (Bele *et al.*, 2021; Chang *et al.*, 2021; Deeds *et al.*, 2019; Derbyshire *et al.*, 2021; Haynes *et al.*, 2021; Hyun *et al.*, 2020; Moroz *et al.*, 2020; O'Donovan *et al.*, 2020; Rose *et al.*, 2021; Tuijt *et al.*, 2021; Wherton *et al.*, 2021) Lower the risk of infection (Harris *et al.*, 2021; Haynes *et al.*, 2021; Wherton *et al.*, 2021) For people with mobility challenges (Donaghy *et al.*, 2019; Elson *et al.*, 2018; Hoffmann *et al.*, 2020) For mental health problems (Donaghy *et al.*, 2019; Kasckow *et al.*, 2015) For acute postoperative settings (Sosa *et al.*, 2017) For repeat prescription requests and admin queries (Willman, 2021)	More involvement/willingness to share (Braune *et al.*, 2021; Chang *et al.*, 2021; Eppler, 2021; Gifford *et al.*, 2021; Haynes *et al.*, 2021; Hoffmann *et al.*, 2020; Nilsen and Moen, 2008; Rose *et al.*, 2021) Longer duration for individual interaction (Haynes *et al.*, 2021; Hoffmann *et al.*, 2020; Mammen *et al.*, 2018; Rose *et al.*, 2021) Mutual respect (Frankel and Beckman, 2020; Wu *et al.*, 2021) Increased responsibility for patient management (Deeds *et al.*, 2019; Greenhalgh *et al.*, 2018; Seuren *et al.*, 2020) The patient consults the staff (Wu *et al.*, 2021) Easier to communicate/contact/send information (Atherton *et al.*, 2013; Maarop and Win, 2012; Moessner and Bauer, 2012; Rose *et al.*, 2021; Stewart *et al.*, 2021; Verma *et al.*, 2020; Wherton *et al.*, 2021) Use less abbreviations/jargon (Seuren *et al.*, 2020; Verma *et al.*, 2020; Williams *et al.*, 2021) Preparation from both sides (Frankel and Beckman, 2020; Stewart *et al.*, 2021) Explanation and understanding (Mammen *et al.*, 2018; Rose *et al.*, 2021; Seuren *et al.*, 2020; Williams *et al.*, 2021) Build trust/maintain existing relationship (Bele *et al.*, 2021; Chang *et al.*, 2021; Cheung *et al.*, 2019; Donaghy *et al.*, 2019; Frankel and Beckman, 2020; Greenhalgh *et al.*, 2018; Lackey *et al.*, 2021; McConnochie *et al.*, 2016) Self-referral (Davis *et al.*, 2020)	Good technical support (Greenhalgh *et al.*, 2018; Hassan *et al.*, 2018; Wherton *et al.*, 2021) Ability to track consultation status (Verma *et al.*, 2020) Have reminders (Davis *et al.*, 2020; Hyun *et al.*, 2020) Reliable scheduling (Donaghy *et al.*, 2019; Hoffmann *et al.*, 2020) Stable quality of audio/images (Hoffmann *et al.*, 2020; Moloczij *et al.*, 2015; Morrison *et al.*, 2021; Wherton *et al.*, 2021; Willman, 2021) Software downloads not required (Wherton *et al.*, 2021) Do not need to create accounts (Wherton *et al.*, 2021) Have backup options (Gilbody *et al.*, 2017; Wherton *et al.*, 2021) Good virtual waiting environment (Wherton *et al.*, 2021) Easy to use (Lackey *et al.*, 2021; Maarop and Win, 2012; Moloczij *et al.*, 2015; Musiat *et al.*, 2014; Rose *et al.*, 2021) Training provided for users (Darrat *et al.*, 2021; Derbyshire *et al.*, 2021) Integrated with existing systems (Cowie *et al.*, 2018)

(*continued*)

Table 3.

	The reason for consulting	The clinical relationship	Technology and software provider
Inhibitor	Accident-related and urgent care (Frankel and Beckman, 2020; Verma *et al.*, 2020) Children's acute illness (McConnochie *et al.*, 2016)	Information/records are insufficient (Verma *et al.*, 2020; Yang *et al.*, 2020) The inability of hands-on care/examination (Chang *et al.*, 2021; Derbyshire *et al.*, 2021; Elawady *et al.*, 2020; Harris *et al.*, 2021; Hassan *et al.*, 2018; Haynes *et al.*, 2021; Mammen *et al.*, 2018; Pappas and Seale, 2010; Seuren *et al.*, 2020; Yang *et al.*, 2020) Less sharing experience/health condition (Cowie *et al.*, 2018; Tuijt *et al.*, 2021) Lack of continuity of care (Mammen *et al.*, 2018) Longer appointment queue (Chrapah *et al.*, 2021; Morrison *et al.*, 2021; Willman, 2021) Less personal interaction (Eppler, 2021; Finkelstein *et al.*, 2021; Hoffmann *et al.*, 2020; Kalwani *et al.*, 2021; Rose *et al.*, 2021; Touson *et al.*, 2021; Tuijt *et al.*, 2021; Verma *et al.*, 2020; Willman, 2021; Yang *et al.*, 2020) Patients challenged staff (Wu *et al.*, 2021) Less tailored advice (Tuijt *et al.*, 2021) Small screen size (Wherton *et al.*, 2021; Yue *et al.*, 2021) Staff do not always keep the appointment (Tuijt *et al.*, 2021) Hard to meet expectations (Lackey *et al.*, 2021; Olayiwola *et al.*, 2018) Hard to build trust, especially with a new provider (Chang *et al.*, 2021; Haynes *et al.*, 2021; Hoffmann *et al.*, 2020; Mammen *et al.*, 2018; Moloczij *et al.*, 2015) Many previous referrals (Davis *et al.*, 2020)	Technical problems (*e.g.* connection; audio; visual; poor quality) (Chrapah *et al.*, 2021; Derbyshire *et al.*, 2021; Donaghy *et al.*, 2019; Eppler, 2021; Greenhalgh *et al.*, 2016, 2018; Harris *et al.*, 2021; Hassan *et al.*, 2018; Mammen *et al.*, 2018; McConnochie *et al.*, 2016; Morrison *et al.*, 2021; O'Donovan *et al.*, 2020; Raymond *et al.*, 2016; Touson *et al.*, 2021; Tuijt *et al.*, 2021; Yang *et al.*, 2020) Difficult/complex to use (*e.g.* scheduling; logging in) (Bele *et al.*, 2021; Harris *et al.*, 2021; Joughin *et al.*, 2021; Pappas and Seale, 2010) Incorrect/incomplete information transferred (Verma *et al.*, 2020) Need to download/update software (Hyun *et al.*, 2020; Shaw *et al.*, 2020) Lost passwords (Shaw *et al.*, 2020) No technical assistance (Joughin *et al.*, 2021) Limited guidance for using software/platform (Shaw *et al.*, 2020) Limited access to related data/records (Braune *et al.*, 2021; Elawady *et al.*, 2020) Security concerns (Atherton *et al.*, 2020; Hyun *et al.*, 2020; Olayiwola *et al.*, 2018; Viers *et al.*, 2015)

(*continued*)

Table 3.

	The healthcare organisation	The wider system	Perceptions of benefits/detriments
Enabler	Adjustable workflow/process (Bele *et al.*, 2021; Chang *et al.*, 2021; Touson *et al.*, 2021; Yang *et al.*, 2020) Training/educational module for staff and patients (Bele *et al.*, 2021; Braune *et al.*, 2021; Cowie *et al.*, 2018; Darrat *et al.*, 2021; Derbyshire *et al.*, 2021; Harris *et al.*, 2021; Hassan *et al.*, 2018; Lackey *et al.*, 2021; O'Donovan *et al.*, 2020; Touson *et al.*, 2021; Wherton *et al.*, 2021; Williams *et al.*, 2021; Yang *et al.*, 2020) Sharing experience with other staff (Cowie *et al.*, 2018; Deeds *et al.*, 2019; Yang *et al.*, 2020) Clear guidance (Atherton *et al.*, 2013; Chu *et al.*, 2022; Cowie *et al.*, 2018; Finkelstein *et al.*, 2021; Olayiwola *et al.*, 2018; Rose *et al.*, 2021; Touson *et al.*, 2021) In-house IT support (Chu *et al.*, 2022; Cowie *et al.*, 2018; Greenhalgh *et al.*, 2018; Moroz *et al.*, 2020) Adequate space (Wherton *et al.*, 2021) Hotline support (Touson *et al.*, 2021) Triage/receptionist (*e.g.* for scheduling) (Chrapah *et al.*, 2021; Greenhalgh *et al.*, 2018; Papoutsi *et al.*, 2021) Backup alternative (balancing mode) (Chrapah *et al.*, 2021; Gifford *et al.*, 2021; Haynes *et al.*, 2021) Additional financial assistance (Chang *et al.*, 2021; Keely and Liddy, 2021) Logistical ability to redistribute resources (Bele *et al.*, 2021; Greenhalgh *et al.*, 2016; Sosa *et al.*, 2017)	Policy pressure/encouragement (Donaghy *et al.*, 2019; Greenhalgh *et al.*, 2016, 2018; Joughin *et al.*, 2021; Maarop and Win, 2012; Morrison *et al.*, 2021; Papoutsi *et al.*, 2021; Seuren *et al.*, 2020; Tuijt *et al.*, 2021) Digital infrastructure (*e.g.* broadband) (Braune *et al.*, 2021; Chang *et al.*, 2021; Darrat *et al.*, 2021; Elawady *et al.*, 2020; Gifford *et al.*, 2021; Papoutsi *et al.*, 2021; Wherton *et al.*, 2021) Financial resources (Joughin *et al.*, 2021; Miner *et al.*, 2021; Wherton *et al.*, 2021) Encourage relevant research (Wherton *et al.*, 2021) Environmental factors (Joughin *et al.*, 2021; Touson *et al.*, 2021) Insurance coverage (Miner *et al.*, 2021; Rose *et al.*, 2021; Viers *et al.*, 2015)	Believe as good as face-to-face (Chang *et al.*, 2021; Hassan *et al.*, 2018; Rose *et al.*, 2021) Time-saving/effective (Atherton *et al.*, 2020; Braune *et al.*, 2021; Chrapah *et al.*, 2021; Cowie *et al.*, 2018; Finkelstein *et al.*, 2021; Frankel and Beckman, 2020; Harris *et al.*, 2021; Hassan *et al.*, 2018; Haynes *et al.*, 2021; Hoffmann *et al.*, 2020; Hyun *et al.*, 2020; Mammen *et al.*, 2018; Moessner and Bauer, 2012; O'Donovan *et al.*, 2020; Rose *et al.*, 2021; Sosa *et al.*, 2017; Verma *et al.*, 2020) Worth the money (Rose *et al.*, 2021) Simplify processes (Verma *et al.*, 2020) Short waiting times (Frankel and Beckman, 2020; Harris *et al.*, 2021; Hoffmann *et al.*, 2020; Moroz *et al.*, 2020; Rose *et al.*, 2021; Verma *et al.*, 2020) Privacy and safety are respected (Chang *et al.*, 2021; Greenhalgh *et al.*, 2018; Harris *et al.*, 2021; Moessner and Bauer, 2012; Musiat *et al.*, 2014; Rose *et al.*, 2021; Viers *et al.*, 2015) Good for continuity of care (Rose *et al.*, 2021; Verma *et al.*, 2020) Convenient (Atherton *et al.*, 2013; Bele *et al.*, 2021; Chrapah *et al.*, 2021; Deeds *et al.*, 2019; Donaghy *et al.*, 2019; Greenhalgh *et al.*, 2016; Harris *et al.*, 2021; Joughin *et al.*, 2021; Keely and Liddy, 2021; Mammen *et al.*, 2018; Miner *et al.*, 2021; Morrison *et al.*, 2021; Musiat *et al.*, 2014; O'Donovan *et al.*, 2020; Viers *et al.*, 2015; Willman, 2021) Easy to send pictures/information regarding medical conditions (Lackey *et al.*, 2021) Less stressful (Braune *et al.*, 2021; Donaghy *et al.*, 2019; Harris *et al.*, 2021; Joughin *et al.*, 2021) Flexibility (Braune *et al.*, 2021; Chang *et al.*, 2021; Chrapah *et al.*, 2021; Cowie *et al.*, 2018; Eppler, 2021; Hyun *et al.*, 2020; Yue *et al.*, 2021) Comfortable (Frankel and Beckman, 2020; Mammen *et al.*, 2018) More thorough assessments (Mammen *et al.*, 2018) Less cost (Deeds *et al.*, 2019; Greenhalgh *et al.*, 2016; Hassan *et al.*, 2018; Hyun *et al.*, 2020; Keely and Liddy, 2021; Mammen *et al.*, 2018; Moessner and Bauer, 2012; Musiat *et al.*, 2014) Less burden for staff/family members (Chu *et al.*, 2022; Deeds *et al.*, 2019; Haynes *et al.*, 2021)

(*continued*)

Table 3.

