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Attitudes and perceptions of health professionals towards management of hypothyroidism in general practice: a qualitative interview study

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ABSTRACT

Objective
To explore the attitudes and perceptions of health professionals towards management of hypothyroidism that contributes to the sub-optimal treatment of hypothyroidism in general practice.

Design
An in-depth interview study using semi-structured interviews.

Participants
16 participants were interviewed comprising nine general practitioners, four pharmacists, two practice nurses and one nurse practitioner

Setting
Primary Care in Northumberland, Tyne and Wear, Stockton-on-Tees and North Cumbria, UK.

Method

A grounded theory approach was used to generate themes from the interviews, which were underpinned by The Theory of Planned Behaviour to give explanation to the data.

Results

Although professionals felt that hypothyroidism was an easy condition to manage, prescribers generally admitted inadequate knowledge of medication interactions and levothyroxine pharmacokinetics. Pharmacists felt limited in the advice that they could provide to patients due to lack of access to patient records. Most prescribers followed local guidelines, and relied on blood tests over clinical symptoms to adjust levothyroxine dose. The information exchanged between professional and patient was usually restricted by time constraints and often centred on symptoms with limited time spent on patient education. Professionals felt that poor levothyroxine adherence was the main reason behind sub-optimal treatment, although other factors such as co-morbidity and concomitant medication were mentioned. Enablers perceived by professionals to improve the management of hypothyroidism included continuity of care, reminders for blood tests, system alerts for interfering medications and prescription renewal, and accessible blood tests and levothyroxine prescriptions for patients.

Conclusion

There is a significant professional behavioural component to the management of hypothyroidism. Addressing the differences in patient and professional knowledge and perceptions may help to reduce the barriers to optimal treatment, while continuity of care and the increased involvement of pharmacists and practice nurses would help to further promote optimal thyroid replacement.

Strengths and Limitations of this study

- Sub-optimal treatment of hypothyroidism in general practice is common and the behavioural approaches to treatment by professionals involved in the management of patients with hypothyroidism warrants exploring.
- A known potential limitation of qualitative research is the influence the researchers may have had in the process of data gathering and analysis, however, the researcher who conducted the interviews did not have medical training or prior medical assumptions, had not met the participants prior to the interviews, or discussed the research with them.
- The confidential in-depth discussions with health professionals in this study allowed for a rich data of experiences, personal thoughts, and perceptions of the management of hypothyroidism.
- Although following protocol, this study consisted of a small sample size of participants in the North of England, reducing the transferability of the findings of this study to others contexts.

Collaborators

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INTRODUCTION

Hypothyroidism is a common chronic disease caused by insufficient thyroid hormone production[1-3]. Levothyroxine, a synthetic isomer of the thyroid hormone thyroxine, is used to treat hypothyroidism and is dispensed to 99.7% of hypothyroid patients in England[4]. Dose increments are made following initiation of treatment to return serum thyroid stimulating hormone (TSH) levels into the reference range[5] and provide symptomatic relief[6]. Without correction, patients with abnormal thyroid results may have an increased risk of cardiovascular disease, dysrhythmias, fractures[7], and are at risk of adverse effects on bone mass[8], lipid metabolism[9], blood pressure[10], and cognitive function[11 12]. Even variation in thyroid function within the normal population reference range may also be associated with important differences in key health outcomes[13 14]. Furthermore, neglected hypothyroidism can result in life threatening myxoedema coma[15]. Patients with overt hypothyroidism may experience low energy levels, cold intolerance, aches and pains, weight gain, and changes in physical appearance.

The management of hypothyroidism is generally carried out in primary care and up till 2014 GPs were required to maintain a register of hypothyroid patients as part of the Quality and Outcomes Framework. Hypothyroidism is considered a simple condition to manage[16] and levothyroxine is well tolerated by the majority of patients[17]. However, the therapeutic benefits of levothyroxine are sometimes unsatisfactory, and TSH levels higher than the reference range have been found in 11-27% of patients receiving thyroid replacement therapy, while the prevalence of low TSH levels has been reported to range from 20-41%[7 18-21].

Compliance[22 23], pharmacogenomics associations[24-28] and interference from medication and comorbidities, such as autoimmune gastritis and coeliac disease[23], have all been found to have an effect on thyroid therapy and it is likely that there are multifactorial reasons for sub-optimal treatment. However, only a limited number of studies to date have addressed potential solutions to sub-optimal thyroid hormone replacement in general practice. To address this problem, we previously explored the attitudes and perceptions of patients with hypothyroidism towards their treatment[29]. In the present study we have investigated the attitudes and perceptions towards the management of hypothyroidism amongst health professionals including GPs, nurse practitioners, pharmacists and practice nurses. We sought to determine the clinical management and behavioural factors that may influence the adequacy of thyroid hormone replacement in patients with hypothyroidism.

METHOD

Design

Using a grounded theory approach[30], in-depth qualitative interviews were performed with health professionals to explore their experiences, attitudes, and perceptions of the treatment of hypothyroidism. Interviews were conducted by the same researcher (RD) and an initial semi-structured topic guide was used (Box 1). Themes from initial interviews were explored and developed in subsequent interviews, and were mapped to the constructs of the Theory of Planned Behaviour (TPB) to give an overall explanation of the data. The TPB describes the association between an individual's beliefs and their behaviour by considering the influence of their attitude towards a particular behaviour, subjective norms and perceived behavioural control[31].

Setting

Professionals from Northumberland, Tyne and Wear, Stockton-on-Tees and North Cumbria were invited to take part. Interviews were conducted between March and August 2016.

Participants

Sixteen one-off interviews were conducted with nine general practitioners (GP), four pharmacists (P), two practice nurses (N) and one nurse practitioner (NP). Participants were recruited through the NIHR Clinical Research Network: North East and North Cumbria and local professional networks via mail and email. Interviews were conducted face-to-face at the participant's place of work or the University of Sunderland, however, due to participant availability, one GP was interviewed at home, and one GP interviewed by telephone. Only the participant and the researcher were present during the interviews, and the researcher had not met the participants previously. Participant characteristics are shown in Table 1.

Confidentiality was assured, the process of the research explained and written consent was obtained prior to the interview. Interviews lasted approximately 45 minutes and interviewees were not paid for participation.

Sampling

Using purposive sampling, participants were recruited from both rural and urban areas to provide an initial maximum variation sample[30]. To test emerging themes, theoretical sampling thereafter proceeded until data saturation was achieved and no new themes were forthcoming[32]. Data saturation occurred quickly in the information provided by the interviews from our allied health professional group, thus more GPs were recruited than other professionals.

Analysis

Interviews were audio recorded and transcribed verbatim, and analysis was performed using Microsoft Word 2010. Open coding of transcripts preceded the categorisation of the data, and as the interviews progressed, themes emerging from the data were tested in subsequent interviews[33]. Notes made by RD after the interviews were considering during analysis. Data analysis occurred concurrently with the interviews, and constant comparison and iterative analysis of the interview data allowed for development and remodelling of themes until data saturation was achieved[30]. In-depth data analysis and negotiation of themes was conducted by RD, KK, and SW. Themes that emerged from the data are shown in Figure 1. Transcripts were returned to participants for comments and corrections; however, no feedback was received.

