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GUT FEELINGS IN THE DIAGNOSTIC PROCESS OF SPANISH GPs. A FOCUS GROUP STUDY.

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ABSTRACT

Objectives. Gut feelings have been shown to play a role in the diagnostic process in Dutch and French general practitioners (GPs), acting as triggers and modulators of this process. This study aimed to investigate the existence, meaning, and role of gut feelings among Spanish GPs.

Design. Qualitative study using a focus group approach. Thematic content analysis.

Setting. Primary health care centres in Majorca (Spain)

Participants. 20 purposively sampled GPs working in Majorca

Results. Spanish GPs were aware of the existence of gut feelings involved in their diagnostic reasoning process. They recognized two kinds: a sense of alarm and a sense of reassurance. The factors with a strong perceived influence in the appearance of gut feelings are a previous physician-patient relationship and the physician's experience. Spanish GPs attached great value to gut feelings, as a characteristic of the primary care style of working, and as one of the tools available to decide whether to begin the diagnostic process or not. They think that the notion of gut feelings and their relevance can be transmitted to students and trainees. Spanish GPs felt comfortable following their gut feelings although they were not sure of their accuracy.

Conclusions. The presence and role of gut feelings in Spanish GPs diagnostic reasoning process were established. Their diagnostic accuracy and how to include them in general practitioner training are areas of future research.

STRENGTHS AND LIMITATIONS

- The first study on diagnostic gut feelings in a Spanish-speaking area.
- The focus group approach provides much information on group feelings, perceptions and opinions.
- The main known gut feelings factors are represented among the physicians selected.
- Three researchers analysed the data and reached consensus on codes and themes.
- Potential distortion because of the bilingualism prevalent in Majorca

BACKGROUND

The diagnostic process in clinical medicine has traditionally been seen from two perspectives: problem solving and decision-making.[1] In the problem solving approach, GPs confirm or refuse a working hypothesis by weighing the symptoms and signs. This model incorporates pattern recognition, in which signs or clues fitting into a specific diagnostic pattern enable doctors to recognize the correct diagnosis. The probabilistic or decision-making model is based on the likelihood that a diagnosis is true depending on the initial probability, based on the disease's known prevalence or the clinician's subjective assessment of the probability of a disease, as well as on the application of available scientific evidence. The decision-making approach is closely related to evidence-based medicine and the use of Bayes theorem and notions such as likelihood ratios, decision trees, and diagnostic algorithms. Despite its theoretical superiority, this model presents potential biases and its use is less common in actual practice.[2,3]

There are other ways of approaching knowledge that have received attention in the medical and the psychological fields.[4] In some models intuition -perceived as the outcome of highly personalised, knowledge-based, non-analytical processes- takes on a characteristic of an advanced stage of the learning process.[5,6] Psychological theories postulate dual processes as the simultaneous existence of two forms of knowing and understanding: a rational and analytical process, controlled, explicit and slow; and an implicit, associative, intuitive and fast non-analytical process.[7] Cognitive neuroscientists showed that feelings are actively involved in the decision-making process.[8]

Related to these other ways of approaching the diagnostic reasoning process are the so-called gut feelings (GFs). These are described as a "useful warning light, which suddenly lights up to announce that there is something unusual".[9] There are expressions with a similar meaning in many other languages.[10] We find references to these GFs in fields such as nursing,[11,12] the diagnosis of cancer and serious diseases in both primary and specialised care,[13–15] chest pain,[16] paediatrics,[17,18] and emergency care.[19] GFs have been studied in the Netherlands (Stolper, et al., 2009), Belgium (Stolper, et al., 2009a), France (Le Reste, et al., 2013), and the United Kingdom.[20–23]

Studies in the Netherlands, Belgium and France show that there are two types of GFs.[21,22] A sense of alarm is described as a feeling that something does not add up in a

particular patient, initiating the diagnostic process and making the GP worry about a possible serious outcome of the current episode. A sense of reassurance means that the GP is sure about the prognosis even without knowing the precise diagnosis. The Gut Feeling Questionnaire is a validated tool for determining the presence or absence of GFs in the diagnostic reasoning process of GPs.[24] It is useful for future research into the significance, prevalence, and accuracy of GFs.

The aim of this study was to explore the existence, significance, determinants, and triggers of GFs among Spanish GPs. By using a similar study design as the Dutch researchers we would be able to compare our results with the Dutch ones.

METHODS

As we were going to work with opinions and feelings we chose a qualitative methods approach. GFs are a complex issue, with a great influence of personal experience and little research as yet conducted in Spanish speaking countries. All the researchers have training in qualitative research. We decided to use the focus group approach over individual interviews in order to exploit the interaction between members of the focus group as a tool to stimulate individual discourses. We opted for purposive sampling to recruit participants for the focus groups. We could thereby achieve a representative distribution of the factors we wanted to study, such as experience, gender, dedication to GP traineeship, and rural or non-rural practice location. We selected GPs working for the Majorca Primary Care Department.

As clinical experience seemed to be the most important determinant for GFs according to the results of previous research, we first formed a group of experienced GPs (more than ten years of experience beyond the residence time) and another one of less experienced GPs.[20] A ten-year cutting point was selected according to the "ten-year rule".[25] We contacted twelve GPs for each group by phone or mail, sending them a written confirmation after their acceptance. No relevant information on the topic of discussion was released to avoid biases. GPs were not remunerated for their collaboration. Focus groups were organized in the Majorcan primary care practices that were more geographically accessible to the participants in each group. The day before the second group was scheduled to meet there was a fire in the health center. Four of the GPs didn´t attend the group as they thoght it was suspended. BO, SM and ME organized the meetings and acted as moderators and observers. We had a written scenario in advance (Table 1) in order to introduce the topic of GFs at the beginning of the group meeting and to be sure during the meeting that all the issues were discussed. We then let the GPs talk about their experiences. The researchers acting as moderator and observer of the group compare their notes about each meeting after it was ended. All the points of interest that were prepared in the script were discussed in the first group. As the issue was raised during the first group, a question was added about GFs in nurses, patients and relatives for the second group, and another one about GFs in non face-to-face consultations for the third group. The focus groups were audio recorded with the oral authorization of the GPs in each group and then transcribed. The duration of the meetings was between 60 and 70 minutes.

Table 1. Gut feelings focus groups script.

The aim of this study is to gather information as to how the diagnostic process works in primary care. You were trained as doctors to make diagnostic decisions through questions, explorations, and algorithms; that is, rational decision-making. That part is known. But we also know that in consultation when making decisions doctors also take into account other things. Let's say that sometimes there are certain feelings, previous experiences that alert us. In English written medical literature we talk about gut feelings.

1. *What can you tell us about them?*
2. *Have you ever felt something like this gut feeling before?*
3. *How would you describe them? What do you feel?*
4. *What would you call them?*
5. *How do we view these gut feelings?*
6. *Do you follow them? What makes you listen to them or not?*
7. *What triggers these feelings?*
8. *Are there any symptoms / diseases / types of people / days / situations that are more related to gut feelings?*
9. *Do you think they are related to professional experience? To knowledge (patient / medical)? To gender?*
10. *Do they depend on the type of consultation (by appointment vs. emergencies), time (normal consultation vs. out of hours), or location (rural / urban)?*
11. *(If they don't mention two types of gut feelings) Research shows a distinction between a sense of alarm and a sense of reassurance. What do you think? Do you recognize both types? Do you think such a distinction is useful?*
12. *Have you ever had feelings of unwarranted security?*
13. *Could this be taught to trainees or students? How?*
14. *What relevance do you give to these feelings in the context of primary care?*

After the first group we added:

1. *Do you pay attention to the gut feelings of patients, relatives or other health professionals?*

After the second group we added:

1. *Do you also have gut feelings in non face-to-face consultations (by phone or email)?*

After the second group we considered there was an insufficient number of GP trainers. We wanted GP trainers and young GPs to be well represented in our groups to discuss teaching GFs. Thus, we organized a group with GPs that had been trainers for at least four years (a complete training period) and GPs with their specialty period recently finished. After the analysis of the third group we agreed that no relevant new information was detected. We considered that the information obtained had reached saturation. The characteristics of the GPs who attended the focus groups are detailed in Table 2. There were physicians from seven Spanish regions and three different Spanish-speaking countries.

Table 2. Characteristics of general practitioners.

	GROUP 1	*GROUP 2*	*GROUP 3*	*TOTAL*
Number of participants	*9*	*4*	*7*	*20*
Female	*5*	*2*	*2*	*9*
Male	*4*	*2*	*5*	*11*
Experience > 10 years	*9*	*0*	*2*	*11*
Experience < 10 years	*0*	*4*	*5*	*9*
Years of experience (mean)	*30.1*	*7.8*	*10.3*	*18.7*
Trainer	*4*	*0*	*3*	*7*
Rural practice	*3*	*1*	*1*	*5*
Urban practice	*6*	*3*	*6*	*15*

BO, SM and CG performed a thematic analysis of the transcriptions. This analysis began right after the first focus group. Researchers individually selected quotes related to the research questions from the transcriptions and assigned them a code. The TAMS Analyzer software program was used for this purpose. Then a meeting was held to discuss the quotes and codes used. Agreement was reached on the quotes, codes and certain categories in which the codes were included. The resultant code tree is shown in Table 3. In case of disagreement, ME and ES were designated to decide.

The Research Committee of the Majorca Primary Care Department authorized this study.

Table 3. Code tree

CODES	1st level CATEGORIES	2nd level CATEGORIES
Patient aspect *Patient language* *Patient paraverbal language* *Frequentation* *Patient symptoms* *Diseases*	*Patient factors*	*FACTORS INFLUENCING GF ARISING*
Longitudinality	*Longitudinality*	
Medical knowledge *Previous experiences* *Years of experience* *Sex* *GP personality* *Costumes*	*Physician factors*	
Out of hours *Time of the day* *Place* *Workload* *Non face to face*	*Context*	
Value *Value for primary care* *GF reassurance value*	*Value*	*RELEVANCE*
No teachable *Teachable personality* *Trainer experience* *Transmission* *Sayings*	*Teaching*	
Efective *Mistakes* *Memory bias*	*Accuracy*	
Rational processes *Added to RP: personal knowledge* *Added to RP: experience* *Added to RP: intuition* *Added to RP: previous experiences* *Uncertainty*	*Diagnostic process*	*GUT FEELINGS*
GF existence *Prognostic* *Other actors: patient* *Other actors: nurses* *Other actors: relatives*	*GF existence and characteristics*	
GF name: hunch *GF name: religious* *GF name: smell* *GF name: art of medicine* *GF name: light* *Alarm GF description*	*Alarm GF*	
Reassurance GF description *Reassurance GF utility*	*Reassurance GF*	
Body sensations *Thougts*	*Physician symptoms*	

Reassurance GF rhytm *Reassurance GF avoid redundancy* *Reassurance GF discard* *Alarm GF: beginning diagnostic process* *Alarm GF: decision making* *Alarm GF: reminders* *Alarm GF: doubts about beginning* *Alarm GF followed? (good job)* *Alarm GF not followed (bad feelings)*	*Consequences on medical decisions*	*CONSEQUENCES*

GP: General practitioner.
GF: Gut feeling
RP: Rational process

RESULTS

After the analysis and coding of the transcriptions, 59 codes were obtained. These codes were distributed in 13 first level categories, and these were further grouped in 4 second-level categories: gut feelings existence and characteristics, influencing factors, consequences, and significance.

Gut feelings

Spanish GPs recognize the existence of gut feelings involved in the diagnostic process, which lead them to make decisions apparently without a real basis. They describe gut feelings as something that makes them feel concerned about a determined patient without any objective evidence.

There must be something that leads us to make decisions with no basis or foundation, there must be something, this can't be something that is generated spontaneously, I'm sure there must be something ... (FG1/9)

A hunch, a feeling, which he was asking about, it's something you think with no clinical suspicion, with no hypothesis. There's something that doesn't fit in this patient. Something that can't be answered, if someone were to ask you why something doesn't add up you wouldn't even dare to tell them why (FG2/10)

GPs use gut feelings in addition to the scientific diagnostic reasoning process learned during their years at medical school and specialty training. Gut feelings emerge, influenced by their personal knowledge of the patients, clinical skills and previous experiences.

