Feasibility of using the Anxiety Thermometer for Routine Screening for Anxiety with Women attending High and Low Risk Antenatal Clinics

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Abstract

Perinatal anxiety is increasingly recognised as a clinical concern in maternity that c. Failure to identify women could potentially lead to them feeling isolated and unsupported, and impact on their psychological health and the health of their baby.

This is a feasibility study of the use of the Anxiety Thermometer (AnxT) as a screening tool for anxiety in high and low risk antenatal clinics, and to elicit pregnant women's most frequently reported concerns. Pregnant women attending follow-up

antenatal appointments were recruited from three antenatal care pathways: Preterm, Multiple Pregnancy and Low Risk to complete the AnxT, which consists of: 1) A single 0 to 10 visual analogue scale, pictorially represented as a vertical temperature thermometer, on which the participants placed a mark to indicate the degree of any current anxiety; 2) A listing of pregnancy-related problems and concerns. Of the 102 women approached, 101 (99%) completed the AnxT. The women were aged between 22 and 44 years (mean age 34.5 years); about half were primigravida and half multigravida. Almost two-thirds rated their current anxiety as 4 or above out of a maximum of 10. The most frequently reported concern was Health of Baby, followed by Fears and Worries, Tiredness and Sleep Problems. The high participation rate suggests that the AnxT can be developed to screen anxiety and elicit perinatal and related concerns to facilitate consultation and appropriate triaging. The problem checklist was refined based on the current results.

Impact statement

- **What is already known on this subject?** Research shows that pregnancy and potential and actual pregnancy complications are associated with anxiety for some women. Anxiety measures exist but they are too long for repeat use during antenatal visits.
- **What the results of this study add?** Participation rate of an adapted version of the Anxiety Thermometer, an ultra brief tool developed in other health care settings for repeat use was almost 100% in the antenatal clinics involved in the current feasibility study.
- **What the implications are of these findings for clinical practice and/or further research?** The current feasibility study introduces into maternity care for

the first time the Anxiety Thermometer, an ultra brief tool established for in other health care settings. The tool was refined and renamed the Perinatal Anxiety Thermometer, which is ready to be tested across maternity units.

Key Words: Distress Thermometer, Anxiety Thermometer, Preterm Birth, Multiple Pregnancy, Pregnancy Loss, Perinatal Psychology, Perinatal Mental Health.

Running title: Feasibility of use of the Anxiety Thermometer in Antenatal Services

Introduction

In many countries, pregnant women experience an increasing range of testing and monitoring procedures. Early identification of risk factors can facilitate appropriate triaging to specialist clinics with concentrated expertise, for example to address hypertension, fetal growth issues, multiple pregnancy, and risk of preterm birth. These clinics can improve the prediction, prevention and treatment of pregnancy complications, but they could also increase anxiety. For example, a study reported that fetal fibronectin testing predicted pre-term delivery in high risk women but the procedure also raised anxiety (Shennan *et al*. 2005).

A first recorded investigation of pregnancy- and birth-related psychological distress was carried out in 1956, when 50 pregnant women were asked to report on areas that they had felt anxious about during pregnancy and the postpartum period (Pleshette *et al*. 1956). Amidst a range of concerns, women reported worrying about fetal abnormalities and stillbirth. A recent review suggests that the number of studies reporting perinatal anxiety has grown, and with wide variations in prevalence estimates (2.6–39%) (Leach *et al*. 2017). Qualitative research has further identified psychological distress associated with specific perinatal risks such as preterm birth (O'Brien *et al*. 2017). The offer of appropriate reassurances and education or triaging to psychological care is dependent on consistent recognition of anxiety and worries in an environment characterized by high volume of clinical throughput. How can maternity staff consistently detect pregnancy-related anxiety without burdening service users?

In many health care settings, screening tools have been developed to enable clinicians to methodically identify patient distress. The deployment of such tools has been found

to increase treatment compliance, improve patient experience and reduce health care costs (Bultz and Carlson 2005, Velikova *et al*. 2004). Brief screening tools are intended for routine use by generic care providers; they are not the same as detailed psychological assessments carried out by mental health professionals. The current study was the first step to develop a user-friendly measure of perinatal anxiety, and to find out what concerned women the most. The longer-term objective was to improve capacity for addressing the anxiety of attendees at preterm and other high risk antenatal clinics. In particular, we wanted to find out whether it was feasible to use a tool already in routine use in other health care settings.