	The healthcare organisation	The wider system	Perceptions of benefits/detriments
Inhibitor	Overwhelming guidance, policies and procedures (Elawady *et al.*, 2020) Unclear processes (Bele *et al.*, 2021) Lack of reliable hardware/software (Keely and Liddy, 2021; Yang *et al.*, 2020) Staff shortages (Rose *et al.*, 2021; Wherton *et al.*, 2021) Lack of patient demand (Cowie *et al.*, 2018; Derbyshire *et al.*, 2021) High technology expense (Elawady *et al.*, 2020) Lack of collaboration (McConnochie *et al.*, 2016)	Lack of reimbursement (Chang *et al.*, 2021; Darrat *et al.*, 2021; Gifford *et al.*, 2021; Hassan *et al.*, 2018) Lack of educational resources (Braune *et al.*, 2021) Lack of proper regulation (Greenhalgh *et al.*, 2016)	Privacy and data security concerns (Atherton *et al.*, 2013; Cowie *et al.*, 2018; Elawady *et al.*, 2020; Eppler, 2021; Gifford *et al.*, 2021; Sosa *et al.*, 2017; Verma *et al.*, 2020; Viers *et al.*, 2015; Yue *et al.*, 2021) Trade-offs between home and work commitments (Gifford *et al.*, 2021; Wherton *et al.*, 2021) Time-consuming (Cowie *et al.*, 2018; O'Donovan *et al.*, 2020; Willman, 2021) Loss of opportunistic assessments/clinical risk (*e.g.* quality and effectiveness) (Atherton *et al.*, 2013; Derbyshire *et al.*, 2021; Donaghy *et al.*, 2019; Finkelstein *et al.*, 2021; Greenhalgh *et al.*, 2016; Lackey *et al.*, 2021; Olayiwola *et al.*, 2018; Shaw *et al.*, 2020; Stewart *et al.*, 2021; Tuijt *et al.*, 2021; Verma *et al.*, 2020; Wherton *et al.*, 2021) Confusing process of consultation (Lackey *et al.*, 2021) Loss of human contact (Chang *et al.*, 2021) Long waiting times (Braune *et al.*, 2021) Feel uncertainty (Donaghy *et al.*, 2019) Not meeting expectations (Cowie *et al.*, 2018) Less clear roles and responsibilities (Bele *et al.*, 2021) Lack of reimbursement (Olayiwola *et al.*, 2018)

Source(s): Created by the authors

can encourage patients to share their detailed health experiences and concerns (Greenhalgh *et al.*, 2018; Stewart *et al.*, 2021).

The reason for consulting. More than ten of the studies declare that remote consultation improves access to healthcare services and constitutes the key reason that people choose it (Haynes *et al.*, 2021; Rose *et al.*, 2021; Tuijt *et al.*, 2021). However, different medical conditions may impact the suitability of the remote option. For example, routine follow-up for long-term and stable conditions (Atherton *et al.*, 2013), mental health problems (Kasckow *et al.*, 2015) or conveying test results (Wherton *et al.*, 2021) appear favoured subjects for both patients and staff. In contrast, accident-related and urgent care (Frankel and Beckman, 2020; Verma *et al.*, 2020), especially for children (McConnochie *et al.*, 2016), are likely less to suit remote consultation. Pandemic-related reasons, such as trying to lower infection risk, were another justification for the adoption and engagement of remote consultation.

The clinical relationship. The relationship and interaction between patients and staff may have a significant impact on engagement. Many works indicate that patients are more willing to share details of their condition with clinicians to compensate for the loss of non-verbal cues (Hoffmann *et al.*, 2020; Nilsen and Moen, 2008), while other studies report that remote consultation makes contact and communication with clinicians easier (Atherton *et al.*, 2013; Maarop and Win, 2012). However, lower levels of person-to-person interaction, especially the inability to conduct a physical examination, raise concerns among both patients and clinicians in relation to issues of trust and clinical safety (Willman, 2021; Yang *et al.*, 2020). Trust is more forthcoming in remote consultation when relationships already exist, whereas it appears more difficult to build with new providers (Chang *et al.*, 2021; Mammen *et al.*, 2018). Interestingly, referral sources can also influence engagement: self-referring patients and those with fewer previous referrals are more likely to attend their remote consultations (Davis *et al.*, 2020).

Technology and software provider. Most of the technological factors identified as antecedents have a negative impact on engagement. Bad connections and poor audio and visual quality are the most frequently mentioned technical inhibitors that people report in relation to remote consultation (Morrison *et al.*, 2021; Touson *et al.*, 2021). Nevertheless, a number of studies offer examples of positive technology involvement, such as ensuring that prompt technical support is provided (Greenhalgh *et al.*, 2018), sending reminders (Hyun *et al.*, 2020), scheduling reliably (Hoffmann *et al.*, 2020) and not requiring a software tool or app to be downloaded/installed (Wherton *et al.*, 2021).

The healthcare organisation. Healthcare organisations are usually the coordinators of the service process, the providers of guidance, and the coordinators of support. Thus, as key stakeholders in remote consultation, they can exert a strong influence on engagement. Several studies in our dataset propose that appropriate training is provided to staff and educational modules made available to patients (Braune *et al.*, 2021; Darrat *et al.*, 2021; Hassan *et al.*, 2018). However, "too much" policy or procedure around remote consultation can lead to staff and patients feeling overwhelmed (Elawady *et al.*, 2020). Other negative factors in relation to engagement include a lack of suitable hardware and software for staff within an organisation to perform the service (Keogh *et al.*, 2016), and staff shortages (Rose *et al.*, 2021), especially for triaging and scheduling (Papoutsi *et al.*, 2021).

The wider system. This category encompasses factors related to the broader context of remote consultation. For example, public policy pressure and encouragement can be important motivations (Morrison *et al.*, 2021; Seuren *et al.*, 2020). Likewise, digital infrastructures, such as broadband, provide essential support for such services (Papoutsi *et al.*, 2021; Wherton *et al.*, 2021). Environmental factors also play a role, because remote consultation has the potential to reduce carbon emissions (Joughin *et al.*, 2021; Touson *et al.*, 2021). Finally, financial factors, such as appropriate insurance coverage and pertinent fee/

reimbursement rates for staff and organisations in relation to remote consultation, also influence people's choices (Gifford *et al.*, 2021; Miner *et al.*, 2021).

Perceptions of benefits/detriments. This category was not identified in the PERCS framework but was raised by many of the studies in our sample. For example, patients, staff and even family members may perceive remote consultation to be more effective (Rose *et al.*, 2021), time-saving (Harris *et al.*, 2021), convenient (Chrapah *et al.*, 2021) and less stressful (Braune *et al.*, 2021) than the alternatives, thereby encouraging engagement. However, the same groups also share concerns about remote consultation, in terms of privacy (Verma *et al.*, 2020), data security (Elawady *et al.*, 2020) and clinical risk (Donaghy *et al.*, 2019). Importantly, such factors involve (subjective) perceptions and feelings rather than material characteristics or objective facts.

4.2.3 The metrics of engagement in remote consultation. As already discussed, engagement is a concept that involves behavioural, emotional and/or cognitive dimensions at each stage of the remote consultation service, and its manifestations range from attending, completing, understanding, accepting and experiencing the consultation to co-design of services (Brodie *et al.*, 2011; Mollen and Wilson, 2010; Vivek *et al.*, 2012). Previous studies have attempted to measure patient engagement in many different dimensions at many different stages of the patient journey. Informed by Lemon and Verhoef (2016), we understand the customer journey as a complex and multifaceted progression, consisting of numerous touchpoints and stages of interaction. Building on their foundational work, we operationalise our service stages as "Before service," "At/during service," and "After service." These stages provide a simplified yet comprehensive representation of the remote consultation experience. We summarise these different "domains" of potential measurement in terms of our three dimensions and three service stages in Table 4. Each of the domains offers the potential to evaluate engagement from a given perspective at a given stage in its cyclical journey. In the subsequent subsections, we will provide more detail of these domains for general healthcare settings, together with examples of possible measures of the domain in their dimensional/process intersections. In future studies, these metrics could be adjusted according to the nature of the disease focus for the consultation.

4.2.3.1 Behavioural. *Before service*. The level of initiative (see Table 4) refers to the extent to which patients take the initiative to participate in the service, thereby presenting one type of manifestation of engagement. For example, the rate at which referral patients make an appointment for a remote consultation could be one possible metric. Willman (2021) conducts an exploratory mixed-methods study to evaluate the eConsult service in the UK and took the appointment-booking rate as one of the measurements. Likewise, if the invitation is issued by a healthcare organisation, the level of invitation acceptance could also be used as an engagement measure. Finally, the level of preparation for the remote consultation, such as searching for relevant information, can provide a useful measure of engagement behaviour in the *before service* phase of the patient journey.

At/during service. In our data set, we found that levels of attendance or uptake formed the most common and explicit domain for engagement measures (Chu *et al.*, 2022; Yang *et al.*, 2020; Yue *et al.*, 2021). In addition, the intensity of interaction between patient and clinician during the consultation, such as a patient asking questions or challenging statements, is also often used as a proxy for engagement (Wu *et al.*, 2021). More passive forms of interaction, such as indicating attention and understanding during conversations, as well as collaborative planning, can also be seen as signs of engagement (Hoffmann *et al.*, 2020).

