

UHI Research Database pdf download summary

Exploring reasons for variation in ordering thyroid function tests in primary care

Hardwick, Rebecca; Heaton, Janet; Griffiths, Glyn; Vaidya, Bijay; Child, Sue; Fleming, Simon; Hamilton, William Trevor; Tomlinson, Julie; Zhelev, Zhivko; Patterson, Anthea; Hyde, Chris

Published in:
Quality in Primary Care

Publication date:
2014

The Document Version you have downloaded here is:
Publisher's PDF, also known as Version of record

[Link to author version on UHI Research Database](#)

Citation for published version (APA):

Hardwick, R., Heaton, J., Griffiths, G., Vaidya, B., Child, S., Fleming, S., Hamilton, W. T., Tomlinson, J., Zhelev, Z., Patterson, A., & Hyde, C. (2014). Exploring reasons for variation in ordering thyroid function tests in primary care: A qualitative study. *Quality in Primary Care*, 22(6), 256-61. <https://primarycare.imedpub.com/exploring-reasons-for-variation-in-ordering-thyroid-function-tests-in-primary-care-a-qualitative-study.php?aid=3764>

General rights

Copyright and moral rights for the publications made accessible in the UHI Research Database are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights:

- 1) Users may download and print one copy of any publication from the UHI Research Database for the purpose of private study or research.
- 2) You may not further distribute the material or use it for any profit-making activity or commercial gain
- 3) You may freely distribute the URL identifying the publication in the UHI Research Database

Take down policy

If you believe that this document breaches copyright please contact us at RO@uhi.ac.uk providing details; we will remove access to the work immediately and investigate your claim.

Research paper

Exploring reasons for variation in ordering thyroid function tests in primary care: a qualitative study

Rebecca Hardwick

Health Services Researcher, Associate Research Fellow, BSc (Hons), MSc. NIHR CLAHRC South West Peninsula, University of Exeter Medical School, University of Exeter, Exeter, UK

Janet Heaton

Sociologist, Research Fellow, BA (Hons), PhD. NIHR CLAHRC South West Peninsula, University of Exeter Medical School, University of Exeter, Exeter, UK

Glyn Griffiths

Research Assistant in Health Services Research, BSc (Hons). Affiliated to University of Exeter Medical School, University of Exeter, Exeter, UK

Bijay Vaidya

Consultant Endocrinologist and Honorary Associate Professor, PhD, FRCP. Department of Endocrinology, Royal Devon and Exeter Hospital, Exeter, UK

Sue Child

Sociologist, Honorary Research Fellow, BA (Hons), PGCE, PhD. Plymouth University Peninsula Schools of Medicine and Dentistry, ITTC Building, Tamar Science Park, Plymouth, UK.

Simon Fleming

Consultant in Clinical Biochemistry and Metabolic Medicine, MD FRCP. Royal Cornwall Hospital, Truro

William Trevor Hamilton

GP, Professor of Primary Care Diagnostics, MD, FRCP, FRCGP. University of Exeter Medical School, University of Exeter, Exeter, UK

Julie Tomlinson

Honorary Consultant Nurse /Advanced Nurse Practitioner & Clinical researcher (Primary Care) MSc, RGN, QN. Pool Health Centre, Redruth, Cornwall, UK

Zhivko Zhelev

Psychologist, Research Fellow, BSc, PhD. NIHR CLAHRC South West Peninsula, University of Exeter Medical School, University of Exeter, Exeter, UK

Anthea Patterson

Consultant Biochemist, BSc, MSc, PhD. FRCP. Royal Cornwall Hospital, Truro, UK

Chris Hyde

Professor of Public Health and Clinical Epidemiology, MBBS Institute of Health Research, University of Exeter Medical School, University of Exeter, Exeter, UK

ABSTRACT

Background: The ordering of thyroid function tests (TFTs) is increasing but there is not a similar increase in thyroid disorders in the general population, leading some to query whether inappropriate testing is taking place. Inconsistent clinical practice is thought to be a cause of this, but there is little evidence of the views of general practitioners, practice nurses or practice managers on the reasons for variation in the ordering of TFTs.