I carry out my scientific procedure: reason for the visit, history, the interview, I perform the physical examination, if I think I have to order tests I do, but sometimes there's something that tells you that... (FG3/20)

GPs repeatedly use the word "*corazonada*" (literally, heart feeling), which is defined by the "*Diccionario de Uso del Español*" (2ªEd) as a "vague belief that something happy or

unhappy is going to happen". GPs gut feelings are frequently depicted as related to light, with expressions that talk about enlightenment, a bulb, a lantern or a star.

I don't know, you see it clearly, I don't know why but a little light comes on here that tells you something's wrong and it's going to get worse (FG2/12)

They also mention expressions related to religion (Marian apparition, guardian angel) and the art of medicine.

I don't know if it was a hunch, but I always think that the Virgin Mary appeared to me that day (FG2/2)

Nobody explained to me what the art of medicine was, but it reminds me of this (FG3/18)

Spanish GPs distinguish two kinds of gut feelings, a sense of alarm and a sense of reassurance. The sense of alarm appears when something doesn't add up in the patient so the GP then has the feeling that even without a clear diagnosis this patient is or is going to be seriously ill.

A completely normal analysis, the physical examination is completely normal, she has an ultrasound scan from a week ago that is completely normal, and I have the feeling this lady is progressively deteriorating (FG3/20)

A sense of reassurance is when the GP, even in the presence of symptoms that may suggest a serious condition, has the feeling that nothing serious is going to happen.

If you, a patient, you say… cough, a temperature and side pain, well any medicine student already knows what they have, don't they? Well, you explore them because there is a medical routine you have to follow, but you know them and you very often say, I'm not going to put it like that because I know they don't have pneumonia, I know they don't have it (FG1/2)

Spanish GPs attach great value to the sense of reassurance. They declare to perceive them more often than the sense of alarm. This sense of reassurance allows them to quickly discriminate potentially mild diseases from serious ones and helps them cope with their daily workload.

And I think it's more this feeling than most of the others. You have a stronger feeling that this is right in twenty patients, on the other hand with one or two you find yourself saying let's see what's up. The feeling of reassurance you have is fairly high. We

work in uncertainty every day, and to be able to have this feeling of reassurance and to go home and rest easy... (FG2/13)

Spanish GPs identify gut feelings as being more related to prognosis (this patient may be seriously ill or not) rather than to an exact diagnosis.

The idea is, not so much making a diagnosis, but being able to discern whether the patient might have something serious or not (FG1/6)

GPs recognize the existence of GFs in other health professionals involved in the care of their patients. They pay attention to nurses' GFs and give them more credibility the more experienced the nurse is.

I also believe very much in nurse's feeling or intuition, who very often tells you: that patient I don't know what they have but they don't look right, and then I quickly take care of the patient (FG2/13)

GPs mention that patients and their relatives also have GFs and they would influence GPs feelings and decisions.

If there's a person who is in his fifties and one day he gets up and says he feels dizzy, and his wife who has known him for ages says it's the first time in his life he's had dizziness, you're going to attach importance to that, and it's going to awaken that GF in you (FG3/19)

Factors

Among the factors linked to the onset of GFs there are factors related to the patient, the physicians, the context in which the consultation takes place, and the previous doctor-patient relationship.

Patient related

Spanish GPs mention the external appearance of the patient, their gestures and paraverbal language as triggers for their GFs

I think sometimes it's not the verbal language, it's the tone of voice they have, the paraverbal language of their body, which, I suppose, you don't do it consciously but you must interpret, and it gives you certain information (FG2/11)

Use of health services is another factor that GPs relate to GFs. The less a patient visits the doctor, the easier it is for the doctor to have a sense of alarm in front of them. Even the number of active episodes in the electronic medical record may exert an influence.

There are patients who hardly ever come to see the doctor and, well, when they come with an appointment and they mention, "the fact is I don't feel too good", you have the feeling that they must be ill, because they never come and when they do come it's because something's wrong (FG2/13)

When a patient presents with diffuse symptoms like thoracic or abdominal pain, cough and headache, the physician's GFs are more likely to be induced, as well as when a patient presents with anxious-depressive symptoms that could mask organic diseases. GPs also mentioned the presence of GFs when a patient presents with symptoms that suggest serious diseases like cancer or pulmonary embolism, even in the absence of red flags.

A serious pathology and also with slightly diffuse symptoms ... with a pulmonary embolism I remember two patients who I said, how did I get it right otherwise…? (FG1/4)

By her aspect, how her character has changed the last months, she used to come alone and she comes with her daughter and her husband, very worried... And I have the feeling that she may have a cancer (FG3/20)

Physician related

Spanish GPs think that, although even young doctors and trainees have GFs, professional experience is a crucial factor in having GFs and in the importance attached to them. Most of them declare that they have had GFs since the beginning of their medical career, but over the years the memory of past experiences facilitates a process of sensitization to GFs.

There's something that has turned on the light… a prior experience of having had similar events, or that reminds you of something (FG1/9)

I think it's the years, although I'm not sure, the fact is I don't know. When I began I think I also had intuitions… (FG1/5)

Medical knowledge is also an important factor. The more a GP knows, the more confidence they can have in their GFs. Both experience and medical knowledge run parallel in the development and credibility of GFs.

*If you study a lot when you are R5 (*first year after completing GP training*) you can work it out, and if you don't study a lot well, with 23 years of experience you have studied it in patients you have seen. In the end it's knowledge. (FG3/17)*

Spanish GPs don't think that a physician's gender has a significant influence on having and trusting GFs or not. They think that a physician's personality, regardless of gender, plays a more decisive role.

There are also doctors who are more sensitive to gut feelings and less sensitive to gut feelings. Perhaps due to their own personality. (FG3/17)

Context

GFs may appear both during regular consultation time and during out of hours consultations. Spanish GPs identify night consultations as more prone to generate GFs. Furthermore, consultations at night in a rural environment are frequently cited as liable to the appearance of GFs.

It's not the same, someone who comes in calmly at ten o'clock in the morning and someone who comes in at twelve o'clock at night… In the villages normally if they call you at night it's trouble. They don't call for any reason; if they call you at three in the morning, it's because they really need it and you can start to run. (FG2/11)

The emergency rooms in hospitals are places where fewer GFs appear due to a different approach to patient care. There are GPs working in the emergency rooms in Spain. Many patients there have been referred by their GP so there is a previous filter that indicates to the physician that there is a greater chance of serious disease.

I think that in hospital there are much fewer, because they've gone through our filter and they arrive there and everything is cut and dry… If you've reached here it's because the suspicion is already there and my job is to carry on the chain. (FG3/19)

Moreover, as workload grows the GF threshold raises, making it more difficult to have or pay attention to them. Anyway, it is still possible to feel them and many doctors remember having a sense of alarm in the middle of an overloaded working day.

If you're seeing a load of emergencies, and you have five minutes per patient instead of seven, you're going as fast as you can, and the GF threshold might rise and some things get past you which with more calm you might realise. It's happened to me, seeing

emergencies, about to close the health centre, five people waiting and suddenly with one of them you say… (FG3/19)

Although GPs are mainly focused on face-to-face consultations, we asked them about GFs in non face-to-face consultations. They declare that it is also possible to have GFs in phone consultations, especially if the patient is well known.

A call from a patient saying 'I'm out of breath', and you know they aren't out of breath. Or the other way round, just by hearing their voice you know you have to see them because something's wrong. It makes a difference if you know them (FG3/20)

Longitudinality

Longitudinality is an important characteristic of primary care. It also plays a role in GFs. Knowing the patient, their social and family context, and their previous medical history and attitudes are crucial when attending a new episode. Spanish GPs use this knowledge provided by continuous care to quickly distinguish whether a patient may have a serious disease or not.

You're lucky enough to have known this person from before, you already know them and as soon as they come through the door you begin to get some clues. (FG1/4)

(You know) a person who comes, who goes, their grandchild, the other, you've known them for fifteen years and you see they don't look right, but that's because you know them… That's one of the advantages of family medicine, continuity (FG3/17)

Consequences

Spanish GPs refer to phisical sensations when they have a gut feeling. They hear bells ringing, they perceive a bad odour relating to the situation, and they have bad bodily sensations.

This idea happened to me and for a while I had a weird body sensation (FG1/9)

There are people that just when they enter the room you say, it smells like a neoplasia, and they still have not say anything (FG1/4)

A sense of alarm is one of the tools used by Spanish GPs to initiate the diagnostic process. They sometimes have doubts and try to rationalize them, but most of the time they follow this sense of alarm.

If there's something that doesn't fit, that patient is different to another one and that's why I'm more concerned and I try to get to the bottom (FG3/15)

When a sense of alarm is taken into consideration, the physician has a feeling of a job well done. When it is not taken into account, the GP remains restless.

Sometimes you have intuitions but you don't always follow them, that is, sometimes you do and when you follow them and you're right, that's great, and sometimes you don't and you get left with a feeling like there…fuck… you're left feeling angry (FG1/9)

What they do in these cases is to take advantage of their closeness to the patient and continuity of care to be attentive to patient evolution.

I, when that happens to me, we're playing with an advantage, and the fact is that, I don't know if it happens to you, but when you don't follow your intuition you're left with a weird feeling. Then you start looking, and if that patient doesn't come back, you look and see if they've had an emergency. Or you give them a call, I've done that, yes, the thing is just the other day… I did that… (FG1/5)

A sense of reassurance helps doctors to way up their decisions, adopt a wait-and-see attitude, and avoid excessive use of tests and treatments. They usually feel comfortable following their sense of reassurance and, again, the possibility of further contact with patient is used as a safety measure.

As you know you can see them the next day or in three days' time or even give them a call, you use this feeling of reassurance so as not to carry out tests you think are not appropriate (FG1/2)

Significance

GFs are recognized as having an important relevance for GP diagnostic tasks. As mentioned above, Spanish GPs introduce GFs in their diagnostic process both frequently and naturally.

I think we always attach value to these intuitions (FG1/6)

In fact GFs, especially the sense of reassurance, are regarded as a characteristic of primary care as opposed to hospital care. GPs are used to working amid high uncertainty without overtesting that may unnecessarily bother the patient and lead to increased expenditure for the health system.

We have to work like that because if we don't, all forty of the people who come in through the door, if you do all the tests every day…this is the way we work in primary care, making decisions depending on what you know about the patient, today they come in looking bad, … it's got nothing to do with the way you work in a hospital, basing absolutely everything on tests. (FG1/9)

There are some doubts concerning the diagnostic accuracy of GFs. As mentioned above, GPs tend to follow their GFs, but they are aware also of the error probability. When recalling successes and errors there is a memory bias for successes.

That gut feelings exist, I believe they exist, but I can't tell you if I get it right very much (FG3/18)

GPs involved in GP training residents think it is difficult to teach about the value of GFs. They think that they have to make residents aware of their existence. Afterwards, students and trainees may learn to pay more or less attention to GFs depending on their personality. Young GPs agree that GFs are usually on the table when discussing a case even if they are not directly named.

I think the resident can be helped to develop them and put them into practice. Not teach them or have them, because that does depend on your personality. (FG3/19)

The main way to help students and trainees to take advantage of their GFs is by increasing their experience. GP trainers advocate the use of clinical cases for this purpose.

If you teach the resident from the start with clinical cases you're increasing their experience. You have knowledge at the bottom of the hard drive and you use it unconsciously, with training based on clinical data you put more and more information in there (FG3/17)

DISCUSSION

Spanish GPs recognize the existence of gut feelings involved in their diagnostic process. They recognize two kinds of gut feelings: a sense of alarm, when something doesn't fit in the patient; and a sense of reassurance, the feeling that nothing serious will happen. The factors considered to have the strongest influence on the appearance of GFs are longitudinality in the patient-physician relationship, and previous professional experience. Spanish GPs attach great value to these GFs. They are considered an important tool for carrying out their tasks and even one of the main characteristics of primary care style of working. The GPs interviewed declare that GFs cannot be directly taught, but their notion and their relevance can be transmitted to students and trainees. GPs feel comfortable taking their GFs into account but they are not sure of their accuracy. GFs are used as one of the tools available to decide whether to begin the diagnostic process or to adopt a wait-and-see attitude (Fig.1)

The results of our study are similar to previous research conducted in the Netherlands and France in terms of recognition of the existence of GFs and their typology.[20–22] The idea of GFs as the GP being worried (sense of alarm) or not (sense of reassurance) about the patient's prognosis, even in the absence of objective findings, is found in previous qualitative research, as well as their influence as to whether or not to initiate a diagnostic process or specific treatment. We have found small differences in Spanish GPs. They feel cautious about the sense of reassurance and, although they usually follow it, they remain alert to the resolution of the case. Spanish GPs refer to the sense of alarm more as a trigger for the diagnostic process than as a need for management. In this latter aspect they are more similar to French GPs than to Dutch GPs. As some authors point out the longer tradition of research and acceptance of these GFs in the Netherlands than in France (and Spain) might explain these differences.[22]

The focus study group technique enabled us to select physicians with all the characteristics we wanted to be present. We found a wide consensus among GPs with different experience, gender, teaching profile, and location of practices. Saturation of information was quickly reached. Although our research was carried out in the island of Majorca, a place where two languages (Spanish and Catalan) coexist, we believe our results are representative of Spanish GPs. Physicians and patients use both languages in most practices. The organization of the practices and GP traineeship is very homogeneous all over Spain. There is no School of Medicine in Majorca, so GPs working in Majorca have all studied Medicine elsewhere in Spain, sharing the same medical culture. There are GPs born and raised in almost every region of Spain and many Spanish-speaking South American countries working in the Majorca Primary Care Department.