After service. The level of patient adherence to a given health or medicine plan following the remote consultation can also be indicative of engaged behaviour. A pilot study by Raymond *et al.* (2016) investigates the acceptability of remote consultation and the results suggest that levels of re-attendance and follow-up by patients could act as good indicators of engagement. In addition, healthcare organisations often ask patients to provide feedback to

	Before service	At/during service	After service
Behavioural	Level of initiative (Haynes *et al.*, 2021; Willman, 2021) Level of invitation acceptance (Gifford *et al.*, 2021; Moessner and Bauer, 2012; Williams *et al.*, 2021) Level of preparation (Chrapah *et al.*, 2021; Wu *et al.*, 2021)	Level of attendance (Chu *et al.*, 2022; Darrat *et al.*, 2021; Greenhalgh *et al.*, 2018; Joughin *et al.*, 2021; Keely and Liddy, 2021; Morrison *et al.*, 2021; O'Donovan *et al.*, 2020; Viers *et al.*, 2015; Wherton *et al.*, 2021; Williams *et al.*, 2021; Yang *et al.*, 2020; Yue *et al.*, 2021) Level of interaction (Chrapah *et al.*, 2021; Haynes *et al.*, 2021; Hoffmann *et al.*, 2020; Williams *et al.*, 2021; Wu *et al.*, 2021) Level of value co-creation (Nilsen and Moen, 2008; Papoutsi *et al.*, 2021) Level of understanding (Hoffmann *et al.*, 2020)	Level of adherence (Davis *et al.*, 2020; Gilbody *et al.*, 2017; McConnochie *et al.*, 2016; Touson *et al.*, 2021) Level of re-attendance (Raymond *et al.*, 2016) Level of sharing experience (Chrapah *et al.*, 2021; Williams *et al.*, 2021) Level of giving feedback (Williams *et al.*, 2021)
Emotional	Level of interest in remote consultation (Chang *et al.*, 2021; Cowie *et al.*, 2018; Greenhalgh *et al.*, 2016; Kasckow *et al.*, 2015; Mammen *et al.*, 2018; Moessner and Bauer, 2012; Pappas and Seale, 2010; Wherton *et al.*, 2021; Yang *et al.*, 2020) Level of hesitation in remote consultation (Chang *et al.*, 2021; Cowie *et al.*, 2018; Greenhalgh *et al.*, 2016)	Level of mutual trust (Donaghy *et al.*, 2019; Willman, 2021) Level of feeling understood (Derbyshire *et al.*, 2021; Mammen *et al.*, 2018; Rose *et al.*, 2021) Level of feeling supported (Mammen *et al.*, 2018)	Level of satisfaction (Braune *et al.*, 2021; Gifford *et al.*, 2021; Moessner and Bauer, 2012; Rose *et al.*, 2021) Level of reliance (Donaghy *et al.*, 2019; Finkelstein *et al.*, 2021; Rose *et al.*, 2021)
Cognitive	Level of familiarity with remote consultation service (Lackey *et al.*, 2021) Level of belief in remote consultation service (Cowie *et al.*, 2018; Lackey *et al.*, 2021)	Level of familiarity with the service process (Chang *et al.*, 2021; Hoffmann *et al.*, 2020) Level of belief in the service process (Cowie *et al.*, 2018; Lackey *et al.*, 2021)	Level of familiarity with the action plan (Musiat *et al.*, 2014) Level of belief in the service outcome (Cowie *et al.*, 2018; Lackey *et al.*, 2021; Musiat *et al.*, 2014) Level of learning (Nilsen and Moen, 2008)

Source(s): Created by the authors

Table 4. Domains for measuring engagement in remote consultation

assess service quality, once they have finished the consultation. Thus, for example, Williams *et al.* (2021) use randomised controlled trials to identify implementation challenges around remote consultation and took "Response to the exit survey" as a measure of engagement, highlighting the importance of willingness to give feedback as an indicative behaviour.

4.2.3.2 Emotional. *Before service*. A personal interest in remote consultation is a strong driver for its use on the part of both patients and clinicians. Thus, high levels of enthusiasm regarding a remote service often lead to greater engagement (Yang *et al.*, 2020). Interestingly, our data suggest that displaying *hesitancy* in relation to a new mode of service such as remote consultation can also be regarded as a form of engagement.

At/during service. Mutual trust is often used to describe the clinical relationship between patients and clinicians, and could also serve as a domain in which to measure service

experience (see the example of video consultation in Donaghy *et al.* (2019)). In addition, the perceived quality of interpersonal relations (Mammen *et al.*, 2018), feeling understood, and feeling supported by others in the course of the service are crucial to the engagement of patients and clinicians.

After service. Post-consultation satisfaction levels are commonly used to measure the experience of remote consultation. Importantly, both high *and* low levels of satisfaction can be indicative of people's engagement with such services (Rose *et al.*, 2021). In addition, the nature of the relationship after the service, such as patients becoming more reliable in attending future sessions, may be a good proxy for engagement.

4.2.3.3 Cognitive. *Before service*. While the emotional dimension considers feelings in relation to remote consultation, the cognitive dimension involves the understanding, knowledge and belief in the service. Lackey *et al.* (2021) conduct a mixed-methods study to explore the factors that influence the experience of remote consultation, and use knowledge and familiarity regarding the service as a domain in which to measure the pre-service perspectives of clinicians. In a similar vein, the level of belief prior to the service (i.e. the willingness to use remote consultation as an alternative method to deliver/receive healthcare) represents another cognitive domain.

At/during service. Familiarity with the process of remote consultation services, and with their potential benefits and pitfalls, is often treated as a precursor to engagement and adoption (Chang *et al.*, 2021). Furthermore, having belief in the process and deeming it to be reasonable and valid could also indicate engagement.

After service. Besides knowing what to do after the service and believing the consultation to be beneficial, significant numbers think that opting for a remote consultation provides an opportunity to learn from their medical condition in support of a new form of healthcare service (Nilsen and Moen, 2008), and such eagerness to learn also appears to be a good proxy for engagement.

4.2.4 Interventions and improvement options for remote consultation engagement. Within our dataset, many interventions have been proposed and implemented in an attempt to improve patient engagement in remote consultation. We address these in relation to individuals, organisations and the broader context.

Interventions targeted at the level of the individual prove the most likely to influence associated stakeholder behaviours. For example, in the case study of Chu *et al.* (2022) on the accessibility of telehealth for elders, the data show 30.4% of patients were video-enabled, with 18.7% requesting technical assistance. Thus, to increase access to telehealth, assistance in enabling video on patients' own devices was offered. More widely, offering targeted educational material and different communication channels to both patients and staff was effective in removing adoption barriers and supporting transition to remote consultation (Finkelstein *et al.*, 2021; Touson *et al.*, 2021).

Our data set highlights many of the disadvantages of remote consultations. Reduced access to facial expressions, body language and other physical cues were the most highlighted concerns (Elawady *et al.*, 2020; Lackey *et al.*, 2021). For example, many clinicians are used to wearing white coats (medical attire) that give their statements more weight, with patients exhibiting stronger obedience/adherence as a result, an effect diluted by remote consultation. Based on the experience of individuals, many pointers emerge for more successful implementation in the future and improved engagement. For example, a survey of 55 clinicians conducted by Eppler (2021) reveals that it is easy to lose non-verbal cues such as eye contact during the consultation, but placing more emphasis on tone of voice, smiling or other facial expressions can help in building rapport and mutual understanding. Many patients state that having a straightforward process to schedule consultations and sending reminders help to enhance their engagement (Hyun *et al.*, 2020).

It is also important to highlight the coordinating role of the organisation. For instance, Morrison *et al.* (2021) apply action research to develop a video consultation process that includes booking and scheduling, virtual receptionists, patient access, clinical support and so on. They proposed a standardised process to support other organisations in developing such services. Deeds *et al.* (2019) use electronic consultation (eConsult) newsletters as interventions to communicate programme updates to various stakeholders to promote, inform and engage patients in healthcare services across a group of primary care centres.

When it comes to the broader context, whilst several interventions have been suggested at this level, few have been implemented. This is partly because, for many healthcare organisations, remote consultations remain a relatively new mode of service delivery. Suggested interventions have included improving public infrastructures for digital services, such as better broadband facilities (Cowie *et al.*, 2018), the introduction of more specific and supportive service regulations and insurance policies, and updated medical reimbursement schemes in support of remote consultation, as well as the elimination or minimisation of any associated financial costs for patient participants vis-à-vis the supporting technologies (Hyun *et al.*, 2020; Wherton *et al.*, 2021).

Where such interventions *have* been implemented, most appear to be operating relatively successfully. However, these have often not been proposed in a very systematic fashion, perhaps reflective of their "emergency" instigation/acceleration in the face of the pandemic. Arguably, there is a significant lack of the more holistic perspective on antecedents and outputs discussed here.

5. Discussion

5.1 Defining patient engagement in remote consultations

In our systematic review, we consistently observed increased attention towards customer engagement in remote consultation services. Such attention has been influenced by the development of internet technology (Bavafa *et al.*, 2018; Dai and Tayur, 2019), and was amplified by the rapid adoption of remote consultations during the COVID-19 pandemic (Cadel *et al.*, 2021). The acceptance and effective adoption of remote consultation hinge directly on the efficacy of its implementation, thereby elevating patient engagement as a crucial factor deserving comprehensive examination in this domain (Jussupow *et al.*, 2021).

Further, our results highlighted the recurring focus on the dimensions (Brodie *et al.*, 2011; O'Brien and Toms, 2008), process (Lemon and Verhoef, 2016; O'Brien and Toms, 2008), and the antecedents and consequences of customer engagement (Carman *et al.*, 2013; Van Doorn *et al.*, 2010). These components emerged as pivotal in understanding patient engagement.

Given the variation observed in the theoretical frameworks (Carman *et al.*, 2013; Lemon and Verhoef, 2016; O'Brien and Toms, 2008; Van Doorn *et al.*, 2010) and definitions presented in empirical studies (Greenhalgh *et al.*, 2016; Joughin *et al.*, 2021; Morrison *et al.*, 2021), our review underscores the need for a nuanced understanding of patient engagement in the context of remote consultations.

We propose that patient engagement in remote consultation services involves an interactive partnership between patients and healthcare professionals, carers and other medical staff across different levels of the healthcare system with the ever-present aim of improving the quality of care. It is a dynamic and interactive process, involving physical behaviour and psychological state before, during or after the remote consultation service. Furthermore, it is driven by multilevel antecedents and can lead to both positive and negative consequences for different individual stakeholders and organisations, and the broader context.

5.2 Influential antecedents and derived outcomes of patient engagement

Drawing on our systematic review, we find evidence of several antecedents that affect patient engagement in remote consultations, including the *patient*, *staff*, the *home and family*, the *reason for consulting*, the *clinical relationship*, *technology and software providers*, the *healthcare organisation*, the *wider system*, and *perceptions of benefits/detriments*. Some of our antecedents do not align seamlessly with the existing PERCS framework (Greenhalgh *et al.*, 2021). For instance, "perceptions of benefits/detriments" emerged as a distinct factor from our dataset (Braune *et al.*, 2021; Chrapah *et al.*, 2021; Harris *et al.*, 2021; Rose *et al.*, 2021), which captures individuals' attitudes towards remote consultation and merited a separate category.

Similarly, the distinct role of software providers was evident in our data. Contrary to the generic "technology" component, our findings stress that software providers represent more than just technical frameworks (Greenhalgh *et al.*, 2018; Wherton *et al.*, 2021). While "technology" broadly encompasses objective technical challenges, software providers introduce a human touch, incorporating technology with subjectivity and control. They serve as primary facilitators, bridging the gap between patients, healthcare professionals, and healthcare organisations.

In addition, in our examination of empirical studies, we consistently observe a shared goal of enhancing patient engagement due to its significant implications for healthcare delivery, which potentially correlates with improved health outcomes, care quality, patient experiences, and safety (Barello *et al.*, 2016; Tobiano *et al.*, 2019). Notwithstanding, our data do not provide *direct evidence* linking patient engagement to these specified benefits.