Aim: To find out the reasons for variation in ordering of TFTs from the perspective of primary healthcare professionals

Methods

Fifteen semi-structured interviews were carried out with primary healthcare professionals (general practitioners, practice nurses, practice managers) that used one laboratory of a general hospital in South West England for TFTs. Framework Analysis was used to analyse views on test ordering variation at the societal, practice, individual practitioner and patient level.

Results: A number of reasons for variation in ordering across practices were suggested. These related to: primary healthcare

professionals awareness of and adherence to national policy changes; practices having different protocols on TFTs ordering; the set-up and use of computer systems in practices; the range of practice healthcare professionals able to order TFTs; greater risk-aversion amongst general practitioners and changes in their training and finally how primary healthcare staff responded to patients who were perceived to seek help more readily than in the past.

Conclusion: The reasons for variation in TFTs ordering are complex and interdependent. Interventions to reduce variation in TFTs ordering need to consider multiple behavioural and contextual factors to be most effective.

Keywords: thyroid disorders, test (ordering), primary care, qualitative research

How this fits in with Quality in Primary Care

What do we know?

There is wide variation in the rate of requests for thyroid functions tests (TFTs) from primary healthcare professionals that is not explained by population age, sex or demographic factors.

What does this paper add?

This is the first qualitative study to explore variation in ordering TFTs with primary healthcare professionals. The results highlight that there is a complex and interdependent range of factors that interviewees used to explain variation in TFTs ordering. This suggests that any package of interventions needs to work at a range of different levels in order to reduce variation in TFTs ordering.

Introduction

In common with many other routinely ordered tests there has been a significant increase in thyroid function tests (TFTs) ordering in recent years, with no corresponding increase in thyroid disorders in the general population. This has led some to ask whether inconsistent clinical practice is leading to inappropriate test ordering.¹⁻³ Theoretically the presence of wide variation in test ordering in primary care practice would indicate that some inappropriate test ordering might be taking place, although defining 'appropriate' test ordering levels is difficult. In our recent study of routine data from two large hospital laboratories in the South West of England, we found a four-fold variation in TFTs ordering across general practices which used their services, only 24% of which was explained by age, sex, practice-level prevalence of hypothyroidism, and socio-economic deprivation. Similar variation in TFTs ordering from general practices in other parts of the UK has been also been reported.⁴⁻⁵

These observations suggest that further investigation is necessary to explore with primary healthcare professionals the reasons for variation in TFTs ordering, paying particular attention to the behaviour of clinicians who order TFTs, and contextual factors which may influence their decision making and any intervention. To do this, a qualitative study was undertaken in a selection of local general practices to explore, from the clinicians' and managers' perspectives, why TFTs were ordered, for whom, and what theories they had to explain variation, and how it might be reduced.

Methods

Sample

General practices from the Exeter district in Devon, UK that had taken part in the original study were stratified according to TFTs ordering rates (high/medium/low).⁴ A purposive sample of 15 primary healthcare professionals (general practitioners (n=9),

practice nurses (n=3), practice managers (n=2) and a practice nurse who is also a practice manager (n=1)) was then drawn from 13 practices. These included 5 staff per high/medium/low tertile, and an even gender mix, to provide a diverse sample. The practices were all served by one local hospital laboratory, and covered a wide range of practice settings (urban, rural and semi-rural). Healthcare professionals from the selected practices were sent a letter about the study inviting them to take part, and a consent form.

Data Collection

A semi-structured topic guide was developed, incorporating ideas from all members of the project steering group and drawing on their different perspectives and experience (SF, AP, JT, WH, BV, CH). This was further refined by the interviewer (GG) and their supervisor (SC) in collaboration with the steering group. Interviews were carried out either face-to-face or by telephone in the summer of 2013. All the interviews were audio-taped, transcribed and the transcripts were checked for accuracy.

