

Miren I Jones, Sheila M Greenfield, Emma P Bray, FD Richard Hobbs, Roger Holder, Paul Little, Jonathan Mant, Bryan Williams and Richard J McManus

Patient self-monitoring of blood pressure and self-titration of medication in primary care:

the TASMINGH2 trial qualitative study of health professionals' experiences

Abstract

Background

Self-monitoring with self-titration of antihypertensives leads to reduced blood pressure. Patients are keen on self-monitoring but little is known about healthcare professional views.

Aim

To explore health professionals' views and experiences of patient self-management, particularly with respect to future implementation into routine care.

Design and setting

Qualitative study embedded within a randomised controlled trial of healthcare professionals participating in the TASMINGH2 trial of patient self-monitoring with self-titration of antihypertensives from 24 West Midlands general practices.

Method

Taped and transcribed semi-structured interviews with 13 GPs, two practice nurses and one healthcare assistant. Constant comparative method of analysis.

Results

Primary care professionals were positive about self-monitoring, but procedures for ensuring patients measured blood pressure correctly were haphazard. GPs interpreted home readings variably, with many not making adjustment for lower home blood pressure. Interviewees were satisfied with patient training and arrangements for blood pressure monitoring and self-titration of medication during the trial, but less sure about future implementation into routine care. There was evidence of a need for training of both patients and professionals for successful integration of self-management.

Conclusion

Health professionals wanted more patient involvement in hypertension care but needed a framework to work within. Consideration of how to train patients to measure blood pressure and how home readings become part of their care is required before self-monitoring and self-titration can be implemented widely. As home monitoring becomes more widespread, the development of patient self-management, including self-titration of medication, should follow but this may take time to achieve.

Keywords

general practice; hypertension, primary care; qualitative research, self-monitoring.

INTRODUCTION

Hypertension places a significant workload on primary care, with around one in eight of the UK population receiving care.¹ Despite recent improvements, many patients' blood pressure remains poorly controlled.² Self-monitoring is becoming more common and has the potential to reduce blood pressure and the monitoring burden currently placed on health professionals.³⁻⁷ Self-monitoring with antihypertensive self-titration leads to reduced blood pressure,⁸ but other interventions using self-monitoring to guide medication titration interventions have been less successful.^{9,10}

Patients are keen to be involved in blood pressure self-monitoring,¹¹ but outside trials, many undertake it without informing their GP.⁴ This significant missed opportunity may reflect healthcare professionals' actual or perceived views about self-monitoring. Primary care physician surveys in Hungary and Canada found enthusiasm for self-monitoring, but concerns about using non-validated monitors and potential patient preoccupation with their blood pressure.^{12,13} An earlier US study reported physicians thought home monitoring could be useful

but seemed hesitant to endorse it fully.¹⁴

This qualitative study explored the views of healthcare professionals in primary care participating in a trial of patient self-monitoring with self-titration of antihypertensives. It also aimed to inform implementation of the results outside trial conditions.

METHOD

Trial intervention

Trial methodology and main results are reported elsewhere.^{15,8} A total of 527 patients from 24 general practices, aged 35-85 years with poorly controlled treated hypertension, were randomised to either self-monitoring with self-titration of antihypertensive medication and telemonitoring or usual care (Box 1). Participating GPs received training (about 1 hour) on trial requirements, including preparing advance medication plans for intervention patients to implement if their home blood pressure readings were above target.

Recruitment of interview participants

A range of hypertension management staff in participating practices were invited for

MI Jones, PhD, research fellow; **SM Greenfield**, BSc, MA, PhD, professor of medical sociology; **EP Bray**, PhD, research fellow; **R Holder**, BSc (Hons), medical statistician, Primary Care Clinical Sciences and NIHR School for Primary Care Research, University of Birmingham, Birmingham. **FDR Hobbs**, FRCGP, FRCP, FESC, FMedSci, MA, professor of primary care health sciences; **RJ McManus**, MA, PhD, FRCGP, professor of primary care, Primary Care Health Sciences and NIHR School for Primary Care Research, University of Oxford, Oxford. **P Little**, MRCP, MD, MRCGP, DLSHTM, LSHTM, FRCGP, FMedSci, professor of primary care research, School of Medicine and NIHR School for Primary Care Research, University of Southampton, Southampton. **J Mant**, MA, MSc, MD, FFPH, professor of primary care research, General Practice and Primary Care Research Unit,

Institute of Public Health, University of Cambridge, Cambridge. **B Williams**, MRCP, FRCP, MD, FAHA, chair of medicine, Institute of Cardiovascular Sciences, University College London, London.