The Emotion Thermometers

The 'Distress Thermometer' (DT) is a single visual analogue measure pictorially represented as a vertical temperature thermometer, along which the patient gives a distress rating from 0 to 10. Next to the scale is a list of problems in several domains specific to the clinical condition (e.g., under a domain labelled 'Physical Symptoms', the list may include items such as 'Nausea' or 'Fatigue'). The DT is brief, easy to use and provides a focal point for the consultation whereby clinicians can ask patients about their psychological wellbeing. Originally validated in the USA (Roth *et al*. 1998, Jacobsen *et al*. 2005), it was subsequently validated for cancer services in a number of other countries (Gessler et al. 2008, Gil et al. 2005, Grassi et al. 2013) and tried and tested extensively. A meta-analysis concluded that the DT was a valid first-stage screening tool for cancer patients (Mitchell 2007). Although much less extensively researched in non-cancer settings, the DT has been applied to some chronic illness settings including paediatric services, where it has been used with children (Kazak *et al*. 2012) and parents of children with chronic health problems (Haverman *et al*. 2013).

In response to criticisms about the ambiguous meaning of the term distress, which can be difficult to translate into some languages, emotion specific thermometers have been developed, such as the Anxiety Thermometer (AnxT) and Depression Thermometer (DepT), which have been examined in oncology (Mitchell *et al*. 2010a, 2010b). Since then, these emotion thermometers have also been piloted in cardiology (Mitchell *et al*. 2012) where the Anxiety Thermometer (AnxT) was found to perform well against the GAD-7 (Spitzer *et al*. 2006). None of these ultra brief tools have been examined in maternity settings.

The aim of current study was to find out how feasible it was to adapt the AnxT (Mitchell *et al*. 2010a, 2010b, 2012) for use with antenatal cohorts. Although the long-term objective was to develop the tool to track anxiety and concerns of women attending high risk clinics through to the postnatal period, at this exploratory stage, we included women attending high and low risk antenatal clinics in a single time point.

Materials and Methods

The study took place at a large maternity unit in a teaching hospital in London, UK.

Ethical approval

NHS ethical approval reference 09/H0714/66 was granted on 3rd January 2015.

Participants

Pregnant women attending low risk antenatal clinics, the specialist preterm clinic and the multiple pregnancy clinic were approached by a midwife (YR) as they waited for their antenatal appointments. Women were provided with an information leaflet

regarding the study and a consent form. Referral criteria to the preterm birth clinic include a history of at least one spontaneous late miscarriage or preterm birth, cone biopsy or at least one Large Loop Excision of the Transformation Zone (LLETZ). Women attending the multiple pregnancy clinics carry twin or higher order multiple gestations. Sixty-seven participants (66.7%) were in their second trimester, 28 (27.7%) in their third trimester and 6 (5.9%) in their first trimester.

Measure

The AnxT is a single page, pen and paper assessment which takes less than one minute to complete, as presented in Figure 1. Women were asked on the paper "How anxious have you been during the past week on a scale of 0 to 10?" They put a mark along a vertical thermometer with 0 at the bottom (labeled 'NONE') and 10 at the top (labeled 'EXTREME').

Insert Figure 1 about here

Next to the pictorial thermometer is a checklist of concerns. In a meta analysis of research with other clinical cohorts, scores of 4 or above on the original DT was found to be predictive of reporting one or more problems on every domain of the checklist (Mitchell 2007). The problem checklist was re-developed for the current study with pregnant women, based on the concerns and worries commonly reported to the authors. The checklist included the following domains: Communication Concerns, Emotional Concerns, Pregnancy Concerns, Physical Concerns, Practical Concerns, Practical Concerns, Family Concerns, Birth, and After the Birth. Participants were asked to tick any of the concerns listed under the domains that applied to them in the preceding week. They were also asked to underline their biggest concerns.

Data analysis

Statistical analysis was performed using SPSS version 24 (Chicago, IL, USA). Pearson's r correlation coefficient was performed to identify associations between continuous variables and independent t-test to identify potential differences between groups. P value of less than 5% was considered to be statistically significant.

Results

The questionnaire was distributed to 102 women and was completed by 101 respondents. The median maternal age was 34.5 years (SD=4.7) ranging from 22 to 44 years. Mean gestation was 23 weeks (SD=7.7) ranging from 10 to 39 weeks. For 50 women (49.5%) this was their first pregnancy; 34 (33.7%) women had one living child, 6 (5.9%) had 2 living children and 2 (2%) had 4 children. Eighteen women (17.8%) had had 1 miscarriage, 2 (2%) had 2 miscarriages and 1 (1%) had 4 miscarriages.