Data Analysis

A thematic analysis was carried out by two of the authors (RH and JH) using a simple form of Framework Analysis where data are tabulated by salient themes in a series of charts or matrices.⁶ Initial familiarisation with the transcripts and audio-files led to the identification of a number of themes for tabulation. The interview transcripts were read and relevant material was extracted and paraphrased onto three charts. This enabled the views of individual participants and particular practices to be logged by themes and structured as follows: Chart A concerned the TFTs ordering characteristics of practices (who orders TFTs, for which patients, how prompted, using what resources) and was used mainly for describing the characteristics of the sample. Chart B concerned the theories of variation given within the interviews, and were categorized across four levels (societal, practice, practitioner, patient). Chart C concerned interviewees' ideas for interventions to reduce variation in TFTs ordering.

The same two researchers conducted random cross-checking of the charts to improve the trustworthiness of findings. Where disagreements arose these were resolved through discussion. The Charts were then summarised and shared with the co-authors in order to inform the development of the analysis.

Results

Below are the findings that emerged from the thematic analysis of participants' theories of variation and their ideas for interventions (Table 1).

Theories of variation

i) Societal level

The interviewees observed that a number of changes in policy and practice had occurred that had influenced the upward trend in ordering and variation in ordering of TFTs. These included changes in policy and guidance, the prevailing culture and climate within the NHS, professional roles and practices, and in demographics.

The only national policy driver discussed by interviewees was the Quality and Outcomes Framework (QOF).⁷ There was broad consensus that QOF had increased coverage of testing within individual general practices, and hence it might have increased test ordering in practices where TFTs ordering was not at the level it should have been. However, it should be noted that, at the time, QOF concerned annual TFTs ordering for patients with hypothyroidism and certain other conditions (such as people with dementia, those taking lithium and people with Down's syndrome). Decisions regarding the ordering of TFTs for patients with other conditions would be left to the discretion of individual general practitioners (GPs) or clinicians (who may

determine a different frequency of ordering), and their patients (who may themselves request a TFT).

Some interviewees felt that variation could be due to a broader range of clinicians being allowed to order TFTs, but that such staff lacked the proper training and education to order tests for the right patients at the right time. Changes to professional roles (such as the advent of practice nurses in managing long term conditions) and new trends in professional practice were referred to by a few interviewees as potential reasons for variation in test ordering. Some interviewees noted that apart from GPs, practice nursing staff also ordered tests (generally repeat TFTs for patients already diagnosed with thyroid disease). Other professionals involved in test ordering included phlebotomists, healthcare assistants and in one instance the practice's receptionist. If unable to order themselves, healthcare professionals would recommend to the GP that a patient had a TFT ordered.

Some interviewees felt that patients were nowadays more likely to access GP services for more minor complaints when historically they may have relied on family or friends. However, several reported that people were not 'ill' more generally, just more willing to see their GP for support and to ask for blood tests in general. This may have been prompted following a consultation with another health professional for advice, discussing with family and friends their health problems or looking up symptoms on the internet. For example, one GP reported:

'Well I think it's I think it's a probably kind of a cultural phenomenon I certainly don't think that there's any kind of increased amount of thyroid disease going on out there, but I think that you do have [...] a group of patients who you know

Table 1: Sample characteristics.

	N Participants from 'low' TFT ordering practices	N Participants from 'medium' TFT ordering practices	N Participants from 'high' TFT ordering practices	N Participants
By role				
GPs	4	3	2	9
Practice Nurses*	1	2	2	5
Practice Managers*	1	0	1	2
Total participants (practices)	5* (5)	5 (3)	5 (5)	15* (13)
By gender				
Male	3	3	1	7
Female	2	2	4	8
Total participants (practices)	5 (5)	5 (3)	5 (5)	15 (13)
By setting				
Rural	1	2	2	5
Semi-rural (market town)	2	3	2	7
Urban	2	0	1	3
Total participants (practices)	5 (5)	5 (3)	5 (5)	15 (13)

* Includes 1 joint Practice Nurse & Practice Manager

who are kind of regular attenders, who are unhappy and feel that there must be something wrong. So ...and I think that people are getting more and more demanding with the Health Service in general. And I think that...so I think kind of the patient factor is probably the driver of this.' (ID05)

ii) Practice level

Practices varied in whether they had developed their own protocol for governing TFTs ordering, or whether they adapted and used the hospital protocol, or didn't have a formal protocol at all. There was also variation in the use and adaptation of existing guidelines. Some interviewees also reported variable knowledge of and adherence to their practice protocol, particularly for TFTs ordering for patients with Type 1 and Type 2 diabetes. Practices had different staffing arrangements for managing TFT ordering and filing results. Several interviewees said that if results were not filed correctly, then it was easier to just order a new test.

