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An open trial with cognitive behavioral therapy for blood- and injection phobia in pregnant women - A group intervention program

Abstract

Purpose: Around 7 % of pregnant women suffer from blood-and injection phobia. The aim was to investigate if cognitive behavior group therapy (CBT) is effective in treating pregnant women's blood- and injection phobia.

Methods: Thirty pregnant women with blood- and injection phobia according to DSM-IV took part in an open treatment intervention. A two-session cognitive behavior group therapy was conducted. As controls, 46 pregnant women with untreated blood-and injection phobia and 70 healthy pregnant women were used. Repeated measures ANOVA were performed.

Results: The scores for the CBT treatment group on the "Injection Phobia Scale-Anxiety" were reduced both after each treatment session and postpartum ($p < 0.001$). Anxiety and depressive symptoms were also reduced ($p < 0.001$).

Conclusion: Cognitive-behavior group therapy for pregnant women with blood- and injection phobia is effective and stable up to at least 3 months postpartum. It seems also to reduce anxiety and depressive symptoms during pregnancy.

Key words: Anxiety, Blood- and injection phobia, Cognitive behavior group therapy, Depression, Pregnancy

Introduction

In the general population a specific phobia is the most common anxiety disorder, with a prevalence of 8.7% (Kessler et al. 2005). The etiology of phobia varies but there is an agreement that genetic factors together with a conditioning experience explain most of the specific phobias (Davey et al. 1993; Menzies and Clark 1995).

The prevalence of blood- and injection phobia is around 4.5% in the general population with the highest prevalence in the youngest age groups (Öst et al. 1992; Nir et al.2003). One study from 2007 reports a prevalence of fear of blood/injection to 19.5% among healthy adults (Kose and Mandiracioglu 2007). Another recent study has shown that the prevalence of blood- and injection phobia is 7% in an unselected pregnant population (Lilliecreutz et al. 2008).

Blood- and injection phobia is fear and avoidance of receiving injections, an aversion to seeing blood and fear of having a blood sample taken (Hamilton 1995). It is also a high probability that the person will faint or be sick (Olatunji et al. 2006) when the phobic situation is encountered.

A person with blood- and injection phobia may not be able to get vaccinations (Nir et al. 2003), to visit hospitals or other health care units (Page 1996), and may even avoid becoming pregnant. A pregnant woman with blood- and injection phobia may as a consequence avoid attending the routine checkups at the antenatal care clinic (ANC), and may also avoid blood tests or other kinds of invasive examinations during pregnancy. There is also a possibility that the pregnant woman with this kind of phobia will express a fear of delivery and therefore require more analgesia and also an elective cesarean (Hofberg and Brockington 2000). There is a known co-morbidity between specific phobia and anxiety disorders especially posttraumatic stress disorder (Goisman and Allsworth 1998). The prevalence of antenatal anxiety during the third trimester is reported to be between 10 and 24% and it also overlaps

with depression and increases the risk of postnatal depression (Sutter-Dally et al. 2004; Heron and O'Connor 2004). Around 13-17% of women suffer from depressive illness during pregnancy and or the first year postpartum (Josefsson et al. 2001). Clinical experience has shown that the number of women who state fear of injections, blood and hospital environments has increased. Blood -and injection phobia is sometimes in the literature regarded as two separate conditions, blood phobia versus injection phobia. In DSM-IV the disorder is considered as one diagnostic entity as well as in a study by Öst (1992) where background, cognitive, physiological and behavioral variables were compared. Öst and colleagues have proposed that individual brief cognitive behavior therapy (CBT) can be provided for different kinds of specific phobia (Öst et al. 1992; Patel et al. 2005). Individual CBT is, however, time-consuming, expensive and difficult to manage in an ANC-setting. Therefore we hypothesized that it would be possible to treat pregnant women with blood- and injection phobia by providing CBT to groups.

The primary aim of this open-trial exploratory study was to investigate if group CBT is effective in treating pregnant women's blood- and injection phobia.

The secondary aim was to investigate whether a successful treatment of phobia has any impact on anxiety and depressive symptoms during pregnancy and postpartum.

Materials and Methods

Subjects

During 2005, 49 women in early pregnancy were referred by an obstetrician at the ANC to the department of psychosocial obstetrics & gynecology due to blood- and injection phobia. The phobic women had no knowledge of the study at the time of referral. All women were assessed and diagnosed or dismissed according to the criteria in DSM-IV for blood-and injection phobia by an authorized psychotherapist (author GS).