Scores on the AnxT ranged between 0 and 10 with a mean anxiety score of 4.7 (SD = 2.6). Thirty-eight women scored below 4, but 63/101 scored 4 or above, with 15 of these women scoring between 8 and 10.

There were no significant associations between AnxT scores and age, weeks of gestation, number of miscarriages and number of living children. Independent t-tests did not identify any significant difference in AnxT scores between women aged 35 years or more and women aged under 35 years, and between women who had had one or more previous miscarriage(s) and those who had not.

Insert Table 1 about here

Frequencies of reported concerns are presented in Table 1. Health of Baby was the most frequently reported concern followed by Tiredness, Fears and Worries, and Sleep Problems. Health of Baby was also most frequently reported as the biggest concern. About a third reported concerns about work with 10% naming work as the biggest concern. Testing, Communication and Family appeared to be the least problematic domains.

Discussion

The purpose of the study was to find out how feasible it was to use the AnxT with maternity service users. Only one woman declined to participate, reasons for non-participation was not questioned. All other respondents were keen to complete the tool. The midwife YR was not present when women completed the ANXT. The completed form was given to the receptionist. Close to two thirds of the participants scored 4 or above, with a sizeable minority scoring 8 or above, suggesting a need for future research to identify factors that contribute to higher anxiety levels. The small sample size did not permit any detailed analysis of potential effects of demographic or clinical factors, which in any case was not the study objective. Perhaps predictably, women were most likely to report being concerned about fetal health. Some physical and emotional symptoms, particularly tiredness, sleep problems, and fears and worries, appeared to affect a relatively high proportion of women. Work as an area of difficulty is rarely attended to in perinatal psychological research. It has emerged as a potential source of anxiety for women.

The reason for refining the AnxT was to enable maternity staff to routinely screen for perinatal anxiety so to facilitate conversation, offer education and reassurance, and

triage to psychological services for more detailed assessments or interventions as appropriate. However, future studies are needed to address a number of questions before the AnxT could be confidently adopted for routine use.

Research with other clinical populations has found the AnxT to perform well against more detailed psychological assessments of anxiety (Mitchell *et al*. 2010a, 2010b, 2012). Nevertheless, validation work should be replicated with perinatal populations. Scores on the AnxT could for example be compared to those on more detailed measures of perinatal anxiety such as 31-item Perinatal Anxiety Screening Scale (Somerville *et al*. 2014) and general anxiety measures such as the GAD-7 (Spitzer *et al*. 2006). In the current study, first time antenatal clinic attendees and postnatal women were excluded. Further work would need to establish whether the AnxT is equally acceptable to these groups. Larger samples recruited in multi centres would enable us to assess any differences between socio-demographic and clinical cohorts. Repeat assessments along the perinatal journey would enable maternity staff to track anxiety and concerns from pre to postnatal to learn about women's anxiety and offer appropriate support. This would mean research to establish compliance with multiple testing. As and when the AnxT is ready to be rolled out as part of a structured programme to enhance maternity care, it would be important to evaluate impact on care user satisfaction.

In the current feasibility study, a midwife was present to ensure that all eligible women were invited to complete the AnxT. This would be a costly procedure as a requirement for implementation. If antenatal clinic staff were to be trained to administer and discuss results of the AnxT during routine consultation, fidelity research is required to assess the impact without a designated person in clinic to ensure consistency.

Based on the current findings, the least frequently checked items on the problem page of the current pilot version of the AnxT (Figure 1) were removed. Descriptions of some of the items were improved for clarification. A few new items are added. Work-related problems are expanded to elicit more information about pregnant women's struggles with work, because a third of the current sample have reported this to be an area of anxiety for them and 10% reported this as their biggest concern. In the enhanced version, which we call Perinatal AnxT, presented in Figure 2, participants are asked to underline only one biggest concern (as opposed to 4 in the version being piloted). This improved tool could be the focus of future research to develop a brief screening tool that can be repeated throughout the perinatal journey.

Insert Figure 2 about here

Conclusions

This was the first step towards developing the AnxT to screen for anxiety and elicit perinatal concerns of pregnant women attending follow-up appointments. The results suggest that the ultra brief screening tool is feasible and acceptable. The participants' responses to the problem checklist provided useful information to streamline the checklist somewhat. The resultant, refined version (Perinatal AnxT) warrants further research, which could lead potentially to broad implementation with antenatal and postnatal care users.