A common issue was the ease (or not) of checking back through patient records for previous test results. Every interviewee talked about how the set-up and/or ease of use of their computerised patient record system influenced test ordering. Practices used a range of different computerised systems (e.g. EMIS, EMIS Web, System One, Microtest), and views varied on how easy or difficult such systems were to use. If it was hard to check the last test date and results, interviewees such as the following GP thought that additional tests might be wrongly ordered instead of finding the most recent results on the system.

'It also varies with the computer software how good it is, how well, it varies how well it's been set up. [We] didn't get set up properly so we've been struggling for six months [...] the way that it's set up currently for us, I think none of us are very quick or good at finding the results, previous results and you can't look back very far on the results...' (ID13)

In addition, several interviewees said that because they didn't have access to test results from the local hospital for their patients, or on occasions when test results accompanying discharge letters were not filed correctly, additional TFTs may be ordered unnecessarily.

iii) GP level

Some interviewees attributed variation in TFTs ordering to differences in the way that clinicians (primarily GPs) were trained (and indirectly their age). There was a sense that older or more experienced general practitioners had a different sort of training, where reflective practice was encouraged that might pre-empt reflex test ordering. To order a TFT 'unthinkingly' was referred to in interviews as poor practice, but was frequently attributed to a systemic cause such as being unable to locate previous test results on the computer, rather than to poor practice of an individual person.

A few interviewees spoke of how the norm for new doctors coming into medicine was to run more tests more often. One spoke of being 'schooled' as a junior doctor into not over-investigating patients with blood tests, adding that in his early career he was encouraged to reflect on why he was ordering particular tests. Reflective practice was referred to by several

interviewees as an important part of their training as well as current practice.

'I look back to when I was a practice nurse fifteen/twenty years ago people were, doctors were bigger risk takers. But now for me it appears that everybody is sent to hospital for an investigation [...] old GPs I used to work with would happily sit on things give them a pat on their back, and send them away. Rightly or wrongly I don't know but it's no it is its very different and that's the way it's gone isn't it?' (ID06)

However, some interviewees did suggest that more cautious and risk averse practitioners would be more likely to over-order tests, but that more experienced practitioners would be confident in managing risk and hold off on test ordering unless it was clearly indicated. Several also spoke of how their fear of missing something important may lead them to order tests. This fear was specifically related to litigation by two participants, who also spoke of the need to keep patients happy and how test ordering in general can be a way to do this; the patient leaves the consultation with a sense that something has been done.

Some interviewees also suggested an association between risk and familiarity with patients. GPs who were familiar with their patients (perhaps because they had a personal, rather than pooled or practice list) were thought to be less likely to order additional TFTs because they knew their patients' history. In contrast, locum GPs were thought to order TFTs more frequently, due to not knowing the patients (and potentially the practice's computer system) well enough to properly judge if a test was necessary. For example, one of the participants reported that:

'[...] we know that when locums come here they do you know a battery of tests and if you actually said "Well why are you doing that?" and actually talked it through, you know it's around they're risk averse, and they don't know the patient and they don't know the details so they will just check everything.' (ID10)

However, there was no consensus on whether knowledge of a patient would always lead to lower test ordering, with some interviewees also commenting that knowing a patient too well might lead to clinical myopia, where symptoms that ought to be investigated are overlooked because the practitioner is too familiar with the patient.

iv) Patient level

Finally, some interviewees attributed variation in TFTs ordering to changes in the behaviour of patients over time, or to the characteristics of their practice's population compared with others in the area.