Primary care is a high uncertainty environment in which quick decisions have to be made. These decisions have to balance concerns about serious outcomes for the patient and avoiding unnecessary tests and treatments. Thus, expert GPs may use their GFs as one of their tools to cope with the many different situations with many different possible outcomes and different suitable solutions. Concerning the issue of teaching GFs, Spanish GPs think it is important for students and residents to get familiar with them. In order to increase their level of expertise and to develop more accurate GFs, techniques such as clinical cases and scenarios may be used, as recommended in the literature on intuition and expertise.[26]

The results obtained in this study corroborate the presence of GFs in Spanish doctors and corroborate similar GFs content as found by our European colleagues. Future research on GFs in our country has to be done evaluating their diagnostic accuracy by themselves or together with symptoms of severe diseases. Our results will enable us to translate and make the linguistic validation of the Gut Feeling Questionnaire to Spanish and to use it to determine the presence and accuracy of GFs. In the few quantitative studies conducted on GPs' suspicion of cancer or serious illness after a consultation the negative predictive value of suspicion is high and the positive predictive value low, but comparable to the predictive values of main red-flag symptoms.[14] Once we know their diagnostic accuracy, teaching strategies may be developed and assessed.

CONCLUSION

Our study shows that Spanish GPs recognize the presence of GFs during the diagnosis process. They mainly identify two types of GF: a sense of reassurance and a sense of alarm. The former is more common and both are considered useful tools to discriminate patients with mild or severe disease, one of the clinical patterns of Primary Care. GPs declare that clinical experience, time duration of patient relationship, and frequency of patient contacts with their GP are the main factors related to GF recognition.

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Competing interests

Authors have no competing interests to declare.

Author's contribution

The study was conceived and designed by BO, SM and ME with support from ES. Focus groups were organized by BO, SM and ME. BO, SM and CG conducted the analysis. BO led the writing guided by SM and ME, with additional comments from ES. All authors read and approved the final manuscript.

Ethics

As no patient data were used or accessed no ethical approval was needed. The study was evaluated and approved by the Majorca Primary Care Department Research Committee.

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Data sharing statement

Transcriptions of the focus groups and quotes are available by email from the corresponding author

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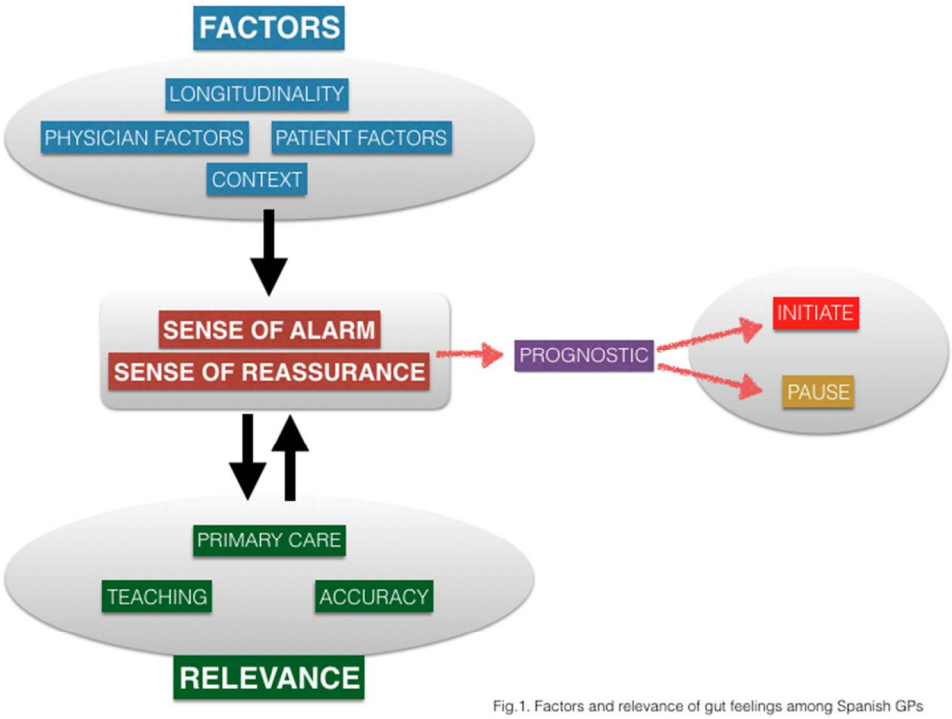

Fig.1. Factors and relevance of gut feelings among Spanish GPs

Factors and relevance of GFs among Spanish GPs

266x200mm (72 x 72 DPI)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group? *Bernardino Oliva-Fanlo, Sebastià March, Magdalena Esteva* *Page 6*
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD* *Bernardino Oliva-Fanlo MD* *Sebastià March BS, MSC* *Magdalena Esteva MD, PhD, MSC* *Cristina Gadea-Ruiz MD* *Erik Stolper MD, PhD*
3.	Occupation	What was their occupation at the time of the study? *Bernardino Oliva-Fanlo GP* *Sebastià March researcher* *Magdalena Esteva researcher* *Erik Stolper GP, academic* *Cristina Gadea-Ruiz GP* *page 1*
4.	Gender	Was the researcher male or female? Three males, two females page 1
5.	Experience and training	What experience or training did the researcher have? *Bernardino Oliva-Fanlo MD, qualitative research formation* *Sebastià March BS, qualitative research formation* *Magdalena Esteva MD, PhD, qualitative research formation* *Erik Stolper MD, PhD, qualitative research formation* *Cristina Gadea-Ruiz MD, qualitative research formation* *Page 6*
Relationship with participants		
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Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *Thematic content analysis* *Page 8*
Participant selection		
10.	Sampling	How were participants selected? *Purposive sampling* *Page 6*
11.	Method of approach	How were participants approached? *By phone and email* *Page 6*
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14.	Setting of data collection	Where was the data collected? *Two primary care practices from Majorca* *Page 6*
15.	Presence of non-participants	Was anyone else present besides the participants and researchers? *No* *Page 6*

16.	Description of sample	What are the important characteristics of the sample? *Representative regarding gender, experience, GP training dedication, rural/urban practice* *Pages 6 and 8*
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Keywords:	PRIMARY CARE, Diagnostics, Intuition, MEDICAL EDUCATION & TRAINING, QUALITATIVE RESEARCH

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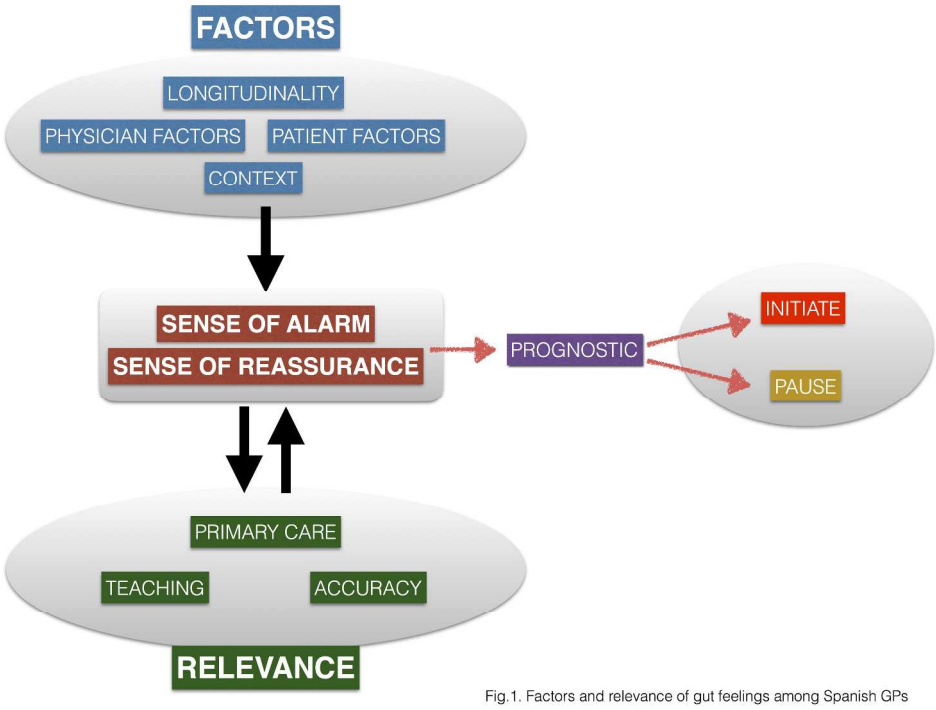

Fig.1. Factors and relevance of gut feelings among Spanish GPs

Fig.1. Factors and relevance of gut feelings among Spanish GPs

361x270mm (300 x 300 DPI)

Gut feelings in the diagnostic process of Spanish GPs. A focus group study

Authors:
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Family practice, general practitioner, gut feelings, intuition, focus groups, diagnosis, practice patterns

Word count
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ABSTRACT

Objectives. The gut feelings of doctors can act as triggers and modulators of the diagnostic process. This study investigated the existence, meaning, and role of gut feelings among Spanish general practitioners.

Design. Qualitative study using a focus group. Thematic content analysis.

Setting. Primary health care centres in Majorca (Spain).

Participants. 20 purposively sampled general practitioners working in Majorca.

Results. General practitioners were aware of the existence of gut feelings in their diagnostic reasoning process and recognized two kinds of gut feelings: a sense of alarm and a sense of reassurance. A previous physician-patient relationship and the physician's experience had a strong perceived influence on the appearance of gut feelings. The physicians attached great significance to gut feelings, and considered them as a characteristic of the primary care working style and as a tool available in their diagnostic process. The physicians thought that the notion of gut feelings and their relevance can be transmitted to students and trainees. They also felt comfortable following their gut feelings, although they were not sure of their accuracy.

Conclusions. Spanish general practitioners in our study agree to recognize the presence and role of gut feelings in their diagnostic reasoning process. Future research should examine the diagnostic accuracy of gut feelings and how to teach about gut feelings in the training of general practitioners.

STRENGTHS AND LIMITATIONS

- This is the first study to examine diagnostic gut feelings in a Spanish-speaking area.
- The qualitative approach used here provides information about self-perceived feelings, perceptions, and opinions.
- Our study sample was heterogeneous in age, experience, gender, and location of practice, and the consensus was wide and rapidly achieved.
- The analysis was performed by three researchers to assure the validity of the results.

