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Research

A qualitative exploration of the motives behind the decision to order a liver function test in primary care

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ABSTRACT

Background The number of tests ordered in primary care continues to increase influenced by a number of factors not all of which are concerned with diagnosis and management of disease. Liver function tests (LFTs) are a good example of inexpensive tests that are frequently ordered in patients with non-specific symptoms. They remain among the most frequently ordered tests despite their lack of specificity yet the full range of motives behind the decision to order an LFT remains unexplored.

Aims To gain an understanding of the family practitioner's (FP) medical and non-medical motives for ordering an LFT and the influence of various social and technical factors on this decision.

Methods We interviewed FPs across six practices who were participating in a prospective study of the efficacy of an abnormal LFT to indicate the development of a serious liver disease. Following content analysis of the data from the semi-structured interviews we used the 'attitude-social influence-efficacy' model to categorise the determinants of test ordering behaviour.

Results Factors influencing an FP's decision to order a test were grouped into two broad categories; the first is 'internal' including expectation of efficacy and general attitude towards LFTs. The second group is 'external' and consists of themes of social influence, tests characteristics and defensive medicine.

Conclusions Whilst our sample acknowledged the clinical use of LFTs such as the routine monitoring of medication and liver-specific diagnostic purposes we also found that social and behavioural reasons are strong motivators to order an LFT and may take precedence over clinical factors.

Keywords: general practitioner, liver function tests, primary care, qualitative study

How this fits in with quality in primary care

What do we know?
The number of tests in primary care continues to increase with considerable burden on resources. Liver function tests (LFTs) are a good example of a non-specific test ordered in high numbers. The range of medical and non-medical motives for ordering liver function tests is little understood.

What does this paper add?
Our qualitative research provides a better understanding of the motives underlying the test-ordering decision of an LFT. Social and behavioural reasons are strong motivators and can take precedence over clinical motives.

Introduction

The numbers of diagnostic tests used in public health systems are increasing in most countries[1] (by 10% per annum in the UK over the last three years).[2] The proportion of tests originating from family practitioners (FPs) is also increasing; requests from FPs accounted for 37.2% of biochemistry tests in 2002, against 41.7% in 2005.[2] Recent estimates in the United States found that family physicians and general internists order laboratory tests in 29% and 38% of patient visits and imaging studies in 10% and 12% respectively.[3]

This reported increase in the quantity of tests ordered could be due to a number of factors; an older population,[4] increased range of tests available,[5] unexplained complaints, increased expectations of patients, and guidelines promoting multiple test use.[6] Increased testing inevitably produces more positive results leading to 'knock on' investigations with consequent financial implications.[4,7] The financial impact is an important consideration when the level of funding is struggling to match the growing demand for healthcare.[8]

For FPs, their motivation for ordering a test can be conceptualised under two non-exclusive categories: technical factors related to the diagnosis and management of disease and social factors. The latter include reassurance for patient and/or doctor, patient expectation, physician characteristics such as age and gender, and maintaining the doctor–patient relationship.[9–11] Guthrie found that non-technical motivations behind blood tests were commonly viewed as relevant by FPs, particularly when used to reassure the patient or the clinician[9] and Van der Weijden *et al* concluded that FPs order tests for many purposes with non-medical motives seen as rational and legitimate.[12]

Liver function tests (LFTs) are a good example of inexpensive tests that we can use to explore the motives around the decision to order a test. LFTs are frequently ordered in patients with non-specific symptoms, such as tiredness or upper abdominal discomfort.[13] They are often carried out when the prior risk of disease is low thereby yielding a high proportion of false positive results. There has been no previous study of FP motivations behind ordering LFTs. Since they remain frequently used despite their lack of specificity our research question was: What are the FP reported medical and non-medical motives and the technical and sociological factors behind the decision to order liver function tests?

Method

Sample

The study group consisted of the Birmingham FPs participating in the Birmingham and Lambeth Liver Evaluation and Testing Strategies (BALLETS) study in England.[13] The BALLETS study was funded by the National Institute of Health Research 'Health Technology Assessment' programme. BALLETS was a unique prospective study, of a fully investigated cohort of 1290 family practice patients with abnormal LFTs, non-specific symptoms, and no known or self-evident liver disease, designed to determine the likelihood of a serious liver disease given an abnormal LFT result. LFTs were selected as they represent a specific type of blood test that is frequently ordered for patients with non-specific symptoms and not always ordered for clinical reasons. The population for this study were chosen specifically because FPs were taking part in BALLETS resulting in increased awareness of LFT ordering.