RESULTS

Perceived Professional Control

Management of Hypothyroidism

Generally health professionals found the management of hypothyroidism straightforward, relying on blood tests over non-specific clinical symptoms. However, there was uncertainty whether to start levothyroxine treatment in asymptomatic patients with borderline TSH levels, or patients with suggestive hypothyroid symptoms that did not have elevated TSH levels:

> *It's relatively commonly and easily managed. And the medication is generally quite palatable for patients. And they largely feel better. (GP-1)*

> *I think it's something that we often go into a bit of autopilot because we rely more on blood tests. (GP-6)*

> *Should you treat them or should you not? …we'll just keep an eye on the blood test. The other side of the coin is that they get labelled and start having treatment for something when actually if you just left them alone they would have been fine. (GP-8)*

Some professionals recounted patients finding information on levothyroxine alternatives from online forums. Alternative treatments or referring to an endocrinologist was a last resort following the unsuccessful management of TSH with levothyroxine. Only a minority described alternatives including liothyronine (a synthetic form of triiodothyronine, T3), Armour Thyroid (desiccated porcine thyroid extract) and homeopathic alternatives. Professionals had a tentative approach to levothyroxine alternatives, even with one example of a patient reporting feeling much better taking liothyronine, despite TSH and T3 levels suggesting over-treatment:

> *People research it and they'll come back and say, "I want the T3 because it's better." (GP-2)*

> *Yeah, so I've got one lady who… Who doesn't take any thyroxine and is… And is trying to manage her hypothyroidism with herbal remedies. (GP-9)*

> *She is taking liothyronine… she had never felt better. But her TSH and her T3... suggest she's being over-treated. (NP)*

Monitoring of Hypothyroidism

Health professionals felt that blood test reminders and prescription renewal alerts were enablers of good thyroid management as were alerts to potentially interacting medication:

> *One of our admin team does a regular search and just finds out who's out of date with their blood tests. (GP-7)*

> *Because it's so good now, the computer system… Because it also alerts you if the doctors are prescribing something that interacts (N-2)*

…we're quite good at making sure that patients come back to have their medication reviews (GP-4)

Access

Easy access to blood tests and electronic prescriptions were perceived by GPs to help patients access their levothyroxine; however, concern was raised that patients in nursing homes might not be as tightly monitored:

Electronic prescriptions and things have been helpful… not having the money, I guess, to get the bus up to pick up a prescription… we can send prescriptions electronically to the chemist. (GP-4)

We do have phlebotomy appointments in the evenings and weekends. (GP-7)

I suppose someone with dementia or in a nursing home is probably going to be less tightly monitored. (GP-5)

Continuity of Care

Continuity of care was perceived by GPs to be important for the management of hypothyroid patients. Interpretation of normal thyroid function was difficult without matching patients' expectations, symptoms and blood tests results:

So continuity of care does make a difference to patients who are difficult to manage or where compliance is potentially a problem. Because if they start dotting all over the place, then you know you have to work that thread back up. And it's all about trust. A lot of it is about trust in the GP. And that comes from continuity of care. (GP-1)

I think sometimes if blood test results are going back to a different [GP] than normally sees the patient, then it may just say "normal". And there's a risk that you would just say normal. (GP-7)

Pharmacists felt the advice they could give patients was limited by their lack of access to patient medical records, and that they could only advise depending on a patient's account of their TSH results and medications. Pharmacists felt that access to TSH results would save time and inaccuracies in advice they give:

And that's something that, you know, it would really help us if we had access to things like TSH results and things. Just as a second check, I think. (P-2)

Professional Knowledge

Prescribers felt they would need to check which medications may interact with levothyroxine, and it was generally perceived that their knowledge of hypothyroidism pharmacokinetics could be increased. Most professionals felt that the GP had overall responsibility for knowledge acquisition:

I mean, off the top of my head, I actually couldn't tell you any interactions between thyroxine… Apart from… I think it's iron. (GP-8)

I think I've hinted that there are some things that I could know a bit more about. (GP-5)

I suppose I haven't really taken the trouble to learn because I know that somebody else is doing it. (N-2)

GPs and pharmacists generally perceived that patient knowledge of thyroid function was basic. Pharmacists mostly felt that patients were unaware of the risk of under or over treatment with levothyroxine:

I don't think many of them can really tell you what it's for, what the thyroid does or what the risks are of going too high or too low. (P-1)

Perceived Professional Responsibility

Provision of Information

Generally health professionals provided verbal information about hypothyroidism and the importance of blood tests. Pharmacists described the need to avoid multivitamins, iron containing drugs, calcium containing drugs, indigestion remedies and coffee. Health professionals generally did not explain the effects of hypothyroidism on the thyroid:

I'm not a leaflet person. I like to talk and tell them. And if I've got a visual aid, using the computer. I'll explain to that. (NP-1)

Best in the morning. Not to take it [levothyroxine] with anything else – certainly not a cup of coffee. (P-3)

Generally, health professionals perceived that patients researched their own condition, or they would use leaflets from, or direct patients to patient.co.uk:

These days I would generally tell people to look it up on the internet. And I would usually direct them to a website. These days, mainly patient.co.uk. (GP-9)

You know, they're quite happy, and they'll often do research themselves. (GP-1)

Use of Guidelines

Local guidelines were used by the majority of GPs, although many were reliant upon the laboratory reference ranges. A few GPs felt that their management of hypothyroidism was not based on any guidelines:

I think that's all in the TRAMP guidelines. I think I try to follow what I'm meant to do. (GP-4)

I did see some guidance from North of Tyne [Area Prescribing Committee], which was very helpful. (GP-1)

I think the idea is just to try and get the result sitting somewhere in that [laboratory reference range]. (GP-8)

You interpret the guidelines to treat the patient, not fitting the patient to the guideline. (GP-3)

Individualistic Approach

Most prescribers perceived that an individualistic approach was necessary for optimal thyroid hormone replacement for each patient. The general consensus was that GPs were happy to increase levothyroxine doses to make patients feel better as long as TSH levels remained within range:

> *I aim to get them within range and feeling okay. (GP-9)*

> *I know there is evidence to suggest that you should keep them more to the suppressed end. If they're in the parameters, to me, they are controlled. (NP-1)*

> *I think the current is to try and push their TSH levels down a bit more from four to, sort of, more like two. (GP-1)*

Overtreatment with Levothyroxine

Professionals described the difficulty of attributing symptoms to thyroid disease when a levothyroxine treated patient's TSH remains in range:

> *But my instinct is that if you say you're unwell and your thyroid blood tests are normal, I don't think you're unwell because of your thyroid problem. I would be... I would be very reluctant to give somebody extra thyroxine just in case. (GP-6)*

Prescribers were conscious of the cardiac complications associated with giving a patient too much levothyroxine too quickly. Extra caution was described when treating the elderly where the risks of fractures may be high:

> *You need to be careful that you don't suppress it too much, because that comes with some clinical risks around fractures – particularly in elderly patients. (GP-1)*

Most prescribers were not prepared to over-treat patients with levothyroxine due to the associated risks. One GP recounted that she had intentionally over suppressed a patient's TSH level, explaining that she knew the patient well; the patient had a good knowledge of their condition, was aware of the risks of over suppression, and was miserable on a lower dose. However, another GP felt that some colleagues choose to ignore over suppression of TSH:

> *And if that little old lady then falls over or fractures… And sues you, because you've, you know, artificially suppressed her TSH. (GP-1)*

> *I felt that she was making an informed decision. She knew what the risks were. Especially as she got older… being over-treated. (GP-3)*

> *I've worked in a new practice, patients that have had TSH below 0.02 for a long time and they've just been told it's normal. (GP-5)*

Reliability of Hypothyroid Symptoms

Professionals had a good knowledge of hypothyroid symptoms and felt that if they knew the patient then developing slowness and change in mood made them suspect hypothyroidism. GPs felt that the symptoms of hypothyroidism were nonspecific and overlapped with a number of clinical conditions. Moreover, professionals perceived that patients often feel that their thyroid is accountable for many symptoms, particularly weight gain and tiredness:

So, you know, tiredness being one, weight gain being another, dry skin, intolerance to cold. But… Those are symptoms of lots of conditions, both physical health and mental health problems. (GP-1)

Once they've got a diagnosis of underactive thyroid, I think they blame it. (GP-2)

Attitudes to Thyroid Control

Responsibility

Professionals felt that it was the patient's responsibility to attend blood tests, for good medication adherence, and to challenge the GP if they were feeling symptomatic, however, it was perceived that the GP had overall responsibility:

I think it's in partnership. Because if the patient doesn't take the tablets, then you're not going to get control… and you don't check the blood tests and manage them appropriately, you're not going to get good control. (GP-3)

Mainly the GP is their GP, who's got the overall responsibility of looking after that patient. (NP-1)