BACKGROUND

General practitioners (GPs) use two traditional perspectives for diagnosis: problem solving and decision-making.[1] In problem solving, GPs confirm or refute a working hypothesis by considering the symptoms and signs. This model incorporates pattern recognition, in which signs or clues that fit a specific condition enable doctors to make the correct diagnosis. In decision-making, the likelihood that a diagnosis is true depends on the initial probability, based on the disease's known prevalence or the clinician's subjective assessment of the probability of a disease, and the application of available scientific evidence. The decision-making approach is used in evidence-based medicine, is analogous to Bayes' theorem, and commonly employs notions such as likelihood ratios, decision trees, and diagnostic algorithms. Despite its theoretical superiority, the decision-making model has potential biases, and is less used in clinical practice.[2,3]

There are other ways of approaching diagnosis in the fields of medicine and psychology.[4] In some models, intuition --defined as the outcome of highly personalised, knowledge-based, automatic non-analytical processes -- is a characteristic of an advanced learning processes.[5,6] Psychological theories postulate dual processes as the simultaneous existence of two forms of knowing and understanding: a rational and analytical process that is controlled, explicit and slow; and an implicit, associative, intuitive, and rapid non-analytical process.[7] Kahneman and Klein discuss these approaches.[8] They agreed that an environment of high validity (they use medicine as an example) and adequate chances for learning the regulariries of that environment (by means of practice and feedback) are necessary conditions for the development of skilled intuitions. Cognitive neuroscientists showed that emotions are actively involved in decision making.[9]

The so-called gut feelings (GFs) are related to the previously exposed methods used in the diagnostic reasoning process. A GF may be described as a "useful warning light, which suddenly lights up to announce that there is something unusual".[10] There are expressions with similar meanings in other languages,[11] and there are references to GFs in fields such as nursing,[12,13] diagnosis of cancer and serious diseases in primary and specialised care,[14–16] cardiology,[17] paediatrics,[18,19] and emergency care.[20] Researchers have previously studied GFs among family physicians in the Netherlands, Belgium, France, and the United Kingdom.[20–24]

Studies in the Netherlands, Belgium, and France showed that there are two types of GFs.[22,23] A "sense of alarm" is a feeling that something "does not add up" in a particular patient, and this initiates the diagnostic process and makes the GP concerned about a possible serious outcome. A "sense of reassurance" means that the GP feels sure about the prognosis, even without knowing the precise diagnosis. The "Gut Feeling Questionnaire" is a validated tool used to determine the presence or absence of GFs in the diagnostic reasoning process of GPs.[25]

The aim of this study was to explore the existence, significance, determinants, and triggers of GFs among Spanish GPs. We used a study design similar to the previous Dutch researchers to allow direct comparison of the results.

METHODS

Our work focuses on opinions and feelings, so we chose a qualitative approach.[26] GFs can be difficult to characterize, because personal experience has a major effect, and there has been little research on GFs in Spanish-speaking countries. All the researchers of the present study have previous training in qualitative research. We used the focus group approach over individual interviews to take advantage of the interactions between members of the focus group as a tool to stimulate individual discourses.[26,27] We used purposive sampling to recruit participants to achieve a representative distribution of the factors we wanted to study, such as experience, gender, dedication to GP traineeship, and rural or non-rural practice location. All selected GPs worked for the Majorca Primary Care Department.

Previous research indicated that clinical experience seemed to be a major determinant for GFs. Thus, we separated experienced GPs (more than 10 years of experience beyond residence) from less experienced GPs.[21] A 10-year cut-off point was selected according to the ten-year rule".[29] We contacted 12 GPs in each group by telephone or mail, and sent written confirmations after their acceptance to participate.

No relevant information on the topic of discussion was released to reduce bias, and none of the GPs were remunerated for their collaboration. Focus groups were organized in the Majorcan primary care practices that were more geographically accessible to the participants in each group. The day before the second group was scheduled to meet, there was a fire in the health centre. Thus, 4 of the GPs did not attend the group, as they thought it was suspended. BO, SM, and ME organized the meetings and acted as moderators and observers. We prepared a written scenario in advance (Table 1) to introduce the topic of GFs at the beginning of the group meeting, and to assure that all issues were discussed during the meeting. We then let the GPs talk about their experiences. The researchers, acting as moderators and observers, compared their notes about each meeting after it ended. All points of interest that were prepared in the script were discussed in the first group. An issue was raised during the first group regarding GFs in nurses, patients, and relatives, so this was added for the second group; another issue regarding GFs in non face-to-face consultations was raised in the second group, and this was added to the third group. Oral acceptance for participation and meeting audio recording was obtained from each of the participants after introduction of the objectives of the focus groups.The focus groups were audio recorded and then transcribed. The duration of the meetings was 60 to 70 min.

Table 1. Gut feelings focus group script.

The aim of this study is to gather information about how the diagnostic process works in primary care. You were trained as doctors to make diagnostic decisions through questions, explorations, and algorithms; that is, rational decision-making. That part is known. But we do know that when making decisions, doctors also consider other things. Let's say that sometimes there are certain feelings and previous experiences that alert us. In the English language medical literature, we talk about "gut feelings".

1. *What can you tell us about gut feelings?*
2. *Have you ever previously felt something like a gut feeling?*
3. *How would you describe it? What do you feel?*
4. *What would you call them?*
5. *How do we view these gut feelings?*
6. *Do you follow gut feelings? What makes you listen to them or not?*
7. *What triggers these feelings?*
8. *Are there any symptoms, diseases, types of people, days, or situations in which you are more likely to have gut feelings?*
9. *Do you think gut feelings are related to professional experience? To knowledge (patient or medical)? To gender?*
10. *Do gut feelings depend on the type of consultation (by appointment vs. emergencies), time (normal consultation vs. off-hours), or location (rural vs. urban)?*
11. *(If there was no mention of the two types of gut feelings) Research shows a distinction between gut feelings that provide a sense of alarm and a sense of reassurance. What do you think? Do you recognize both types? Do you think such a distinction is useful?*
12. *Have you ever had feelings of unwarranted security?*
13. *Could this be taught to trainees or students? How?*
14. *What relevance do you give to these feelings in the context of primary care?*

After the first group we added:

1. *Do you pay attention to the gut feelings of patients, relatives or other healthcare professionals?*

After the second group we added:

1. *Do you also have gut feelings in non face-to-face consultations (by telephone or*

email)?

After the second group, we decided there were not enough GP trainers. We wanted GP trainers and young GPs to be well represented in our groups to discuss the teaching GFs. Thus, we organized a group of GPs who were trainers for at least 4 years (a complete training period) and GPs who recently completed their specialty training. After analysis of the third group, we agreed that no relevant new information was detected, and considered the information obtained had reached saturation. Table 2 shows the characteristics of the GPs who attended the focus groups. There were physicians from 7 regions of Spain and from 3 different Spanish-speaking countries.

Table 2. Characteristics of enrolled general practitioners.

	GROUP 1	*GROUP 2*	*GROUP 3*	*TOTAL*
Number of participants	*9*	*4*	*7*	*20*
Female	*5*	*2*	*2*	*9*
Male	*4*	*2*	*5*	*11*
Experience > 10 years	*9*	*0*	*2*	*11*
Experience < 10 years	*0*	*4*	*5*	*9*
Years of experience (mean)	*30.1*	*7.8*	*10.3*	*18.7*
Number of GP Trainers	*4*	*0*	*3*	*7*
Rural practice	*3*	*1*	*1*	*5*
Urban practice	*6*	*3*	*6*	*15*

BO, SM, and CG performed a thematic analysis of the transcripts immediately after the first focus group.[26,28] The researchers individually selected quotes related to the research questions from the transcripts, and assigned codes to them. The coding was mainly deductive, based on previous research, although it also allowed debate and the use of new categories.[21,22] This analysis employed the TAMS Analyzer software. Then, a meeting was held to discuss the quotes and the codes that were used. Agreement was reached on the quotes, codes, and certain categories in which the codes were included. In cases of disagreement, ME and ES made the decision.

The Research Committee of the Majorca Primary Care Department approved this study.

RESULTS

We obtained 59 codes after analysis and coding of the transcripts. We grouped these codes into 13 first-level categories, and 4 second-level categories: gut feelings existence and characteristics, influencing factors, consequences, and significance. Table 3 shows the resulting code tree.

Table 3. Code tree

CODE	*1st level CATEGORY*	*2nd level CATEGORY*
Patient aspect *Patient language* *Patient paraverbal language* *Frequentation* *Patient symptoms* *Diseases*	*Patient factors*	*FACTORS INFLUENCING THE APPEARANCE OF GFs*
Continuity of care	*Continuity of care*	
Medical knowledge *Previous experiences* *Years of experience* *Sex* *GP personality* *Costums*	*Physician factors*	
Off- hours *Time of day* *Place* *Workload* *Non face-to-face*	*Context*	
Value *Value for primary care* *GF reassurance value*	*Value*	*SIGNIFICANCE*
Not teachable *Teachable personality* *Trainer experience* *Transmission* *Sayings*	*Teaching*	
Effective *Mistakes* *Memory bias*	*Accuracy*	
Rational processes *Added to RP: personal knowledge* *Added to RP: experience* *Added to RP: intuition* *Added to RP: previous experiences* *Uncertainty*	*Diagnostic process*	*GFs*
GF existence *Prognostic* *Other actors: patient* *Other actors: nurses* *Other actors: relatives*	*GF existence and characteristics*	

GF name: hunch *GF name: religious* *GF name: smell* *GF name: art of medicine* *GF name: light* *Alarm GF description*	*Alarm GF*	
Reassurance GF description *Reassurance GF utility*	*Reassurance GF*	
Body sensations *Thoughts*	*Physician symptoms*	
Reassurance GF rhythm *Reassurance GF avoid redundancy* *Reassurance GF discard* *Alarm GF: beginning diagnostic process* *Alarm GF: decision making* *Alarm GF: reminders* *Alarm GF: doubts about beginning* *Alarm GF followed (good job)* *Alarm GF not followed (bad feelings)*	*Effect on medical decisions*	*CONSEQUENCES*

GP: General practitioner.
GF: Gut feeling
RP: Rational process

Presence and characteristics of gut feelings

The GPs in our study recognized that GFs had a role in the diagnostic process, and that GFs led them to make decisions that were not entirely scientific. They describe GFs as something that makes them feel concerned about a patient, without any objective evidence.

There must be something that leads us to make decisions with no basis or foundation. There must be something. This can't be something that is generated spontaneously. (FG1/9)

A hunch, a feeling, it's something you think with no clinical suspicion, with no hypothesis. There's something that "doesn't fit" in this patient. Something that can't be answered. If someone were to ask you why something doesn't "add up", you wouldn't even dare to tell them why. (FG2/10)

GPs use GFs, in addition to the scientific diagnostic reasoning process that they learned during their years at medical school and specialty training. GFs emerge during diagnosis process, and are influenced by the GP's personal knowledge of patients, clinical skills, and previous experiences.

I carry out my scientific procedure -- reason for the visit, history, the interview -- and perform the physical examination. If I think I have to order tests, then I do, but sometimes, something that tells you that ... (FG3/20)

Many GPs repeatedly used the word "*corazonada*" (literally, "heart feeling"), which is defined by the "*Diccionario de Uso del Español*" (2ªEd) as a "vague belief that something happy or unhappy is going to happen". The GPs frequently depicted their GFs as related to light, with expressions that refer to enlightenment, a bulb, a lantern, or a star.

I don't know, you see it clearly. I don't know why, but a little light comes on here that tells you something's wrong and it's going to get worse. (FG2/12)

They also mention expressions related to religion (a Marian apparition, a guardian angel) and the art of medicine.

I don't know if it was a hunch, but I always think that the Virgin Mary appeared to me that day. (FG2/2)

Nobody explained to me what the art of medicine was, but it reminds me of this. (FG3/18)

The interviewed Spanish GPs distinguished two kinds of gut feelings: a sense of alarm and a sense of reassurance. The sense of alarm appears when something "does not add up", so the GP has the feeling that -- even without a clear diagnosis -- a patient is or will become seriously ill.

A completely normal analysis. The physical examination is completely normal, she has an ultrasound scan from a week ago that is completely normal, and yet I have the feeling this lady is progressively deteriorating. (FG3/20)

A sense of reassurance is when the GP, even in the presence of symptoms that may suggest a serious condition, has the feeling that nothing serious will happen.

Suppose you see a patient with a cough, a temperature, and side pain. Well, any medical student already knows what the patient has, doesn't he? Well, you examine the patient because there is a medical routine you must follow, but you very often say, "I know they don't have pneumonia, I know they don't have it." (FG1/2)

The GPs in our study attached great value to the sense of reassurance provided by GFs. They said they perceived reassurance more often than a sense of alarm. This sense of reassurance allows them to quickly discriminate potentially mild from serious diseases, and helps them cope with their daily workload.

And I think it's more this feeling than most of the others. You have a stronger feeling that this is right in twenty patients. On the other hand, with one or two, you find yourself saying, "Let's see what's up". The feeling of reassurance you have is fairly high. We

work in uncertainty every day, and to be able to have this feeling of reassurance and to go home and rest easy ... (FG2/13)

The Spanish GPs in our study regarded GFs as being more related to prognosis (the severity of a patient's condition) than to an exact diagnosis.

The idea is, not so much making a diagnosis, but being able to discern whether the patient might have something serious or not. (FG1/6)

GPs also recognize the existence of GFs in other health professionals who care for their patients. They pay attention to nurses' GFs, and give more credibility to more experienced nurses.

I also believe very much in a nurse's feelings or intuition, who very often tells you "That patient, I don't know what they have, but they don't look right", and then I quickly take care of the patient. (FG2/13)

The GPs also mentioned that patients and their relatives also have GFs that could influence their own feelings and decisions.

