

Understanding laboratory testing in diagnostic uncertainty: a qualitative study in general practice

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SUMMARY

Background: Better knowledge of the professional's motives for ordering laboratory tests in the case of diagnostic uncertainty may lead to interventions directed at reducing unnecessary testing.

Aim: To gain insight into the general practitioner's (GP's) motives for ordering laboratory tests for patients presenting with unexplained complaints.

Design of study: Semi-structured interviews based on surgery observations.

Setting: Twenty-one general practices in rural and urban areas of The Netherlands.

Method: Investigation of the GP's perception of determinants of test-ordering behaviour in the situation of diagnostic uncertainty. The interviews were structured by evaluating the consultations and test-ordering performance of that day.

Results: Dutch GPs vary considerably in their motives for ordering tests. Numerous motives emerged from the data. Some examples of important themes include: personal routines; tolerance of diagnostic uncertainty; time pressure; and tactical motives for test ordering. Complying with the perceived needs of the patient for reassurance through testing is seen as an easy, cost- and time-effective strategy. A clear hierarchy in the determinants was not found.

Conclusion: The decision to request laboratory testing is the result of a complex interaction of considerations that are often conflicting. Designers of interventions meant to improve the ordering of tests should be aware of the numerous determinants, and take contextual variables into account.

Keywords: physician's practice patterns; routine diagnostic tests; diagnostic uncertainty.

Introduction

FOR a long time there has been a discussion on the potential effects of tests ordered for patients with mild, probably self-limiting, complaints. From the perspective of evidence-based medicine, testing may be called 'superfluous' if the test results do not influence the medical decision-making process, and the general practitioner (GP) would have had the same management with or without the test result. 'Superfluous' testing carries the risk of false-positive outcomes and may increase the risk of somatisation by labelling healthy persons as unhealthy, which in turn leads to a cascade of unnecessary interventions.¹⁻³ In addition, it raises the costs of health care.

In particular, many laboratory tests are requested for patients with unexplained complaints,⁴ such as fatigue, dizziness, and headache (a complaint is unexplained if the GP cannot decide on a specific diagnosis after adequate history taking and physical examination and after consideration of the patient's psychosocial context). As the incidence of serious disease is low in the general practice population, it is generally accepted that most of these tests are superfluous from a medical point of view. In an attempt to stimulate rational use of testing in these situations, the Dutch College of General Practitioners (DCGP) developed a guideline for laboratory testing for patients presenting with unexplained complaints, advocating a 'watchful waiting' attitude towards blood tests.⁵ Despite the publication of this guideline, test-ordering behaviour in The Netherlands appears to be unchanged. Perhaps GPs have urgent motives that stop them from adhering to the guideline. Insight into the motives underlying the test-ordering behaviour is a prerequisite to generating ideas for interventions meant to improve test ordering.⁶⁻⁸

Non-medical determinants for test-ordering behaviour in general have already been sought in quantitative studies. For example, it was found that GP characteristics, such as age or working experience, number of working days per week, or type of reimbursement (fee for service) did have an influence on the amount of tests requested.⁹⁻¹¹ The patient's social class¹² and insurance coverage type¹³ seem to influence the volume of tests ordered. Organisational factors, such as the logistics and layout of the request form, do have an influence.⁴ However, both positive and negative relations with the number of tests ordered were shown, and only a minority of the variations in laboratory utilisation were explained by the variables used in the analyses.

This study was carried out to investigate GPs' motives underlying test-ordering behaviour in cases of diagnostic

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HOW THIS FITS IN*What do we know?*

From quantitative studies, several non-behavioural related determinants of test-ordering behaviour in general are described.

*What does this paper add?*

This study adds a qualitative investigation of the general practitioner's perception of determinants of test-ordering behaviour in the situation of diagnostic uncertainty. The determinants are reported in a model, which may be used as a tool for developing and focusing strategies for quality improvement.

uncertainty, and to answer the question: which factors do GPs mention as influencing their decision to request laboratory testing when they are confronted with patients with unexplained complaints?

Method*Participating GPs*

The aim of the study was to elicit as many relevant factors influencing the test-ordering behaviour as possible. In the sample of physicians, therefore, the doctors' characteristics were varied as much as possible. For example, a GP with a divergent, multicultural practice population, and a GP with a special interest in complementary medicine, were actively invited to participate. General practitioners were recruited over the years 1998 and 1999, both in the north-western, urban part of The Netherlands, and in the southern, predominantly rural, part. General practitioners of different ages, with varying work experience, and of both sexes, were recruited (Table 1). The GPs were informed that the purpose of the study was to gain insight into their decision-making process with regard to the ordering of tests, not to judge or criticise practice.