Address for correspondence

Sheila Greenfield, Primary Care Clinical Sciences, Primary Care Clinical Sciences Building, School of Health & Population Sciences, University of Birmingham, Birmingham B15 2TT.

E-mail: s.m.greenfield@bham.ac.uk

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How this fits in

Self-monitoring with self-titration of antihypertensives leads to reduced blood pressure. Patients are keen to be involved in self-management but little is known about healthcare professional views. Work outside the UK suggests although apparently enthusiastic, professionals have concerns about routine implementation of self-monitoring such as non-validated monitors and patient preoccupation with blood pressure. In this study self-monitoring was largely welcomed as a useful tool to increase patient involvement in blood pressure management and assessment of out-of-office blood pressure was seen as important. Healthcare professionals needed education on the correct interpretation of self-monitored readings and were sometimes surprised at the type of patients who successfully self-managed. Healthcare professionals were concerned about the effort and cost needed to routinely implement self titration and about patient self-confidence to do this.

interview, using judgement sampling¹⁶ to reflect main trial practice variety. This involved participants being specifically selected based. Practices had to be at the point where practice and/or patients were trained and attending for medication review. GPs were preferentially included having had most trial input. Interviews were undertaken early in the trial, when patients had been seen in practice to prepare medication plans, or at the end when patients had completed the intervention, to allow for inclusion of the range of experience. Recruitment continued to theme saturation.

Box 1. Summary of TASMINGH2 12-month trial intervention

Intervention patients

- Given a blood pressure monitor (Omron 705IT) and a modem (i-modem, Netmedical, NL) to transmit their readings to the research team
- Attended two training sessions run by the research team (45–60 minutes each)
- Attended a medication review with GP at the start of the study to discuss potential medication changes and devise a titration plan to be implemented as required
- Measured their blood pressure daily for 1 week each month for 12 months taking two readings 5 minutes apart each morning while sitting quietly
- Coded the second readings as
 - ‘green’ (normal: systolic 101–130 and diastolic <86 mmHg),
 - ‘amber’ (raised: systolic 131–200 or diastolic 86–100 mmHg), or
 - ‘red’ (high or low: systolic >200 or <101, or diastolic >100 mmHg)
- Were advised to contact their GP surgery if any readings were high or low (‘red’)
- ≥4 ‘amber’ readings per month was classed as an ‘amber’ month, and two consecutive ‘amber’ months triggered a medication change
- Patients could implement a medication change without further need to contact their GP by putting a red sticker on their repeat prescription request form

Control patients

- Received usual hypertension care from GP and/or practice nurse
- Attended a standard medication review with GP at the start of the study

Interviews

Semi-structured interview questions were developed through discussion by research team members and covered usual hypertension management, patient self-monitoring outside the TASMINGH2 trial, trial experience, and the future of post-trial hypertension care. Health professionals were interviewed between 2008–2009 in their practices and gave signed informed consent. Interviews (30–60 minutes duration) were recorded and transcribed.

Analysis

Transcripts and field notes were read to identify main themes and subthemes and analysed manually. Initial themes were identified independently and discussed by three authors (a biomedical scientist, a GP, and a medical sociologist) followed by theme development and refinement using a constant comparative method.¹⁷ Each transcript was reread to identify where themes were mentioned, and a brief synopsis for each interviewee for each theme was entered on a chart to enable comparison for data understanding and interpretation.¹⁸

RESULTS

Participants

All 16 healthcare professionals invited to participate agreed (Table 1). Thirteen GPs, two practice nurses (PN) and one healthcare assistant (HCA) from 14 practices were interviewed. Sixteen interviews were carried out.