Poor Levothyroxine Adherence as the Main Reason for Suboptimal Treatment

Some professionals in our study felt that avoiding weight gain encouraged levothyroxine adherence in patients. Health professionals believed that poor adherence was the main reason patients struggle to achieve optimal thyroid hormone replacement. Additionally, the majority of professionals said they had experienced a small proportion of patients who would take more levothyroxine than prescribed to alleviate tiredness or in an attempt to lose weight:

They think, oh, if I don't take it, I'll put even more weight on. So I think there is a lot of that going on. (N-2)

If they could get a really abnormal TSH - that's in the 30s or 40s - it is a compliance... A concordance. (GP-6)

Certainly one patient I can remember who had said he had been feeling tired and have been taking an extra tablet. (P-1)

… likes to run his TSH low. And there is no arguing with him, because he will just take what he wants to take. He'll come in and lie. (GP-8)

The Priority of Hypothyroidism

Health professionals believed patients may not prioritise hypothyroidism over health conditions such as heart disease, diabetes, hypertension and hypercholesterolaemia, and hypothyroidism was not a routine focus of medication reviews. Removal of hypothyroidism from the Quality and Outcome Framework (QOF) targets led to suspicions of reduced control and monitoring in some practices:

People who are on Dosette trays… they're more concerned about the other conditions that they have. (P-3)

There's certain drugs that we get, sort of, payment for sitting down with patients and really going through how they work and how they should be taken. (P-2)

And it used to be a QOF target that each year they had to have an annual TSH, which was a very easy target to hit. And then it stopped about two years ago. So I think some practices, potentially, have sort of let their thyroid management drop. (GP-2)

Time Restrictions

GPs and pharmacists felt that lack of time limited the information exchanged when speaking to a patient. One pharmacist felt there was pressure to focus on medication reviews, reducing the time available to give advice to other patients:

You're always short of time. It's always a problem. (GP-7)

They encourage us to do new services, such as medication use reviews and new medicine service reviews in pharmacies. We don't necessarily have as much time as we would like to stand on the counter and talk to patients (P-1)

Concern over prioritising the busy GP workload was articulated, with thyroid function tests potentially accepted as being normal when they may not be:

And we've got an awful lot on our plates – using that old excuse again. But we're really, really busy. And… Sometimes the blood results come through and you're just like, well, actually they might have missed it for the last few days or whatever. And just bounce it through, you know. And then the patient… It's on the patient's head to ring up for their results and check that their levels are okay. (GP-8)

Factors that Interact with Treatment for Hypothyroidism

GPs and pharmacists felt that if patients had an elevated TSH but reported that they were compliant then it may be due to other medication affecting the absorption of levothyroxine. Health professionals also felt that stress, diet, alcohol, coffee, smoking, having a busy lifestyle, co-morbidities, other medications, mental health, learning disabilities, deafness and dementia could all have an effect on optimal thyroid hormone replacement:

So I guess when it's [TSH] too high it's usually like what I said before – are you taking your medication at all? Are there other reasons why it might be that you're not absorbing it? Like the medication? Other conditions? (GP-4)

And I don't think people had realised for many years, is the caffeine thing. And that's the kind of thing that could come out in an MUR [medicine use review]. So are they drinking it with a cup of coffee in a morning? And calcium supplements as well. (P-3)

Discussion

Summary

Professionals perceived that hypothyroidism was an easy condition to manage, and felt they relied on blood tests over non-specific clinical symptoms to confirm a diagnosis. However, professionals generally perceived they had a lack of in-depth knowledge of medication interaction. On the other hand pharmacists felt they could provide limited advice due to

their lack of access to patient data and lack of time. Enablers to improve the management of hypothyroidism included continuity of care, reminders for blood tests, system alerts for medication interactions and prescription renewal, and easy access to blood tests and levothyroxine prescriptions for patients.

Most prescribers followed local guidelines for the management of hypothyroidism, and would only increase the levothyroxine dose to improve symptom control as long as TSH levels remained within range. However, one GP recounted over suppressing a patient at the patient's request. The information exchanged between professional and patient was limited by time restrictions, with most prescribers assuming that patients would research their condition online. Written information leaflets were rarely provided to patients.

Attitudes towards hypothyroidism included seeing the condition as less serious and more straightforward than other health conditions and that poor compliance was the main reason for inadequate thyroid control. However, interfering factors such as stress, other conditions and concomitant medication were acknowledged. GPs felt they were mainly responsible for a patient's treatment, but stressed that good medication adherence by patients was important for optimal treatment.

Professionals will usually strive to hold all attitudes, beliefs and behaviours in harmony[34]. However, this study has highlighted the cognitive dissonance between attitudes and beliefs versus behaviours that exist. The strongest example of this is the known detrimental effects of suboptimal treatment versus the acceptance of being out of range through perceived non-adherence, an explanation not supported by our recent evaluation of patient perceptions and attitudes[29].

Comparisons with existing literature

Similar to the findings of our study, the management of hypothyroidism has been reported to be straightforward[16]. Like the GPs in our study, continuity of care was described by GPs in a previous qualitative study to enable them to provide higher quality of care in general practice due to the personal relationships that had formed[35]. However, health professionals generally felt they had incomplete knowledge of hypothyroidism, which was also found for other diseases such as gout[36] and dementia[37]. Access to patients medical records suggested by the pharmacists in this study has also been recommended to improve care and patient safety within Britain by the Royal Pharmaceutical Society[38]. Including pharmacists in health care teams has been shown to reduce hospital admissions and medical costs of patients aged 80 years of age or older in Sweden[39], and pharmacist involvement has also been associated with lower rates of adverse drug events[40].

Having an individualistic approach for each patient to tailor TSH levels within the reference range has been suggested to be the optimal approach for management of hypothyroid patients. Deliberate TSH suppression (<0.1 mU/L) with high doses of levothyroxine, which was avoided by the majority of GPs in our study, is not recommended due to the potential risk of heart disease, stroke, osteoporosis and fractures[41]. Lack of agreement with national guidelines has been identified by Lugtenberg et al., (2009) to be the main barrier to guideline adherence by GPs, while lack of familiarity, lack of self-efficacy and patient factors such as disagreement with guideline recommendations or not attending appointments were also barriers[42], which may also explain the variation seen between the guideline use by GPs in our study. In our previously published work with hypothyroid patients, patients felt that professionals were more inclined to treat their TSH levels than their symptoms and that they

were not given very much information at the time of diagnosis[29], as reported by some professionals in this study.

Time was a barrier to thyroid management identified by health professionals in our study, and is a well-documented limitation in primary care[43 44]. However, previous studies have shown that although time is a limitation in terms of the information exchanged, it is consultation quality rather than the length of appointment that is more impactful[44]. Poor levothyroxine adherence, medication interactions and co-morbidities have been reported to have an effect on thyroid replacement therapy[45], which were some of the barriers reported in this study. However, in our qualitative interview study with hypothyroid patients, good levothyroxine adherence was reported by nearly all patients, even those who had TSH levels outside of the reference range[29], suggesting that the reasons for inadequate thyroid treatment may lie deeper than the typical assumptions by professionals that poor adherence is the main reason for suboptimal treatment[22 23].

Strengths and weaknesses

Due to time restrictions of this research project, this study did not have the opportunity to be pilot tested, which may have affected how the interviews progressed. Moreover, no feedback on their transcripts was provided by participants; feedback may have contributed to enriching the data further.

Although this study was conducted with a sample of 16 participants in the North of England, and may not be generally applicable, the findings are transferrable within this professional population, and this study provides novel insights into the attitudes, experiences and behaviour of professionals involved in the management of hypothyroidism.

Implications for future research and clinical practice

Quantifying the extent that clinical, behavioural and pharmacogenomic associations may affect levothyroxine therapy and providing this information to professionals involved in management of hypothyroidism may improve treatment for this group of patients. However, it should be considered that professionals in general practice have limited time and expertise. Increasing the involvement of pharmacists or practice nurses in the management of hypothyroidism may help relieve the pressure on GPs and may also increase continuity of care, for example through pharmacist led medication reviews or specific chronic disease management clinics for this cohort of patients.