Recruitment

Practice managers at all eight family practices participating in the BALLETS study were approached and asked to consult their constituent FPs to ascertain their willingness to take part in the study. A total of six of the eight family practices elected to participate and all 29 FPs from the six practices formally consented to take part. This number of interviews needed to reach saturation is consistent with previous research recommendations of sample size to allow saturation to be achieved.[14,15] Interviews were arranged with consenting FPs via the practice manager at a time and date of their choosing and the order in which interviews were carried out depended on FPs' availability.

Interviews

Semi-structured interviews with a topic guide and prompts were used (Table 1). The themes in the topic guide were informed by existing literature concerning test ordering behaviour of FPs and included the impact of an FP's formal and experiential knowledge base, social influences on decision making, defensive medicine, and characteristics of the test and order process.[10–12,16–21]

Analyses

Interviews were digitally recorded and transcribed verbatim by IL using a Trillium N629 telephone recording adaptor and an Olympus WS-750M digital voice recorder. The adaptor was connected between

Table 1 Semi-structured interview – topic guide

a	Do you work full-time or part-time? If part-time then what % of full time?
b	Could tell me what you think of LFTs in general?
c	Do you believe that on the whole FPs order the right number of LFTs?
d	Are there any patient characteristics that lead you to order a test?
e	Medically, what do you think is the importance of LFTs?
f	What constraints are there on your decision to order?
g	Would you agree with those FPs that say a blood test (LFT) is a way of signalling to the patient that you are taking a complaint seriously?
h	What role do you think defensive medicine plays in the decision to order an LFT?
i	Does your experience as an FP influence your decision to order an LFT?
j	Could you tell me if you feel that the format of the blood test request form impacts on your decision to order?
k	Is there anything else you would like to say on the subject of LFTs?

the telephone and the adaptor and produced a high-fidelity recording.[22] The interviews lasted between seven and 15 minutes, averaging ten minutes and six seconds.

Following preliminary analysis by three of the authors (IL, SG and LB) and initial discussions within the study team the principal codes were determined and coding proceeded manually. The constant comparative method[23] was used leading to the inclusion of an additional question addressing the use of LFTs as a tool for modifying patient behaviour. All FPs preferred a telephone interview, usually immediately following morning surgery. Interviews were carried out by the same individual. Theoretical saturation was reached after 11 interviews.[14–15] We suggest that this could be explained by 'consensus theory', where 'experts' with shared knowledge about the topic being discussed are more likely to exhibit common values.[24]

After finishing the content analysis the 'attitude-social influence-efficacy' model was chosen to categorise the determinants of test-ordering behaviour.[25,26] Usually applied in the description of patient behaviour, the model is useful as it integrates a number of social-psychological models. The key tenet being that behavioural intention is modified by external variables though constructed by attitudes (cognitions and beliefs), perceived social influence, and self-efficacy expectations.[25]

Results

Family practice characteristics

A breakdown of family practices by number of patients registered, number of full-time equivalent FPs, and Index of Multiple Deprivation (IMD) codes[27] is given in Table 2.

Family practitioner characteristics

A breakdown of the 11 FPs by age (31–58 years), gender (five males, six females), duration of service, and part-time or full-time working is given in Table 3. The participating FPs were heterogeneous with respect to these attributes.

Motives behind the decision to order an LFT

The themes emerging from the interviews were grouped using the 'attitude-social influence-efficacy' model which has been used in previous studies to identify internal and external influences on test-ordering behaviour.[25,26] The factors influencing an FP's decision to order a test were grouped into two broad categories. The first category is internal influences and includes the themes of expectation of efficacy and general attitude toward LFTs (positive or negative). The second category contains external influences and consists of the themes of social influence, test characteristics and defensive medicine.

Table 2 Family practices

Family practice	Number of patients registered	Number of full-time equivalent FPs	IMD code*
A	8500	8.5	0–2
B	9300	7.5	4–5
C	8780	4.0	2–3
D	6500	7.5	5–7
E	7500	5.0	5–7
F	6000	4.0	2–3

* United Kingdom (UK) local authority Index of Multiple Deprivation (IMD) codes are produced by the UK government and were first released in 2004, they provide indicators of deprivation in local authority areas to inform health and social research and policy.