Analysis themes

Emerging themes were organised under three main headings: professionals’ views of self-monitoring in general, professionals’ experience of the trial, and professionals’ views of how it may affect future practice. There were no major differences in themes from interviews undertaken early compared with those at the end of the trial.

Professionals’ views on blood pressure self-monitoring in general

All clinicians noted in recent years the cost of blood pressure monitors had reduced with the increasing demand from patients who were self-monitoring, some with GP encouragement. Clinicians in more affluent areas thought large numbers of their patients had bought their own monitors, but few advised them what type to buy.

GPs thought there were benefits in patients becoming more involved in and understanding more about their care, reducing surgery workload, identifying

Table 1. Characteristics of healthcare professionals participating in this study

	Mean	Range
Practice list size	11894	1896–20481
Number of GP partners	7.2	1–17
Number of years in profession	16.9	4.5–30
Number of years in current practice	14.4	1.5–30
Number of patients randomised into TASMINH2 trial	27.5	8–56

white coat syndrome and therefore unnecessary medication:

'... it's quite nice to see if you can ship out some of the work to, or give the stuff back to the patients to do which if it makes them more involved and helps them understand things is ultimately better.' (GP1)

'... some of them get a bit anxious when they come here and as I said they're always keen to avoid increase in the medication and if they take it at home they do usually get lower readings which they feel ... which I and the patient feels really reassured about.' (GP2)

'Yes. Not everybody, selectively ... a lot of people ask us about them proactively and if anybody asks I never discourage them because it's, you know, it empowers them and ... they can see how they're getting on and sometimes when they feel they have a headache and they worry about their blood pressure they are able to take it and either confirm their fears or are reassured.' (GP3)

Practice nurses were less positive about self-monitoring and the healthcare assistant said she discouraged patients from buying a monitor:

'No, I don't because I think they get a little bit um, neurotic about it. You know, they're checking it every day ...' (HCA)

Patients were not trained to measure their blood pressure correctly, except when lent a practice monitor. GPs occasionally asked patients to bring their monitor into the surgery and would compare the reading against the surgery monitor to check calibration, but not all had considered the need to train patients:

'[training] ... at the moment no, ... it would be the pharmacist I guess when they buy the machine. But we don't actively ... we're quite happy ... I mean I do occasionally ask

them to bring them in to see the practice nurse and just ... just to go through it ... but, normally we rely on the pharmacist but whether they're just buying them and trying it out at home I don't know. We're certainly not checking them here. Maybe it's something that we should do.' (GP12)

Paradoxically, although the healthcare assistant did not encourage home monitoring, she asked patients with a home monitor to bring it in to show them how to use it correctly.

Professionals' utilisation of self-monitoring.

Several practices had monitors for lending to patients, usually at diagnosis. GP10 reported he would normally ask patients to record morning and evening readings for a week before making a diagnosis, although not all GPs in his surgery did this. He also sometimes asked patients to do home readings before adjusting their medication. Others suggested a less systematic approach to their patients:

'I normally suggest you do it first thing in the morning and after sitting down for a little ... either first thing in the morning or when they're sitting down watching television, so they're sat down for a little while. And probably only once a week, because I don't need thousands of readings.' (GP12)

GPs were inconsistent in how they used patients' home readings. They reported patients sometimes brought home readings to consultations but not in an organised way and even when GPs asked to see the readings, they did not always incorporate these into decision making:

'Yeah so some of them write it and different patients do different things, some of them write it on their repeat prescription slip, other ones do write on a scrap of paper and other ones do spread sheets which they email in.' (GP2)

'Yeah, I use those well over and above what I get here.' (GP13)

'If they're being reviewed for hypertension, yes. [patients bring home readings] ... or I just ask them what their home average is and they tell me and then I put it on the screen.' (GP10)

'Yes, we just ask them to write it on the ... either to submit a piece of paper or write it on their repeat prescription. ... I usually add 10 to it and use that as a guideline to ... in

terms of monitoring it and compare to what we read in the surgery.’ (GP12)