Observations

One of the authors was present during the consulting hours of the participating GPs and introduced to the patients as a researcher from Maastricht University. The purpose of her presence was explained, and a guarantee of anonymity was given. Detailed notes on a pre-structured form were taken of all consecutive patient contacts during the observed consultation hours. The notes concerned the reason for encounter, history taking and physical diagnostic examination, and the actual decisions about diagnostic management.

Interviews

The semi-structured interviews were conducted by one of the authors in the surgery, immediately after the consulting hour. Each interview consisted of two parts. In the first part, all patients seen in the previous consulting hour were discussed with regard to the ability of the GP to give a specific diagnosis. Patients were discussed in the same order as they had consulted, using the detailed information in the notes taken by the observer. All patients without a specific diagnosis were discussed, with the focus on the GP's motives for the decision whether or not to request laboratory tests. In the second part of the interview, motives for ordering tests were questioned more generally.

Analyses

The interviews were audiotaped and transcribed, then they were read and coded by two of the authors independently of each other, according to the grounded theory on qualitative content analysis.¹⁴ Differences in coding were solved through discussion. Re-reading of the transcripts and ongoing discussion between the researchers led to a reduction of categories, and major themes were retained and refined. The qualitative analyses were executed by using the software programme NUDIST. Saturation in the determinants was found after 12 to 14 interviews. Therefore, in the final set of interviews the GPs were asked for their opinion on the existence of a hierarchy in the reported motives.

Table 1. Characteristics of the 21 participating GPs.

	Study population	Dutch GPs ^a (%)
Mean age (SD, range)	49 (7, 36–62)	–
Age categories (%)		
<40 years	14	21
40–50 years	38	45
>50 years	48	35
Mean number of years of experience (SD, range)	18 (8, 6–30)	–
Male sex, absolute number (%)	17 (81)	74
Mean number of patients (SD, range)	2325 (455, 1500–3100)	–
Type of practice in absolute numbers (%)		
Single-handed	5 (24)	42
Two-handed	9 (43)	33
Group	7 (33)	25
Urbanisation (absolute numbers)		
Urban	10	–
Semi-urban	5	–
Rural	6	–
Working factor % (range)	90% (60–100)	88

^aDutch Institute for Research in Health Care (www.nivel.nl). SD = standard deviation.

After finishing the content analysis, the 'attitude-social influence-efficacy' model was chosen to categorise the determinants of test-ordering behaviour.¹⁵ The model, which is usually applied to describe determinants of patient behaviour, is an integration of social psychological models.¹⁶⁻¹⁸ The assumption is that behavioural intention is determined by attitudes (cognitions and beliefs), perceived social influence, and self-efficacy expectations (Figure 1). These categories may all be modified by external variables.

Results

Response of GPs and patients

Twenty-one GPs were recruited. Only a very few patients did not give permission for observation during the consultation. The exact number was not registered, but it was less than 1% of the consultations. The total number of observed patient contacts was 567. A mean of 27 patient contacts per GP (SD [standard deviation] = 15.6, minimum = 7, maximum = 65) was observed. According to the GPs, there was diagnostic uncertainty in 13% of the consultations on average.

Factors that influence the decision to order tests for patients with unexplained complaints

In the model the external variables were subdivided by the micro (practice) and macro (society) organisation in which the health care is being delivered (Figure 1). The attitudes category consists of GP-related factors, the social influence category comprises factors related to the interaction between GP and patient or between GP and colleagues, and the self-efficacy category covers factors related both to the GP and to the context of the consultation. A clear hierarchy in the determinants was not found.

External variables related to the context of the consultation or the societal setting

This included time pressure; for example, during busy Monday mornings or Friday afternoons, or when the surgery is running late and many more patients are waiting. Requesting a laboratory test is a quick and efficient way to finish the consultation, a non-verbal means of signalling the end of the consultation.

'If you had the time to do a thorough history-taking of all these people ... Their basic complaints, roughly their life circumstances. People would say "I think I've been well understood, listened to, and examined", and need far fewer further investigations. But that is much too time consuming.' (GP 4.)

Availability of technology; for example, desktop test devices in the practice, makes it easy to perform testing. Travelling to the laboratory means a burden for the patient. Another trigger is the situation in which the patient is already being sent for another test to the diagnostic centre, which creates a low threshold for doing more testing. In general, blood tests are not expensive. The costs are relatively low compared with other tests. So why not?

'But then I think, goodness, someone takes his car to the garage twice a year for a service. If I look around ... in our society. Money's being spent in all directions, why can't I just once do some blood tests for someone to set his mind at rest. Even if this is not rational. Setting people's minds at rest is very important.' (GP 2.)