Consistent provision of patient information leaflets and discussions about hypothyroidism would help increase patient understanding and this type of information can be exchanged in a short period of time, and may reduce the time pressures on GPs if patients are more informed. Clarity on the timing of initiation of treatment in asymptomatic patients with slightly elevated TSH, and an age specific and symptom focus were appropriate may help to improve the management of hypothyroid patients within general practice.

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Ethical approval

Ethical approval was granted from NRES Committee West Midlands - South Birmingham REC (REC reference 15/WM/0345) with SSA approval from Northumberland, Gateshead, and South Tyneside Local Research Ethics Committees. Approval was also granted from the University of Sunderland Research Ethics Committee.

Competing interests

The authors have stated that there are none

Contribution

SW designed the study. RD was responsible for the recruitment and interviewing of participants. RD gained qualitative research skills through attendance at a qualitative interview training course at Newcastle University, and from working on previous research projects. RD, SW and KK were involved in the in-depth data analysis and development of themes that emerged from the data. RD wrote the first draft of this paper. OO, SP, GD, PT, JH, CD, GL and SR were involved in the overall explanation of the data and revision of the final manuscript.

Data sharing

No additional data are available

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Box 1. Initial Topic Guide for Interviews

What is your role in the management of patients with hypothyroidism?

Symptoms of hypothyroidism

- How would you describe your familiarity with the symptoms of hypothyroidism?
- Are you confident to spot patients with hypothyroidism? Why? Example?
- What makes you suspect hypothyroidism? Why? Example?

Diagnosis

- How would you describe your confidence in making a diagnosis of hypothyroidism?

Referral

- Do you refer patients who have abnormal thyroid function tests? Can you describe the process?
- Do you refer patients to get a diagnosis of hypothyroidism?
- Who do you refer to? Can you describe the process?

Management

- What do you think about the management of hypothyroidism in general practice? Are you happy to manage hypothyroidism in general practice?
- How often do you check thyroid function tests?
- Does this differ for controlled/out of control patients?
- Are there any instances when you would refer/seek help? Example?
- How do you manage patients who complain of symptoms and the TSH is in the normal range? Example? Or would in theory? What are your thoughts on this?
- Do you find it difficult to keep the TSH in the reference range?
- What do you think about changing levothyroxine dose for patients? Do you think the increments of 25mcg of levothyroxine too great?

What are your thoughts about hypothyroid patients who are out of control? Are you concerned about hypothyroid patients who are out of control?

- What are your thoughts on patients with:
  - High TSH (usually indicating too little levothyroxine)?
  - Low TSH (usually indicating too much levothyroxine)?

How do you manage patients who insist on taking more levothyroxine than their TSH suggests (i.e. over-suppressed)?

What do you think about patients who have high TSH blood tests which suggests that they are not taking enough levothyroxine? Have you experienced this?

What are the main influences that you see that contribute to patients struggling to control their hypothyroidism?

Can you predict which patients will struggle to control their hypothyroidism? Example?

Figure 1 Themes and categories that emerged from the data

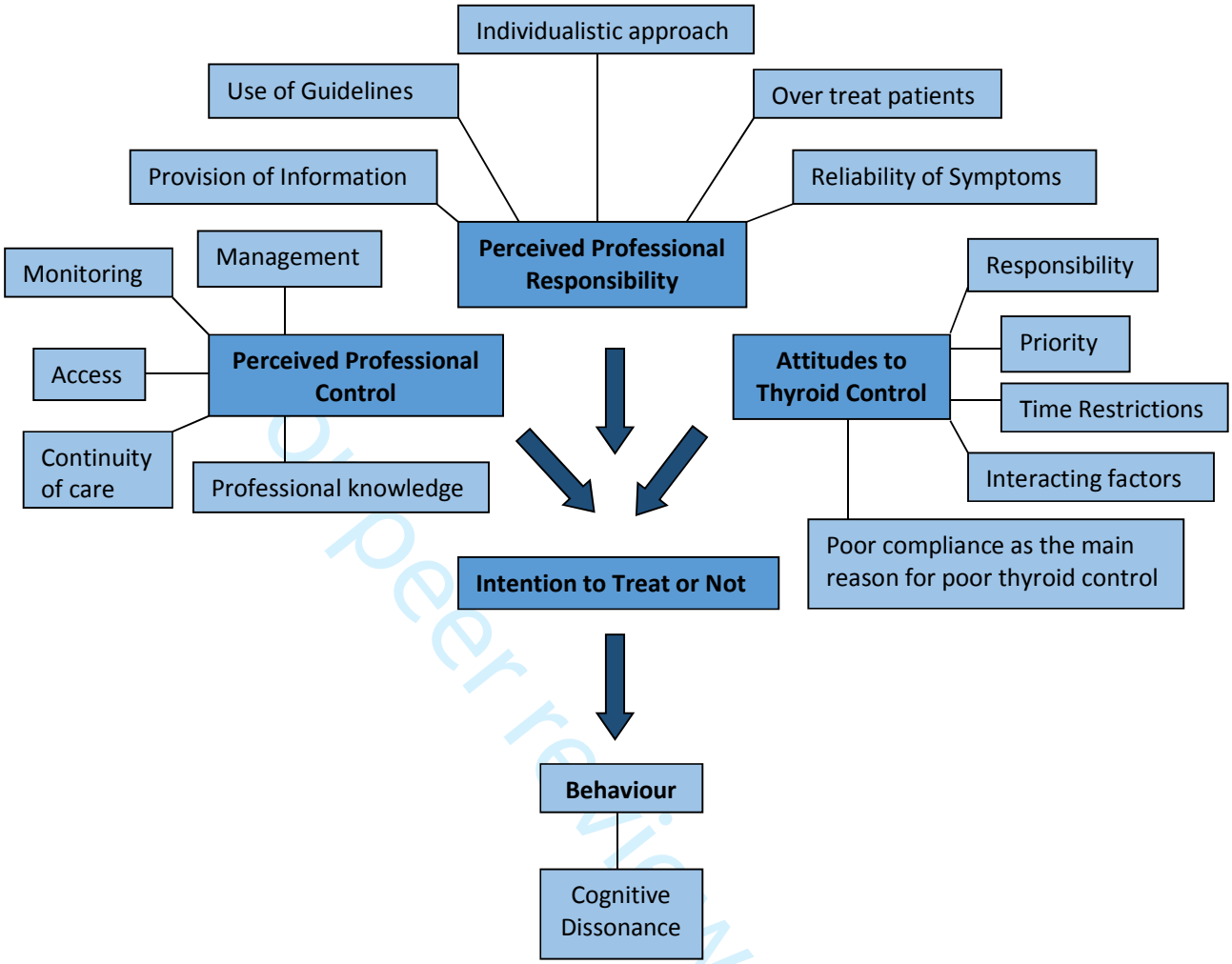

Table 1 Participant Characteristics

Job Role	Location	Age	Gender	Years Qualified
General Practitioner				
GP-1	Urban	45	Female	10
GP-2	Rural	40	Male	14
GP-3	Urban	59	Female	36
GP-4	Urban	36	Female	10
GP-5	Urban	39	Female	16
GP-6	Urban	51	Male	27
GP-7	Rural	52	Female	29
GP-8	Rural	39	Female	14
GP-9	Rural	48	Male	20
Nurse practitioner				
NP-1	Rural	55	Female	35
Practice Nurse				
N-1	Urban	58	Female	40
N-2	Rural	60	Female	40
Community Pharmacist				
P-1	Urban	30	Male	8
P-2	Urban	29	Female	6
P-3	Urban	39	Female	15
P-4	Urban	25	Female	2

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

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

YOU MUST PROVIDE A RESPONSE FOR ALL ITEMS. ENTER N/A IF NOT APPLICABLE

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	Methods
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Collaborators
3. Occupation	What was their occupation at the time of the study?	Collaborators
4. Gender	Was the researcher male or female?	N/A
5. Experience and training	What experience or training did the researcher have?	Contribution
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Methods
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Strengths and Limitations
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Strengths and Limitations
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Methods
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Methods
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Methods
12. Sample size	How many participants were in the study?	Methods

13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Methods
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Methods
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Methods
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Methods and Strengths and Limitations
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	Methods
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Methods
20. Field notes	Were field notes made during and/or after the inter view or focus group?	Methods
21. Duration	What was the duration of the inter views or focus group?	Methods
22. Data saturation	Was data saturation discussed?	Methods
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Methods
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Methods
25. Description of the coding tree	Did authors provide a description of the coding tree?	Methods
26. Derivation of themes	Were themes identified in advance or derived from the data?	Methods
27. Software	What software, if applicable, was used to manage the data?	Methods
28. Participant checking	Did participants provide feedback on the findings?	Methods + Strengths and limitations
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Results
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Results
31. Clarity of major themes	Were major themes clearly presented in the findings?	Results
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Results

Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

BMJ Open

Attitudes and perceptions of health professionals towards management of hypothyroidism in general practice: a qualitative interview study

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Attitudes and perceptions of health professionals towards management of hypothyroidism in general practice: a qualitative interview study

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ABSTRACT

Objective
To explore the attitudes and perceptions of health professionals towards management of hypothyroidism that contributes to the sub-optimal treatment of hypothyroidism in general practice.