‘... if I find that there’s a particular pattern, showing a lot of high readings then I think that would be a cause for concern just because we sort of tend to appreciate our patients will usually have better blood pressure readings at home, so yes I would. But saying that if they came here and their blood pressure was high and they were getting normal readings at home, I may be swayed towards using my readings as opposed to readings they are getting at home.’ (GP9)

The practice nurses and healthcare assistant followed their practice protocols for blood pressure monitoring but these did not include guidance on home readings. One practice nurse was unaware home readings were generally lower than office readings and was unsure how to deal with patients with low home readings. A GP also reported he was amending patient home blood pressure reading targets from 140/85 mmHg to 135/85 mmHg:

‘I think they think it’s a good idea cos often their blood pressures are lower when they’re doing it themselves ... It’s put us in a bit of a dilemma I think cos we’re getting their blood pressures high and then when they’re doing them at home, they’re low, it’s difficult isn’t it, to know what to do ... Are they going to be more correct than the ones we do?’ (PN1)

Professionals’ experience of the trial

Pre-specifying medication changes. For patients to self-titrate, GPs needed to pre-specify medication changes in advance. Although many were comfortable with this, some found it challenging as it was outside their usual practice. They found it difficult to explain to patients that they may not make such changes for some months. This could be further complicated if a patient had side effects and subsequent titration plans needed updating.

GPs were divided about the benefits of preparing advance medication plans. While some found it useful, others felt the additional paperwork gave no advantage as they would do it anyway when the patient needed to increase their medication, particularly if plans subsequently needed changing due to side effects:

‘Well, that [preparing medication change plans in advance] would involve probably as much work as actually seeing them every 6

months or when the blood pressure is not right, and then just changing it at that point, so I can’t see a good reason why I should spend another 10 minutes to tell them what to do next time.’ (GP10)

‘I mean it saves you a lot of time really, if you sit down and say well you can monitor your blood pressure and yeah, it’s all sorted in terms of the next medication change and whether you need blood tests or not. Because otherwise what happens is they’ll see the practice nurse on two or three occasions, and then I will have to phone the patient, discuss it on the phone, sort out a blood test. So it was probably a lot less work than normal, apart from the individual appointment was a little bit longer to do.’ (GP12)

‘I think it’s something new, new to them [patients] and I think they may take a bit of persuading. ... they’re a bit self-reliant on, on their advisers, medical advisers at the moment, the health professionals, so it is a quite a major change in perception of health care, so it’s something that perhaps will come with the future. I can see it.’ (GP14)

GP2 wondered if the training emphasised sufficiently that patients could implement medication changes themselves without returning to the GP:

‘... they haven’t had the confidence when they have the amber [raised] readings to phone up offer up the slip and get the next prescription ... I don’t know if it wasn’t emphasised enough to them that part of the project was about not coming back, having to come back to see your doctor or some of them were just not used to monitoring it themselves anyway.’ (GP2)

Self-titration. Some GPs felt self-titration could be implemented into routine practice, but were unsure how training could be organised because of cost and limited staff time. Bringing in outside trainers was acceptable for some GPs but again cost was an issue. The trial included some individuals that GPs may have considered unsuitable as any respondent eligible, willing and able to take part was randomised. This did not cause undue problems but was noted by several GPs and one practice nurse:

‘... you actually picked some old people who I’d have thought would probably be a bit ... not very technologically minded and they seemed to get on with it fine.’ (GP10)

'... one or two got a little bit more confused than others, but it wasn't a major problem.' (GP12)

'... different people have different intelligence levels, different abilities to deal with these things, so I was concerned that depending on who was picked there may be one or two people that may struggle with it for a variety of reasons. The one lady that I had to explain in detail I think I'm still not 100% sure she has done it as she should have but everybody else as far as I'm aware hasn't been a problem.' (GP9)

'As the recruiting went on there were certain patients that when they, you pressed the randomisation button and they got randomised into the intervention arm I thought this will never work.' (PN2)

When asked for his views on trial patients sometimes choosing not to increase their medication when their home readings were borderline and/or raised, one GP reflected this was not unexpected as it is often how GPs act in similar circumstances:

'I think they [patients] quite enjoyed doing the blood pressure, though not all of them wanted to do as the trial suggested. So they were happy to stay on their medication and their blood pressure was, in their eyes, and probably our eyes, quite acceptable. But according to the trial we had to increase the medication and they didn't particularly want to do that ... but their blood pressure readings were what we would think as quite low at that point. Yes, but they were coming in the amber group ...' (GP12)

Professionals' experience of how the trial may affect future practice

Workload and self-management. All participants commented on the heavy hypertension management workload, both because of the large numbers of patients involved and the need to recall them regularly for blood pressure checks:

'... it's just such a huge problem, it's like twelve to thirteen percent of our practice population, I'm trying to work out how we can be, do it well but efficiently.' (GP4)

'When we call them up for the QOF, you know, sort of coming up to the end of March, it's just bedlam because we sort of have to look at everybody's, you know, who's hypertensive that hasn't had their blood pressure checked in the last 12 months.' (HCA)

Practices were having to think about ways of encouraging patients to do more themselves to manage their workload. Several GPs said their trial experience encouraged them to suggest more patients buy their own monitor:

'... since doing the study I am probably doing it more [suggesting home monitoring] because I've found it very beneficial from doing the TASMING and my feeling is it probably just helps them understand a little bit more about their own blood pressure, may aid compliance and ... although I do suggest they don't do it too often ...' (GP12)

The trial used telemonitoring to transmit home readings to the research team with summaries sent to GPs. GPs were concerned that if data were transmitted directly to the practice it would require assessment and input into the clinical system and some patients would send in excessive numbers of readings. Consequently they were unsure if blood pressure telemonitoring should be developed further.

During the study one surgery changed their practice by giving patients starting on angiotensin-converting-enzyme (ACE) inhibitors written instructions on how to increase their medication themselves in response to trial procedures.

The practice nurse had responsibility for her surgery hypertension clinic and, based on her trial experience, subsequently made a number of hypertension management changes. The practice bought six monitors for home loan and patients were trained to self-monitor according to trial procedure: two readings 5 minutes apart in the morning, resting in between, daily for a week. She had devised a chart for patients to record their readings systematically and bring to the clinic, and an average of the readings was entered on their electronic record.

However, self-management was seen by others as something which would develop in the future as it would take time to become widely acceptable:

'... it wouldn't work at the moment but sometimes it takes a few years to actually have a fundamental shift on how people view things and if people start to see it as their responsibility, their health is their responsibility rather than somebody else's responsibility, and change their locus of control ... if this gets going as a 'this is the way it's done', I can foresee people being more motivated. I think that's away in the future yet ...' (GP4)

DISCUSSION

Summary

This study provides unique data regarding primary care professionals' views and experiences of hypertension self-monitoring and self-management. Self-monitoring was largely welcomed as a useful tool to increase patient involvement in management and out-of-office blood pressure assessment was seen as important, but prior to the trial, healthcare professionals' use of such monitoring appeared haphazard.

Healthcare professionals were generally enthusiastic about the TASMINH2 trial. In some cases they were surprised which patients could self-manage. However GPs had concerns about the additional effort and expense required for training for wider implementation of self-titration and were unsure whether patients in general would be confident to adjust their own medication. A key issue was integration of self-monitoring into usual care from an organisational viewpoint. Perhaps due to this, there was more enthusiasm for self-monitoring than self-management, although interviews were undertaken prior to the trial's favourable results being available.

Home monitoring enables multiple measurements, at different times of day and over several days, potentially better reflecting 'true' blood pressure than a single clinic reading. The optimum monitoring schedule appears to require readings over 4–7 days and although still developing, there is growing evidence that home readings give better prognostic information than office readings.^{19–24} The TASMINH2 trial has shown patients are able and willing to provide such monitoring over prolonged periods of time.^{8,11} It involved professional led, self-drug titration of an asymptomatic condition, highlighting how patients and healthcare professionals can jointly contribute to disease management.²⁵ Until recently, guidelines for treating hypertension have been based on office readings but this is changing in the UK at least with recent clinical guidelines from the National Institute of Health and Care Excellence recommending out-of-office measurement for hypertension diagnosis.²⁶ The TASMINH2 trial showed a greater blood pressure reduction in patients self-managing compared to usual care.⁸ Perhaps the next guideline iteration will include self-management.