If there's a person who is in his fifties, and one day he gets up and says he feels dizzy, and his wife, who has known him for ages, says "It's the first time in his life he's had dizziness", then you're going to attach importance to that, and it's going to awaken that gut feeling in you. (FG3/19)

Factors that influence appearance of GFs

Numerous factors are linked to the onset of GFs, and these factors are related to the patient, the physician, the context in which the consultation occurs, and the existence of a previous doctor-patient relationship.

Patient-related factors

The GPs in our study mentioned the external appearance of a patient, and the patient's gestures and paraverbal language as triggers for their GFs.

I think sometimes it's not the verbal language, it's the tone of voice they have. The paraverbal language of the body, which I suppose is not done consciously, but you must interpret. And it gives you certain information. (FG2/11)

Use of health services is another factor related to GFs in GPs. Patients who visit doctors less frequently are more likely to elicit a sense of alarm in the GP. Even the number of active episodes in the electronic medical record may have an influence.

There are patients who hardly ever come to see the doctor. And, well, when they come with an appointment and they mention, "the fact is I don't feel too good", you have the feeling that they must be ill, because they rarely come, and when they do come, it's because something's wrong. (FG2/13)

When a patient presents with diffuse symptoms, such as thoracic or abdominal pain, or cough and headache, the physician is more likely to rely upon GFs. This also happens when a patient presents with anxious-depressive symptoms that could mask an organic disease. GPs also mentioned the presence of GFs when a patient presents with symptoms that may suggest serious diseases, such as cancer or pulmonary embolism, even in the absence of "red flags".

A serious pathology, and also slightly diffuse symptoms … With a pulmonary embolism, I remember seeing two patients and saying, "How did I get it right otherwise …?" (FG1/4)

By her aspect, how her character has changed the last months. She used to come alone, and she now comes with her daughter and her husband. Very worried ... And I have the feeling that she may have a cancer. (FG3/20)

Physician-related factors

The GPs in our study thought that, although even young doctors and trainees have GFs, professional experience is a crucial factor in having and attaching importance to GFs. Most of the GPs declared that they have had GFs since beginning their medical careers. But over the years, the memory of past experiences has made them more sensitive to GFs.

There's something that has turned on the light … a prior experience of having had similar events, or that reminds you of something. (FG1/9)

I think it's the years, although I'm not sure. The fact is, I don't know. When I began, I think I also had intuitions … (FG1/5)

Medical knowledge is also an important factor. GPs who know more have more confidence in their GFs. Both experience and medical knowledge develop in parallel with the credibility of GFs.

*If you study a lot when you are R5 (*first year after completing GP training*) you can work it out. And if you don't study a lot, well, with 23 years of experience you have studied it in patients you have seen. In the end, it's knowledge. (FG3/17)*

The GPs we interviewed did not think that a physician's gender had a significant influence on having and trusting GFs. Instead, they thought that a physician's personality, regardless of gender, plays a more decisive role.

There are some doctors who are more sensitive to gut feelings, and others who are less sensitive to gut feelings. Perhaps this is due to personality differences. (FG3/17)

Context-related factors

GFs may appear during regular consultation times, or during after-hours consultations. The GPs in our study reported that night consultations were more likely to generate GFs. Furthermore, consultations at night in a rural environment had a greater association with GFs.

It's not the same. Someone who comes in calmly at ten o'clock in the morning and someone who comes in at twelve o'clock at night … In the villages, normally if they call you at night it's trouble. They don't call unless there's a good reason. If they call you at three in the morning, it's because they really need help and you can start to run. (FG2/11)

The GPs reported having fewer GFs in emergency rooms due to the different approach to patient care in that environment. GPs work in emergency rooms in Spain, and many patients are referred by their GPs, so there is an initial "filter" that indicates to the physician that there is a greater chance of serious disease.

I think that in a hospital, there are much fewer gut feelings, because they've gone through our "filter" and they arrive there, and everything is cut and dry … If you've reached here, it's because the suspicion is already there, and my job is to carry on the chain. (FG3/19)

Moreover, as a GP's workload grows, there are fewer GFs and it is more difficult to pay attention to them. Regardless, it is still possible to have GFs, and many doctors reported remembering having a sense of alarm in the middle of an overloaded working day.

If you're seeing a load of emergencies, you're going as fast as you can, and the GF threshold might rise. Some things get past you, which, with more calm, you might have realised. It's happened to me, seeing emergencies, about to close the health centre, five people waiting, and suddenly with one of them you say… (FG3/19)

Although GPs mainly focus on face-to-face consultations, we asked them about GFs in non face-to-face consultations. They reported it was also possible to have GFs from telephone consultations, especially if they knew the patient.

A call from a patient saying, "I'm out of breath", and you know they aren't out of breath. Or the other way round, just by hearing the voice you know you have to see the patient because something's wrong. It makes a difference if you know them. (FG3/20)

Continuity of care

Continuity of care is an important characteristic of primary care, and also affects GFs. Knowing the patient, the social and family context, and the previous medical history and attitudes are crucial when attending a new episode. Spanish GPs in our study used knowledge provided by continuous care to quickly determine whether a patient had a serious disease.

You're lucky enough to have known this person from before. You already know them, and as soon as they come through the door, you begin to get some clues. (FG1/4)

(You know) a person who comes, who goes, their grandchild, the other, you've known them for fifteen years and you see they don't look right. But that's because you know them ... That's one of the advantages of family medicine: continuity. (FG3/17)

Consequences of GFs

The GPs in our study reported physical sensations when they had GFs. They hear bells ringing, they perceive a bad odour related to the situation, and they have bad bodily sensations.

This idea happened to me, and for a while I had a weird body sensation. (FG1/9)

There are people who, just when they enter the room, you say it smells like a neoplasia. And they still have not said anything. (FG1/4)

The GPs reported that a "sense of alarm" is one of the tools used to initiate the diagnostic process. They sometimes have doubts and try to rationalize them, but most of the time they follow this "sense of alarm".

If there's something that doesn't fit, that patient is different to another one, and that's why I'm more concerned. And I try to get to the bottom of it. (FG3/15)

When a sense of alarm is considered, the physician has a feeling of a job well done. When it is not considered, the GP remains restless.

Sometimes you have intuitions, but you don't always follow them. That is, sometimes you do, and when you follow them and you're right, that's great. And sometimes you don't, and you get left with a feeling like ... you're left feeling angry. (FG1/9)

In these cases, the GPs take advantage of their closeness to the patient and the continuity of care, and try to be attentive to patient evolution.

Then you start looking. And if that patient doesn't come back, you look and see if they've had an emergency. Or you give them a call. I've done that, yes. The thing is, just the other day … I did that … (FG1/5)

A sense of reassurance helps doctors to balance their decisions, adopt a wait-and-see attitude, and avoid excessive use of tests and treatments. The GPs usually felt comfortable following their sense of reassurance. Again, the possibility of further contact with the patient is a safety measure.

As you know, you can see them the next day or in three days' time, or even give them a call. You use this feeling of reassurance so as not to carry out tests you think are not appropriate. (FG1/2)

Significance of GFs

The GPs reported that GFs were important for certain diagnostic tasks.

I think we always attach value to these intuitions. (FG1/6)

In fact, GPs regarded GFs, especially the sense of reassurance, as a characteristic of primary care as opposed to hospital care. GPs are used to working with a high degree of uncertainty, and tend to avoid over-testing, because it may unnecessarily upset the patient and increase the cost of care.

We have to work like that, because if we don't, all forty of the people who come in through the door. If you do all the tests every day … This is the way we work in primary care. Making decisions depending on what you know about the patient. Today, they come in looking bad … It's got nothing to do with the way you work in a hospital, basing absolutely everything on tests. (FG1/9)

There are some doubts about the diagnostic accuracy of GFs. As mentioned above, GPs tend to follow their GFs, but they are also aware that their GFs may be wrong. When recalling previous successes and errors, there is a bias to better remember successes than failures.

That gut feelings exist, I believe they exist. But I can't tell you if I get it right very much. (FG3/18)

GPs who train residents reported it was difficult to teach about the value of GFs. But they also said they should try to teach residents about GFs. Afterwards, students and trainees may learn to pay more or less attention to their own GFs, depending on their personality. Young GPs agree that GFs are usually considered when discussing a case, even if not directly acknowledged.

I think the resident can be helped to develop them, and put them into practice. Not teach them or have them, because that does depend on your personality. (FG3/19)

The main way to help students and trainees take advantage of their GFs is by increasing the experience of GFs. GP trainers advocate the use of clinical cases for this purpose.

If you teach the resident from the start with clinical cases, you're increasing their experience. You have knowledge at the bottom of the "hard drive", and you use it unconsciously. With training based on clinical data, you put more and more information in there. (FG3/17)

DISCUSSION

The Spanish GPs in our study recognized the existence of GFs in their own diagnostic processes. In particular, they recognized two kinds of gut feelings: a sense of alarm, when something does not fit in the patient; and a sense of reassurance, the feeling that nothing serious will happen. The two factors with the strongest influence on the appearance of GFs are continuity of care in the patient-physician relationship, and amount of professional experience. The GPs in our study attached great value to their GFs, and considered them an important tool for carrying out their tasks, and even one of the main characteristics of working in a primary care setting. The GPs that we interviewed said that GFs cannot be directly taught during training, but the notion of GFs and their relevance can be transmitted to students and trainees. The GPs felt comfortable about considering their GFs during diagnosis, but were unsure of their accuracy. Thus, the GPs considered GFs as one of the tools available

when deciding whether to begin a diagnostic process or to adopt a wait-and-see attitude (Fig. 1).

We found no effect of gender or previous medical experience on the discourses of the GPs we examined. In fact, all the GPs in our study had experienced GFs during their work. Experienced GPs had more confidence in their GFs than less experienced GPs.

The results of our study are similar to those of previous research of GPs conducted in the Netherlands and France, in terms of recognition of the existence of GFs and their typology. Previous qualitative research reported the idea of GFs as the GP being worried (sense of alarm) or not (sense of reassurance) about a patient's prognosis, even in the absence of objective findings, and the role of GFs on whether to initiate the diagnostic process or a specific treatment. However, we found some small differences in Spanish GPs. Spanish GPs reported feeling cautious about the sense of reassurance provided by GFs, and although they usually follow their GFs, they remained alert to the resolution of the case. The GPs in our study referred to the sense of alarm from a GF more as a trigger for the diagnostic process than as a need for management. In this latter aspect, they are more similar to French GPs than Dutch GPs. As previously noted, the longer tradition of research and acceptance of GFs in the Netherlands than in France and Spain might explain these differences.[23]

Our use of a focus study group enabled us to select physicians with the characteristics we wanted. We found a wide consensus among GPs who had different years of experience, gender, teaching profiles, and practice locations. Saturation of information was quickly reached. Although our research was performed on the island of Majorca, where the languages of Spanish and Catalan coexist, we believe the GPs interviewed in our study are representative of Spanish GPs. Physicians and patients use both languages in most practices. The organization of medical practices and GP traineeship is very similar throughout Spain. There is no School of Medicine in Majorca, so GPs working in Majorca have all studied medicine elsewhere in Spain, and have the same medical culture as residents of the Spanish mainland. The GPs that we interviewed, and GPs in general, who work in the Majorca Primary Care Department, are born and raised in almost every region of Spain and Spanish-speaking South American countries.

The primary care environment has many uncertainties, and quick decisions are often necessary. These decisions must balance concerns about patient outcomes with avoiding unnecessary and expensive tests and treatments. Thus, expert GPs may use their GFs as a tool

to cope with the many different situations that have multiple possible outcomes and solutions. Concerning the issue of teaching GFs, the GPs in our study reported it is important for students and residents to become familiar with the use of GFs in clinical practice. To increase their expertise and develop more accurate GFs, techniques such as clinical cases and scenarios may be used, as recommended in the literature on the teaching of intuition and expertise in medical training.[30]

The results of this study confirm the presence of GFs in Spanish doctors, and are in agreement with studies of doctors from elsewhere in Europe. Future research on the GFs of doctors in Spain should seek to evaluate their diagnostic accuracy. As Spanish GPs has a similar GF to the Dutch concept where the origin of the Gut Feeling Questionnaire is, we can proceed to translate and make the linguistic validation of the Gut Feeling Questionnaire to Spanish, and use it to determine the presence and accuracy of GFs. In the few quantitative studies conducted on GPs' suspicion of cancer or serious illness after a consultation, the negative predictive value of suspicion was high and the positive predictive value was moderate, but these were comparable to the predictive values of the main "red-flag" symptoms.[15] Once we know the diagnostic accuracy of GFs, it may be possible to develop and assess teaching strategies.