Conflict of Interests

None declared.

Funding

The study was unfunded.

Figure Legends

Figure 1 – Anxiety Thermometer version used in current feasibility study

Figure 2 – Perinatal Anxiety Thermometer version refined for further research

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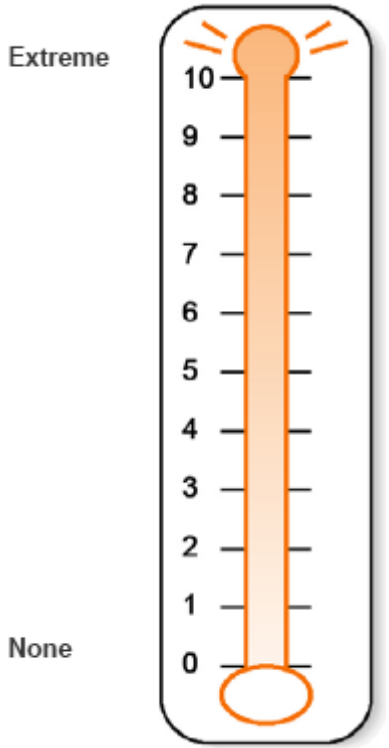
Table 1: Prevalence of problems and biggest concerns (N=101)

Domains and concerns	Current problem		Biggest concern		Domains and concerns	Current problem		Biggest concern	
	n	%	n	%		n	%	n	%
Communication					**Practical Concerns**				
1. Too much information	7	6.9	-	-	1. Childcare	19	18.8	3	3.0
2. Too little information	13	12.9	2	2.0	2. Housing	9	8.9	1	1.0
3. Conflicting information	8	7.9	2	2.0	3. Money	25	24.8	3	3.0
4. Interaction with staff	8	7.9	2	2.0	4. Transport	5	5.0	1	1.0
					5. Education	6	5.9	3	3.0
					6. Work	34	33.7	10	9.9
Emotional Concerns					**Family Concerns**				
1. Low mood	9	8.9	1	1.0	1. Dealing with children	9	8.9	3	3.0
2. Lack of confidence	5	5.0	1	1.0	2. Dealing with partner	5	5.0	2	2.0
3. Fears and worries	50	49.5	25	24.8	3. Dealing with extended family	12	11.0	4	4.0
4. Difficult decisions	7	6.9	-	-					
5. Sadness	10	9.9	1	1.0					
6. Hard to concentrate	17	16.8	3	3.0					
7. Lack of support	2	2.0	1	1.0					
8. Feeling isolated	2	2.0	-	-					
Pregnancy Concerns					**Tests**				
1. Health of baby	62	61.4	43	42.6	1. Screening	7	6.9	2	2.0
2. Safety of baby	34	33.7	19	18.8	2. Scanning	10	9.9	4	4.0
3. Uncertainties about labour	36	35.6	15	14.9	3. Diagnostic testing	7	6.9	2	2.0
4. The birth itself	36	35.6	14	13.9	4. Safety of tests	6	5.9	2	2.0
					5. Accuracy of test results	12	11.9	3	3.0
					6. Pain or discomfort of tests	6	5.9	1	1.0
Physical Concerns					**After the birth**				
1. Nausea or sickness	16	15.8	4	4.0	1. Breastfeeding	20	19.8	6	5.9
2. Indigestion	16	15.8	2	2.0	2. Coping with baby	16	15.8	6	5.9
3. Tiredness	50	49.5	14	13.9	3. Coping with other people	8	7.9	1	1.0
4. Feeling bloated/swollen	14	13.9	5	5.0	4. Work-related issues	17	16.8	3	3.0
5. Aches and pains	41	40.6	8	7.9	5. Maintaining social networks	1	1.0	-	-
6. Sleep problems	47	46.5	10	9.0					
7. Hard to breathe	13	12.9	-	-					
8. Thirst	9	8.9	1	1.0					
9. No appetite	7	6.9	1	1.0					
10. Big appetite	7	6.9	1	1.0					
11. Weight gain	17	16.8	4	4.0					
12. Stretch marks	7	6.9	1	1.0					
13. Problems/issues with sex	1	1.0	-	-					
Other Concerns									
Hard to contact ACN	1	1.0	-	-	Food does not taste the same	1	1.0	-	-
Disabled baby	1	1.0	-	-	After birth concerns	1	1.0	-	-
My safety	1	1.0	1	1.0	Constipation	1	1.0	-	-
Preterm labour	1	1.0	-	-					

1. Please circle the number (0-10) that best describes how much anxiety in general you have been experiencing over the past week, including today.