Defensive medicine owing to the societal tendency towards juridical claims is another reason. Some GPs are

External variables		
The practice organisation + time pressure, lack of time + availability of technology	Societal perspective + not expensive, so why not? + societal tendency towards juridical claims + lower threshold for consulting a physician	
Category 1: attitudes General features of the GP (cognition and beliefs)	Category 2: social influence The interaction between GP and others (social norms, pressure, support, modeling)	Category 3: self-efficacy GP's expectation regarding capability to perform the desired behaviour
Cognitions: +older patient +alarming somatic symptoms - fear of overtreatment or insurance trouble Misconceptions: +value of tests overestimated +once-in-a-lifetime finding Uncertainty: +difficult to handle insecurity +small error tolerance Wish to comfort patients: +'empty hands' feeling	Social influence from the patient; +assertive patient +prejudice on the patient's desire for reassurance +worried patient, the patient needs to be reassured +long-term relationship with patient +realistic patient +'magic action', laboratory testing as a ritual Social influence from the profession: +influence of specialist - insight into test-ordering behaviour	Perceived capability/skills: - high physical diagnostic capability - skills in negotiating with the patient +fear of pitfall of somatising patient - ability to reassure oneself - ability in history taking Other factors: +routines +poor condition of GP; e.g. tiredness +tactical motives for testing
+ = positive relation between determinant and test ordering, - = negative relation between determinant and test ordering.		

Figure 1. Determinants of test ordering, factors that influence the GP in ordering tests in patients presenting themselves with unexplained complaints.

aware of legal complications that can arise if diagnostic uncertainty persists for a long time. GPs feel that there is a lower threshold for consulting a physician, or even different pathology, than a generation ago.

'Yes, consumption has gone up considerably and I certainly request more than in the past. Especially in the age group between 30 and 50. There is an increase in presenting these vague complaints. Pelvic instability didn't exist. All the complaints of tiredness, that too I find increasing.' (GP 11.)

Attitudes, general features of the GP

The pre-test chance of a test is higher in older patients, because they have a higher risk of disease. The GPs mentioned 50 or 60 years of age as a turning point in their threshold for test ordering. The GP's threshold for test ordering also decreases if there are alarming symptoms present along with the unexplained symptoms; for example, weight loss. A contrary determinant for test ordering is the fear of overtreatment, of making healthy patients dependent on medicine, and of insurance problems for the patient. Health insurers can use even minor deviations in test results; for example, in a serum cholesterol or X-ray of the spine, to the patient's disadvantage. The diagnostic value of tests was often overestimated by the GPs. Some GPs did not realise that the diagnostic yield is usually nil. It may even lead to the decision-making process being undertaken in the wrong order; for example, doing blood testing first and physical examination later.

'Yes, and then I don't know in which direction I should think. Often I do blood tests first, and then a physical examination. Because I have so few leads, I get the blood tested first. The next time I examine the liver, look at the spleen and listen to the lungs.' (GP 8.)

Some GPs based pre-test probability more on the 'once-in-a-lifetime' finding of an abnormal test result. For example, since an interviewee had found a hypercalcaemia in a patient with fatigue unaccompanied by other complaints or signs over 10 years ago, this GP always included this test, 'because you never know'. The GPs seemed to differ quite a lot in their risk-taking attitude. Some of the GPs found it difficult to handle insecurity.

'I think we have the most difficult job. Let me give you an example. You're sitting there with someone who has a sudden-onset splitting headache, but otherwise you see nothing alarming. Then you start weighing things up. There's a family history of subarachnoidal bleeding. So I'm sweating there wondering whether to refer or not. Then the neurologist meets you with a laugh: "It seems to me to be just hyperventilation, but a CT scan has been planned anyway." Now this man doesn't have to think about it anymore. A CT scan for an acute headache. Even if the pre-test chance is 0.01. He does it anyhow. They have much more certainty than we do.' (GP 6.)

Some GPs experience small error tolerance because of

recent medical blunders.

'If you're way off the mark ... Then you really feel it in the pit of your stomach. Goodness, it did come out in the end. Naturally the patient says, "... you always said that nothing was wrong." Then I feel just so big [indicates preschool child height].' (GP 5.)

'If you've ever experienced something like that, you can be sure that you'll send patients with vague complaints for further testing much faster. Absolutely.' (GP 2.)

Some GPs mentioned their frustration at not being able to offer the patient something useful, at the feeling of empty hands, owing to the lack of a diagnostic or therapeutic plan for patients presenting with unexplained complaints. A test request symbolises a serious attempt to deal with the patient's complaint.