CONCLUSION

Spanish GPs in our study recognized the presence of GFs during the diagnostic process. There were two main types of GFs: a sense of reassurance and a sense of alarm. The former is more common, but both are useful for discrimination of patients according to disease severity, an important goal in primary care. The GPs reported that clinical experience, duration of the patient relationship, and frequency of patient contact were the main factors related to recognition of GFs.

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Competing interests

The authors have no competing interests to declare.

Authors' contributions

This study was conceived and designed by BO, SM, and ME with support from ES. Focus groups were organized by BO, SM, and ME. BO, SM, and CG conducted the analysis. BO led the writing, and was guided by SM and ME, with additional comments from ES. All authors read and approved the final manuscript.

Ethics

All interviewed GPs participated voluntarily. They were asked for consent to record their interviews and to use the transcripts. The study was evaluated and approved by the Majorca Primary Care Department Research Committee.

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Data sharing statement

Full transcripts of the focus groups and quotes and authorization of the study are available as supplementary files by email from the corresponding author.

Supplementary files

- Authorization of the study by the Research Comitee of the Majorca Primary Care Department (original)
- Authorization of the study by the Research Comitee of the Majorca Primary Care Department (tranlated into English)

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Gut feelings in the diagnostic process of Spanish GPs. A focus group study

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ABSTRACT

Objectives. The gut feelings of doctors can act as triggers and modulators of the diagnostic process. This study explored the existence, significance, determinants, and triggers of gut feelings among Spanish general practitioners.

Design. Qualitative study using focus groups. Thematic content analysis.

Setting. Primary health care centres in Majorca (Spain).

Participants. 20 purposively sampled general practitioners working in Majorca.

Results. General practitioners were aware of the existence of gut feelings in their diagnostic reasoning process and recognized two kinds of gut feelings: a sense of alarm and a sense of reassurance. A previous physician-patient relationship and the physician's experience had a strong perceived influence on the appearance of gut feelings. The physicians attached great significance to gut feelings, and considered them as a characteristic of the primary care working style and as a tool available in their diagnostic process. The physicians thought that the notion of gut feelings and their relevance can be transmitted to students and trainees. They tended to follow their gut feelings, although they were not sure of their accuracy.

Conclusions. Spanish general practitioners in our study recognize the presence and role of gut feelings in their diagnostic reasoning process. Future research should examine the diagnostic accuracy of gut feelings and how to teach about gut feelings in the training of general practitioners.

STRENGTHS AND LIMITATIONS

- This is the first study to examine diagnostic gut feelings in a Spanish-speaking area.
- The qualitative approach used here provides information about the existence, significance, determinants, and triggers of gut feelings among Spanish general practitioners.
- Our study sample was heterogeneous in age, experience, gender, and location of practice, and the consensus was wide and rapidly achieved.
- The analysis was performed by three researchers to assure the validity of the results.

BACKGROUND

Psychological research on clinical reasoning shows that general practitioners (GPs), and doctors in general, use two strategies for diagnosis: problem solving and decision-making.[1] In problem solving, GPs confirm or refute a working hypothesis by considering the symptoms and signs. This model incorporates pattern recognition, in which signs or clues that fit a specific condition enable doctors to make the correct diagnosis. In decision-making, the likelihood that a diagnosis is true depends on the initial probability, based on the disease's known prevalence or the clinician's subjective assessment of the probability of a disease, and the application of available scientific evidence. The decision-making approach is used in evidence-based medicine, is analogous to Bayes' theorem, and commonly employs notions such as likelihood ratios, decision trees, and diagnostic algorithms. Despite its theoretical superiority, the decision-making model has potential biases, and is less used in clinical practice.[2,3]

There are other ways of approaching diagnosis in the fields of medicine and psychology.[4] In some models, intuition --defined as the outcome of highly personalised, knowledge-based, automatic non-analytical processes -- is a characteristic of advanced learning processes.[5,6] Psychological theories postulate dual processes as the simultaneous existence of two forms of knowing and understanding: a rational and analytical process that is controlled, explicit and slow; and an implicit, associative, intuitive, and rapid non-analytical process.[7] Kahneman and Klein discuss these approaches.[8] They agreed that an environment of high validity (they use medicine as an example) and adequate chances for learning the regularities of that environment (by means of practice and feedback) are necessary conditions for the development of skilled intuitions. Cognitive neuroscientists showed that emotions are actively involved in decision making.[9]

The so-called gut feelings (GFs) are related to the previously exposed methods used in the diagnostic reasoning process. A GF may be described as a "useful warning light, which suddenly lights up to announce that there is something unusual".[10] There are expressions with similar meanings in other languages,[11] and there are references to GFs in fields such as nursing,[12,13] diagnosis of cancer and serious diseases in primary and specialised care,[14–16] cardiology,[17] paediatrics,[18,19] and emergency care.[20] Researchers have previously studied GFs among family physicians in the Netherlands, Belgium, France, and the United Kingdom.[20–24]

Studies in the Netherlands, Belgium, and France showed that there are two types of GFs.[22,23] A "sense of alarm" is a feeling that something "does not add up" in a particular patient, and this initiates the diagnostic process and makes the GP concerned about a possible serious outcome. A "sense of reassurance" means that the GP feels sure about the prognosis, even without knowing the precise diagnosis. The "Gut Feeling Questionnaire" is a validated tool used to determine the presence or absence of GFs in the diagnostic reasoning process of GPs.[25]

The aim of this study was to explore the existence, significance, determinants, and triggers of GFs among Spanish GPs. We used a study design similar to the previous Dutch researchers to allow direct comparison of the results.

METHODS

Our work focuses on opinions and feelings, so we chose a qualitative approach.[26] GFs can be difficult to characterize, because personal experience has a major effect, and there has been little research on GFs in Spanish-speaking countries. All the researchers of the present study have previous training in qualitative research. We used the focus group approach over individual interviews to take advantage of the interactions between members of the focus group as a tool to stimulate individual discourses.[26,27] We used purposive sampling to recruit participants to achieve a representative distribution of the factors we wanted to study, such as experience, gender, dedication to GP traineeship, and rural or non-rural practice location. All selected GPs worked for the Majorca Primary Care Department.

Previous research indicated that clinical experience seemed to be a major determinant for GFs. Thus, we separated experienced GPs (more than 10 years of experience beyond residence) from less experienced GPs.[21] A 10-year cut-off point was selected according to the ten-year rule".[28] We contacted 12 GPs in each group by telephone or mail, and sent written confirmations after their acceptance to participate.

No relevant information on the topic of discussion was released to reduce bias, and none of the GPs were remunerated for their collaboration. Focus groups were organized in the Majorcan primary care practices that were more geographically accessible to the participants in each group. The day before the second group was scheduled to meet, there was a fire in the health centre. Thus, 4 of the GPs did not attend the group, as they thought it was suspended. BO, SM, and ME organized the meetings and acted as moderators and observers. We prepared a written scenario in advance (Table 1) to introduce the topic of GFs at the beginning of the group meeting, and to assure that all issues were discussed during the meeting. We then let the GPs talk about their experiences. The researchers, acting as moderators and observers, compared their notes about each meeting after it ended. All points of interest that were prepared in the script were discussed in the first group. An issue was raised during the first group regarding GFs in nurses, patients, and relatives, so this was added for the second group; another issue regarding GFs in non face-to-face consultations was raised in the second group, and this was added to the third group. Oral acceptance for participation and audio recording was obtained from each of the participants after introduction of the objectives of the focus groups. The focus groups were audio recorded and then transcribed. The duration of the meetings was 60 to 70 min.

Table 1. Gut feelings focus group script.

The aim of this study is to gather information about how the diagnostic process works in primary care. You were trained as doctors to make diagnostic decisions through questions, explorations, and algorithms; that is, rational decision-making. That part is known. But we do know that when making decisions, doctors also consider other things. Let's say that sometimes there are certain feelings and previous experiences that alert us. In the English language medical literature, we talk about "gut feelings".

1. *What can you tell us about gut feelings?*
2. *Have you ever previously felt something like a gut feeling?*
3. *How would you describe it? What do you feel?*
4. *What would you call them?*
5. *How do we view these gut feelings?*
6. *Do you follow gut feelings? What makes you listen to them or not?*
7. *What triggers these feelings?*
8. *Are there any symptoms, diseases, types of people, days, or situations in which you are more likely to have gut feelings?*
9. *Do you think gut feelings are related to professional experience? To knowledge (patient or medical)? To gender?*
10. *Do gut feelings depend on the type of consultation (by appointment vs. emergencies), time (normal consultation vs. off-hours), or location (rural vs. urban)?*
11. *(If there was no mention of the two types of gut feelings) Research shows a distinction between gut feelings that provide a sense of alarm and a sense of reassurance. What do you think? Do you recognize both types? Do you think such a distinction is useful?*
12. *Have you ever had feelings of unwarranted security?*
13. *Could this be taught to trainees or students? How?*
14. *What relevance do you give to these feelings in the context of primary care?*

After the first group we added:

1. *Do you pay attention to the gut feelings of patients, relatives or other healthcare professionals?*

After the second group we added:

1. *Do you also have gut feelings in non face-to-face consultations (by telephone or*

email)?

After the second group, we decided there were not enough GP trainers. We wanted GP trainers and young GPs to be well represented in our groups to discuss the teaching of GFs. Thus, we organized a group of GPs who were trainers for at least 4 years (a complete training period) and GPs who recently completed their specialty training. After analysis of the third group, we agreed that no relevant new information was detected, and considered the information obtained had reached saturation. Table 2 shows the characteristics of the GPs who attended the focus groups. There were physicians from 7 regions of Spain and from 3 different Spanish-speaking countries.

Table 2. Characteristics of enrolled general practitioners.

	GROUP 1	*GROUP 2*	*GROUP 3*	*TOTAL*
Number of participants	*9*	*4*	*7*	*20*
Female	*5*	*2*	*2*	*9*
Male	*4*	*2*	*5*	*11*
Experience > 10 years	*9*	*0*	*2*	*11*
Experience < 10 years	*0*	*4*	*5*	*9*
Years of experience (mean)	*30.1*	*7.8*	*10.3*	*18.7*
Number of GP Trainers	*4*	*0*	*3*	*7*
Rural practice	*3*	*1*	*1*	*5*
Urban practice	*6*	*3*	*6*	*15*

BO, SM, and CG performed a thematic analysis of the transcripts immediately after the first focus group.[26,29] The researchers individually selected quotes related to the research questions from the transcripts, and assigned codes to them. The coding was mainly deductive, based on previous research, although it also allowed debate and the use of new categories.[21,22] This analysis employed the TAMS Analyzer software. Then, a meeting was held to discuss the quotes and the codes that were used. Agreement was reached on the quotes, codes, and certain categories in which the codes were included. In cases of disagreement, ME and ES made the decision.

The Research Committee of the Majorca Primary Care Department approved this study.

RESULTS

We obtained 59 codes after analysis and coding of the transcripts. We grouped these codes into 13 first-level categories, and 4 second-level categories: gut feelings existence and characteristics, influencing factors, consequences, and significance. Table 3 shows the resulting code tree.

Table 3. Code tree

CODE	1st level CATEGORY	2nd level CATEGORY
Rational processes *Added to RP: personal knowledge* *Added to RP: experience* *Added to RP: intuition* *Added to RP: previous experiences* *Uncertainty*	*Diagnostic process*	*PRESENCE AND CHARACTERISTICS OF GFs*
GF existence *Prognostic* *Other actors: patient* *Other actors: nurses* *Other actors: relatives*	*GF existence and characteristics*	
GF name: hunch *GF name: religious* *GF name: smell* *GF name: art of medicine* *GF name: light* *Alarm GF description*	*Alarm GF*	
Reassurance GF description *Reassurance GF utility*	*Reassurance GF*	
Patient aspect *Patient language* *Patient paraverbal language* *Frequentation* *Patient symptoms* *Diseases*	*Patient-related factors*	*FACTORS INFLUENCING THE APPEARANCE OF GFs*
Medical knowledge *Previous experiences* *Years of experience* *Sex* *GP personality* *Costums*	*Physician-related factors*	
Out of hours *Time of the day* *Place* *Workload* *Non face to face*	*Context-related factors*	
Continuity of care	*Continuity of care*	
Body sensations *Thougts*	*Physician symptoms*	*CONSEQUENCES*
Reassurance GF rhytm *Reassurance GF avoid redundancy* *Reassurance GF discard* *Alarm GF: beginning diagnostic*	*Effects on medical decisions*	

process *Alarm GF: decision making* *Alarm GF: reminders* *Alarm GF: doubts about beginning* *Alarm GF followed? (good job)* *Alarm GF not followed (bad feelings)*		
Value *Value for primary care* *GF reassurance value*	*Value*	*SIGNIFICANCE*
Efective *Mistakes* *Memory bias*	*Accuracy*	
No teachable *Teachable personality* *Trainer experience* *Transmission* *Sayings*	*Teaching*	

GP: General practitioner.
GF: Gut feeling
RP: Rational process

Presence and characteristics of gut feelings

The GPs in our study recognized that GFs had a role in the diagnostic process, and that GFs led them to make decisions that were not entirely scientific. They describe GFs as something that makes them feel concerned about a patient, without any objective evidence.