Patients were reported to be more demanding of services than in the past, and willing to request a test themselves. The way that healthcare staff responded to such requests varied considerably, with some declining outright whereas others used it as an opportunity to explore further with the patient using broader health questions (in particular on emotional and psychological wellbeing). As one participant reported:

'Well it depends with the history really whether you would or not [do a TFT] and whether anything had changed. It's not something that I would rush to do unless it reassured the

patient. [...] if I get somebody in and my intuition tells me that they are stressed and bordering on depression, but they are not particularly very emotionally aware themselves, their emotional intelligence is pretty low, I will sort of say “Okay well if we do the blood tests and they all come back normal what are you going to do, have you thought about maybe it’s related to stress?”.’ (ID10)

While the majority thought that practices with a higher proportion of older patients would be higher orderers, one suggested that younger patients, who need to work, would be more determined to get a health issue dealt with, and so may request a test. Only one interviewee reflected on the inconvenience for the patient at having to have additional blood tests done.

Ideas for interventions

The following ideas for improvement are based on the interviewees’ accounts of their ordering systems and behaviour, their direct suggestions for reducing variation, and our observations arising from comparing their accounts of their everyday practice. Interviewees reflected on improving TFTs computerised ordering systems (their design and management) to increase user-friendliness. This included adding access to secondary care hospital results, reducing the number of staff able to order and having dedicated members of staff to manage repeat test ordering. Furthermore, staff permitted to order TFTs should have training and education to ensure that they are aware of and are operating within the guidelines and practice protocols, and know how to use the computer systems effectively.

This study also suggests that standardising both protocols and laboratory feedback, and synthesising guidance on TFTs ordering for different conditions into a simple summary would be valuable in reducing variation. Several interviewees thought that it was important for primary healthcare professionals to know the number of tests ordered, as well as the costs of the tests. Two other issues concerned the importance of patient education, in understanding repeat testing intervals, and therefore why TFTs are or are not requested by their GP, and the impact that leadership can have on how a group of practitioners view and manage testing overall.

Discussion

This qualitative study explored primary healthcare professionals’ theories on the causes of variation in TFTs ordering. A wide range of theories were identified, at four levels: societal, practice, practitioner and patient. A number of system and individual reasons for variation were suggested, including changes in policy and professional roles; use of protocols and computerised systems; training and risk-aversion of clinicians; and the behaviour and characteristics of patient population.

It is important to note that when reflecting on reasons for variation in ordering of TFTs, interviewees did not always make a distinction between whether the test was for a patient with a diagnosed thyroid disorder, or a patient on a medication which required regular monitoring of thyroid function, or whether it was part of achieving a diagnosis for a patient presenting with a range of symptoms, where TFTs may be used alongside a range of tests in order to reach diagnosis. It may be that

practices which had the higher rates of TFTs ordering were not necessarily conducting tests inappropriately, but rather their practice population included a greater proportion of patients with diagnosed thyroid disorders or on medications which require regular monitoring. The antecedent study indicated that there was variation in ordering both new and repeat TFTs, so the reasons for variations in tests done (and therefore potential interventions to reduce variation) in these two groups of patients are likely to be different.⁴ However, any differences have not been explored in this study.

Some of the interventions that were suggested might serve to reduce ordering levels (e.g. by stopping over-frequent or duplicate requests), while others may help to raise levels (e.g. by improving computer systems and reminders for when patients are due a repeat test). Accordingly, implementation of a combination of these interventions may not show a large net reduction or increase, but a re-distribution of where individual practices are ranked and a narrowing of variation. Behavioural interventions could focus on increasing reflective practice, and organisational interventions on improving the way that test results are communicated (both between practices and hospitals, and within individual practices), as well as providing feedback on the number and costs of test ordering, on an individual and practice basis.