Design
A qualitative interview study using semi-structured interviews.

Participants
Sixteen participants were interviewed between March and August 2016 comprising of nine general practitioners, four pharmacists, two practice nurses and one nurse practitioner

Setting
General practice and community pharmacies in the counties of Northumberland, Tyne and Wear, Stockton-on-Tees and North Cumbria, North of England, UK.

Method

A grounded theory approach was used to generate themes from interviews, which were underpinned by The Theory of Planned Behaviour to give explanation to the data.

Results

Although health professionals felt that hypothyroidism was easy to manage, GPs and nurses generally revealed inadequate knowledge of medication interactions and levothyroxine pharmacokinetics. Pharmacists felt limited in the advice that they provide to patients due to lack of access to patient records. Most GPs and nurses followed local guidelines, and relied on blood tests over clinical symptoms to adjust levothyroxine dose. The information exchanged between professional and patient was usually restricted by time and often centred on symptoms rather than patient education. Health professionals felt that incorrect levothyroxine adherence was the main reason behind sub-optimal treatment, although other factors such as co-morbidity and concomitant medication were mentioned. Enablers perceived by health professionals to improve the management of hypothyroidism included continuity of care, blood test reminders, system alerts for interfering medications and prescription renewal, and accessible blood tests and levothyroxine prescriptions for patients.

Conclusion

There is a significant health professional behavioural component to the management of hypothyroidism. Addressing the differences in patient and professional knowledge and perceptions could reduce the barriers to optimal treatment, while continuity of care and increased involvement of pharmacists and practice nurses would help to promote optimal thyroid replacement.

Strengths and Limitations of this study

- Sub-optimal treatment of hypothyroidism in general practice is common and behavioural approaches to treatment by health professionals involved in the management of patients with hypothyroidism warrants exploring.
- Confidential discussions with health professionals in this study allowed for a rich data of experiences, personal thoughts, and perceptions of the management of hypothyroidism to be collected.
- A known potential limitation of qualitative research is the influence the researchers may have had in the process of data gathering and analysis, causing bias. However, to help reduce this limitation the researcher who conducted the interviews did not have medical training, had not met the participants prior to the interviews or discussed the research with them.
- The small sample size of participants from the North of England may reduce the transferability of the findings of this study to other contexts.

Collaborators

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INTRODUCTION

Hypothyroidism is a common chronic disease caused by insufficient thyroid hormone production[1-3]. Levothyroxine, a synthetic isomer of the thyroid hormone thyroxine, is used to treat hypothyroidism and is dispensed to 99.7% of hypothyroid patients in England[4]. Dose increments are made following initiation of treatment to return serum thyroid stimulating hormone (TSH) levels into the reference range[5] and provide symptomatic relief[6]. Without correction, patients with abnormal thyroid results may have an increased risk of cardiovascular disease, dysrhythmias, fractures[7], and are at risk of adverse effects on bone mass[8], lipid metabolism[9], blood pressure[10], and cognitive function[11 12]. Even variation in thyroid function within the normal population reference range may also be associated with important differences in key health outcomes[13 14]. Furthermore, neglected hypothyroidism can result in life threatening myxoedema coma[15]. Patients with overt hypothyroidism may experience low energy levels, cold intolerance, aches and pains, weight gain, and changes in physical appearance.

The management of hypothyroidism is generally carried out in primary care and up till 2014 GPs were required to maintain a register of hypothyroid patients as part of the Quality and Outcomes Framework. Hypothyroidism is considered a simple condition to manage[16] and levothyroxine is well tolerated by the majority of patients[17]. However, the therapeutic benefits of levothyroxine are sometimes unsatisfactory, and TSH levels higher than the reference range have been found in 11-27% of patients receiving thyroid replacement therapy, while the prevalence of low TSH levels has been reported to range from 20-41%[7 18-21].

Compliance[22 23], pharmacogenomics associations[24-28] and interference from medication and comorbidities, such as autoimmune gastritis and coeliac disease[23], have all been found to have an effect on thyroid therapy and it is likely that there are multifactorial reasons for sub-optimal treatment. However, only a limited number of studies to date have addressed potential solutions to sub-optimal thyroid hormone replacement in general practice. To address this problem, we previously explored the attitudes and perceptions of patients with hypothyroidism towards their treatment[29]. In the present study we have investigated the attitudes and perceptions towards the management of hypothyroidism amongst health professionals including GPs, nurse practitioners, pharmacists and practice nurses. We sought to determine the clinical management and behavioural factors that may influence the adequacy of thyroid hormone replacement in patients with hypothyroidism.

METHOD

Design

Using a grounded theory approach[30], qualitative interviews were performed with health professionals to explore their experiences, attitudes, and perceptions of the treatment of

hypothyroidism. Interviews were conducted by the same researcher (RD) and an initial semi-structured topic guide was used (Box 1). Themes from initial interviews were explored and developed in subsequent interviews, and were mapped to the constructs of the Theory of Planned Behaviour (TPB) to give an overall explanation of the data. The TPB describes the association between an individual's beliefs and their behaviour by considering the influence of their attitude towards a particular behaviour, subjective norms and perceived behavioural control[31].

Setting

Health professionals from general practice and community pharmacies in the counties Northumberland, Tyne and Wear, Stockton-on-Tees and North Cumbria, North of England, were invited to take part. Interviews were conducted between March and August 2016.

Participants

Sixteen one-off interviews were conducted with nine general practitioners (GP), four pharmacists (P), two practice nurses (N) and one nurse practitioner (NP). Participants were recruited through the NIHR Clinical Research Network: North East and North Cumbria and local professional networks via mail and email, and participants were given the option to contact the researcher if they wanted to take part. Most interviews were conducted face-to-face at the participant's place of work or the University of Sunderland. However, due to participant availability, one GP was interviewed at home, and one GP was interviewed by telephone. Only the participant and the researcher were present during the interviews, and the researcher had not met the participants previously. Most participants were not known to each other; however, three pharmacists had lecturing roles at the University of Sunderland and were known to each other.

Confidentiality was assured, the process of the research explained and written consent was obtained prior to the interview. Interviews lasted approximately 45 minutes and interviewees were not paid for participation.

Sampling

Using purposive sampling, participants were recruited from both rural and urban areas to provide an initial maximum variation sample[30]. To test emerging themes, theoretical sampling thereafter proceeded until data saturation was achieved and no new themes were forthcoming[32] in the following two interviews. Data gathered from the interview with the nurse practitioner was similar to that of the data obtained from the interviews with the practice nurses. Data saturation occurred quickly in the information provided by the interviews from our allied health professional group, thus more GPs were recruited than other health professionals.

Analysis

Interviews were audio recorded and transcribed verbatim, and analysis was performed using Microsoft Word 2010. Open coding of transcripts preceded the categorisation of the data, and as the interviews progressed, themes emerging from the data were tested in subsequent interviews[33]. Notes made by RD after the interviews were considering during analysis. Data analysis occurred concurrently with the interviews, and constant comparison and iterative analysis of the interview data allowed for development and remodelling of

themes until data saturation was achieved[30]. Coding was performed by RD and in-depth data analysis and negotiation of themes was conducted by RD, KK, and SW. Transcripts were returned to participants for comments and corrections; however, no feedback was received.