Strengths and limitations

This study was undertaken within

a randomised controlled trial using qualitative methodologies. It provides unique insight into some of the practicalities and challenges involved in integrating self-management into usual care, a significant change to current practice. Three types of healthcare professional from a range of practice sizes, years in practice, and number of trial patients were interviewed. All GPs had undertaken the trial and were hence more likely to be self-monitoring and self-management enthusiasts and it is not possible to comment on how prevalent their views are in the wider healthcare professional population. Further work needs to determine whether implementation issues are similar in practices where these issues are not a priority. The study randomised 527 patients from 24 practices so professionals' perceptions of patients' participation in self-management will have been based on a minority of their hypertension patients, although trial experiences had nevertheless influenced practice.

Although many participants were enthusiastic about self-monitoring before the TASMINH2 trial, there was little evidence of any consideration to systematically incorporate it into their daily practice or include issues such as pre-specifying medication changes or checking whether monitors had been validated. While some questioned the validity of home readings, few provided training to either practice staff or patients to improve quality of readings. This lack of a structured approach may be damaging: in a trial of diabetes self-monitoring many patients expressed concern about the value health professionals placed on their readings, and this was a disincentive to continue self-monitoring.²⁷ Similarly there is evidence that many patients who self-monitor their blood pressure do not disclose this to professionals.⁴ Clinicians' concerns about patients becoming obsessed with self-monitoring appear to be unfounded.¹¹

Comparison with existing literature

Training was a particular issue. Patient training has been shown to improve the accuracy of readings and increase willingness to self-monitor and buy a home monitor.^{28,29} Interviews with TASMINH2 trial patients also showed education in the use of a blood pressure monitor and interpretation of readings gave them confidence and encouraged self-monitoring.¹¹ Conversely, without training, patients' knowledge and measurement technique has been shown to be inadequate,^{20,30} as have instruction

materials provided with some home monitors.³¹ Changing this culture could be achieved through practice nurse- or pharmacist-led education. Pharmacists have been shown to be able to work with patients in titrating medication against self-monitored readings.³²

Professionals were concerned about the practicalities of including self-monitored readings in the clinical record. While laboratory readings have been routinely sent to practices electronically for over a decade, no such system is available for self-monitored blood pressure, despite around 30% patients with hypertension in the UK self-monitoring.³ Agreement on standards and a method of summarising results are prerequisites for widespread adoption of a telemonitoring solution such as the one used in the trial.

Implications for research and practice

Self-care has risen to prominence because of the finite resource pool and the evidence base suggesting shared decision making can result in more effective care.³³ Before the trial, study practices were trying to develop ways of managing workload more efficiently

and some were encouraging patients to take more responsibility for their own care. In the surgery where the practice nurse was a trial researcher, she showed value could be added to home readings by training patients to measure their blood pressure correctly and systematically, giving confidence to both patients and professionals in the validity of the readings, and by setting up procedures for returning readings to the surgery and recording them on the practice system. There needs to be a partnership between patients and health professionals to gain maximum benefit from increasing home monitor use. As the majority of hypertension care is done in primary care, all health professionals, including practice nurses and healthcare assistants involved in measuring blood pressure, need to be familiar with self-monitoring guidelines, particularly the adjustment of targets to take into account lower home readings.

Once home monitoring is established and better accepted by both professional and patient groups, it will also be possible to develop patient self-management of medication more widely, but this may take time to achieve.

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Ethical approval

This study was approved by Sandwell and West Birmingham Local Research Ethics Committee (07/Q2709/42) and informed consent was given by all participants.

Provenance

Freely submitted; externally peer reviewed.

Competing interests

Richard J McManus received a consultancy fee from Tplus Medical (in 2006) to advise on telemonitoring services. FD Richard Hobbs has received limited research support in terms of blood pressure devices from Microlife and BpTRU. All other authors have declared no competing interests.

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