Table 3 Characteristics of participating FPs

FP no.	Practice	Gender	Age	Part time (%)/ full time (ft)	Years practising as an FP (including training)	Years at current practice
1	C	m	31	ft	2 years 6 months	1 year 8 months
2	D	m	36	ft	9	8
3	B	m	41	ft	12	10
4	C	m	52	ft	20+	20
5	E	m	54	66%	25	24
6	A	f	33	ft	6	6
7	A	f	38	75%	11	9
8	F	f	41	55%	14	14
9	F	f	43	ft	15	8
10	C	f	46	77%	16	15
11	D	f	58	50%	28	28

Table 4 shows the themes and sub-themes mentioned by each respondent (represented by X).

Internal influences on the decision to order an LFT

Expectation of efficacy: The expectation an FP has of their own ability to correctly diagnose a patient and order the correct test at the apposite time is a function of the knowledge gained from formal training and knowledge in the form of experience gained as a practising FP.

Formal knowledge: Clinical reasons for test ordering were mentioned spontaneously by all interviewees. These included decisions based on a patient presenting symptoms of liver disease, such as jaundice or pruritus, and medicines known to affect (or be affected by) liver function.

> 'If someone is jaundiced or suffering from weight loss or something like that ...' (FP8, female, 41 years old)

> 'I would tend to tick someone's LFTs if I was checking someone's cholesterol. If they are going to go on a statin then I am going to need to know what someone's LFTs are like.' (FP2, male, 36)

Table 4 Pattern of response by FP to themes and sub-themes

	Internal						External						
	Expectation of efficacy				Attitude to LFT		Social influence			Test characteristics			Defensive medicine
FP Number	Formal knowledge	Craft knowledge	Personal reassurance	Over ordered	Positive	Negative	Colleagues	Patients	Research partici-pation	a	b	c	
1	X		X	X		X		X					
2	X				X							X	X
3	X	X	X	X	X							X	X
4	X			X	X			X	X				
5	X	X	X	X	X			X		X			
6	X			X	X								
7	X	X			X		X	X	X		X	X	X
8	X	X	X		X			X					
9	X	X		X	X			X	X				X
10	X			X	X			X		X	X	X	X
11	X	X			X								

a = cost
b = invasive nature of test
c = order process
After van der Weijden T *et al*[25]

Craft knowledge: Tests were ordered for a number of personal reasons related to the FP's beliefs and experiences. Evidence emerged during the early interviews that LFTs were used to incentivise certain patients to make behavioural modifications necessary to improve their health. Notably FPs would order LFTs for patients suspected of drinking too much alcohol. The expectation being that an abnormal test result would provide evidence of impending self-harm and thereby prompt a change in behaviour.

> 'If someone has got alcohol-related problems ... and the LFT does come back as abnormal, then I would use that as a way of saying, ''Look, what you're doing is affecting your liver and you're at a stage where you can do something about it''.' (FP8)

> 'I've got one particular alcoholic who successfully became a teetotaller. His λ-GTs were up in the sky and then came down to normal or near normal again and with his permission I use a printout of his λ-GTs going up and down to try and motivate other patients.' (FP11, female, 58)

Personal reassurance: The FPs we interviewed conceded a lack of complete confidence in their ability to identify a condition by using physical examinations and medical history and so sought reassurance from tests such as the LFT.

> '... I get the feeling that the more experienced you become the more you do a lot more tests because you know what can happen.' (FP3)

> 'Rather than just keep saying, ''Yes, everything's ok and it's just anxiety which is x,y,z and more of a psychological and mental component'', sometimes you do the blood test so that you're more reassured ...' (FP8, female, 41)

General attitude to LFT: Despite the fact that none of the analytes in an LFT can provide a definitive diagnosis nor are necessarily specific for liver complaints, ten of the eleven FPs interviewed held positive opinions on the effectiveness of the LFT though one recently qualified FP was less convinced.

> 'They are a useful tool, especially for a patient that is unwell and you can't work out what is going on.' (FP10, female, 46)

> 'I think they're pretty useless to be honest. I think they throw up a lot of spurious results, most of which don't mean anything at all.' (FP1, male, 31)

Over-ordered: It became apparent that those interviewed felt that LFTs were not used as efficiently as they might be. Drawing comparison with other blood tests they felt too many were being ordered.