RESULTS

Participant characteristics are shown in Table 1. Participant age ranged from 25-60 years, and four participants were male and twelve were female, with six participants working in rural areas and ten working in urban areas. The three main themes that emerged from the data were perceived health professional control, perceived health professional responsibility and attitudes to thyroid control, which were underpinned to the TPB as shown in Figure 1.

Perceived Health Professional Control

Management of Hypothyroidism

Generally health professionals found the management of hypothyroidism straightforward, relying on blood tests over non-specific clinical symptoms. However, there was uncertainty whether to start levothyroxine treatment in asymptomatic patients with borderline TSH levels, or patients with suggestive hypothyroid symptoms that did not have elevated TSH levels:

> *It's relatively commonly and easily managed. And the medication is generally quite palatable for patients. And they largely feel better. (GP-1)*

> *I think it's something that we often go into a bit of autopilot because we rely more on blood tests. (GP-6)*

> *Should you treat them or should you not? …we'll just keep an eye on the blood test. The other side of the coin is that they get labelled and start having treatment for something when actually if you just left them alone they would have been fine. (GP-8)*

Some health professionals recounted patients finding information on levothyroxine alternatives from online forums. Alternative treatments or referring to an endocrinologist was a last resort following the unsuccessful management of TSH with levothyroxine. Only a minority described alternatives including liothyronine (a synthetic form of triiodothyronine, T3), Armour Thyroid (desiccated porcine thyroid extract) and homeopathic alternatives. Health professionals had a tentative approach to levothyroxine alternatives, even with one example of a patient reporting feeling much better taking liothyronine, despite TSH and T3 levels suggesting over-treatment:

> *People research it and they'll come back and say, "I want the T3 because it's better." (GP-2)*

> *She is taking liothyronine… she had never felt better. But her TSH and her T3... suggest she's being over-treated. (NP)*

Monitoring of Hypothyroidism

Health professionals felt that blood test reminders and prescription renewal alerts were enablers of good thyroid management as were alerts to potentially interacting medication:

One of our admin team does a regular search and just finds out who's out of date with their blood tests. (GP-7)

Because it's so good now, the computer system… Because it also alerts you if the doctors are prescribing something that interacts (N-2)

Access

Easy access to blood tests and electronic prescriptions were perceived by GPs to help patients access their levothyroxine; however, concern was raised that patients in nursing homes might not be as tightly monitored:

Electronic prescriptions and things have been helpful… not having the money, I guess, to get the bus up to pick up a prescription… we can send prescriptions electronically to the chemist. (GP-4)

We do have phlebotomy appointments in the evenings and weekends. (GP-7)

Continuity of Care

Continuity of care was perceived by GPs to be important for the management of hypothyroid patients. Interpretation of normal thyroid function was difficult without matching patients' expectations, symptoms and blood tests results:

So continuity of care does make a difference to patients who are difficult to manage or where compliance is potentially a problem. Because if they start dotting all over the place, then you know you have to work that thread back up. And it's all about trust. A lot of it is about trust in the GP. And that comes from continuity of care. (GP-1)

I think sometimes if blood test results are going back to a different [GP] than normally sees the patient, then it may just say "normal". And there's a risk that you would just say normal. (GP-7)

Pharmacists felt the advice they could give patients was limited by their lack of access to patient medical records, and that they could only advise depending on a patient's account of their TSH results and medications. Pharmacists felt that access to TSH results would save time and inaccuracies in advice they give:

And that's something that, you know, it would really help us if we had access to things like TSH results and things. Just as a second check, I think. (P-2)

Health Professional Knowledge

GPs and nurses felt they would need to check which medications may interact with levothyroxine, and it was generally perceived that their knowledge of hypothyroidism pharmacokinetics could be increased. Most health professionals felt that the GP had overall responsibility for knowledge acquisition:

I mean, off the top of my head, I actually couldn't tell you any interactions between thyroxine… Apart from… I think it's iron. (GP-8)

I suppose I haven't really taken the trouble to learn because I know that somebody else is doing it. (N-2)

GPs and pharmacists generally perceived that patient knowledge of thyroid function was basic. Pharmacists mostly felt that patients were unaware of the risk of under or over treatment with levothyroxine:

I don't think many of them can really tell you what it's for, what the thyroid does or what the risks are of going too high or too low. (P-1)

Perceived Health Professional Responsibility

Provision of Information

Generally health professionals provided verbal information about hypothyroidism and the importance of blood tests. Pharmacists described the need to avoid multivitamins, iron containing drugs, calcium containing drugs, indigestion remedies and coffee. Health professionals generally did not explain the effects of hypothyroidism on the thyroid:

I'm not a leaflet person. I like to talk and tell them. And if I've got a visual aid, using the computer. I'll explain to that. (NP-1)

Best in the morning. Not to take it [levothyroxine] with anything else – certainly not a cup of coffee. (P-3)

Generally, health professionals perceived that patients researched their own condition, or they would use leaflets from, or direct patients to patient.co.uk:

These days I would generally tell people to look it up on the internet. And I would usually direct them to a website. These days, mainly patient.co.uk. (GP-9)

You know, they're quite happy, and they'll often do research themselves. (GP-1)

Use of Guidelines

Local guidelines were used by the majority of GPs, although many were reliant upon the laboratory reference ranges. A few GPs felt that their management of hypothyroidism was not based on any guidelines:

I think that's all in the TRAMP [Thyroid Regional Assessment and Management Plan, NHS North of Tyne and Gateshead Area Prescribing Committee, North of England] guidelines. I think I try to follow what I'm meant to do. (GP-4)

I think the idea is just to try and get the result sitting somewhere in that [laboratory reference range]. (GP-8)

You interpret the guidelines to treat the patient, not fitting the patient to the guideline. (GP-3)

Individualistic Approach

Most GPs and nurses perceived that an individualistic approach was necessary for optimal thyroid hormone replacement for each patient. The general consensus was that GPs were

happy to increase levothyroxine doses to make patients feel better as long as TSH levels remained within range:

> *I aim to get them within range and feeling okay. (GP-9)*

> *I know there is evidence to suggest that you should keep them more to the suppressed end. If they're in the parameters, to me, they are controlled. (NP-1)*

Overtreatment with Levothyroxine

Health professionals described the difficulty of attributing symptoms to thyroid disease when a levothyroxine treated patient's TSH remains in range:

> *But my instinct is that if you say you're unwell and your thyroid blood tests are normal, I don't think you're unwell because of your thyroid problem. I would be... I would be very reluctant to give somebody extra thyroxine just in case. (GP-6)*

GPs and nurses were conscious of the cardiac complications associated with giving a patient too much levothyroxine too quickly. Extra caution was described when treating the elderly where the risks of fractures may be high:

> *You need to be careful that you don't suppress it too much, because that comes with some clinical risks around fractures – particularly in elderly patients. (GP-1)*

Most GPs and the nurse practitioner were not prepared to over-treat patients with levothyroxine due to the associated risks. One GP recounted that she had intentionally over suppressed a patient's TSH level, explaining that she knew the patient well; the patient had a good knowledge of their condition, was aware of the risks of over suppression, and was miserable on a lower dose. However, another GP felt that some colleagues choose to ignore over suppression of TSH:

> *And if that little old lady then falls over or fractures… And sues you, because you've, you know, artificially suppressed her TSH. (GP-1)*

> *I felt that she was making an informed decision. She knew what the risks were. Especially as she got older… being over-treated. (GP-3)*

> *I've worked in a new practice, patients that have had TSH below 0.02 for a long time and they've just been told it's normal. (GP-5)*

Reliability of Hypothyroid Symptoms

Health professionals had a good knowledge of hypothyroid symptoms and felt that if they knew the patient then developing slowness and change in mood made them suspect hypothyroidism. GPs felt that the symptoms of hypothyroidism were nonspecific and overlapped with a number of clinical conditions. Moreover, health professionals perceived that patients often feel that their thyroid is accountable for many symptoms, particularly weight gain and tiredness:

