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UNCERTAINTY
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Management of diagnostic uncertainty in teleconsultation by General Practitioners (GPs) in primary care

BACKGROUND

Clinical reasoning refers to the decision-making process used by physicians to address a health problem. It relies on both analytical and intuitive processes, including the "gut feeling" or intuition, which can manifest as a sense of alert or reassurance and plays a major role in medical decision-making[1-3].

In general practice, when hypothetical-deductive reasoning is used, diagnostic uncertainty (DU) persists in half of the cases. Some symptoms remain unexplained despite all the clinical and paraclinical strategies employed by the general practitioner (GP) [4]. The French Society of General Medicine (SFMG) estimates that GPs find themselves in a situation of DU in 70% of cases after 18 minutes of consultation[5]. The concept of DU in clinical reasoning is the subject of numerous studies. DU is characterized by the feeling of being unable to provide a precise explanation for the patient's health problem, but it is primarily the management of uncertainty and its tolerance that are of interest in general medicine[6,7]. Bloy showed that the GP's positioning in the face of DU depends on the importance given to the patient's complaint and scientific vigilance[8]. DU affects both the physician (stress, anxiety, burnout) and the relationship with the patient, potentially generating doubts about their competence[9,10]. Different tolerances for uncertainty or resilience lead to varied management approaches for the same clinical situation[11].

Numerous studies have been conducted on DU in-person consultations, but few have explored it in teleconsultations (TC). The COVID-19 health crisis in 2020 led to the significant and constrained development of TC for GPs, with 13.2 million teleconsultations. Factors promoting DU in TC have been identified, such as patient self-examination, the absence of a physical examination by the physician, and changes in the physician-patient relationship[12]. GPs found the experience of TC challenging[13]. A study conducted in 2022 in Île-de-France on 130 teleconsultations found that the topics addressed included prevention, acute respiratory infections, depression, allergic rhinitis, and hypertension[14]. Other studies found that one quarter of teleconsultation reasons were prescription renewals[15]. Île-de-France was the region with the highest number of teleconsultations in 2021[16].

The objective of this study was to explore how GPs in Île-de-France (Paris region) manage DU in teleconsultations.

METHOD

A qualitative study using semi-structured interviews based on a general inductive thematic analysis was conducted. The study was reported in accordance with the Consolidated Criteria for Reporting Qualitative Research (COREQ), a quality guide for presenting qualitative studies[17].

Sampling and participant recruitment

GPs were recruited using purposive sampling based on varied criteria (gender, age, training, experience, practice location, and teaching involvement) to obtain a diverse perspective on the management of diagnostic uncertainty (DU) in teleconsultations (TC), without aiming for representativeness. Recruitment was initiated through the researchers' personal contacts, followed by snowball sampling, where other GPs were contacted via email, messaging, Facebook®, WhatsApp®, and phone after verifying that they performed teleconsultations. Interviews were conducted on a voluntary basis. Sample size was determined when data sufficiency was agreed upon by the researchers. Participants known to the researchers were aware of the topic. Some had a pre-existing professional relationship with the principal investigator. The research objectives were presented during the pre-consent information procedure.

Participant selection

Inclusion criteria required participants to be GPs

and to perform teleconsultations at least once a week in the Île-de-France region. Exclusion criteria included practicing a specialty other than general medicine, performing teleconsultations less than once a week, or practicing outside Île-de-France.

Data collection

Participants were informed in advance that the interview would focus on DU in teleconsultations. Semi-structured, recorded individual interviews were conducted using an interview guide. These were led by MC trained in qualitative research and supervised by an academic GP, a telemedicine teacher practicing in a health center, with confirmed experience in qualitative research acquired through conducting and supervising several qualitative studies. The location for the interviews was freely chosen by the participants (home, office, or videoconference). The guide explored themes related to DU derived from the literature[5,8,13]. The interview began with an introduction, followed by discussions on the definition, experienced situations, and management of DU. Diagnostic, emotional, and communication aspects were also explored. The guide, initially untested, was adjusted twice during the study.

Data analysis

Interviews were fully and manually transcribed using Word® software and then anonymized. These transcriptions were not shared with the participants. An open analysis of the verbatim was performed and triangulated by the two researchers: through an initial immersive reading, then by labeling to identify units of meaning, which were grouped into categories and themes using axial analysis with Nvivo® software. The research director had an academic interest in the studied topic. This institutional position was explicitly acknowledged and considered in the methodological reflection.

Ethical issues

Recruited participants were informed about the guarantee of anonymity, and their written consent was collected by the investigator using an information notice. This work did not involve human subjects and was conducted in accordance with the ethical requirements established under French law.