> 'I think like most tests we order too many.' (FP4, male, 52)

External influences on the test-ordering decision

Social influence: The external sources affecting the motivation to order LFTs included patient influence, defensive medicine, and characteristics of the test and ordering process.

Patient influence: Ordering an LFT can be used as a way of reassuring the anxious patient that their concerns are being taken seriously and maintaining the working alliance between patient and doctor.

> 'I do think that patients do feel on the whole that they're being taken more seriously if you stick a needle in them.' (FP7, female, 38)

One of the FPs in our sample used LFTs alongside other blood tests as a way of managing patients presenting psychosomatic complaints.

> 'Sometimes a patient's come and you're sure that they have a psychosocial problem or even depression ... but you take a blood test and they're all normal. That's actually quite useful information to feedback to the patient.' (FP10, female, 46)

The experience of private healthcare can also serve to raise levels of expectation amongst patients.

> 'They may go to a private consultation and have panels of blood tests done so they have an expectation that they have regular blood tests.' (FP10, female, 46)

Research participation: A theme that we had not anticipated, introduced by three interviewees, was that taking part in the primary BALLETS study helped them focus on the underlying physiology behind the test and led them to reconsider the weight attached to the result of an LFT.

> 'In light of the BALLETS study I'll probably find them less useful. If I get a slightly abnormal liver function test I'm probably not going to worry about it.' (FP4, male, 52)

> 'Since we've done the BALLETS study I feel much more able to understand what's going on.' (FP7, female, 38)

Defensive medicine: Negative defensive practice was observed in our sample.

> 'We have to do that [LFT test]. Because if someone ends up with liver disease because they were on statins and you didn't do the test, you can end up in big trouble.' (FP10, female, 46)

Test characteristics

Cost: Currently there is less financial pressure on investigation than on prescribing and referral. The lower financial impact of ordering a test means that the decision can become easier.

> 'Instead of just doing one, checking renal samples, you might check the whole lot; kidneys, liver, bones, because it doesn't cost any more.' (FP10, female 46)

Order process: The ease with which an LFT can be ordered can influence the decision-making process.

> 'I think one of the reasons [we order too many] is because of the tick box, you end up doing a profile on people and you end up taking them.' (FP3, male, 41)

Invasive nature of the test: Ordering an LFT has little impact on the patient particularly if other tests are being ordered and so lowers the decision-making threshold for ordering LFTs.

> 'I will do an LFT because it's a relatively non-invasive test isn't it, really, to be honest? It's not like a colonoscopy.' (FP7, female, 38)

Discussion

Summary of findings

This study has for the first time explored the underlying influences behind an FP's decision to order an LFT. LFTs are somewhat unusual in that each 'test' is composed of a panel of five to seven analytes so it could be seen as a kind of 'catch all'. Moreover, the tests are fairly sensitive to alcohol abuse and (to a lesser extent) over-eating. LFTs are frequently ordered for patients with non-specific symptoms[13] and our findings suggest that motivations for ordering LFTs are often non-clinical, for example to motivate people to make changes to their lifestyle or by FPs practising 'defensively'. Our study sample consistently acknowledged the clinical use of an LFT for routine monitoring of medication and liver-specific diagnostic reasons. In addition a number of non-clinical motives behind the test-ordering decision were explored. These include both internal and external influences on test-ordering behaviour.

Limitations

Although, as stated in methods, this was not an observational study, FPs, in addition to being clinically active and routinely ordering LFTs, were also taking part in the BALLETS study which served to emphasise their focus on LFTs. We cannot comment on how representative these views were of the wider FP population; however, the group was heterogeneous in terms of levels of experience, those working full and part-time, and across practices representing a wide variety of IMD codes. Though telephone interviews were chosen over face-to-face interviews for practical reasons, short telephone interviews have been found to be equally productive as short face-to-face interviews.[28]

Main findings

Internal influences: The internal influences on FPs' test-ordering behaviour stem from their own expectations of efficacy including their clinical training and the craft knowledge derived from their experiences in the role. This knowledge appeared to have two notable consequences. Firstly, the FPs in our study who had experience of discovering something unexpected said that as a result they were more likely to order a test in the future. This heuristic is known as the 'availability bias' in the psychological literature.[29] This may explain existing evidence of a positive correlation between experience and propensity to order common blood tests.[13]