5.3 Identifying effective metrics for assessing patient engagement

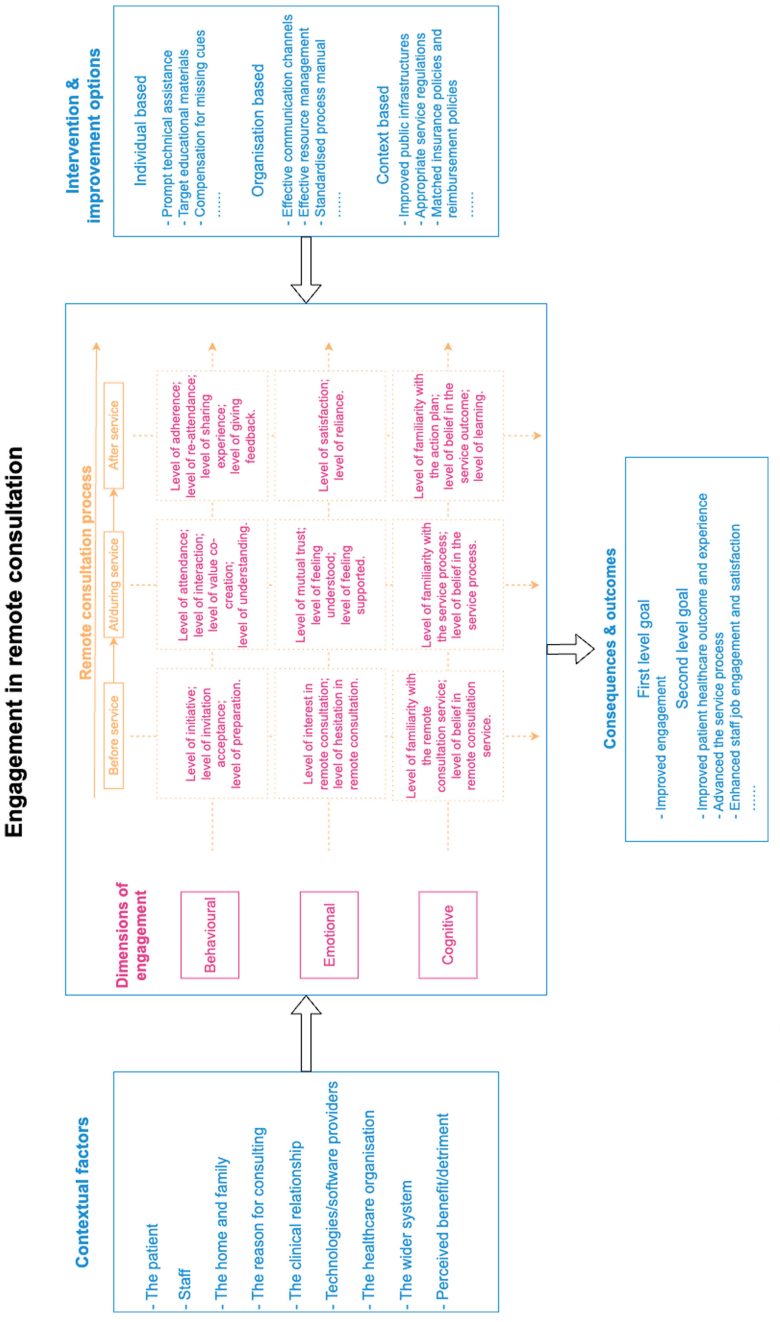
Building upon our review results, we observe many empirical studies that only suggest certain manifestations as potential metrics for measuring patient engagement. These manifestations include the behaviour of uptake consultation (Chu *et al.*, 2022; Yang *et al.*, 2020; Yue *et al.*, 2021), the emotion linked with satisfaction towards remote consultation services (Braune *et al.*, 2021; Gifford *et al.*, 2021; Rose *et al.*, 2021), and cognitions centred around the familiarity and trust in remote consultations (Cowie *et al.*, 2018; Lackey *et al.*, 2021). This observed trend saturated various studies (Willman, 2021; Wu *et al.*, 2021; Yang *et al.*, 2020) indicating an evident gap in the current literature and highlighting the pressing need for consistent, explicit, and actionable metrics for engagement evaluation.

Given the ongoing efforts to refine remote consultation services, our analysis highlights the importance of developing robust metrics. These metrics should enable both academics and practitioners to determine varying degrees of engagement that are adaptable to distinctive service stages and diverse healthcare contexts. These metrics, as informed by our results, should encompass the diverse dimensions of engagement – behavioural, emotional, and cognitive – and span the entirety of the patient journey, i.e. before, during, and after the service (Carman *et al.*, 2013; Lemon and Verhoef, 2016; O'Brien and Toms, 2008).

5.4 Conceptual framework for engagement in remote consultation

Pulling together the analysis of the articles in our dataset, we proposed an *ex post* conceptual framework for engagement in remote consultation (see Figure 3). Mirroring our initial *ex ante* framework, this framework is designed to be a tool for both academics and healthcare operations practitioners to explore the various facets of patient engagement in remote consultation. It integrates three key aspects – the *dimensions* (in red), *process* (in orange), and *antecedents and consequences* (in blue) - of patient engagement, deconstructed in greater detail.

Drawing from our research findings, we identified diverse manifestations of patient engagement in remote consultation. These manifestations can be categorically structured into three distinct dimensions as outlined by O'Brien and Toms (2008): the *behavioural*, the



Source(s): Created by the authors

Figure 3.
Ex post conceptual framework for patient engagement in remote consultation

emotional and the *cognitive*. Furthermore, these dimensions intersect with the three critical phases of a patient's journey in the remote consultation process (Lemon and Verhoef, 2016): *before service*, *at/during service* and *after service*. For instance, taking Willman (2021)'s evaluation of the eConsult service in the UK uses the patient's appointment-booking rate as an engagement metric. This act of scheduling an appointment is a *behavioural* manifestation of being engaged in the *before service* stage, whilst the level of such initiative could be one of the domains used to measure engagement at this particular juncture. Given such empirical evidence, we have retained the classification of engagement in the *ex post* framework, populating it with specific manifestations and potential measures of patient engagement in remote consultations.

Nevertheless, our analysis revealed limited evidence addressing the dynamic nature of patient engagement as conceptualised by O'Brien and Toms (2008), where patients can cycle between different phases of engagement – *point of engagement*, *engagement*, *disengagement*, and *re-engagement*. We still believe this cyclical process is crucial to comprehending patient engagement and should therefore not be neglected. Taking the example of consultation scheduling from our dataset, many studies (Haynes *et al.*, 2021; Willman, 2021) treat this as a static act. However, we argue for its inherent dynamism: as patients initiate an appointment, they are at the *point of engagement* before the remote consultation service encounter, within the behavioural dimension of engagement. Upon confirming the appointment, they transition to the phase of *engagement*. As the appointment approaches, some may lose track, leading to *disengagement* phase. Yet, a timely reminder can spark *re-engagement* with the service. This fluidity potentially permeates all stages of the remote consultation service and every dimension of engagement. Therefore, we advocate for retaining this iterative aspect in our *ex post* framework.

Upon analysing the antecedents of patient engagement, we found that not only *contextual factors* have an influence on patient engagement in remote consultation, but there are also many *intervention and improvement options* proposed or implemented that would also impact patient engagement (Finkelstein *et al.*, 2021; Hyun *et al.*, 2020; Morrison *et al.*, 2021; Touson *et al.*, 2021). Consequently, we refined the *ex post* framework by distinguishing the antecedents from the *ex ante* framework into two distinct categories: *contextual factors* and *intervention and improvement options*.

In addition, we employed the PERCS framework (Greenhalgh *et al.*, 2021) to guide our analysis and identify contextual factors. The original PERCS framework outlines eight critical antecedents for remote consultation. However, after analysing our dataset, we revised some of the factors, such as *technology* (Greenhalgh *et al.*, 2018; Wherton *et al.*, 2021), and identified an additional factor previously unaddressed: *perceptions of benefits/detriments* (Braune *et al.*, 2021; Chrapah *et al.*, 2021; Harris *et al.*, 2021; Rose *et al.*, 2021). Given its significance, we have treated this as a standalone factor and incorporated it, along with the other detailed contextual factors, into our enhanced *ex post* framework.

Furthermore, our analysis revealed that patients, clinicians, healthcare organisations, and public sectors each employ distinct interventions for patient engagement (Cowie *et al.*, 2018; Deeds *et al.*, 2019; Finkelstein *et al.*, 2021; Lackey *et al.*, 2021). Consequently, in our refined *ex post* framework, we categorised *intervention and improvement options* into three tiers: individual-based, organisation-based, and context-based. This classification aligns with the framework presented by Van Doorn *et al.* (2010).

Lastly, in our examination of the empirical literature, it is evident that a primary objective (the first level goal) across studies is to bolster patient engagement. This objective is of immediate concern to both academics and healthcare operations practitioners due to its crucial role in healthcare delivery and its potential correlation with health outcomes, care quality, patient experiences, and safety (Barello *et al.*, 2016; Tobiano *et al.*, 2019). However, our dataset did not provide direct evidence underscoring the influence of patient engagement on

these outlined benefits, which reflect the broader and long-term implications of enhanced patient engagement. Therefore, in our *ex post* framework, we have outlined these as secondary objectives (second level goal), emphasising how enhanced patient engagement can potentially enhance patient healthcare outcomes and experience, service process, and the job engagement and satisfaction of staff.

5.5 Future directions

The predominance of healthcare journals in our systematic review points to a notable current gap in empirical research on remote consultation within HOM. In many respects, this may simply be a function of the longer research project and publication lifecycles associated with management research when contrasted to biomedical research for what is an emerging area of research interest. The recent pandemic, which has brought telehealth and remote consultations to the forefront, is already stimulating HOM researchers, as evidenced by an increase in telehealth-related articles in leading OM conferences and special issue calls (for example, Journal of Operations Management, 2023). As the topic continues to gain traction, OM scholars can add significant value through their empirical insights on telehealth and patient engagement in remote consultations, thereby actively shaping the future of healthcare operations. We briefly outline several research opportunities for HOM scholars that speak to the field's evolving focus on digital health and patient-centred care.

5.5.1 Patient engagement focused research in remote consultation. An essential trajectory for future research in HOM is the deeper exploration of patient engagement issues in remote consultation. This could involve examining the trade-offs inherent in remote healthcare delivery, such as balancing accessibility with quality, weighing the costs and benefits of technology, and evaluating standardisation versus customisation of services, particularly in the post-COVID19 era. For instance, Saghafian *et al.* (2018) emphasise the challenge of managing the speed-versus-quality trade-off in telemedical physician triage. Their research stresses the critical interplay between agent knowledge and flow of work between the telemedical physician and triage nurses. In a similar vein, Rajan *et al.* (2018) investigate the impact of telemedicine on the quality-speed trade-off in chronic care management, revealing the complexities and importance of these trade-offs in enhancing patient engagement in remote healthcare services. Such studies amplify the message of our paper on the importance of addressing these challenges in future HOM research.

Building on this observation, the relationship between the technical efficacy of remote consultations and the emotional dimensions of patient care also deserves further in-depth investigation. This aspect of research would benefit from the insights of Ko *et al.* (2019), who analyse over a million physician reviews across 17 medical specialties and provide strong empirical evidence to reveal the correlation between operational efficiency and patient satisfaction. Correspondingly, Youn *et al.* (2022) note that while patients appreciate the convenience and simplicity of digital interactions, personalised care remains the cornerstone in maintaining their loyalty. They argue that an optimal healthcare experience, whether virtual or in-person, requires a human touch. These studies collectively demonstrate the critical need to understand how technology-mediated interactions influence patient satisfaction, trust, and the overall healthcare experience, and highlight the use of a patient-centric approach in healthcare operations management.

Furthermore, aligning with the growing interest in behavioural operations and intervention-based research (IBR) within the OM community (Chandrasekaran *et al.*, 2020), future research could explore the behavioural aspects of patient engagement and the impact of various interventions. This future direction would be in line with Groop *et al.* (2017), who apply a design science approach to enhance the efficiency of a home care delivery system in a Northern European city. Similarly, Anand *et al.* (2021) adopt an IBR framework to develop a

methodology for implementing sustainable process improvements in healthcare delivery. These approaches offer promising directions for research focused on patient engagement in remote consultation and show how employing IBR can be instrumental in examining how different patient groups interact with various modes of remote consultation and the subsequent impact on healthcare outcomes.

