Evaluating the impact of COVID-19 on the adoption of virtual care in general practice in 20 countries (inSIGHT): rationale and study protocol

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Abstract

Background: In recent decades, virtual care has emerged as a promising option to support primary care delivery. However, despite the potential, adoption rates remained low. With the outbreak of COVID-19, it has suddenly been pushed to the forefront of care delivery. As we progress into the second year of the COVID-19 pandemic, there is a need and opportunity to review the

impact remote care had in primary care settings and reassess its potential future role.

Objective: This study aims to explore the perspectives of General Practitioners / Family Doctors (GPs/FDs) on a.) use of virtual care during the COVID-19 pandemic; b.) perceived impact on quality and safety of care; c.) essential factors for high-quality and sustainable use of virtual care in the future.

Methods: Online cross-sectional questionnaire of GPs/FDs, distributed across 20 countries. The survey was hosted in Qualtrics and distributed using email, social media, and the researchers' personal contact networks. General Practitioners were eligible for the survey if they were working mainly in primary care during the period of the COVID-19 pandemic. Descriptive statistical analysis will be performed for quantitative variables, and subgroup analyses will be conducted to explore the relationships between the use of virtual care and perceptions on impact on quality and safety of care, and participants' characteristics. Qualitative data (free-text responses) will be analysed using framework analysis.

Results: N/A

Conclusions: The study will provide a comprehensive overview of the availability of virtual care technologies, perceived impact on quality and safety of care and essential factors for high-quality future use. In addition, a description of the underlying factors that influence this adoption and perceptions, in both individual GP/FD characteristics, and the context in which they work, will be provided. While the COVID-19 pandemic may prove the first great stress test of the capabilities, capacity, and robustness of digital systems currently in use, remote care will likely remain an increasingly common approach in the future. There is an imperative to identify the main lessons from this unexpected transformation and use them to inform policy decisions and health service design.

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Declarations

Ethics approval and consent to participate

This project received ethics approval by Imperial College Research Office (Reference 20IC5956/2020) and, whenever required, additional ethics approval at national level by local ethics committees.

Consent for publication

Not applicable

Availability of data and materials

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

ALN, EL, GF, JC, AM, and AD contributed to the conception and design of this work. ALN and EL wrote the manuscript with input from all authors. All authors approved the version submitted for publication.

Abstract

Background: In recent decades, virtual care has emerged as a promising option to support primary care delivery. However, despite the potential, adoption rates remained low. With the outbreak of COVID-19, it has suddenly been pushed to the forefront of care delivery. As we progress into the second year of the COVID-19 pandemic, there is a need and opportunity to review the impact remote care had in primary care settings and reassess its potential future role. This study aims to explore the perspectives of General Practitioners / Family Doctors (GPs/FDs) on a.) use of virtual care during the COVID-19 pandemic; b.) perceived impact on quality and safety of care; c.) essential factors for high-quality and sustainable use of virtual care in the future.

Methods: Online cross-sectional questionnaire of GPs/FDs, distributed across 20 countries. The survey was hosted in Qualtrics and distributed using email, social media, and the researchers' personal contact networks. General Practitioners were eligible for the survey if they were working mainly in primary care during the period of the COVID-19 pandemic. Descriptive statistical analysis will be performed for quantitative variables, and subgroup analyses will be conducted to explore the relationships between the use of virtual care and perceptions on impact on quality and safety of care, and participants' characteristics. Qualitative data (free-text responses) will be analysed using framework analysis.

Discussion: The study will provide a comprehensive overview of the availability of virtual care technologies, perceived impact on quality and safety of care and essential factors for high-quality future use. In addition, a description of the underlying factors that influence this adoption and perceptions, in both individual GP/FD characteristics, and the context in which they work, will be provided. While the COVID-19 pandemic may prove the first great stress test of the capabilities, capacity, and robustness of digital systems currently in use, remote care will likely remain an increasingly common approach in the future. There is an imperative to identify the main lessons from this unexpected transformation and use them to inform policy decisions and health service design.

Background

Even before the COVID-19 pandemic, virtual care (a broad term that encompasses all the ways healthcare providers remotely interact with their patients) was on the rise, with many healthcare systems developing strategies to facilitate the adoption of this approach [1]. Yet, despite digital remote care having long been anticipated to play an increasingly important role in supporting primary care, its mainstream usage remained suboptimal and piecemeal in many countries, often limited by cultural, regulatory, industrial and technical, knowledge, financial, and market-related barriers, amongst others [2][3].