There must be something that leads us to make decisions with no basis or foundation. There must be something. This can't be something that is generated spontaneously. (FG1/9)

A hunch, a feeling, it's something you think with no clinical suspicion, with no hypothesis. There's something that "doesn't fit" in this patient. Something that can't be answered. If someone were to ask you why something doesn't "add up", you wouldn't even dare to tell them why. (FG2/10)

GPs use GFs, in addition to the scientific diagnostic reasoning process that they learned during their years at medical school and specialty training. GFs emerge during the diagnosis process, and are influenced by the GP's personal knowledge of patients, clinical skills, and previous experiences.

I carry out my scientific procedure -- reason for the visit, history, the interview -- and perform the physical examination. If I think I have to order tests, then I do, but sometimes, something that tells you that ... (FG3/20)

Many GPs repeatedly used the word "*corazonada*" (literally, "heart feeling"), which is defined by the "*Diccionario de Uso del Español*" (2ªEd) as a "vague belief that something

happy or unhappy is going to happen". The GPs frequently depicted their GFs as related to light, with expressions that refer to enlightenment, a bulb, a lantern, or a star.

I don't know, you see it clearly. I don't know why, but a little light comes on here that tells you something's wrong and it's going to get worse. (FG2/12)

They also mentioned expressions related to religion (a Marian apparition, a guardian angel) and the art of medicine.

I don't know if it was a hunch, but I always think that the Virgin Mary appeared to me that day. (FG2/2)

Nobody explained to me what the art of medicine was, but it reminds me of this. (FG3/18)

The interviewed Spanish GPs distinguished two kinds of gut feelings: a sense of alarm and a sense of reassurance. The sense of alarm appears when something "does not add up", so the GP has the feeling that -- even without a clear diagnosis -- a patient is or will become seriously ill.

A completely normal analysis. The physical examination is completely normal, she has an ultrasound scan from a week ago that is completely normal, and yet I have the feeling this lady is progressively deteriorating. (FG3/20)

A sense of reassurance is when the GP, even in the presence of symptoms that may suggest a serious condition, has the feeling that nothing serious will happen.

Suppose you see a patient with a cough, a temperature, and side pain. Well, any medical student already knows what the patient has, doesn't he? Well, you examine the patient because there is a medical routine you must follow, but you very often say, "I know they don't have pneumonia, I know they don't have it." (FG1/2)

The GPs in our study attached great value to the sense of reassurance provided by GFs. They said they perceived reassurance more often than a sense of alarm. This sense of reassurance allows them to quickly discriminate potentially mild from serious diseases, and helps them cope with their daily workload.

And I think it's more this feeling than most of the others. You have a stronger feeling that this is right in twenty patients. On the other hand, with one or two, you find yourself saying, "Let's see what's up". The feeling of reassurance you have is fairly high. We work in uncertainty every day, and to be able to have this feeling of reassurance and to go home and rest easy ... (FG2/13)

The Spanish GPs in our study regarded GFs as being more related to prognosis (the severity of a patient's condition) than to an exact diagnosis.

The idea is, not so much making a diagnosis, but being able to discern whether the patient might have something serious or not. (FG1/6)

GPs also recognize the existence of GFs in other health professionals who care for their patients. They pay attention to nurses' GFs, and give more credibility to more experienced nurses.

I also believe very much in a nurse's feelings or intuition, who very often tells you "That patient, I don't know what they have, but they don't look right", and then I quickly take care of the patient. (FG2/13)

The GPs also mentioned that patients and their relatives also have GFs that could influence their own feelings and decisions.

If there's a person who is in his fifties, and one day he gets up and says he feels dizzy, and his wife, who has known him for ages, says "It's the first time in his life he's had dizziness", then you're going to attach importance to that, and it's going to awaken that gut feeling in you. (FG3/19)

Factors that influence appearance of GFs

Numerous factors are linked to the onset of GFs, and these factors are related to the patient, the physician, the context in which the consultation occurs, and the existence of a previous doctor-patient relationship.

Patient-related factors

The GPs in our study mentioned the external appearance of a patient, and the patient's gestures and paraverbal language as triggers for their GFs.

I think sometimes it's not the verbal language, it's the tone of voice they have. The paraverbal language of the body, which I suppose is not done consciously, but you must interpret. And it gives you certain information. (FG2/11)

Use of health services is another factor related to GFs in GPs. Patients who visit doctors less frequently are more likely to elicit a sense of alarm in the GP. Even the number of active episodes in the electronic medical record may have an influence.

There are patients who hardly ever come to see the doctor. And, well, when they come with an appointment and they mention, "the fact is I don't feel too good", you have the

feeling that they must be ill, because they rarely come, and when they do come, it's because something's wrong. (FG2/13)

When a patient presents with diffuse symptoms, such as thoracic or abdominal pain, or cough and headache, the physician is more likely to rely upon GFs. This also happens when a patient presents with anxious-depressive symptoms that could mask an organic disease. GPs also mentioned the presence of GFs when a patient presents with symptoms that may suggest serious diseases, such as cancer or pulmonary embolism, even in the absence of "red flags".

A serious pathology, and also slightly diffuse symptoms … With a pulmonary embolism, I remember seeing two patients and saying, "How did I get it right otherwise …?" (FG1/4)

By her aspect, how her character has changed the last months. She used to come alone, and she now comes with her daughter and her husband. Very worried ... And I have the feeling that she may have a cancer. (FG3/20)

Physician-related factors

The GPs in our study thought that, although even young doctors and trainees have GFs, professional experience is a crucial factor in having and attaching importance to GFs. Most of the GPs declared that they have had GFs since beginning their medical careers. But over the years, the memory of past experiences has made them more sensitive to GFs.

There's something that has turned on the light … a prior experience of having had similar events, or that reminds you of something. (FG1/9)

I think it's the years, although I'm not sure. The fact is, I don't know. When I began, I think I also had intuitions … (FG1/5)

Medical knowledge is also an important factor. GPs who know more have more confidence in their GFs. Both experience and medical knowledge develop in parallel with the credibility of GFs.

*If you study a lot when you are R5 (*first year after completing GP training*) you can work it out. And if you don't study a lot, well, with 23 years of experience you have studied it in patients you have seen. In the end, it's knowledge. (FG3/17)*

The GPs we interviewed did not think that a physician's gender had a significant influence on having and trusting GFs. Instead, they thought that a physician's personality, regardless of gender, plays a more decisive role.

There are some doctors who are more sensitive to gut feelings, and others who are less sensitive to gut feelings. Perhaps this is due to personality differences. (FG3/17)

Context-related factors

GFs may appear during regular consultation times, or during after-hours consultations. The GPs in our study reported that night consultations were more likely to generate GFs. Furthermore, consultations at night in a rural environment had a greater association with GFs.

It's not the same. Someone who comes in calmly at ten o'clock in the morning and someone who comes in at twelve o'clock at night … In the villages, normally if they call you at night it's trouble. They don't call unless there's a good reason. If they call you at three in the morning, it's because they really need help and you can start to run. (FG2/11)

The GPs reported having fewer GFs in emergency rooms due to the different approach to patient care in that environment. GPs work in emergency rooms in Spain, and many patients are referred by their GPs, so there is an initial "filter" that indicates to the physician that there is a greater chance of serious disease.

I think that in a hospital, there are much fewer gut feelings, because they've gone through our "filter" and they arrive there, and everything is cut and dry … If you've reached here, it's because the suspicion is already there, and my job is to carry on the chain. (FG3/19)

Moreover, as a GP's workload grows, there are fewer GFs and it is more difficult to pay attention to them. Regardless, it is still possible to have GFs, and many doctors reported remembering having a sense of alarm in the middle of an overloaded working day.

If you're seeing a load of emergencies, you're going as fast as you can, and the GF threshold might rise. Some things get past you, which, with more calm, you might have realised. It's happened to me, seeing emergencies, about to close the health centre, five people waiting, and suddenly with one of them you say… (FG3/19)

Although GPs mainly focus on face-to-face consultations, we asked them about GFs in non face-to-face consultations. They reported it was also possible to have GFs from telephone consultations, especially if they knew the patient.

A call from a patient saying, "I'm out of breath", and you know they aren't out of breath. Or the other way round, just by hearing the voice you know you have to see the patient because something's wrong. It makes a difference if you know them. (FG3/20)

Continuity of care

Continuity of care is an important characteristic of primary care, and also affects GFs. Knowing the patient, the social and family context, and the previous medical history and attitudes are crucial when attending a new episode. Spanish GPs in our study used knowledge provided by continuous care to quickly determine whether a patient had a serious disease.

You're lucky enough to have known this person from before. You already know them, and as soon as they come through the door, you begin to get some clues. (FG1/4)

(You know) a person who comes, who goes, their grandchild, the other, you've known them for fifteen years and you see they don't look right. But that's because you know them … That's one of the advantages of family medicine: continuity. (FG3/17)

Consequences of GFs

The GPs in our study reported physical sensations when they had GFs. They hear bells ringing, they perceive a bad odour related to the situation, and they have bad bodily sensations.

This idea happened to me, and for a while I had a weird body sensation. (FG1/9)

There are people who, just when they enter the room, you say it smells like a neoplasia. And they still have not said anything. (FG1/4)

The GPs reported that a "sense of alarm" is one of the tools used to initiate the diagnostic process. They sometimes have doubts and try to rationalize them, but most of the time they follow this "sense of alarm".

If there's something that doesn't fit, that patient is different to another one, and that's why I'm more concerned. And I try to get to the bottom of it. (FG3/15)

When a sense of alarm is considered, the physician has a feeling of a job well done. When it is not considered, the GP remains restless.

Sometimes you have intuitions, but you don't always follow them. That is, sometimes you do, and when you follow them and you're right, that's great. And sometimes you don't, and you get left with a feeling like … you're left feeling angry. (FG1/9)

In these cases, the GPs take advantage of their closeness to the patient and the continuity of care, and try to be attentive to patient evolution.

Then you start looking. And if that patient doesn't come back, you look and see if they've had an emergency. Or you give them a call. I've done that, yes. The thing is, just the other day … I did that … (FG1/5)

A sense of reassurance helps doctors to balance their decisions, adopt a wait-and-see attitude, and avoid excessive use of tests and treatments. The GPs usually felt comfortable following their sense of reassurance. Again, the possibility of further contact with the patient is a safety measure.

As you know, you can see them the next day or in three days' time, or even give them a call. You use this feeling of reassurance so as not to carry out tests you think are not appropriate. (FG1/2)

Significance of GFs

The GPs reported that GFs were important for certain diagnostic tasks.

I think we always attach value to these intuitions. (FG1/6)

In fact, GPs regarded GFs, especially the sense of reassurance, as a characteristic of primary care as opposed to hospital care. GPs are used to working with a high degree of uncertainty, and tend to avoid over-testing, because it may unnecessarily upset the patient and increase the cost of care.

We have to work like that, because if we don't, all forty of the people who come in through the door. If you do all the tests every day … This is the way we work in primary care. Making decisions depending on what you know about the patient. Today, they come in looking bad … It's got nothing to do with the way you work in a hospital, basing absolutely everything on tests. (FG1/9)

There are some doubts about the diagnostic accuracy of GFs. As mentioned above, GPs tend to follow their GFs, but they are also aware that their GFs may be wrong. When recalling previous successes and errors, there is a bias to better remember successes than failures.