5.5.2 General OM research in remote consultation. More generally, OM research in the area of remote consultation could extend beyond patient engagement – for example, to optimise process flows in remote healthcare delivery. This line of future research could include studies on workflow optimisation, resource allocation, and service delivery models. Betcheva *et al.* (2020) point out the complexities in healthcare supply chain management, presenting significant opportunities for impactful research avenues in areas such as the coordination and integration of new care models, including remote consultation. The COVID-19 pandemic has accelerated the implementation of telehealth, bringing healthcare services closer to patients and enhancing service efficiency through the pooling of remote resources. Researchers can now explore how emerging technologies can guide personalised care and resource allocation, not only in response to the pandemic but also in preparation for future health crises as well as in the context of financial pressures and population ageing. This shift reinforces the need to understand how remote consultations can be integrated more effectively into existing care delivery systems.

Finally, addressing inequality in patient access in remote healthcare services is vital. Youn *et al.* (2022) conduct a review of planning and scheduling research in healthcare published in prominent OM journals over the past 3 decades. They identify seven emerging trends, with "expanded reach of virtual care", "patient engagement and personalised care", and "working toward health equity" being paramount for future OM research. Their work emphasises the necessity of multidisciplinary perspectives to develop coherent solutions that address complex contemporary healthcare issues. Empirical research, as also advocated by Youn *et al.* (2022), is needed to understand and mitigate the potential increase in healthcare inequity caused by disparities in access to technology, digital literacy, and socio-economic factors. Such research is essential for ensuring equitable healthcare delivery in increasingly digital healthcare environments. This also meets the broader objectives of healthcare operations management, striving to provide high-quality, accessible, and equitable healthcare services.

6. Conclusion

In this paper, we have addressed the explosive growth in remote consultations within healthcare and the critical role of patient engagement in this rapidly evolving context. We first examined the theoretical background of *engagement* and then conducted a comprehensive literature review of empirical studies focused on remote consultation in healthcare. Based on our analysis of the 63 articles in our dataset, we have proposed a definition of engagement in relation to such services, identified the antecedents to these services, and introduced potential domains within which we can measure engagement. We leveraged our initial conceptual framework as a prism through which to examine the interventions and improvements suggested in the literature, and generated a final framework of patient engagement in remote consultation.

6.1 Implications

We contribute by proposing a comprehensive framework for patient engagement in remote consultation, that uniquely integrates insights from multiple disciplines to offer a nuanced understanding of patient engagement specific to the operations of remote consultations. Our innovative connection of the three dimensions of engagement (*behavioural*, *emotional*, and

cognitive) to the stages of the clinical process (*before service*, *at/during service* and *after service*) offers both academics and healthcare operations practitioners a structured approach to assess and improve patient interaction at different stages of the consultation process.

Furthermore, our identification of antecedents offers actionable insights for healthcare operations practitioners to enhance service delivery. Specifically, understanding these factors can guide operations practitioners and healthcare organisations in improving patient adoption rates, optimising application procedures, and enhancing patient satisfaction levels, all of which play a crucial role in operational effectiveness and efficiency in the HOM domain.

By adopting a cyclic perspective on the nature of engagement (as represented by *point of engagement*, *engagement*, *disengagement*, and *re-engagement*), our research offers a more comprehensive understanding of the patient's engagement journey, and provides HOM academics and practitioners a dynamic approach to evaluate and address patient engagement. This cyclic understanding can serve as a roadmap for continuous improvement in patient engagement strategies, a core concern for effective healthcare operations. In addition, our proposed potential metrics and broader directions of improvement interventions provide direct tools and strategies for both academics and healthcare operations practitioners to improve remote consultation processes. These tools are increasingly vital as remote consultation becomes increasingly integral to healthcare delivery.

Lastly, our research underscores the sustainability benefits and potential for reducing healthcare inequality through effective remote consultation operations, emphasising the strategic importance of this domain in future healthcare operations management.

6.2 Limitations

As a conceptual/literature review work, this study is subject to several limitations. For example, in examining the theoretical background of our subject, we have used purposive sampling to find the most cited and highest quality studies and we may have missed important works that were not necessarily published in elite journals. In our empirical work, we conducted a comprehensive review rather than a systematic review, which could also give rise to a potentially skewed sample. As such, our sample risks a degree of subjectivity. The conceptual framework we have proposed has yet to be tested empirically and is not specific to a specific clinical specialty or type of disease. However, due to the nature of healthcare services, health conditions can be significantly different from one another, and so too the treatment process. Thus, in future works, it will be important to enhance our framework by applying it to specific health departments or health conditions.

References

Agyekum, K., Adinyira, E., Baiden, B., Ampratwum, G. and Duah, D. (2019), "Barriers to the adoption of green certification of buildings", *Journal of Engineering, Design and Technology*, Vol. 17 No. 5, pp. 1035-1055, doi: 10.1108/jedt-01-2019-0028.

Alexander, A., Blome, C., Schleper, M.C. and Roscoe, S. (2022), "Managing the 'new normal': the future of operations and supply chain management in unprecedented times", *International Journal of Operations and Production Management*, Vol. 42 No. 8, pp. 1061-1076, doi: 10.1108/ijopm-06-2022-0367.

Anand, G., Chandrasekaran, A. and Sharma, L. (2021), "Sustainable process improvements: evidence from intervention-based research", *Journal of Operations Management*, Vol. 67 No. 2, pp. 212-236, doi: 10.1002/joom.1119.

Barello, S., Triberti, S., Graffigna, G., Libreri, C., Serino, S., Hibbard, J. and Riva, G. (2016), "eHealth for patient engagement: a systematic review", *Frontiers in Psychology*, Vol. 6, 2013, doi: 10.3389/fpsyg.2015.02013.

Bavafa, H., Hitt, L.M. and Terwiesch, C. (2018), "The impact of E-visits on visit frequencies and patient health: evidence from primary care", *Management Science*, Vol. 64 No. 12, pp. 5461-5480, doi: 10.1287/mnsc.2017.2900.

Betcheva, L., Erhun, F. and Jiang, H. (2020), "OM forum—supply chain thinking in healthcare: lessons and outlooks", *Manufacturing and Service Operations Management*, Vol. 23 No. 6, pp. 1333-1353, doi: 10.1287/msom.2020.0920.

Bowden, J. (2009), "The process of customer engagement: a conceptual framework", *Journal of Marketing Theory and Practice*, Vol. 17 No. 1, pp. 63-74, doi: 10.2753/mtp1069-6679170105.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77-101, doi: 10.1191/1478088706qp063oa.

Brodie, R.J., Hollebeek, L.D., Jurić, B. and Ilić, A. (2011), "Customer engagement: conceptual domain, fundamental propositions, and implications for research", *Journal of Service Research*, Vol. 14, pp. 252-271.

Brodie, R.J., Ilic, A., Juric, B. and Hollebeek, L. (2013), "Consumer engagement in a virtual brand community: an exploratory analysis", *Journal of Business Research*, Vol. 66 No. 1, pp. 105-114, doi: 10.1016/j.jbusres.2011.07.029.

Cadel, L., Marcinow, M., Sandercock, J., Dowedoff, P., Guilcher, S.J.T., Maybee, A., Law, S. and Kuluski, K. (2021), "A scoping review of patient engagement activities during COVID-19: more consultation, less partnership", *PloS One*, Vol. 16 No. 9, p. e0257880, doi: 10.1371/journal.pone.0257880.

Carman, K.L., Dardess, P., Maurer, M., Sofaer, S., Adams, K., Bechtel, C. and Sweeney, J. (2013), "Patient and family engagement: a framework for understanding the elements and developing interventions and policies", *Health Affairs*, Vol. 32 No. 2, pp. 223-231, doi: 10.1377/hlthaff.2012.1133.

Chandler, J.D. and Lusch, R.F. (2015), "Service systems: a broadened framework and research agenda on value propositions, engagement, and service experience", *Journal of Service Research*, Vol. 18 No. 1, pp. 6-22, doi: 10.1177/1094670514537709.

Chandrasekaran, A., De Treville, S. and Browning, T. (2020), "Editorial: intervention-based research (IBR)—what, where, and how to use it in operations management", *Journal of Operations Management*, Vol. 66 No. 4, pp. 370-378, doi: 10.1002/joom.1093.

Csikszentmihalyi, M. and Csikzentmihaly, M. (1990), *Flow: the Psychology of Optimal Experience*, Harper & Row, New York.

Dai, T. and Tayur, S. (2019), "OM forum—healthcare operations management: a snapshot of emerging research", *Manufacturing and Service Operations Management*, Vol. 22 No. 5, pp. 869-887, doi: 10.1287/msom.2019.0778.

Dobrzykowski, D.D. and Tarafdar, M. (2015), "Understanding information exchange in healthcare operations: evidence from hospitals and patients", *Journal of Operations Management*, Vol. 36 No. 1, pp. 201-214, doi: 10.1016/j.jom.2014.12.003.

Durach, C.F., Kembro, J. and Wieland, A. (2017), "A new paradigm for systematic literature reviews in supply chain management", *Journal of Supply Chain Management*, Vol. 53 No. 4, pp. 67-85, doi: 10.1111/jscm.12145.

Ferrand, Y.B., Magazine, M.J., Rao, U.S. and Glass, T.F. (2018), "Managing responsiveness in the emergency department: comparing dynamic priority queue with fast track", *Journal of Operations Management*, Vols 58-59 No. 1, pp. 15-26, doi: 10.1016/j.jom.2018.03.001.

Fox, G., Fergusson, D.A., Daham, Z., Youssef, M., Foster, M., Poole, E., Sharif, A., Richards, D.P., Hendrick, K., Mendelson, A.A., Macala, K.F., Monfaredi, Z., Montroy, J., Fiest, K.M., Presseau, J. and Lalu, M.M. (2021), "Patient engagement in preclinical laboratory research: a scoping review", *EBioMedicine*, Vol. 70, 103484, doi: 10.1016/j.ebiom.2021.103484.

Galle, A., Semaan, A., Huysmans, E., Audet, C., Asefa, A., Delvaux, T., Afolabi, B.B., El Ayadi, A.M. and Benova, L. (2021), "A double-edged sword—telemedicine for maternal care during COVID-

19: findings from a global mixed-methods study of healthcare providers", *BMJ Global Health*, Vol. 6 No. 2, e004575, doi: 10.1136/bmjgh-2020-004575.

Gambetti, R.C. and Graffigna, G. (2010), "The concept of engagement: a systematic analysis of the ongoing marketing debate", *International Journal of Market Research*, Vol. 52 No. 6, pp. 801-826, doi: 10.2501/s147078531020166.

Green, L.V. (2012), "OM forum—the vital role of operations analysis in improving healthcare delivery", *Manufacturing and Service Operations Management*, Vol. 14 No. 4, pp. 488-494, doi: 10.1287/msom.1120.0397.

Greenhalgh, T., Rosen, R., Shaw, S.E., Byng, R., Faulkner, S., Finlay, T., Grundy, E., Husain, L., Hughes, G., Leone, C., Moore, L., Papoutsi, C., Pope, C., Rybczynska-Bunt, S., Rushforth, A., Wherton, J., Wieringa, S. and Wood, G.W. (2021), "Planning and evaluating remote consultation services: a new conceptual framework incorporating complexity and practical ethics", *Frontiers in Digital Health*, Vol. 3, 726095, doi: 10.3389/fdgth.2021.726095.

Grey, E., Brown, F., Smith, P., Springett, D., Augustine, D., Sengupta, R., Peacock, O. and Gillison, F. (2023), "Patient–clinician dynamics in remote consultations: a qualitative study of cardiology and rheumatology outpatient clinics in the UK", *BMJ Open*, Vol. 13 No. 5, p. e070923, doi: 10.1136/bmjopen-2022-070923.