RESULTS

After recruiting eighteen participants, fifteen interviews were conducted at the doctor's home, office, a public place, or via a video call from February 2022 to August 2022, with an average duration of 44 minutes (ranging from 33 to 71 minutes). Data sufficiency was achieved starting from the 12th interview, as no new elements emerged from the 11th interview onward. Three additional interviews were conducted with substitute GPs to ensure a reasoned sample for this variable. Table 1 presents the characteristics of the participating GPs.

Diagnostic Uncertainty (DU) in General Practice Teleconsultations (TC)

According to the interviewed GPs, general practice is characterized by an omnipresent DU that is exacerbated by TC. Perceived as both an uncomfortable and stimulating situation, it elicited negative emotions such as worry, stress, fear, frustration, annoyance, dissatisfaction, disappointment, and helplessness:

"Well, I found it... sorry for the word... but stupid to consult for ear pain via video. Maybe a bit of annoyance, a waste of time for another patient who would have been more eligible for teleconsultation." (M4)
"In almost 4 out of 5 teleconsultations, I feel frustrated." (M3)

Sources of DU Identified in TC

The GPs identified multiple sources of DU in TC. Inadequate conditions and frameworks for TC, including non-compliance with good practice guidelines: *"There are guidelines, I've seen them, but... I don't follow them."* (M10). This included unknown patients or those with significant medical histories, acute somatic symptoms or situations perceived as emergencies by the patient, patients far from the consultation location, or TC conducted at late hours: *"When you don't know the patient at all, there's more stress, emotion, and uncertainty."* (M6)

Lack of clinical information, due to the patient's imprecise description of symptoms and the absence of a physical examination, limiting the GP's ability to interpret correctly: *"She couldn't express herself, and none of the words or descriptions I suggested matched any symptoms. She didn't know how to describe them."* (M9).

Loss of medical intuition due to a "barrier" preventing the intimate, mutual connection between the GP and the patient necessary to develop a "sixth sense": *"You know, that kind of feeling you get in a consultation that you don't get on video."* (M8)

Management of medico-legal risk in situations of DU

GPs felt an increased medico-legal risk due to DU in TC, which led them to either over-prescribe or under-prescribe without objective criteria, or even to schedule in-person consultations: *"I treat more... well, I use more of a bazooka approach than I would in in-person consultation."* (M14). They meticulously documented all TC exchanges in the medical records. Some GPs perceived patient reluctance after an initial contact marked by DU, which complicated the doctor-patient relationship.

Management of the diagnostic process in situations of DU

To address DU, GPs implemented filters for TC reasons during appointment scheduling based on their own criteria and only consulted their own patients. At the beginning of the TC, GPs assessed the urgency and eligibility of the reason for the TC: *"We sort things out, we eliminate emergencies first... we*

GP	Gender	Age	Type of Practice	Department	Activity	Thesis	MSU	Start of TC	% of TC	Unscheduled Care
1	M	50–60 years	Semi-urban	91	Salaried/Private practice	Yes	No	Feb-20	10–20%	No
2	F	40–50 years	Urban	75	Salaried/Private practice	Yes	No	Feb-20	> 20%	Yes
3	F	35–40 years	Urban	75	Private practice	Yes	Yes	Feb-20	10–15%	Yes
4	F	< 30 years	Urban	92	Locum tenens GP	No	No	Jun-20	> 20%	Yes
5	M	30–35 years	Urban	75	Locum tenens GP	Yes	No	May-20	5–10%	No
6	M	40–50 years	Urban	92	Salaried/Private practice	Yes	No	Feb-20	7%	No
7	F	35–40 years	Urban	75	Private practice	Yes	Yes	Feb-20	10%	No
8	M	40–50 years	Semi-urban	91	Private practice	Yes	No	Nov-19	15%	No
9	F	40–50 years	Urban	75	Salaried and Private practice	Yes	No	Feb-20	> 20%	Yes
10	M	40–50 years	Urban	75	Private practice	Yes	Yes	Jan-19	10–20%	No
11	M	> 60 years	Urban	94	Private practice	Yes	Yes	Jan-20	10%	No
12	M	> 60 years	Semi-urban	91	Private practice	Yes	Yes	May-19	> 20%	No
13	F	30–35 years	Urban	75	Locum tenens GP	Yes	No	Mar-20	20%	No
14	F	< 30 years	Urban	93	Locum tenens GP	No	No	Jun-20	10–15%	No
15	M	< 30 years	Urban	75	Locum tenens GP	No	No	May-20	< 5%	No