Social influence, the interaction between the GP and others

The GP may experience pressure from the assertive patient, who readily and actively asks for testing. On the other hand, if the patient spontaneously states, 'I think it is nothing serious', and does not ask for testing, the GP is more likely to wait before ordering tests. The GP may assume that another patient has a strong desire for reassurance by testing.

'Sometimes you can have wrong expectations yourself. Sometimes you think that this patient will definitely want an X-ray, and then, no. And then I say that I haven't found anything, and they are then, to my surprise, reassured.' (GP 4.)

The worried patient needs to be reassured.

'This young woman of 21 years old. Her father had got severe rheumatism at a young age. Now she had problems with her feet and arms, morning stiffness, pain in the joints. But there was no redness, no swelling, wasn't warm, functioning was good. But she was still uneasy. I had to confirm this to her with a blood test, otherwise the discussion would go on and on. She had been having relationship problems for a few months, which played a role. That did explain part of her uneasy feeling.' (GP 7.)

The GP is conscious of the long-term relationship with the patient owing to continuity of care.

'The specialist can be very brusque, he can say, "Yes, Miss, this is not for me, go back to your GP." The specialist can botch it up. But the GP lives in the community, has to continue caring for the patient. If you really mess things up, so that the patient switches to another doctor, that's what affects me.' (GP 5.)

The GP will more readily opt for ordering tests when the patient is 'realistic', and known to have a realistic view on complaints or to have a low medical consumption. On the other hand, with easily worried frequent attenders or soma-

tising patients, the GP will be more cautious about ordering tests. Laboratory testing is regarded as a trustworthy ritual or 'magic action' by the patients. Many patients have a greater belief in technological medicine than in history taking and physical examination.

'Blood testing is naturally part and parcel of the treatment ritual, a somewhat magical technology, which makes people willing to take the next step, willing to begin thinking about themselves.' (GP 11.)

The GP may experience pressure from specialists, e.g. the specialist who has been consulted excludes disease but suggests focusing on other organ systems.

'Yes. If the neurologist had written, "There's nothing the matter" ... But how must I say "you have to accept it" if the neurologist says that perhaps the patient should be looked at by someone else.' (GP 7.)

The GP may, moreover, experience pressure from colleagues following analysis into test-ordering behaviour. The GP who has a higher rate of ordering tests than average may be willing to change this behaviour through modelling by feedback with comparison data from GP colleagues.

'If I get a letter from the diagnostic centre with the comment "You request 10% more than the average GP in Maastricht", then you get critical. You wonder if we should wait a bit longer with this patient.' (GP 14.)

Self-efficacy — the GP's expectation regarding capability to perform the desired behaviour

Some GPs feel insecure about their own diagnostic capability in physical examination.

'I use the PSA test too, but that has to do with my insecurity. Because I don't rate my ability as sufficiently good at present to correctly judge all prostates. I dare not go just on my rectal examination.' (GP 1.)

Some GPs find it difficult to negotiate with assertive patients.

'I don't know, it is one against the other. But I wouldn't know quite what arguments to use if he says, "Doctor, can you give me a blood test?" Still, he who persists wins, he is always put in the right.' (GP 1.)

Some GPs are worrying about the pitfall of minimising risk of disease in patients with phlegm, frequent attenders or somatising patients. Sometimes the GP feels unable to reassure himself and to communicate this feeling. If an atmosphere of insecurity remains during the consultation, and the patient is sensitive to the GP's feeling of insecurity, then they will come back. A positive opinion towards the possibilities of history taking might help in postponing the ordering of tests.

'With tiredness you come up against something of a psy-

chological nature much more often than something somatic. Since my training, I ask much earlier and much more directly. I ask more and more about the inner story, where is someone in his life, in which phase, what is someone occupied with?' (GP 9.)

Certain routines in diagnosis or screening play a role. Most interviewees had their own routines in ordering tests. These routines were mostly a remnant of their medical education, sometimes modified by feedback given by the local laboratory and structured laboratory test-order forms.

'Spinal cord reflexes as I always call them. At a given moment you just got into the habit of a particular routine, and it is very difficult not to tick off certain boxes. I myself think that I ought to do so, but then I think "I'll let it be done just this time, next time not".' (GP 10.)

The physical fitness of the GP was mentioned by many GPs as being an influence on their test-ordering behaviour; for example, they could be tired after working a night shift. If the GP is not fit then there is less enthusiasm for history taking and physical examination, or for informing or negotiating with the patient. Moreover, the feeling of insecurity is triggered more quickly if the GP feels tired. There are also tactical motives for testing; for example, the test request may be used as a compromise in a refusal of a patient's wish; or it may be used to create a somatic excuse, an organic basis, for the complaint, to assist the patient in accepting the complaint.