Groop, J., Ketokivi, M., Gupta, M. and Holmström, J. (2017), "Improving home care: knowledge creation through engagement and design", *Journal of Operations Management*, Vols 53-56 No. 1, pp. 9-22, doi: 10.1016/j.jom.2017.11.001.

Guha, S. and Kumar, S. (2018), "Emergence of big data research in operations management, information systems, and healthcare: past contributions and future roadmap", *Production and Operations Management*, Vol. 27 No. 9, pp. 1724-1735, doi: 10.1111/poms.12833.

Hardyman, W., Daunt, K.L. and Kitchener, M. (2015), "Value co-creation through patient engagement in health care: a micro-level approach and research agenda", *Public Management Review*, Vol. 17 No. 1, pp. 90-107, doi: 10.1080/14719037.2014.881539.

Harmeling, C.M., Moffett, J.W., Arnold, M.J. and Carlson, B.D. (2017), "Toward a theory of customer engagement marketing", *Journal of the Academy of Marketing Science*, Vol. 45 No. 3, pp. 312-335, doi: 10.1007/s11747-016-0509-2.

Heim, G.R., Nair, A. and Bendoly, E. (2021), "Aims and criteria for advancing technology management research at the Journal of Operations Management", *Journal of Operations Management*, Vol. 67 No. 8, pp. 920-925, doi: 10.1002/joom.1164.

Johnston, R. (1999), "Service operations management: return to roots", *International Journal of Operations and Production Management*, Vol. 19 No. 2, pp. 104-124, doi: 10.1108/01443579910247383.

Journal of Operations Management (2023), "Call for papers: special issue on emerging technologies in healthcare", available at: https://onlinelibrary.wiley.com/pb-assets/assets/18731317/JOM%20SI%20-%20Emerging%20Techs%20in%20Healthcare%20-%20CfP%20(1).pdf (accessed 16 August 2023).

Jussupow, E., Spohrer, K., Heinzl, A. and Gawlitza, J. (2021), "Augmenting medical diagnosis decisions? An investigation into physicians' decision-making process with artificial intelligence", *Information Systems Research*, Vol. 32 No. 3, pp. 713-735, doi: 10.1287/isre.2020.0980.

Kc, D.S., Scholtes, S. and Terwiesch, C. (2020), "Empirical research in healthcare operations: past research, present understanding, and future opportunities", *Manufacturing and Service Operations Management*, Vol. 22 No. 1, pp. 73-83, doi: 10.1287/msom.2019.0826.

Keogh, K., Clark, P., Valery, P.C., Mcphail, S.M., Bradshaw, C., Day, M. and Smith, A.C. (2016), "Use of telehealth to treat and manage chronic viral hepatitis in regional Queensland", *Journal of Telemedicine and Telecare*, Vol. 22 No. 8, pp. 459-464, doi: 10.1177/1357633x16673794.

Ko, D.-G., Mai, F., Shan, Z. and Zhang, D. (2019), "Operational efficiency and patient-centered health care: a view from online physician reviews", *Journal of Operations Management*, Vol. 65 No. 4, pp. 353-379, doi: 10.1002/joom.1028.

Kumar, V., Aksoy, L., Donkers, B., Venkatesan, R., Wiesel, T. and Tillmanns, S. (2010), "Undervalued or overvalued customers: capturing total customer engagement value", *Journal of Service Research*, Vol. 13 No. 3, pp. 297-310, doi: 10.1177/1094670510375602.

Kumar, V., Rajan, B., Gupta, S. and Pozza, I.D. (2019), "Customer engagement in service", *Journal of the Academy of Marketing Science*, Vol. 47 No. 1, pp. 138-160, doi: 10.1007/s11747-017-0565-2.

Lee, S.M., Lee, D. and Schniederjans, M.J. (2011), "Supply chain innovation and organizational performance in the healthcare industry", *International Journal of Operations and Production Management*, Vol. 31 No. 11, pp. 1193-1214, doi: 10.1108/01443571111178493.

Lemon, K.N. and Verhoef, P.C. (2016), "Understanding customer experience throughout the customer journey", *Journal of Marketing*, Vol. 80 No. 6, pp. 69-96, doi: 10.1509/jm.15.0420.

Lim, W.M., Rasul, T., Kumar, S. and Ala, M. (2022), "Past, present, and future of customer engagement", *Journal of Business Research*, Vol. 140, pp. 439-458, doi: 10.1016/j.jbusres.2021.11.014.

Matinheikki, J., Kauppi, K., Brandon-Jones, A. and Van Raaij, E.M. (2022), "Making agency theory work for supply chain relationships: a systematic review across four disciplines", *International Journal of Operations and Production Management*, Vol. 42 No. 13, pp. 299-334, doi: 10.1108/ijopm-12-2021-0757.

Menichetti, J., Libreri, C., Lozza, E. and Graffigna, G. (2016), "Giving patients a starring role in their own care: a bibliometric analysis of the on-going literature debate", *Health Expectations*, Vol. 19 No. 3, pp. 516-526, doi: 10.1111/hex.12299.

Mollen, A. and Wilson, H. (2010), "Engagement, telepresence and interactivity in online consumer experience: reconciling scholastic and managerial perspectives", *Journal of Business Research*, Vol. 63 Nos 9-10, pp. 919-925, doi: 10.1016/j.jbusres.2009.05.014.

Mukherjee, U.K. and Sinha, K.K. (2020), "Robot-assisted surgical care delivery at a hospital: policies for maximizing clinical outcome benefits and minimizing costs", *Journal of Operations Management*, Vol. 66 Nos 1-2, pp. 227-256, doi: 10.1002/joom.1058.

O'Brien, H.L. and Toms, E.G. (2008), "What is user engagement? A conceptual framework for defining user engagement with technology", *Journal of the American Society for Information Science and Technology*, Vol. 59 No. 6, pp. 938-955, doi: 10.1002/asi.20801.

O'Brien, H.L. and Toms, E.G. (2010), "The development and evaluation of a survey to measure user engagement", *Journal of the American Society for Information Science and Technology*, Vol. 61 No. 1, pp. 50-69, doi: 10.1002/asi.21229.

Pachankis, J.E. (2007), "The psychological implications of concealing a stigma: a cognitive-affective-behavioral model", *Psychological Bulletin*, Vol. 133 No. 2, pp. 328-345, doi: 10.1037/0033-2909.133.2.328.

Pansari, A. and Kumar, V. (2017), "Customer engagement: the construct, antecedents, and consequences", *Journal of the Academy of Marketing Science*, Vol. 45 No. 3, pp. 294-311, doi: 10.1007/s11747-016-0485-6.

Prey, J.E., Woollen, J., Wilcox, L., Sackeim, A.D., Hripcsak, G., Bakken, S., Restaino, S., Feiner, S. and Vawdrey, D.K. (2014), "Patient engagement in the inpatient setting: a systematic review", *Journal of the American Medical Informatics Association*, Vol. 21 No. 4, pp. 742-750, doi: 10.1136/amiajnl-2013-002141.

Queenan, C.C., Angst, C.M. and Devaraj, S. (2011), "Doctors' orders—If they're electronic, do they improve patient satisfaction? A complements/substitutes perspective", *Journal of Operations Management*, Vol. 29 Nos 7-8, pp. 639-649, doi: 10.1016/j.jom.2011.03.001.

Rajan, B., Tezcan, T. and Seidmann, A. (2018), "Service systems with heterogeneous customers: investigating the effect of telemedicine on chronic care", *Management Science*, Vol. 65 No. 3, pp. 1236-1267, doi: 10.1287/mnsc.2017.2979.

Rajpurkar, P., Chen, E., Banerjee, O. and Topol, E.J. (2022), "AI in health and medicine", *Nature Medicine*, Vol. 28 No. 1, pp. 31-38, doi: 10.1038/s41591-021-01614-0.

Saghafian, S., Hopp, W.J., Iravani, S.M.R., Cheng, Y. and Diermeier, D. (2018), "Workload management in telemedical physician triage and other knowledge-based service systems", *Management Science*, Vol. 64 No. 11, pp. 5180-5197, doi: 10.1287/mnsc.2017.2905.

Sashi, C.M. (2012), "Customer engagement, buyer-seller relationships, and social media", *Management Decision*, Vol. 50 No. 2, pp. 253-272, doi: 10.1108/00251741211203551.

Sawhney, M., Verona, G. and Prandelli, E. (2005), "Collaborating to create: the internet as a platform for customer engagement in product innovation", *Journal of Interactive Marketing*, Vol. 19, pp. 4-17, doi: 10.1002/dir.20046.

Shippee, N.D., Domecq Garces, J.P., Prutsky Lopez, G.J., Wang, Z., Elraiyah, T.A., Nabhan, M., Brito, J.P., Boehmer, K., Hasan, R., Firwana, B., Erwin, P.J., Montori, V.M. and Murad, M.H. (2015), "Patient and service user engagement in research: a systematic review and synthesized framework", *Health Expectations*, Vol. 18 No. 5, pp. 1151-1166, doi: 10.1111/hex.12090.

Stephenson, W. (1967), *The Play Theory of Mass Communication*, Transaction, New Brunswick, NJ.

Stevens, M. and Van Schaik, J. (2020), "Implementing new technologies for complex care: the role of embeddedness factors in team learning", *Journal of Operations Management*, Vol. 66 Nos 1-2, pp. 112-134, doi: 10.1002/joom.1034.

Tang, P.C. and Lansky, D. (2005), "The missing link: bridging the patient–provider health information gap", *Health Affairs*, Vol. 24 No. 5, pp. 1290-1295, doi: 10.1377/hlthaff.24.5.1290.

Tobiano, G., Chaboyer, W., Teasdale, T., Raleigh, R. and Manias, E. (2019), "Patient engagement in admission and discharge medication communication: a systematic mixed studies review", *International Journal of Nursing Studies*, Vol. 95, pp. 87-102, doi: 10.1016/j.ijnurstu.2019.04.009.

Toms, E.G. (2002), "Information interaction: providing a framework for information architecture", *Journal of the American Society for Information Science and Technology*, Vol. 53 No. 10, pp. 855-862, doi: 10.1002/asi.10094.

Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a methodology for developing evidence-informed management knowledge by means of systematic review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222, doi: 10.1111/1467-8551.00375.

Tyler, J.M.B., Pratt, A.C., Wooster, J., Vasilakis, C. and Wood, R.M. (2021), "The impact of increased outpatient telehealth during COVID-19: retrospective analysis of patient survey and routine activity data from a major healthcare system in England", *The International Journal of Health Planning and Management*, Vol. 36 No. 4, pp. 1338-1345, doi: 10.1002/hpm.3185.

Van Doorn, J., Lemon, K.N., Mittal, V., Nass, S., Pick, D., Pirner, P. and Verhoef, P.C. (2010), "Customer engagement behavior: theoretical foundations and research directions", *Journal of Service Research*, Vol. 13 No. 3, pp. 253-266, doi: 10.1177/1094670510375599.

Vargo, S.L. and Lusch, R.F. (2016), "Institutions and axioms: an extension and update of service-dominant logic", *Journal of the Academy of Marketing Science*, Vol. 44 No. 1, pp. 5-23, doi: 10.1007/s11747-015-0456-3.

Verhoef, P.C., Reinartz, W.J. and Krafft, M. (2010), "Customer engagement as a new perspective in customer management", *Journal of Service Research*, Vol. 13 No. 3, pp. 247-252, doi: 10.1177/1094670510375461.

Vivek, S.D., Beatty, S.E. and Morgan, R.M. (2012), "Customer engagement: exploring customer relationships beyond purchase", *Journal of Marketing Theory and Practice*, Vol. 20 No. 2, pp. 122-146, doi: 10.2753/mtp1069-6679200201.