COVID-19 has brought an abrupt end to this unhurried introduction. Over the course of a short few weeks, primary care worldwide rapidly transitioned from face-to-face consultations to virtual care solutions [4][5]. In less than a year, virtual care approaches have taken centre stage, triaging and monitoring COVID-19 patients and other acute conditions in primary care, as well as ensuring access and continuity of care for those with long term conditions (e.g., diabetes, hypertension, asthma, psychiatric illnesses, chronic pain) [6][7][8]. Consequently, existing digital technologies and systems supporting virtual care suddenly faced an immense challenge; both in their ability to cope with the surge in use, as well as the new myriad of clinical tasks they were now expected to fulfil. However, COVID-19 also presented a unique opportunity and a catalyst for furthering the deeper integration of virtual care into the modern primary care landscape [9][10].

A year on from this initial mass transition, there is a growing need to review the impact of widespread digital-first models usage on patients, carers, primary healthcare providers, and health systems worldwide. Much uncertainty remains surrounding whether systems now in place adequately address the diverse range of clinical needs found in primary care, as well as its effects on quality and safety of care delivery. Some efforts to promote remote care were based on the assumption that a considerable proportion of visits can be managed sufficiently remotely without compromising safety or quality of care [11]. However, this remains to be clearly demonstrated [12,13] and concerns have been raised regarding remote physical assessments [14]. It is also unclear whether the use of digital remote care will dissipate or attenuate, after the pandemic is resolved [9], and whether General Practitioners / Family Doctors (GPs/FDs) have the necessary competencies for delivery of remote care [12,13].

As primary users of virtual care technologies, ascertaining feedback from GPs/FDs is imperative to understanding the extent of the use of these remote care technologies, as well as evaluate their practical implications on quality and safety of care, in order to inform guidance and policies concerning their continued use into the future. GPs'/FDs' experience during the pandemic is valuable as digital-first models no longer serve just as a backup to traditional face-to-face consultations, but rather act as an essential means for GPs/FDs to interact with their patients [15], amongst other reasons to protect the vulnerable and most sick, a role and responsibility not originally envisaged when virtual systems and technologies were first adopted. The lessons learned will likely outlast the pandemic and serve as a watershed moment in transforming how primary healthcare can be remotely delivered for decades to come.

Aims

This study aims to explore GPs' perspectives on a.) use of virtual care during the COVID-19 outbreak; b.) impact of virtual care on quality and safety of care; c.) critical factors for high-quality and sustainable use of virtual care technologies in the future.

Methods and design

The study will use an online cross-sectional questionnaire of GPs/FDs. Online surveys have been successfully used in healthcare-professional research and was chosen in this case to ensure widespread geographical coverage [16]. Recruitment started in June 2020 and was completed at the end of September of 2020. The study adheres to the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guideline for cross-sectional studies [17].

Study population

The inSIGHT Research Group is a collaborative research group of primary care researchers, aiming to explore the impact of the COVID-19 pandemic on the adoption of digital remote technologies in General Practice/Primary Care. The research is conducted by a consortium spread across 20 countries (Australia, Brazil, Canada, Chile, Colombia, Croatia, Finland, France, Germany, Ireland, Israel, Italy, Poland, Portugal, Slovenia, Spain, Sweden, Turkey, United Kingdom, and the United States of America).

Sampling

Each local lead was asked to email an invitation to take part in the survey to GPs in their country, using their personal contact networks. GPs were eligible for the survey if they were working mainly in primary care during the period of the COVID-19 pandemic. Recruitment of healthcare professionals during the COVID-19 pandemic posed significant challenges; additionally, low survey response rates are common in primary care [18]. Thus, local leads who had difficulty achieving the minimum number required were asked to use snowballing, a recognised technique for recruiting hard-to-reach populations in health studies, to increase the number of responses [19][20].

Sample size

The total population of GPs in the countries included was calculated using a combination of publicly available resources (**Table 1**).