Table 1- Characteristics of the interviewed GPs
M: Male F: Female Yes: Affirmative No: Negative
Unscheduled Care: Unplanned care
MSU: University Master of Internship
TC: Teleconsultation
Department: Administrative department code in Île-de-France (e.g., 75 = Paris, 91 = Essonne, 92 = Hauts-de-Seine, 93 = Seine-Saint-Denis, 94 = Val-de-Marne)

quickly identify emergencies." (M10). GPs used an exhaustive analytical reasoning process combined with a chaining reasoning approach, making the diagnostic process energy-consuming: *"To target the most likely hypotheses, there's a lot of very exhaustive and very tedious work to eliminate all alternative diagnoses."* (M7) Delegating the physical examination to the patient helped with the diagnosis but was less effective than a healthcare professional equipped with medical devices, as many objective elements were required: *"Sometimes, the healthcare staff act as the therapeutic or diagnostic arm of the doctor on the other side."* (M1). Another solution was to offer the patient an in-person consultation.

Expressing DU through in-depth dialogue

To maintain the relationship and quality of care, GPs shared their DU with the patient, summarized the clinical situation, provided guidance, and verified understanding. GPs found that a more careful expression of their medical expertise allowed them to include the patient in the management process, creating an ally against DU: *"Uncertainty is expressed orally, and... with transparency, actually, and it's very well received. Patients take it very well."* (M14)

DISCUSSION

Main results

DU was omnipresent in general practice TC. Perceived as both an uncomfortable and stimulating situation, DU was exacerbated in TC. It generated a range of negative emotions, from worry to frustration. According to GPs, the sources of this DU were multiple: inadequate TC conditions, difficulty identifying and interpreting patient symptoms, delegating the clinical examination to a non-clinician, and the loss of medical intuition. DU in TC complicated the doctor-patient relationship if the GP was not the patient's usual doctor.

To address DU, GPs filtered patients and reasons for TC, delegated the clinical examination to the patient or a third party, and adopted a diagnostic approach different from the one typically used in-person consultations. To reassure themselves and protect against medico-legal risks, they might overprescribe or under-prescribe, request additional tests and treatments, or even suggest in-person consultation. Expressing DU, communicating monitoring instructions, and providing patients with a course of action enabled GPs to make the patient an

active participant in their care, acting as an ally in the diagnostic process.

Comparison with the existing literature

The emotions experienced and the mechanisms used by the interviewed GPs to manage DU were similar to those observed in the context of uncertainty in-person consultations[18]. The negative emotional impact of DU was also found in other studies, with frustration and disappointment[19]. A qualitative study found that since COVID-19, GPs felt compelled to practice teleconsultation due to a perceived high demand from the general population. They considered that the reasons for using teleconsultation were often inappropriate, requiring a clinical examination. They feared the deterioration of the doctor-patient relationship[13]. This feeling should be compared based on the experience of TC.

Some GPs were aware of the recommendations for TC, including the mandatory use of video, a secure channel, verification of the patient's identity (if seen in consultation at least once in the past year), and assessment of their environment during the TC, with the doctor disconnecting last[20]. In our study, these recommendations were often poorly followed, as shown in a study conducted in the Grand-Est region, which highlighted the low adherence to good TC practices among GPs[21]. Adhering to a suitable framework and conditions for TC could reduce the limited analytical position of the doctor caused by the absence of a clinical examination, the lack of an overall view, and a holistic approach to the patient, according to the French College of general practice (CMG)[22].

According to some studies, TC limited communication between the doctor and the patient by reducing the flow of visual information and the patient's speaking time. This resulted in the loss of important information, such as non-verbal language and the precision of the patient's symptoms[23]. Doctors must therefore be mindful of their communication during TC to allow the patient to express as many elements as possible[24].

In a study conducted by the French Directorate for Research, Studies, Evaluation and Statistics (DREES), during the first wave of the COVID-19 epidemic, up to 53% of GPs estimated that an in-person clinical examination was indispensable during TC[25]. Yet, in in-person consultations, 82% of diagnoses were made solely through the interview[26,27]. The clinical examination and additional tests each contributed only an additional 9% of precise diagnoses[26,27]. While good practice recommendations for prescriptions in TC existed, doctors tended to over-prescribe or under-prescribe in TC compared to in-person consultations[20,28]. This behavior could be attributed to greater and less well-tolerated DU in TC than in in-person consultations. Over-prescription and the use of additional consultations multiplied the number of procedures and additional tests after a TC, suggesting an overconsumption of care[29].