Vivek, S.D., Beatty, S.E., Dalela, V. and Morgan, R.M. (2014), "A generalized multidimensional scale for measuring customer engagement", *Journal of Marketing Theory and Practice*, Vol. 22 No. 4, pp. 401-420, doi: 10.2753/mtp1069-6679220404.

Wreen, M.J. and Callen, D.M. (1982), *The Aesthetic Point of View: Selected Essays of Monroe C. Beardsley*, Cornell University Press, Ithaca, NY.

Youn, S., Geismar, H.N. and Pinedo, M. (2022), "Planning and scheduling in healthcare for better care coordination: current understanding, trending topics, and future opportunities", *Production and Operations Management*, Vol. 31 No. 12, pp. 4407-4423, doi: 10.1111/poms.13867.

Supplementary

References of empirical articles included in review:

Atherton, H., Boylan, A.-M., Eccles, A., Fleming, J., Goyder, C.R. and Morris, R.L. (2020), "Email consultations between patients and doctors in primary care: content analysis", *Journal of Medical Internet Research*, Vol. 22 No. 11, e18218, doi: 10.2196/18218.

Atherton, H., Pappas, Y., Heneghan, C. and Murray, E. (2013), "Experiences of using email for general practice consultations: a qualitative study", *British Journal of General Practice*, Vol. 63 No. 616, e760, doi: 10.3399/bjgp13x674440.

Bele, S., Cassidy, C., Curran, J., Johnson, D.W. and Bailey, J.A.M. (2021), "Using the theoretical domains framework to identify barriers and enablers to implementing a virtual tertiary–regional telemedicine rounding and consultation for kids (TRaC-K) model: qualitative study", *Journal of Medical Internet Research*, Vol. 23 No. 12, e28610, doi: 10.2196/28610.

Braune, K., Boss, K., Schmidt-Herzel, J., Gajewska, K.A., Thieffry, A., Schulze, L., Posern, B. and Raile, K. (2021), "Shaping workflows in digital and remote diabetes care during the COVID-19 pandemic via service design: prospective, longitudinal, open-label feasibility trial", *JMIR mHealth and uHealth*, Vol. 9 No. 4, e24374, doi: 10.2196/24374.

Chang, J.E., Lindenfeld, Z., Albert, S.L., Massar, R., Shelley, D., Kwok, L., Fennelly, K. and Berry, C.A. (2021), "Telephone vs. video visits during COVID-19: safety-net provider perspectives", *The Journal of the American Board of Family Medicine*, Vol. 34 No. 6, pp. 1103-1114, doi: 10.3122/jabfm.2021.06.210186.

Cheung, L., Leung, T.I., Ding, V.Y., Wang, J.X., Norden, J., Desai, M., Harrington, R.A. and Desai, S. (2019), "Healthcare service utilization under a new virtual primary care delivery model", *Telemedicine and E-Health*, Vol. 25 No. 7, pp. 551-559, doi: 10.1089/tmj.2018.0145.

Chrapah, S., Becevic, M., Washington, K.T., Sheets, L.R., Wallach, E., Chitima, R. and Malm-Buatsi, E. (2021), "Patient and provider satisfaction with pediatric urology telemedicine clinic", *Journal of Patient Experience*, Vol. 8, doi: 10.1177/2374373520975734.

Chu, J.N., Kaplan, C., Lee, J.S., Livaudais-Toman, J. and Karliner, L. (2022), "Increasing telehealth access to care for older adults during the COVID-19 pandemic at an academic medical center: video Visits for Elders Project (VVEP)", *Joint Commission Journal on Quality and Patient Safety*, Vol. 48 No. 3, pp. 173-179, doi: 10.1016/j.jcjq.2021.11.006.

Cowie, J., Calveley, E., Bowers, G. and Bowers, J. (2018), "Evaluation of a digital consultation and self-care advice tool in primary care: a multi-methods study", *International Journal of Environmental Research and Public Health*, Vol. 15 No. 5, p. 896, doi: 10.3390/ijerph15050896.

Darrat, I., Tam, S., Boulis, M. and Williams, A.M. (2021), "Socioeconomic disparities in patient use of telehealth during the coronavirus disease 2019 surge", *JAMA Otolaryngology - Head and Neck Surgery*, Vol. 147 No. 3, pp. 287-295, doi: 10.1001/jamaoto.2020.5161.

Davis, A., Smith, T., Talbot, J., Eldridge, C. and Betts, D. (2020), "Predicting patient engagement in IAPT services: a statistical analysis of electronic health records", *Evidence-Based Mental Health*, Vol. 23 No. 1, pp. 8-14, doi: 10.1136/ebmental-2019-300133.

Deeds, S.A., Dowdell, K.J., Chew, L.D. and Ackerman, S.L. (2019), "Implementing an opt-in eConsult program at seven academic medical centers: a qualitative analysis of primary care provider experiences", *Journal of General Internal Medicine*, Vol. 34 No. 8, pp. 1427-1433, doi: 10.1007/s11606-019-05067-7.

Derbyshire, S., Field, J., Vennik, J., Sanders, M. and Newell, D. (2021), "'Chiropractic is manual therapy, not talk therapy': a qualitative analysis exploring perceived barriers to remote consultations by chiropractors", *Chiropractic and Manual Therapies*, Vol. 29 No. 1, 47, doi: 10.1186/s12998-021-00404-2.

Donaghy, E., Atherton, H., Hammersley, V., McNeilly, H., Bikker, A., Robbins, L., Campbell, J. and McKinstry, B. (2019), "Acceptability, benefits, and challenges of video consulting: a qualitative study in primary care", *British Journal of General Practice*, Vol. 69 No. 686, pp. E586-E594, doi: 10.3399/bjgp19x704141.

Elawady, A., Khalil, A., Assaf, O., Toure, S. and Cassidy, C. (2020), "Telemedicine during COVID-19: a survey of health care professionals' perceptions", *Monaldi Archives for Chest Disease*, Vol. 90 No. 4, pp. 576-581, doi: 10.4081/monaldi.2020.1528.

Elson, M.J., Stevenson, E.A., Feldman, B.A., Lim, J., Beck, C.A., Beran, D.B., Schmidt, P.N., Biglan, K.M., Simone, R., Willis, A.W., Dorsey, E.R. and Boyd, C.M. (2018), "Telemedicine for Parkinson's disease: limited engagement between local clinicians and remote specialists", *Telemedicine and E-Health*, Vol. 24 No. 9, pp. 722-724, doi: 10.1089/tmj.2017.0210.

Eppler, C. (2021), "Systemic teletherapists' meaningful experiences during the first months of the coronavirus pandemic", *Journal of Marital and Family Therapy*, Vol. 47 No. 2, pp. 244-258, doi: 10.1111/jmft.12515.

Finkelstein, J.B., Tremblay, E.S., van Cain, M., Farber-Chen, A., Schumann, C., Brown, C., Shah, A.S. and Rhodes, E.T. (2021), "Pediatric clinicians' use of telemedicine: qualitative interview study", *JMIR Human Factors*, Vol. 8 No. 4, e29941, doi: 10.2196/29941.

Frankel, R.M. and Beckman, H. (2020), "'Won't you be my doctor?': four keys to a satisfying relationship in an increasingly virtual world", *Journal of Patient Experience*, Vol. 7 No. 6, pp. 851-855, doi: 10.1177/2374373520957184.

Gifford, A.H., Ong, T., Dowd, C., Van Citters, A.D., Scalia, P., Sabadosa, K.A. and Sawicki, G.S. (2021), "Evaluating barriers to and promoters of telehealth during the COVID-19 pandemic at U.S. cystic fibrosis programs", *Journal of Cystic Fibrosis*, Vol. 20, pp. 9-13, doi: 10.1016/j.jcf.2021.08.034.

Gilbody, S., Brabyn, S., Lovell, K., Kessler, D., Devlin, T., Smith, L., Araya, R., Barkham, M., Bower, P., Cooper, C., Knowles, S., Littlewood, E., Richards, D.A., Tallon, D., White, D. and Worthy, G. (2017), "Telephone-supported computerised cognitive-behavioural therapy: REEACT-2 large-scale pragmatic randomised controlled trial", *British Journal of Psychiatry*, Vol. 210 No. 5, pp. 362-367, doi: 10.1192/bjp.bp.116.192435.

Greenhalgh, T., Shaw, S., Wherton, J., Vijayaraghavan, S., Morris, J., Bhattacharya, S., Hanson, P., Campbell-Richards, D., Ramoutar, S., Collard, A. and Hodkinson, I. (2018), "Real-world implementation of video outpatient consultations at macro, meso, and micro levels: mixed-method study", *Journal of Medical Internet Research*, Vol. 20 No. 4, e150, doi: 10.2196/jmir.9897.

Greenhalgh, T., Vijayaraghavan, S., Wherton, J., Shaw, S., Byrne, E., Campbell-Richards, D., Bhattacharya, S., Hanson, P., Ramoutar, S., Gutteridge, C., Hodkinson, I., Collard, A. and Morris, J. (2016), "Virtual online consultations: advantages and limitations (VOCAL) study", *BMJ Open*, Vol. 6 No. 1, e009388, doi: 10.1136/bmjopen-2015-009388.

Harris, L., Gilmore, D., Hanks, C., Coury, D., Moffatt-Bruce, S., Garvin, J.H. and Hand, B.N. (2021), "'It was surprisingly equivalent to the appointment I had in person': advantages and disadvantages of synchronous telehealth for delivering primary care for autistic adults", *Autism*, Vol. 26 No. 6, pp. 1573-1580, doi: 10.1177/13623613211060589.

Hassan, A., Dorsey, E.R., Goetz, C.G., Bloem, B.R., Guttman, M., Tanner, C.M., Mari, Z., Pantelyat, A., Galifianakis, N.B., Bajwa, J.A., Gatto, E.M. and Cubo, E. (2018), "Telemedicine use for movement disorders: a global survey", *Telemedicine and E-Health*, Vol. 24 No. 12, pp. 979-992, doi: 10.1089/tmj.2017.0295.

Haynes, S.C., Kamerman-Kretzmer, R., Khan, S.S., Crossen, S., Lieng, M.K., Marcin, J.P., Kenyon, N.J. and Kim, C.H. (2021), "Telemedicine use for pediatric asthma care: a mixed methods study", *Journal of Asthma*, Vol. 59 No. 12, pp. 2431-2440, doi: 10.1080/02770903.2021.2019265.

Hoffmann, M., Wensing, M., Peters-Klimm, F., Szecsenyi, J., Hartmann, M., Friederich, H.C. and Haun, M.W. (2020), "Perspectives of psychotherapists and psychiatrists on mental health care integration within primary care via video consultations: qualitative preimplementation study", *Journal of Medical Internet Research*, Vol. 22 No. 6, e17569, doi: 10.2196/17569.

Hyun, C., McMenamin, J., Ko, O. and Kim, S. (2020), "Efficacy of a mobile texting app (Heptalk) in encouraging patient participation in viral hepatitis B care: development and cohort study", *JMIR mHealth and uHealth*, Vol. 8 No. 4, e15098, doi: 10.2196/15098.

Joughin, A., Ibitoye, S., Crees, A., Shipway, D. and Braude, P. (2021), "Developing a virtual geriatric perioperative medicine clinic: a mixed methods healthcare improvement study", *Age and Ageing*, Vol. 50 No. 4, pp. 1391-1396, doi: 10.1093/ageing/afab066.

Kalwani, N.M., Johnson, A.N., Parameswaran, V., Dash, R. and Rodriguez, F. (2021), "Initial outcomes of CardioClick, a telehealth program for preventive cardiac care: observational study", *JMIR Cardio*, Vol. 5 No. 2, e28246, doi: 10.2196/28246.