Secondly, FPs in our study also reported using part of the LFT panel to demonstrate to a patient the clinical necessity for a reduction in alcohol consumption and also to illustrate the benefits of successful adherence to a reduced alcohol regimen. Fear-arousing communication has long been established as a tool for encouraging health-promoting behaviour[30] and the negative or fear appeal to health has in the past been shown to be more persuasive than positive appeals.[31] However, support for this approach is not unequivocal as the underlying cognitive processes are not fully understood.[32] There are also potential dangers in the use of LFTs in this way since a normal result may have a perverse effect by providing false reassurance for heavy drinkers. The pattern of alcohol consumption in the UK is changing; women are drinking more,[33] as are young people and from an earlier age[34] with potentially large costs to both their health and the NHS. Though the use of the full LFT panel in reinforcing behaviour change may be a comparatively crude tool in comparison to the use of the gamma-glutamyl transferase test,[13] using LFTs to promote lifestyle change among heavy drinkers is an interesting idea that warrants further study.

External influences: The 'external' influences on test ordering included litigative pressure for defensive practice, characteristics of the test, and social interaction with patients. Many in our study group felt an increased need to practice defensively and other research in the UK and elsewhere has shown that FPs here are now more likely to pursue diagnostic testing as a result of fear of litigation.[35] With regards to the characteristics of the test a number of FPs in our study provided comments on the ease with which an LFT can be ordered. It has also been shown that the design of laboratory request forms including presenting provisional diagnoses and pathology-specific laboratory profiles can influence the decision to order a test.[36,37]

Studies elsewhere have demonstrated that reducing the options on the test order form can reduce the total number of tests.[36,37] The cost of a test can also influence how frequently they are ordered. Though relatively inexpensive, the frequency with which LFTs are ordered means that costs can mount. In the UK a recent study demonstrated that educating clinicians about the true cost of a test can help reduce the numbers ordered.[38]

Another key factor in testing for unexplained complaints is the need to maintain the doctor–patient relationship by meeting user expectations. We found FPs frequently ordered tests to reassure patients and to signal to them they were being taken seriously. The drive toward patient-centred care[39] means individuals are increasingly aware of their role as customers which may engender a sense of entitlement. Recent initiatives in the UK have sought to further empower patients encouraging mutual decision making.[40] Evidence of patient pressure was observed in this study and it has been described elsewhere that FPs are more likely to test if a patient is assertive and actively asks for a test.[25] FPs in our study also acknowledged reassuring a worried or concerned patient by ordering a test, maintaining their relationship with patients by using ritual care.[41] Using tests as a means of reassuring patients may become increasingly prevalent as many patients now see a blood test as the most reliable diagnostic tool at the FP's disposal.[25,26] The countervailing risks of embarking on an investigation 'cascade' triggered by a false positive test seem to weigh less highly with patients.

Conclusions

A number of elements interact to prompt frequent orders of LFTs. The need that patients feel for reassurance and the need for investigation perceived by FPs in our study could be driven in part by the 'democratisation' of medical information as web-based sources of medical data continue to proliferate. The pressure on FPs to order tests is unlikely to be reduced and all FPs that participated in this study felt the number of LFTs ordered was higher than necessary. However, the FP cannot be solely influenced or restricted by formal guidelines and training as this approach would exclude the social and consultative nature of the doctor–patient relationship and the carefully constructed working alliance that exists between FP and patient. The character and maintenance of this relationship often drives the testing process beyond narrowly defined clinical need.

The study illustrates that social and behavioural reasons are strong motivators to order an LFT and may even take precedence over clinical motives on some occasions. The FP's acceptance of the need to balance what the patient expects with what the patient requires is further influenced by the low financial and temporal costs of ordering these tests, their non-invasive nature, and the increasing threat of litigation if failing to use correctly the diagnostic tools at their disposal. However, in meeting patients' perceived need for a blood test the LFT would appear unsuitable due to the high rate of positive tests with unclear implications. That said their use as a tool to increase uptake of health-promoting behaviour could be further explored.

It was interesting that a number of FP interviewees reported that active participation in research (the BALLETS study) had led to a reappraisal of LFT use in their routine practice. An educational change to reduce testing among patients and their doctors might be the theoretical optimal solution to reducing the number of tests ordered. However, the above range of factors favouring test use suggests that rapid large scale change is unlikely to occur.

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None.

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