This study highlights a complex and interdependent range of factors that interviewees used to explain variation in TFTs ordering. The findings are consistent with others who have looked at the motivators for test ordering behaviours amongst healthcare professionals in that there are a range of factors which influence test ordering behaviour, and therefore variation. Our findings suggest that any package of interventions needs to work at a range of different levels in order to reduce variation in TFTs ordering.^{8,9}

Strengths and limitations

This is the first qualitative study that has sought to explore reasons for variation in TFTs ordering in primary care in the UK. It is part of a larger programme of work investigating reasons for and interventions to address TFTs ordering variation. This study has provided important insight into why TFTs are ordered, and what might help to narrow variation in test ordering. The sample size was small, and whilst drawn from a diverse range of practices, it only covered one locality, served by one hospital and laboratory, and so cannot be seen as representative of primary healthcare professionals’ views in other contexts. In addition, certain factors leading to variation not pertinent to the UK may not have been captured in this research. In particular primary care in the UK is not billed directly for the tests it orders, which would not be true in many other health care systems.

This qualitative study was carried out after the original survey, and so the theories put forward now regarding policy and practice may be different from when the original survey was done.⁴ However, the theories of variation and ideas for interventions relate to some contextual factors, as well as more behavioural or embedded practice, which are unlikely to have significantly changed by developments in policy and practice in the interval.

Implications for future research

Future work could explore the potential acceptability of interventions thought likely to reduce variation to healthcare professionals and patients where relevant. The question of what counts as appropriate and inappropriate ordering could also be usefully explored with clinicians and managers in further qualitative work. It is hoped that the results of this study will help to inform the design of a trial to examine the effectiveness and cost-implications of a multi-factorial intervention to improve the targeting of TFTs. Also we believe that our findings on TFT ordering may be applicable to other routine tests, but this will need to be formally explored.

ETHICAL APPROVAL

Paperwork concerning the study was submitted to the Chair of the University of Exeter Medical School Research Ethics Committee for review, but was judged as exempt from needing ethical approval as it was classified as being a service evaluation.

ACKNOWLEDGEMENTS

Thanks for support from Sarah Dawkins, Research Manager, NIHR CLAHRC South West Peninsula, and to the interviewees that participated in this study.

SOURCES OF SUPPORT

This research was funded by the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care South West Peninsula at the Royal Devon and Exeter NHS Foundation Trust. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

CONFLICT OF INTEREST

All Authors confirm they have no conflict of interest.

REFERENCES

1. British Thyroid Association. UK Guidelines for the Use of Thyroid Function Tests. 2006 July 2006. http://www.british-thyroid-association.org/info-for-patients/Docs/TFT_guideline_final_version_July_2006.pdf (accessed 03/09/2014).
2. Roti E, Gardini E, Magotti MG, et al. Are thyroid function tests too frequently and inappropriately requested? *Journal of endocrinological investigation* 1999;22(3):184-90.
3. Gopal Rao G, Crook M, Tillyer ML. Pathology tests: is the time for demand management ripe at last? *Journal of Clinical Pathology* 2003;56(4):243-48.
4. Vaidya B, Ukoumunne OC, Shuttleworth J, et al. Variability in thyroid function test requests across general practices in south-west England. *Quality in primary care* 2013;21(3):143-8.
5. O'Kane MJ, Casey L, Lynch PL, et al. Clinical outcome indicators, disease prevalence and test request variability in primary care. *Annals of clinical biochemistry* 2011;48(Pt 2):155-8.
6. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: Bryman A, Burgess R, eds. *Analysing qualitative data*. London: Routledge, 1993:pp. 173-94.
7. Quality and Outcomes Framework (<http://www.hscic.gov.uk/qof>)
8. van der Weijden, T. van Bokhoven, M.A. Dinant, G. van Hasselt, CM. Grol, RPTM. Understanding laboratory testing in diagnostic uncertainty: a qualitative study in general practice. *British Journal of General Practice*, 2002 52: pp974-980
9. Whiting, P. Toerien, M. de Salis, I. Sterne, JAC. Dieppe, P. Egger, M. Fahey, T. A review identifies and classifies reasons for ordering diagnostic tests. *Journal of Clinical Epidemiology* 2007 60: pp. 981-989

ADDRESS FOR CORRESPONDENCE

Ms Rebecca Hardwick, NIHR CLAHRC South West Peninsula, University of Exeter Medical School, Veysey Building, Salmon Pool Lane, Exeter, EX2 4SG, United Kingdom, Tel: +44 1392 727408; email: r.j.l.hardwick@exeter.ac.uk