Our results suggested that the assistance of a healthcare professional and the use of connected medical devices in TC would improve the quality of the clinical examination, strengthen the doctor-patient relationship, and could reduce DU and associated over-prescription. However, classic TC would remain relevant for certain reasons, such as analyzing additional test results.

To manage their uncertainty, GPs used analytical diagnostic approaches in TC, such as forward chaining or Bayesian methods, to structure their reasoning[1]. Less common than the classic combination of hypothetical-deductive reasoning and intuition in in-person consultations, these approaches are more cognitively demanding and may deviate from evidence-based practice. Nevertheless, they allow GPs to manage their DU by differentiating between acceptable and unacceptable risk[30]. By multiplying prescriptions for additional tests to compensate for the shortcomings of an interview or the absence of a clinical examination in TC, some doctors might adopt a "contained uncertainty" posture as conceptualized by Bloy[8]. This positioning, in the context of general medicine, can also manifest as excessive modes of denial ("it's probably nothing") and/or defiance ("I'm sure it's nothing") to avoid addressing clinical uncertainty.

Rather than demanding a certain diagnosis, patients primarily wanted to be listened to and understood, and for the doctor to explain their reasoning and the situation[19]. Taking these expectations into account could improve the GP's tolerance of DU in TC while limiting the risk of iatrogenesis and unnecessary expenses.

Strengths and limitations

The qualitative approach using inductive thematic analysis was relevant for exploring a still understudied topic. Purposive sampling allowed for the collection of a diversity of profiles and viewpoints.

Anonymized interviews conducted in various contexts encouraged free and rich expression. The iterative adjustment of the guide and dual analysis strengthened the rigor of the results. Triangulation through double coding reinforced the rigor of the interpretation.

Recruitment, partly from the researchers' personal networks and based on voluntarism, may limit the diversity of viewpoints. Participants may have adapted their responses to perceived expectations and reported incomplete memories. Video interviews sometimes suffered from technical constraints. Finally, the data, based on *a posteriori* accounts, may be influenced by memory and professional norms.

Perspectives

Care

Following good TC practices and developing assisted teleconsultation with connected medical tools, operated by a third-party healthcare professional, seem to reduce DU among GPs. This practice should be explored and evaluated. Doctors must be

mindful of their communication during TC.

Research

These results could be supplemented by a comparative evaluation of prescriptions in teleconsultation and in-person consultation for similar patients and reasons. The negative emotional experience of GPs facing DU in TC raises questions about the quality of care and healthcare expenditures. In a context of digital health deployment, data are needed to inform a scientific and ethical reflection on teleconsultation.

Education

The initial training implemented at the Department of General Practice of Paris Est Créteil University (UPEC) since 2021 could be adapted to take these results into account. The implementation of the "digital health" module in the pedagogical program of the 4th year of the French Post Graduate Specialty Diploma in General Practice could be built using these elements.

Summary

Introduction: Diagnostic uncertainty is ubiquitous in general practice. General practitioners perceive it more frequently during teleconsultations, where the clinical reasoning process is altered, the physician-patient relationship is disrupted, and physical examination is limited or absent. In 2020, general practitioners feared that teleconsultations would increase diagnostic uncertainty, yet no study had explored how diagnostic uncertainty is managed in this context.

Objectives: To identify the sources and consequences of diagnostic uncertainty and to explore how general practitioners manage diagnostic uncertainty in teleconsultations.

Methods: An inductive qualitative study based on semi-structured individual interviews was conducted using an interview guide. Sampling began through networking, then was purposive as interviews progressed until data saturation was reached. Two researchers performed an inductive thematic content analysis.

Results: Fifteen interviews approached data saturation. Diagnostic uncertainty was greater in teleconsultations and generated negative emotional experiences among general practitioners, including worry, frustration, and dissatisfaction. Inappropriate conditions for teleconsultations and difficulties in identifying or interpreting symptoms via video contributed to this uncertainty. In response, general practitioners adapted their diagnostic approach by adopting a more exhaustive process, which sometimes led to over- or under-prescribing and the arrangement in-person consultations. They also involved patients by explicitly expressing their diagnostic uncertainty , instructing them on warning signs, and providing guidance based on symptom evolution.

Conclusion: To manage diagnostic uncertainty in teleconsultations, general practitioners modified their usual reasoning process, tended to over-prescribe, and arranged in-person consultations. While the exhaustive diagnostic approach compensates for uncertainty, it may also be more resource-intensive and less aligned with evidence-based medicine.

Mesh terms: Remote consultation; primary care; qualitative research; uncertainty

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