Kasckow, J., Zickmund, S., Rotondi, A., Welch, A., Gurklis, J., Chinman, M., Fox, L. and Haas, G.L. (2015), "Optimizing scripted dialogues for an e-health intervention for suicidal veterans with major depression", *Community Mental Health Journal*, Vol. 51 No. 5, pp. 509-512, doi: 10.1007/s10597-014-9775-y.

Keely, E. and Liddy, C. (2021), "Specialist participation in e-consult and e-referral services: best practices", *Telemedicine and E-Health*, Vol. 27 No. 1, pp. 17-19, doi: 10.1089/tmj.2020.0023.

Lackey, S., Schmidtke, K.A. and Vlaev, I. (2021), "A mixed-methods study describing behavioral factors that influenced general practitioners' experiences using triage during the COVID-19 pandemic", *BMC Family Practice*, Vol. 22 No. 1, 146, doi: 10.1186/s12875-021-01469-x.

Maarop, N. and Win, K.T. (2012), "Understanding the need of health care providers for teleconsultation and technological attributes in relation to the acceptance of teleconsultation in Malaysia: a mixed methods study", *Journal of Medical Systems*, Vol. 36 No. 5, pp. 2881-2892, doi: 10.1007/s10916-011-9766-2.

Mammen, J.R., Elson, M.J., Java, J.J., Beck, C.A., Beran, D.B., Biglan, K.M., Boyd, C.M., Schmidt, P.N., Simone, R., Willis, A.W. and Dorsey, E.R. (2018), "Patient and physician perceptions of virtual visits for Parkinson's disease: a qualitative study", *Telemedicine and E-Health*, Vol. 24 No. 4, pp. 255-267, doi: 10.1089/tmj.2017.0119.

McConnochie, K.M., Wood, N.E., Alarie, C. and Ronis, S. (2016), "Care offered by an information-rich pediatric acute illness connected care model", *Telemedicine and E-Health*, Vol. 22 No. 6, pp. 465-472, doi: 10.1089/tmj.2015.0161.

Miner, H., Ring, D. and Koenig, K.M. (2021), "Convenience is key for patient engagement with remote video visits in a musculoskeletal practice", *Archives of Bone and Joint Surgery*, Vol. 9 No. 4, pp. 439-444, doi: 10.22038/abjs.2020.50024.2480.

Moessner, M. and Bauer, S. (2012), "Online counselling for eating disorders: reaching an underserved population?", *Journal of Mental Health*, Vol. 21 No. 4, pp. 336-345, doi: 10.3109/09638237.2011.643512.

Moloczij, N., Mosley, I., Moss, K.M., Bagot, K.L., Bladin, C.F. and Cadilhac, D.A. (2015), "Is telemedicine helping or hindering the delivery of stroke thrombolysis in rural areas? A qualitative analysis", *Internal Medicine Journal*, Vol. 45 No. 9, pp. 957-964, doi: 10.1111/imj.12793.

Moroz, I., Archibald, D., Breton, M., Cote-Boileau, E., Crowe, L., Horsley, T., Hyseni, L., Johar, G., Keely, E., Burns, K.K., Kuziemsky, C., Laplante, J., Mihan, A., Oppenheimer, L., Sturge, D., Tuot, D.S. and Liddy, C. (2020), "Key factors for national spread and scale-up of an eConsult innovation", *Health Research Policy and Systems*, Vol. 18 No. 1, 57, doi: 10.1186/s12961-020-00574-0.

Morrison, C., Beattie, M., Wherton, J., Stark, C., Anderson, J., Hunter-Rowe, C. and Gray, N.M. (2021), "Testing and implementing video consulting for outpatient appointments: using quality improvement system thinking and codesign principles", *BMJ Open Quality*, Vol. 10 No. 1, e001259, doi: 10.1136/bmjoq-2020-001259.

Musiat, P., Goldstone, P. and Tarrier, N. (2014), "Understanding the acceptability of e-mental health – attitudes and expectations towards computerised self-help treatments for mental health problems", *BMC Psychiatry*, Vol. 14 No. 1, 109, doi: 10.1186/1471-244x-14-109.

Nilsen, L.L. and Moen, A. (2008), "Teleconsultation – collaborative work and opportunities for learning across organizational boundaries", *Journal of Telemedicine and Telecare*, Vol. 14 No. 7, pp. 377-380, doi: 10.1258/jtt.2008.007012.

O'Donovan, M., Buckley, C., Benson, J., Roche, S., McGowan, M., Parkinson, L., Byrne, P., Rooney, G., Bergin, C., Walsh, D., Bird, R., McGroarty, F., Fogarty, H., Smyth, E., Ahmed, S., O'Donnell, J.S., Ryan, K., O'Mahony, B., Dougall, A. and O'Connell, N.M. (2020), "Telehealth for delivery of haemophilia comprehensive care during the COVID-19 pandemic", *Haemophilia*, Vol. 26 No. 6, pp. 984-990, doi: 10.1111/hae.14156.

Olayiwola, J.N., Knox, M., Dubé, K., Lu, E.C.Y., Woldeyesus, T., James, I.E., Willard-Grace, R. and Tuot, D. (2018), "Understanding the potential for patient engagement in electronic consultation and referral systems: lessons from one safety net system", *Health Services Research*, Vol. 53 No. 4, pp. 2483-2502, doi: 10.1111/1475-6773.12776.

Papoutsi, C., Wherton, J., Shaw, S., Morrison, C. and Greenhalgh, T. (2021), "Putting the social back into sociotechnical: case studies of co-design in digital health", *Journal of the American Medical Informatics Association*, Vol. 28 No. 2, pp. 284-293, doi: 10.1093/jamia/ocaa197.

Pappas, Y. and Seale, C. (2010), "The physical examination in telecardiology and televascular consultations: a study using conversation analysis", *Patient Education and Counseling*, Vol. 81 No. 1, pp. 113-118, doi: 10.1016/j.pec.2010.01.005.

Raymond, J.K., Berget, C.L., Driscoll, K.A., Ketchum, K., Cain, C. and Thomas, J.F.F. (2016), "CoYoT1 clinic: innovative telemedicine care model for young adults with type 1 diabetes", *Diabetes Technology and Therapeutics*, Vol. 18 No. 6, pp. 385-390, doi: 10.1089/dia.2015.0425.

Rose, S., McKee Hurwitz, H., Mercer, M.B., Hizlan, S., Gali, K., Yu, P.C., Franke, C., Martinez, K., Stanton, M., Faiman, M., Rasmussen, P. and Boissy, A. (2021), "Patient experience in virtual visits hinges on technology and the patient-clinician relationship: a large survey study with open-ended questions", *Journal of Medical Internet Research*, Vol. 23 No. 6, e18488, doi: 10.2196/18488.

Seuren, L.M., Wherton, J., Greenhalgh, T., Cameron, D., A'Court, C. and Shaw, S.E. (2020), "Physical examinations via video for patients with heart failure: qualitative study using conversation analysis", *Journal of Medical Internet Research*, Vol. 22 No. 2, e16694, doi: 10.2196/16694.

Shaw, S.E., Seuren, L.M., Wherton, J., Cameron, D., A'Court, C., Vijayaraghavan, S., Morris, J., Bhattacharya, S. and Greenhalgh, T. (2020), "Video consultations between patients and clinicians in diabetes, cancer, and heart failure services: linguistic ethnographic study of video-mediated interaction", *Journal of Medical Internet Research*, Vol. 22 No. 5, e18378, doi: 10.2196/18378.

Sosa, A., Heineman, N., Thomas, K., Tang, K., Feinstein, M., Martin, M.Y., Sumer, B. and Schwartz, D.L. (2017), "Improving patient health engagement with mobile texting: a pilot study in the head and neck postoperative setting", *Head and Neck*, Vol. 39 No. 5, pp. 988-995, doi: 10.1002/hed.24718.

Stewart, J., McCorry, N., Reid, H., Hart, N. and Kee, F. (2021), "Implementation of remote asthma consulting in general practice in response to the COVID19 pandemic: evaluation using extended normalisation process theory", *BJGP Open*, Vol. 6 No. 1, doi: 10.3399/BJGPO.2021.0189.

Touson, J.C., Azad, N., Depue, C., Crimmins, T. and Long, R. (2021), "An application of Harrison's system theory model to spark a rapid telehealth expansion in the time of COVID-19", *Learning Health Systems*, Vol. 5 No. 1, e10239, doi: 10.1002/lrh2.10239.

Tuijt, R., Rait, G., Frost, R., Wilcock, J., Manthorpe, J. and Walters, K. (2021), "Remote primary care consultations for people living with dementia during the COVID-19 pandemic: experiences of people living with dementia and their carers", *British Journal of General Practice*, Vol. 71 No. 709, pp. E574-E582, doi: 10.3399/bjgp.2020.1094.

Verma, R., Krishnamurti, T. and Ray, K.N. (2020), "Parent perspectives on family-centered pediatric electronic consultations: qualitative study", *Journal of Medical Internet Research*, Vol. 22 No. 4, e16954, doi: 10.2196/16954.

Viers, B.R., Pruthi, S., Rivera, M.E., O'Neil, D.A., Gardner, M.R., Jenkins, S.M., Lightner, D.J. and Gettman, M.T. (2015), "Are patients willing to engage in telemedicine for their care: a survey of preuse perceptions and acceptance of remote video visits in a urological patient population", *Urology*, Vol. 85 No. 6, pp. 1233-1240, doi: 10.1016/j.urology.2014.12.064.

Wherton, J., Greenhalgh, T. and Shaw, S.E. (2021), "Expanding video consultation services at pace and scale in Scotland during the COVID-19 pandemic: national mixed methods case study", *Journal of Medical Internet Research*, Vol. 23 No. 10, e31374, doi: 10.2196/31374.

Williams, K., Markwardt, S., Kearney, S.M., Karp, J.F., Kraemer, K.L., Park, M.J., Freund, P., Watson, A., Schuster, J. and Beckjord, E. (2021), "Addressing implementation challenges to digital care delivery for adults with multiple chronic conditions: stakeholder feedback in a randomized controlled trial", *JMIR mHealth and uHealth*, Vol. 9 No. 2, e23498, doi: 10.2196/23498.

Willman, A.S. (2021), "Evaluation of eConsult use by defence primary healthcare primary care clinicians using a mixed-method approach", *BMJ Military Health*, Vol. 169 No. e1, pp. e39-e43, doi: 10.1136/bmjmilitary-2020-001660.

Wu, W., Liu, W. and Ma, L. (2021), "The good, the bad, and the contingency: how patients' treatment verification behaviors are linked to doctors' reactions", *Patient Education and Counseling*, Vol. 104 No. 6, pp. 1364-1370, doi: 10.1016/j.pec.2020.11.003.

Yang, L., Brown-Johnson, C.G., Miller-Kuhlmann, R., Kling, S.M.R., Saliba-Gustafsson, E.A., Shaw, J.G., Gold, C.A. and Winget, M. (2020), "Accelerated launch of video visits in ambulatory neurology during COVID-19: key lessons from the Stanford experience", *Neurology*, Vol. 95 No. 7, pp. 305-311, doi: 10.1212/wnl.0000000000010015.

Yue, H., Mail, V., DiSalvo, M., Borba, C., Piechniczek-Buczek, J. and Yule, A. (2021), "Patient preferences for patient portal-based telepsychiatry in a safety-net hospital setting during COVID-19: a cross-sectional study", *JMIR Formative Research*, Vol. 6 No. 1, e33697, doi: 10.2196/33697.

Corresponding author
Alistair Brandon-Jones can be contacted at: abj20@bath.ac.uk