Country	**Total GP number**	**Reference**
Australia	36,938	The Royal Australian College of General Practitioners, 2019 [21]
Brazil	7,149*	Scheffer et al, 2020 [22]
Canada	43,500	Canadian Medical Association, 2018 [23]
Chile	20,361	Health Ministry of Chile, 2016 [24]
Colombia	522	Health Ministry and Social Protection of Colombia, 2017 [25]
Croatia	984	Croatian Institute of Public Health, 2019 [26]
Finland	2,362	Finish Medical Association,

		2019 [27]
Germany	47,708	German Medical Association, 2019 [28]
Ireland	3,378	Collins C et al, 2021 [29]
Israel	5,052	Ministry of Health of Israel, 2018 [30]
Italy	42,987	I.Stat, 2018 [31]
Poland	8,439	OECD/EU Health at a Glance, 2018 [33]
Portugal	7,768	Portuguese Medical Council, 2020 [34]
Slovenia	1,237	National Institute of Public Health, 2017 [35]
Spain	29,743	Ministry of Health, Consumption and Social Welfare, 2019 [36]
Sweden	6,195	European Health Information Gateway, 2013 [32]
Turkey	24,082	Ministry of Health of Turkey, 2019 [37]
United Kingdom	35,146	NHS Digital, 2020 [38]
United States of America	204,419	Basu S et al, 2019 [39]
Total	527,970	-

*All doctors working in Primary Care settings were considered in this analysis, including those that have not completed a formal training in General Practice / Family Medicine

Based on this estimated population, sample size was estimated using the following formula, where N = population size, e = margin of error (percentage in decimal form) and z = z-score.

$$Sample \frac{¿\frac{z^2 \times p(1-p)}{e^2}}{1+(\frac{z^2 \times p(1-p)}{e^2 n})}$$

A total sample size of 386 or more responses was calculated to be sufficient to provide us with a confidence level of 95% and a margin of error of 5%. Given the 30 items in the questionnaire, this is

also in excess of the Hair et al. (1998) rule of requiring a sample size of at least ten times the number of variables [40].

Survey development

The study was designed by investigators at the Patient Safety Translational Research Centre and Department of Primary Care and Public Health at Imperial College London (ALN, EL, GF, JC, AM, AD) in March 2020. The questions were generated from expert consultation, including both GPs/FDs and academic/researchers with experience in digital health and health services research. A draft survey was developed by the first author and subsequently reviewed by other co-authors prior to being finalised. The questionnaire (in English) was piloted by the national leads of the 20 inSIGHT Research Group member countries in May 2020 to identify statements that needed adaptation for cultural or organisational contexts, at a national level. In order to improve participation rates, the questionnaire was translated into 5 additional languages (Portuguese, Spanish, French, Italian, and German) by inSIGHT Research Group local leads. Translation and validation were carried out in a standardised way, with medically qualified native speakers of the local languages and fluent in English performing 'forward' translations. The questionnaires were made available online using Qualtrics ®.

Description of the questionnaire

The questionnaire included an introductory section with participant information, and 30 questions divided into four sections:

A. Participant basic demographics
B. Use of digital-first models before and during the COVID-19 pandemic
C. Experience and impact of using digital-first models during the COVID-19 outbreak
D. Future of digital-first models in primary care

The introductory section included the purpose of the study, a link to the Participant Information Sheet and an introduction to the concept of remote digital care (**Appendix 1**). The first part included questions about participants' individual characteristics (e.g., age, gender, country, years of experience), as well as practice characteristics (e.g., country; urban, rural or mixed setting). The digital maturity of the practice was also evaluated using the Patient-Centred Framework for Evaluating Digital Maturity of Health Services [41]. The second part explored participants' use and experience using virtual care approaches before and during the pandemic. Questions focused on the use of eight virtual care solutions: 1.) telephone consultations, 2.) video consultations, 3.) chat consultations, 4.) online triage, 5.) remote clinical monitoring technologies, 6.) patient-initiated digital services (e.g., scheduling, health education activities, prescription renewal, test requests), 7.) secure messaging systems, and 8.) remote access to electronic health records. Participants were asked about the availability and number of hours spent using each solution before and during the COVID-19 pandemic, training and guidance available and/or undertaken. In the third part, participants were asked about their overall experience, and perceived impact of digital remote technologies on quality and safety of care. In this section, participants were also asked about the main benefits, challenges and barriers to future use of digital remote technologies in primary care (free-text questions). The fourth and last section explored GPs perceptions on the future of digital remote models in primary care. In particular, participants were asked how they would like the adoption of these tools to evolve in the future, and to identify which are the key aspects to ensure a high-quality adoption of digital remote care in the future, once the COVID-19 pandemic has resolved. A complete copy of the survey is provided in **Appendix 2.**

Statistical analysis

For quantitative data, descriptive statistics will be calculated, including absolute (n) and relative frequencies (%) for categorical variables, and mean (μ) and standard deviation (SD) for continuous variables. Subgroup analyses will be conducted to explore the relationships between the use of virtual care solutions, perceptions on impact on quality and safety of care, and participants' characteristics. The significance level for all statistical tests will be set at p-value <0.05, using two-tailed statistical tests.