'He wanted a scan of his head and he wanted other tests too. Because I had refused him the scan, I let him have the other tests. But OK, that isn't as far-reaching, yeah, some blood tests. A scan means one less patient at the neurologist's surgery.' (GP 3.)

'Yes, that's why I've done it. Simply because I think that now for once you can put a line under it. Instead of "it's nothing, there are no abnormalities on the X-ray", the orthopaedist says, "yes, it's logical, the vertebra is turned by about two degrees", or something like that. So the circle is round.' (GP 14.)

Discussion

Main findings

The determinants of test-ordering behaviour in general practice are numerous and both medical and non-medical motives play their role. The decision to request laboratory tests in a situation in which the GP cannot formulate a clear diagnosis is the result of a complex interplay of often conflicting considerations. This study shows clearly that GPs order tests for many purposes in the consultation, and that the non-medical motives may be just as rational and legitimate in the overall context of a particular patient's care than the medical decision making process. The context of the consultation and external factors, such as the practice organisation or society, contribute to the complexity. How all the investigated determinants interact probably remains an individual GP matter, or a matter of the uniqueness of each

consultation. Moreover, it is often difficult to know whether testing is required from a medical point of view, as this in itself seems to be dependent on the attitudes of doctor and patient. This study did not reveal a definite, generalisable list of 'most important factors', or a generalisable hierarchy.

Strengths and limitations

The strength of this explorative study is that real practice was observed, and therefore actual considerations and decisions were critically examined in the interviews. This has two important advantages. First, it is well known that actual patient management in daily practice differs from indirect reports of the care given; for example, in patient record audits, or verbal reports of standardised patients. Secondly, by looking at actual decisions that had been made, the unique character and context of each decision moment was recognised. A limitation is that this is not the complete picture, because this study revealed perceived determinants only. General practitioners may have overestimated the influence of certain determinants, or, vice versa, GPs may not be aware of certain other determinants.

Agreement with the existing literature

Some of the determinants were confirmed in recent studies. Reassurance of the patient and diagnostic uncertainty came forward as positive determinants of test ordering in a quantitative study on blood testing by GPs.¹⁹ The prejudice on the patients' desire for reassurance was described in a study about misunderstandings between doctors and patients for prescribing decisions.²⁰ In a study exploring the factors that influence the GPs' management of somatising patients, comparative feelings of frustration were described. The doctor-patient relationship is complicated by constraints of time, by patients using techniques to influence the GP in order to gain an investigation or treatment, or by the fear of pitfall associated with the treatment of somatising patients.²¹

Implications for future research or clinical practice

For future research, triangulation methods or quantitative validation of these findings might generate a more profound insight. The issue of defining appropriateness in general practice needs further research. In general practice, the low incidence of serious disease, the vagueness of early presentation, and the importance of non-diagnostic considerations make the traditional diagnostic model harder to apply. The question is whether blood tests are effective at reassuring patients without unintended adverse consequences.¹⁹

For clinical practice it can be said that GPs probably profit by having insight into their own (non-evidence based) routines, and from training in tolerating diagnostic uncertainty. The difficulty in general practice is that the GP must at the same time recognise the complaint and take the patient's symptoms seriously, and help the patient to focus on healthy, positive findings. An important skill for GPs is to identify the strategies whereby patients influence their own clinical decisions, and to respond to these strategies in ways that reflect patients' needs rather than their requests.²² It might help if GPs could have a tool at their disposal to pre-

vent the 'empty hands' feeling in the situation in which they want to delay test requests for a couple of weeks. Such a tool could be designed in various formats; for example, as patient education leaflets, decision aids for the patient, as a diary for the patient to register the course of the complaint, or as a prescription for relaxation exercises. Perhaps a 'delayed' diagnostic request form can be an effective tool, to be lodged at reception and collected by the patient if the complaint persists for more than a week.²³

This study revolves around the conflict between rationalising work (the application of evidence-based guidelines) and patient-centred work (the practice of consultation). It is evident that this conflict cannot be totally solved. Guidelines should not restrict the GP too much, and GPs should still have the freedom to adjust to the ongoing flow of contingencies that characterises medical work.²⁴ Designers of interventions meant to improve the ordering of tests should be aware of the numerous determinants. External variables should also be taken into account. No single quality improvement intervention can tackle this complicated problem. However, quality improvers should focus on the determinants that are most attractive and promising from a cost effectiveness point of view.

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