> *So, you know, tiredness being one, weight gain being another, dry skin, intolerance to cold. But… Those are symptoms of lots of conditions, both physical health and mental health problems. (GP-1)*

Once they've got a diagnosis of underactive thyroid, I think they blame it. (GP-2)

Attitudes to Thyroid Control

Responsibility

Health professionals felt that it was the patient's responsibility to attend blood tests, for good medication adherence, and to challenge the GP if they were feeling symptomatic, however, it was perceived that the GP had overall responsibility:

I think it's in partnership. Because if the patient doesn't take the tablets, then you're not going to get control… and you don't check the blood tests and manage them appropriately, you're not going to get good control. (GP-3)

Mainly the GP it's their GP, who's got the overall responsibility of looking after that patient. (NP-1)

Incorrect Levothyroxine Adherence as the Main Reason for Suboptimal Treatment

Some health professionals in our study felt that avoiding weight gain encouraged levothyroxine adherence in patients. Health professionals believed that poor adherence was the main reason patients struggle to lower TSH levels. Additionally, the majority of health professionals said they had experienced a small proportion of patients who would take more levothyroxine than prescribed to alleviate tiredness or in an attempt to lose weight:

They think, oh, if I don't take it, I'll put even more weight on. So I think there is a lot of that going on. (N-2)

Certainly one patient I can remember who had said he had been feeling tired and have been taking an extra tablet. (P-1)

… likes to run his TSH low. And there is no arguing with him, because he will just take what he wants to take. He'll come in and lie. (GP-8)

The Priority of Hypothyroidism

Health professionals believed patients may not prioritise hypothyroidism over health conditions such as heart disease, diabetes, hypertension and hypercholesterolaemia, and hypothyroidism was not a routine focus of medication reviews. Removal of hypothyroidism from the Quality and Outcome Framework (QOF) targets led to suspicions of reduced control and monitoring in some practices:

People who are on Dosette trays… they're more concerned about the other conditions that they have. (P-3)

There's certain drugs that we get, sort of, payment for sitting down with patients and really going through how they work and how they should be taken. (P-2)

And it used to be a QOF target that each year they had to have an annual TSH, which was a very easy target to hit. And then it stopped about two years ago. So I think some practices, potentially, have sort of let their thyroid management drop. (GP-2)

Time Restrictions

GPs and pharmacists felt that lack of time limited the information exchanged when speaking to a patient. One pharmacist felt there was pressure to focus on medication reviews, reducing the time available to give advice to other patients:

> *You're always short of time. It's always a problem. (GP-7)*

> *They encourage us to do new services, such as medication use reviews and new medicine service reviews in pharmacies. We don't necessarily have as much time as we would like to stand on the counter and talk to patients (P-1)*

Concern over prioritising the busy GP workload was articulated, with thyroid function tests potentially accepted as being normal when they may not be:

> *And we've got an awful lot on our plates – using that old excuse again. But we're really, really busy. And… Sometimes the blood results come through and you're just like, well, actually they might have missed it for the last few days or whatever. And just bounce it through, you know. And then the patient… It's on the patient's head to ring up for their results and check that their levels are okay. (GP-8)*

Factors that Interact with Treatment for Hypothyroidism

GPs and pharmacists felt that if patients had an elevated TSH but reported that they were compliant then it may be due to other medication affecting the absorption of levothyroxine. Health professionals also felt that stress, diet, alcohol, coffee, smoking, having a busy lifestyle, co-morbidities, other medications, mental health, learning disabilities, deafness and dementia could all have an effect on optimal thyroid hormone replacement:

> *So I guess when it's [TSH] too high it's usually like what I said before – are you taking your medication at all? Are there other reasons why it might be that you're not absorbing it? Like the medication? Other conditions? (GP-4)*

> *And I don't think people had realised for many years, is the caffeine thing. And that's the kind of thing that could come out in an MUR [medicine use review]. So are they drinking it with a cup of coffee in a morning? And calcium supplements as well. (P-3)*

Discussion

Principal Findings

Regarding perceived professional control, health professionals felt that hypothyroidism was an easy condition to manage, and felt they relied on blood tests over non-specific clinical symptoms to confirm a diagnosis. However, health professionals generally perceived they had a lack of in-depth knowledge of medication interaction. On the other hand pharmacists felt they could provide limited advice due to their lack of access to patient data and lack of time. Enablers perceived by health professionals to improve the management of hypothyroidism included continuity of care, reminders for blood tests, system alerts for medication interactions and prescription renewal, and easy access to blood tests and levothyroxine prescriptions for patients.

In terms of perceived professional responsibility, most GPs and the nurse practitioner followed local guidelines for the management of hypothyroidism, and would only increase

the levothyroxine dose to improve symptom control as long as TSH levels remained within range. However, one GP recounted over suppressing a patient at the patient's request. The information exchanged between health professional and patient was limited by time restrictions, with most GPs and nurses assuming that patients would research their condition online. Written information leaflets were rarely provided to patients.

Attitudes to thyroid control included perceiving hypothyroidism as less serious and more straightforward than other health conditions and that taking too much or too little levothyroxine was the main reason for inadequate thyroid control. However, interfering factors such as stress, other conditions and concomitant medication were acknowledged. GPs felt they were mainly responsible for a patient's treatment, but stressed that good medication adherence by patients was important for optimal treatment.

Health professionals will usually strive to hold all attitudes, beliefs and behaviours in harmony[34]. However, this study has highlighted the cognitive dissonance between attitudes and beliefs versus behaviours that exist.

Comparisons with existing literature

Similar to the findings of our study, the management of hypothyroidism has been reported to be straightforward[16]. Like the GPs in our study, continuity of care was described by GPs in a previous qualitative study to enable them to provide higher quality of care in general practice due to the personal relationships that had formed[35]. However, health professionals generally felt they had incomplete knowledge of hypothyroidism, which was also found for other diseases such as gout[36] and dementia[37]. Access to patients medical records suggested by the pharmacists in this study has also been recommended to improve care and patient safety within Britain by the Royal Pharmaceutical Society[38]. Including pharmacists in health care teams has been shown to reduce hospital admissions and medical costs of patients aged 80 years of age or older in Sweden[39], and pharmacist involvement has also been associated with lower rates of adverse drug events[40].

Deliberate TSH suppression (<0.1 mU/L) with high doses of levothyroxine, which was avoided by the majority of GPs in our study, is not recommended due to the potential risk of heart disease, stroke, osteoporosis and fractures[41]. In our previously published work with hypothyroid patients, patients felt that health professionals were more inclined to treat their TSH levels than their symptoms and that they were not given very much information at the time of diagnosis[29], as reported by some health professionals in this study.

Time was a barrier to thyroid management identified by health professionals in our study, and is a well-documented limitation in primary care[42 43]. However, previous studies have shown that although time is a limitation in terms of the information exchanged, it is consultation quality rather than the length of appointment that is more impactful[43]. Poor levothyroxine adherence, medication interactions and co-morbidities have been reported to have an effect on thyroid replacement therapy[44], which were some of the barriers reported in this study. However, in our qualitative interview study with hypothyroid patients, although not generlisable outside of the patient population, good levothyroxine adherence was reported by nearly all patients, even those who had TSH levels outside of the reference range[29], suggesting that the reasons for inadequate thyroid treatment may lie deeper than the typical assumptions by health professionals that poor adherence is the main reason for suboptimal treatment[22 23].

Strengths and weaknesses

Due to time restrictions of this research project, this study did not have the opportunity to be pilot tested, which may have affected how the interviews progressed. Moreover, no feedback on the transcripts was provided by participants; feedback may have contributed to enriching the data further. Open coding was performed by RD, however, negotiation of categories and themes were conducted by RD, KK and SW to help reduce this limitation.