For qualitative analysis, free-text answers will be analysed; online surveys are a recognised qualitative research tool [42]. The framework analysis method was used, which includes five main stages: familiarisation, identifying a thematic framework, indexing, charting, and mapping and interpretation [43]. The charting stage is applied as a principle for developing the coding framework through a process of abstraction to ensure that coding elements that might have been missed with an a priori approach are adequately captured [43]. Coding will be performed by at least two independent researchers and the coding framework was kept both deductive and inductive, allowing the ongoing inclusion of emergent themes. All themes identified will be supported by quotations, and results will be presented both as conceptual maps and textboxes. Qualitative analysis will follow the Consolidated Criteria for Reporting Qualitative studies (COREQ) to ensure the study meets the recommended standards of qualitative data reporting [44].

Dissemination

Sharing information about the project will take place throughout the duration of the work. Results will be published in peer-reviewed scientific journals as well as shared as preprints and in conference presentations. Local leads will be encouraged to publicise the project findings within their universities and health services, for example in newsletters, websites, meetings, and local journal publications. Additionally, patient partners will be included in the interpretation of our results, in the co-development of a dissemination strategy, and in summarising the research findings into lay summaries and reports, in order to raise awareness and stimulate public participation on this topic.

Discussion

This study will provide novel insights into GPs' perspectives on the availability of digital-first models before and during the COVID-19 outbreak. We will investigate their perceptions on its impact on quality and safety of care, as well as the critical factors surrounding high-quality, sustainable use of digital technologies in the future.

Despite the size and diversity of the sample, it remains a non-probability sample which might have implications for representativeness, external validity, and overall generalisability of the study's findings. As local leads recruited GPs at a national level using a range of methods, including convenience and snowballing sampling, there is an inherent risk of selection bias. Additionally, while online surveys have been successfully used in healthcare professionals research and allow for widespread geographical and demographic coverage [45], their use also comes with possible selection bias, potentially favouring the participation of subjects who likely are more research-inclined, have greater access to, and are more familiar with, digital technologies. Finally, it is important to consider that the questions evaluating the availability of digital-first solutions only capture self-reported availability rather than actual availability, and thus are likely to introduce some level of reporting bias.

To our knowledge, this is the first study, both before and during the COVID-19 pandemic, to explore the availability of virtual care solutions in Primary Care and the perspectives of GPs/FDs regarding their impact on quality and safety of care at an international level. Being at the frontline of primary

care delivery, GPs/FDs are ideally placed to identify the main pragmatic benefits and challenges of using digital tools for remote care as well as its impact on care quality and safety. Additionally, the study has included a large sample size, estimated based on sample power calculations, and representing a variety of participants, healthcare settings and systems, and countries. An extensive description of the sample will be performed, allowing for several subgroup analyses to explore the factors associated with the availability of digital-first solutions and their perceived impact on quality and safety of care. Finally, the questionnaire was carefully developed and piloted with several national leads, capitalising on their experience as frontline GPs working during the COVID-19 pandemic to ensure its relevance and ability to capture data necessary to address the study objectives.

The inSIGHT study will provide a comprehensive overview of the availability of digital-first models across 20 countries, as well as attempt to capture the underlying factors in both individual GP characteristics, and the contextual characteristics in which they work in, to better explain any findings observed. It will afford new knowledge about what digital tools worked well in the past, and what is in dire need of improvement. While the COVID-19 crisis may prove the first great stress test as to the capabilities, capacity, and robustness of digital systems currently in use, remote care as a whole, will likely remain an increasingly prevalent consultation method for years to come. It is therefore critical to reflect upon the main lessons to be learned from this global real-life experiment and capitalise on this transformative moment to improve the means with which primary care will increasingly depend upon as we progress towards an increasingly digital future.

Abbreviations

AHRQ: Agency for Healthcare Research and Quality (AHRQ)
COVID-19: Coronavirus disease (COVID-19)
COREQ: Consolidated criteria for reporting qualitative research
OECD: Organization for Economic Cooperation and Development (OECD)
GP: General practitioners
STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

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Supplementary Files

Multimedia Appendixes

Participant information sheet.
URL: http://asset.jmir.pub/assets/4da2e083ba2a0d24899322ae9a496fb2.pdf

Survey questions.
URL: http://asset.jmir.pub/assets/3350cde3cb5ad37e316c2c6baf66dd9d.pdf