Anxiety



2. If any of the following has been a problem for you over the past week, including today, please tick the box next to it. Leave it blank if it does not apply to you.

Communication Concerns
- ☐ Too much information
- ☐ Too little information
- ☐ Conflicting information
- ☐ Interaction with staff

Emotional Concerns
- ☐ Low mood
- ☐ Lack of confidence
- ☐ Fears and worries
- ☐ Difficult decisions
- ☐ Sadness
- ☐ Hard to concentrate
- ☐ Lack of support
- ☐ Feeling isolated

Pregnancy Concerns
- ☐ Health of baby
- ☐ Safety of baby
- ☐ Uncertainties about labour
- ☐ The birth itself

Physical Concerns
- ☐ Nausea or sickness
- ☐ Indigestion
- ☐ Tiredness
- ☐ Feeling bloated/swollen
- ☐ Aches and pains
- ☐ Sleep problems
- ☐ Hard to breathe
- ☐ Thirst
- ☐ No appetite
- ☐ Big appetite
- ☐ Weight gain
- ☐ Stretch marks
- ☐ Problems/issues with sex

Practical Concerns
- ☐ Childcare
- ☐ Housing
- ☐ Money
- ☐ Transport
- ☐ Education
- ☐ Work

Family Concerns
- ☐ Dealing with children
- ☐ Dealing with partner
- ☐ Dealing with extended family

Tests
- ☐ Screening
- ☐ Scanning
- ☐ Diagnostic testing
- ☐ Safety of tests
- ☐ Accuracy of test results
- ☐ Pain or discomfort of tests

After the birth
- ☐ Breastfeeding
- ☐ Coping with baby
- ☐ Coping with other people
- ☐ Work-related issues
- ☐ Maintaining social networks

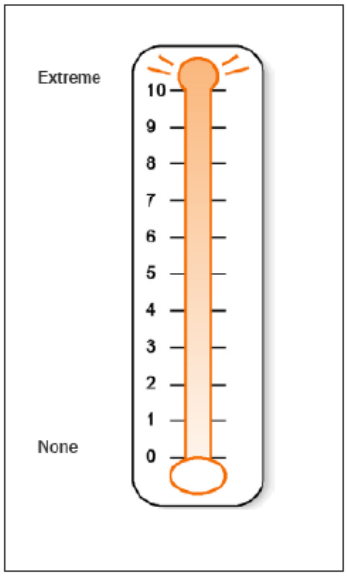
Other Concerns
- ☐ _____
- ☐ _____
- ☐ _____

3. **FINALLY**, out of the items you have ticked, please underline your biggest concerns (up to 4 items)

Figure 1 – Anxiety Thermometer version used in current feasibility study

1. Please circle the number (0–10) that best describes how much anxiety in general you have been experiencing **over the past week**, including today

Anxiety



2. If you have ticked four or above on the thermometer and some of the below problems have affected you over the past week including today, please tick only the most relevant items. If you have concerns that are not listed please write them down in the blank spaces

Physical
- Nausea or sickness
- Digestion problems
- Tiredness
- Problems with sleep
- Bloating, swelling
- Aches and pains
- Hard to breathe
- Weight gain
- Urinary frequency
- High blood pressure

Emotional
- Fear
- Hard to concentrate
- Feeling low or sad
- Feeling overwhelmed
- Guilt
- Anger
- Feeling bad about my body
- Under too much pressure

Information
- Confidence in test results
- Not enough information
- Don't know what to do with information
- Lack of continuity in my care

Practical
- Volume of work
- Difficult colleague(s)
- Long or difficult commute
- Question mark about my career
- Money worries
- Worries about current childcare arrangements
- No time for me

Relationships
- Conflict with my partner
- Uncertainty about our future together
- Coping with existing child(ren)
- Difficulties with extended family

Birth outcome concerns
- Safety of pregnancy
- Health of baby (babies)
- Long labour
- Painful labour
- Out of control in labour
- Birth complications
- Recovery complications

After birth concerns
- Breastfeeding
- Looking after baby (babies)
- Postnatal depression
- Worry about work

Other concerns
- _____
- _____
- _____

3. **FINALLY**, out of the items you have ticked, please underline your BIGGEST concern

Figure 2. Perinatal anxiety thermometer version refined for further research