That gut feelings exist, I believe they exist. But I can't tell you if I get it right very much. (FG3/18)

GPs who train residents reported it was difficult to teach about the value of GFs. But they also said they should try to teach residents about GFs. Afterwards, students and trainees may learn to pay more or less attention to their own GFs, depending on their personality. Young GPs agree that GFs are usually considered when discussing a case, even if not directly acknowledged.

I think the resident can be helped to develop them, and put them into practice. Not teach them or have them, because that does depend on your personality. (FG3/19)

The main way to help students and trainees take advantage of their GFs is by increasing the experience of GFs. GP trainers advocate the use of clinical cases for this purpose.

If you teach the resident from the start with clinical cases, you're increasing their experience. You have knowledge at the bottom of the "hard drive", and you use it unconsciously. With training based on clinical data, you put more and more information in there. (FG3/17)

DISCUSSION

The Spanish GPs in our study recognized the existence of GFs in their own diagnostic processes. In particular, they recognized two kinds of gut feelings: a sense of alarm, when something does not fit in the patient; and a sense of reassurance, the feeling that nothing serious will happen. The two factors with the strongest influence on the appearance of GFs are continuity of care in the patient-physician relationship, and amount of professional experience. The GPs in our study attached great value to their GFs, and considered them an important tool for carrying out their tasks, and even one of the main characteristics of working in a primary care setting. The GPs that we interviewed said that GFs cannot be directly taught during training, but the notion of GFs and their relevance can be transmitted to students and trainees. The GPs felt comfortable about considering their GFs during diagnosis, but were unsure of their accuracy. Thus, the GPs considered GFs as one of the tools available when deciding whether to begin a diagnostic process or to adopt a wait-and-see attitude. Figure 1 summarizes the main discourses around GFs and how factors related with GFs appearance, and the relevance given to them influence the diagnosis process.

We found no effect of gender or previous medical experience on the discourses of the GPs we examined. In fact, all the GPs in our study had experienced GFs during their work. Experienced GPs had more confidence in their GFs than less experienced GPs.

The results of our study are similar to those of previous research of GPs conducted in the Netherlands and France, in terms of recognition of the existence of GFs and their typology. Previous qualitative research reported the idea of GFs as the GP being worried (sense of alarm) or not (sense of reassurance) about a patient's prognosis, even in the absence of objective findings, and the role of GFs on whether to initiate the diagnostic process or a specific treatment. However, we found some small differences in Spanish GPs. Spanish GPs reported feeling cautious about the sense of reassurance provided by GFs, and although they usually follow their GFs, they remained alert to the resolution of the case. The GPs in our study referred to the sense of alarm from a GF more as a trigger for the diagnostic process than as a need for management. In this latter aspect, they are more similar to French GPs than Dutch GPs. As previously noted, the longer tradition of research and acceptance of GFs in the Netherlands than in France and Spain might explain these differences.[23]

Our use of a focus group study enabled us to select physicians with the characteristics we wanted. We found a wide consensus among GPs who had different years of experience, gender, teaching profiles, and practice locations. Saturation of information was quickly reached. Although our research was performed on the island of Majorca, where the languages of Spanish and Catalan coexist, we believe the GPs interviewed in our study are representative of Spanish GPs. Physicians and patients use both languages in most practices. The organization of medical practices and GP traineeship is very similar throughout Spain. There is no School of Medicine in Majorca, so GPs working in Majorca have all studied medicine elsewhere in Spain, and have the same medical culture as residents of the Spanish mainland. The GPs that we interviewed, and GPs in general, who work in the Majorca Primary Care Department, are born and raised in almost every region of Spain and Spanish-speaking South American countries.

The primary care environment has many uncertainties, and quick decisions are often necessary. These decisions must balance concerns about patient outcomes with avoiding unnecessary and expensive tests and treatments. Thus, experienced GPs may use their GFs as a tool to cope with the many different situations that have multiple possible outcomes and solutions. Concerning the issue of teaching GFs, the GPs in our study reported it is important for students and residents to become familiar with the use of GFs in clinical practice. To increase their expertise and develop more accurate GFs, techniques such as clinical cases and

scenarios may be used, as recommended in the literature on the teaching of intuition and expertise in medical training.[30]

The results of this study suggest the presence of GFs in Spanish doctors, and our findings are in agreement with studies of doctors from elsewhere in Europe. Future research on the GFs of doctors in Spain should seek to evaluate their diagnostic accuracy. As Spanish GPs have a similar GF to the Dutch concept where the Gut Feeling Questionnaire originates, we can proceed to translate and make the linguistic validation of the Gut Feeling Questionnaire to Spanish, and use it to determine the presence and accuracy of GFs. In the few quantitative studies conducted on GPs' suspicion of cancer or serious illness after a consultation, the negative predictive value of suspicion was high and the positive predictive value was moderate, but these were comparable to the predictive values of the main "red-flag" symptoms.[15] Once we know the diagnostic accuracy of GFs, it may be possible to develop and assess teaching strategies.

CONCLUSION

Spanish GPs in our study recognized the presence of GFs during the diagnostic process. There were two main types of GFs: a sense of reassurance and a sense of alarm. The former is more common, but both are useful for discriminating between patients according to disease severity, an important goal in primary care. The GPs reported that clinical experience, duration of the patient relationship, and frequency of patient contact were the main factors related to recognition of GFs.

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Competing interests

The authors have no competing interests to declare.

Authors' contributions

This study was conceived and designed by BO, SM, and ME with support from ES. Focus groups were organized by BO, SM, and ME. BO, SM, and CG conducted the analysis. BO

led the writing, and was guided by SM and ME, with additional comments from ES. All authors read and approved the final manuscript.

Ethics

All interviewed GPs participated voluntarily. They were asked for consent to record their interviews and to use the transcripts. The study was evaluated and approved by the Majorca Primary Care Department Research Committee.

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Data sharing statement

Full transcripts of the focus groups and quotes and authorization of the study are available by email from the corresponding author.

Figure 1 legend: Factors and significance of gut feelings among Spanish GPs

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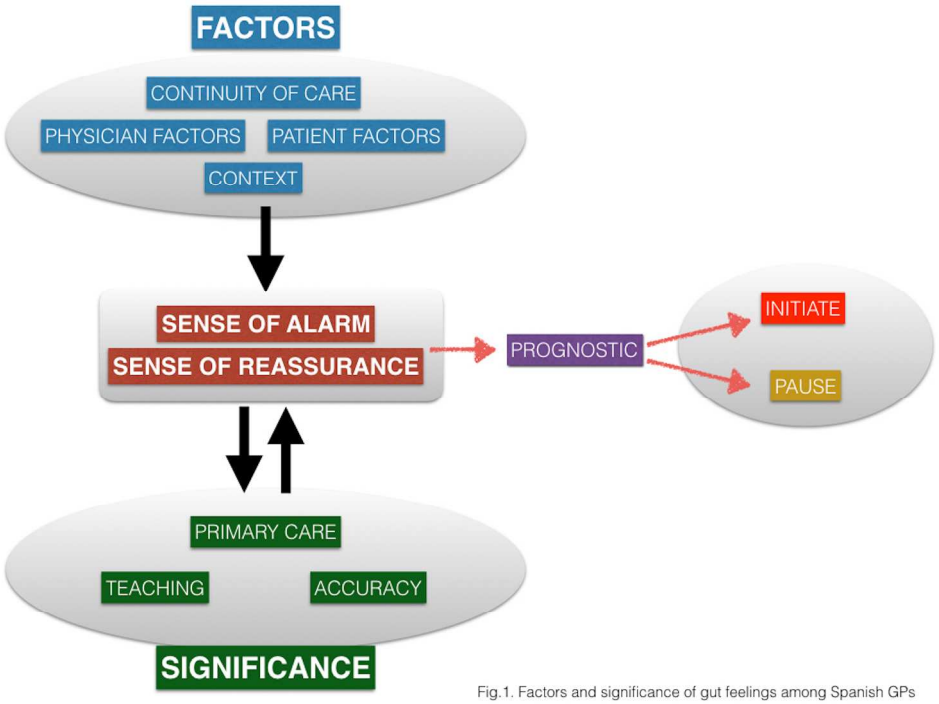

Fig.1. Factors and significance of gut feelings among Spanish GPs

Factors and significance of gut feelings among Spanish GPs

361x270mm (300 x 300 DPI)

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No	Item	Guide questions/description
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.	Interviewer/facilitator	Which author/s conducted the interview or focus group? *Bernardino Oliva-Fanlo, Sebastià March, Magdalena Esteva* *Page 6*
2.	Credentials	What were the researcher's credentials? *E.g. PhD, MD* *Bernardino Oliva-Fanlo MD* *Sebastià March BS, MSC* *Magdalena Esteva MD, PhD, MSC* *Cristina Gadea-Ruiz MD* *Erik Stolper MD, PhD*
3.	Occupation	What was their occupation at the time of the study? *Bernardino Oliva-Fanlo GP* *Sebastià March researcher* *Magdalena Esteva researcher* *Erik Stolper GP, academic* *Cristina Gadea-Ruiz GP* *page 1*
4.	Gender	Was the researcher male or female? Three males, two females page 1
5.	Experience and training	What experience or training did the researcher have? *Bernardino Oliva-Fanlo MD, qualitative research formation* *Sebastià March BS, qualitative research formation* *Magdalena Esteva MD, PhD, qualitative research formation* *Erik Stolper MD, PhD, qualitative research formation* *Cristina Gadea-Ruiz MD, qualitative research formation* *Page 6*
Relationship with participants		
6.	Relationship established	Was a relationship established prior to study commencement? *The participants are GPs from the Majorca Primary Care Department, as two of the researchers.* *Page 6*
7.	Participant knowledge of the interviewer	What did the participants know about the researcher? *Some of them different degress of personal knowledge, interest in researching* *Page 6*
8.	Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? *Reasons and interests in the research topic, part of his PhD* *Page 6*
Domain 2: study design		
Theoretical framework		
9.	Methodological orientation and Theory	What methodological orientation was stated to underpin the study? *Thematic content analysis* *Page 8*
Participant selection		
10.	Sampling	How were participants selected? *Purposive sampling* *Page 6*
11.	Method of approach	How were participants approached? *By phone and email* *Page 6*
12.	Sample size	How many participants were in the study? *20* *Page 8*
13.	Non-participation	How many people refused to participate or dropped out? Reasons? *Twelve could not cooperate because they were absent from Mallorca the day of the meeting.* *Four dropped out. There were a fire in the health center the day the second group was scheduled. Four of the participants thought the group was suspended.* *Page 6*
Setting		
14.	Setting of data collection	Where was the data collected? *Two primary care practices from Majorca* *Page 6*
15.	Presence of non-participants	Was anyone else present besides the participants and researchers? *No* *Page 6*

16.	Description of sample	What are the important characteristics of the sample? *Representative regarding gender, experience, GP training dedication, rural/urban practice* *Pages 6 and 8*
Data collection		
17.	Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested? *There were a scenario to introduce the issue and questions prepared in case some issues don't arise during the meeting. No other guides were provided to the participants.* *No pilot tested.* *Page 7*
18.	Repeat interviews	Were repeat interviews carried out? If yes, how many? *Three focus groups* *Pages 6 and 8*
19.	Audio/visual recording	Did the research use audio or visual recording to collect the data? *The groups were audiorecorded* *Page 6*
20.	Field notes	Were field notes made during and/or after the interview or focus group? *Yes* *Page 6*
21.	Duration	What was the duration of the interviews or focus group? *60-70' each group* *Page 6*
22.	Data saturation	Was data saturation discussed? *Yes* *Page 8*
23.	Transcripts returned	Were transcripts returned to participants for comment and/or correction? *No*
Domain 3: analysis and findingsz		
Data analysis		
24.	Number of data coders	How many data coders coded the data? *Three* *Page 8*
25.	Description of the coding tree	Did authors provide a description of the coding tree? *Table 3* *Page 9*
26.	Derivation of themes	Were themes identified in advance or derived from the data? *Themes were derived from the data* *Page 10*
27.	Software	What software, if applicable, was used to manage the data? *TAMS Analyzer* *Page 8*
28.	Participant checking	Did participants provide feedback on the findings? *Not until the study is published*
Reporting		
29.	Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? *Yes. The quotations are identified with the group and number of participant* *Pages 10-17*
30.	Data and findings consistent	Was there consistency between the data presented and the findings? *Yes*
31.	Clarity of major themes	Were major themes clearly presented in the findings? *Yes* *Pages 10-17*
32.	Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes? *Yes* *Pages 10-17*