Since our sample only included four pharmacists and three nurses the evidence presented from these groups may lack validity and generalisability outside of this small sample size. Moreover, a different sample of participants with different levels of experience may have provided different results, particularly pharmacists with more years of experience, and also from rural areas. Additionally, within our GP sample it was unknown whether those that took part in our study were more likely to follow guidelines and regularly review patients, thus being less likely to have higher numbers of thyroxine treated patients with abnormal TSH than those who did not take part in our study. However, although this study was conducted with a sample of sixteen participants in the North of England, and may not be generally applicable, the findings are transferrable within this professional population, and this study provides novel insights into the attitudes, experiences and behaviour of health professionals involved in the management of hypothyroidism.

Implications for future research and clinical practice

To help increase perceived health professional control in the future, quantifying the extent that clinical, behavioural and pharmacogenomic associations may affect levothyroxine therapy and providing this information to health professionals involved in management of hypothyroidism may improve management and therefore treatment for this group of patients. However, it should be considered that health professionals in general practice have limited time and specialism. Moreover, increasing the involvement of pharmacists or practice nurses in the management of hypothyroidism may improve their perceived control and help relieve the pressure on GPs, and may also increase continuity of care, for example through pharmacist led medication reviews or specific chronic disease management clinics for this cohort of patients.

To reinforce perceived health professional responsibility, consistent provision of patient information leaflets and discussions about hypothyroidism would help increase patient understanding and this type of information can be exchanged in a short period of time, and may reduce the time pressures on GPs if patients are more informed. Finally, clarity on the timing of initiation of treatment in asymptomatic patients with slightly elevated TSH, and an age specific and symptom focus where appropriate may help to improve the management of hypothyroid patients within general practice.

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Ethical approval

Ethical approval was granted from NRES Committee West Midlands - South Birmingham REC (REC reference 15/WM/0345) with SSA approval from Northumberland, Gateshead, and South Tyneside Local Research Ethics Committees. Approval was also granted from the University of Sunderland Research Ethics Committee.

Competing interests

The authors have stated that there are none

Contribution

SW designed the study. RD was responsible for the recruitment and interviewing of participants. RD gained qualitative research skills through attendance at a qualitative interview training course at Newcastle University, and from working on previous research projects. RD, SW and KK were involved in the in-depth data analysis and development of themes that emerged from the data. RD wrote the first draft of this paper. OO, SP, GD, PT, JH, CD, GL and SR were involved in the overall explanation of the data and revision of the final manuscript.

Data sharing

No additional data are available

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Box 1. Initial Topic Guide for Interviews

What is your role in the management of patients with hypothyroidism?

Symptoms of hypothyroidism

- How would you describe your familiarity with the symptoms of hypothyroidism?
- Are you confident to spot patients with hypothyroidism? Why? Example?
- What makes you suspect hypothyroidism? Why? Example?

Diagnosis

- How would you describe your confidence in making a diagnosis of hypothyroidism?

Referral

- Do you refer patients who have abnormal thyroid function tests? Can you describe the process?
- Do you refer patients to get a diagnosis of hypothyroidism?
- Who do you refer to? Can you describe the process?

Management

- What do you think about the management of hypothyroidism in general practice? Are you happy to manage hypothyroidism in general practice?
- How often do you check thyroid function tests?
- Does this differ for controlled/out of control patients?
- Are there any instances when you would refer/seek help? Example?
- How do you manage patients who complain of symptoms and the TSH is in the normal range? Example? Or would in theory? What are your thoughts on this?
- Do you find it difficult to keep the TSH in the reference range?
- What do you think about changing levothyroxine dose for patients? Do you think the increments of 25mcg of levothyroxine too great?

What are your thoughts about hypothyroid patients who are out of control? Are you concerned about hypothyroid patients who are out of control?

- What are your thoughts on patients with:
  - High TSH (usually indicating too little levothyroxine)?
  - Low TSH (usually indicating too much levothyroxine)?

How do you manage patients who insist on taking more levothyroxine than their TSH suggests (i.e. over-suppressed)?

What do you think about patients who have high TSH blood tests which suggests that they are not taking enough levothyroxine? Have you experienced this?

What are the main influences that you see that contribute to patients struggling to control their hypothyroidism?

Can you predict which patients will struggle to control their hypothyroidism? Example?

Table 1 Participant Characteristics

Job Role	Location	Age	Gender	Years Qualified
General Practitioner				
GP-1	Urban	45	Female	10
GP-2	Rural	40	Male	14
GP-3	Urban	59	Female	36
GP-4	Urban	36	Female	10
GP-5	Urban	39	Female	16
GP-6	Urban	51	Male	27
GP-7	Rural	52	Female	29
GP-8	Rural	39	Female	14
GP-9	Rural	48	Male	20
Nurse practitioner				
NP-1	Rural	55	Female	35
Practice Nurse				
N-1	Urban	58	Female	40
N-2	Rural	60	Female	40
Community Pharmacist				
P-1	Urban	30	Male	8
P-2	Urban	29	Female	6
P-3	Urban	39	Female	15
P-4	Urban	25	Female	2

Figure 1 Concept diagram showing the attitudes and perceptions of health professionals towards management of hypothyroidism in general practice

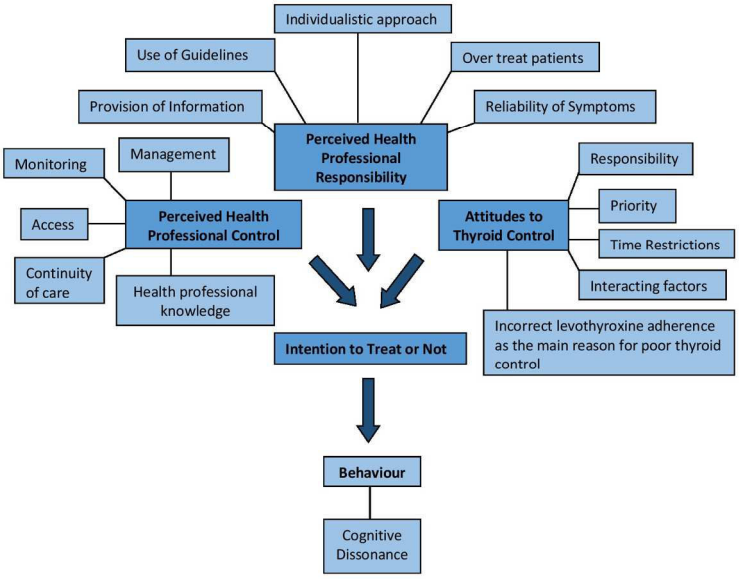

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Figure 1 Concept diagram showing the attitudes and perceptions of health professionals towards management of hypothyroidism in general practice

140x198mm (300 x 300 DPI)

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

Developed from:
Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

YOU MUST PROVIDE A RESPONSE FOR ALL ITEMS. ENTER N/A IF NOT APPLICABLE

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Inter viewer/facilitator	Which author/s conducted the inter view or focus group?	Methods
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Collaborators
3. Occupation	What was their occupation at the time of the study?	Collaborators
4. Gender	Was the researcher male or female?	N/A
5. Experience and training	What experience or training did the researcher have?	Contribution
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Methods
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Strengths and Limitations
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Strengths and Limitations
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Methods
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Methods
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Methods
12. Sample size	How many participants were in the study?	Methods

13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Methods
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	Methods
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Methods
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Methods and Strengths and Limitations
18. Repeat interviews	Were repeat inter views carried out? If yes, how many?	Methods
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Methods
20. Field notes	Were field notes made during and/or after the inter view or focus group?	Methods
21. Duration	What was the duration of the inter views or focus group?	Methods
22. Data saturation	Was data saturation discussed?	Methods
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Methods
Domain 3: analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Methods
25. Description of the coding tree	Did authors provide a description of the coding tree?	Methods
26. Derivation of themes	Were themes identified in advance or derived from the data?	Methods
27. Software	What software, if applicable, was used to manage the data?	Methods
28. Participant checking	Did participants provide feedback on the findings?	Methods + Strengths and limitations
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Results
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Results
31. Clarity of major themes	Were major themes clearly presented in the findings?	Results
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Results

Once you have completed this checklist, please save a copy and upload it as part of your submission. When requested to do so as part of the upload process, please select the file type: *Checklist*. You will NOT be able to proceed with submission unless the checklist has been uploaded. Please DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.