Forty-one women fulfilled the criteria for blood- and injection phobia and were invited to take part in a two-session group therapy. Eleven of these women wanted to be treated individually because they could not handle a group situation. Eight out of the 49 referred pregnant women who did not fulfill the diagnostic criteria for blood- and injection phobia received counseling by their midwives at the ANC. In total, 30 pregnant women received a two-session group CBT. None of the women received any other psychological or pharmacological treatment during this period.

Controls

From a prevalence study on blood- and injection phobia (Lilliecreutz et al. 2008) conducted during the same time period and in the same geographic area, 46 women diagnosed with clinical interviews according to DSM-IV by the same psychotherapist served as controls, they were neither offered nor given any treatment except from regular antenatal health care. As healthy controls, 70 pregnant women from the prevalence study were chosen.

Measures

The 30 women with blood-and injection phobia in the CBT treatment group were assessed with questionnaires on 5 occasions: before and after each group therapy session, as well as 3 months after delivery. In order to assess the women's self reported degree of phobia, the "Injection Phobia Scale-Anxiety" (IPSA) and the "Injection Phobia Scale-Avoidance"

(IPSAV) were used (Öst et al. 1992). The scales consist of 18 items each, describing various injection situations. The woman rates the degree of anxiety in situations involving injections on 0-4 scales, (range 0-72) and thereafter the avoidance of the same situations on 0-2 scales, (range 0-36). A high score indicates a high degree of anxiety. The internal consistency of the scales and the correlation between the two scales have been tested and found to be reliable (Öst et al. 1992).

To assess depressive symptoms the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al. 1982) was used. The EPDS is specifically designed to screen for depression postpartum but it can also be used as a valid measure through pregnancy and the puerperium (Green and Murray 1994). A cut off level of 10 was used. To assess anxiety the Beck Anxiety Inventory (BAI) was used (Beck et al. 1988) with a cut off level of 10.

The two control groups; 46 pregnant women with untreated blood -and injection phobia and 70 healthy pregnant women all answered the IPSA, EPDS and BAI at gestational weeks 25, 36 and 6-8 weeks postpartum.

Procedure

Each treatment group consisted of 4-6 women with a CBT therapist (author GS) and a midwife specially trained for the purpose.

The two group therapy sessions were scheduled four weeks apart. The treatment was based on a model described by Öst & Hellström (Öst et al. 1992). Session one, which took place around gestational week 25-30, consisted of an intensive and prolonged exposure to and education on different functions of lancets, syringes, injection needles and intravenous catheters. All women were asked to report their anxiety and the therapist did not continue with new tasks until all the participants in the group were ready and had a low anxiety level of 1-2 (verbally estimated from 1-10 where 10 is maximum anxiety). In this session the midwife performed a vein puncture and gave a subcutaneous injection of saline on the therapist.

Education on the different physical reactions when encountering a phobic stimuli and how to handle these symptoms and thoughts that occur were also performed.

All participants were then given lancets, syringes, and injection needles to touch and look at for training purposes and as homework. The second session started with a discussion on how the past weeks had been experienced by the women, and all participants were given the opportunity to ask questions and report on their homework. This session consisted of a prolonged intensive exposure to the most phobic situations; pricking a finger, subcutaneous injection in the arm, vein puncture and insertion of an intravenous catheter. The order of these components was discussed and almost all participants considered the above order to match their individual phobic hierarchy. Almost all women rated vein puncture and insertion of an intravenous catheter as the most anxiety-provoking situation. During the session all of the exercise moments were done on each participant at least once. Both therapy sessions were closed with a 5 minutes relaxation.

Statistics

Repeated measures ANOVA with the scores on the EPDS, BAI, and IPSA with the different occasions as within-subject effects and parity and age as between-subject effects were performed on each group (i.e. CBT treated, untreated, and controls), respectively, in order to detect within-group differences over time. Univariate analysis of variance (ANOVA) with the scores on EPDS, BAI, and IPSA on each occasion, respectively, as dependent variables and group, parity, and age as independent factors were performed to test if the scores differed between groups on the different occasions (i.e. within the first session, the second session, as well as the post partum check-up). In addition, to control for the possibility of regression to the mean, a repeated measures ANOVA was performed, where the first measurement of EPDS, BAI and IPSA, respectively, was used as a baseline and subsequent measurements in gestational week 36 and postpartum as within-subject effects and parity, age and group as

covariates. In all analyses age was split into three categories, 18-25, 26-32 and 33-41 and parity into two groups, no previous children and previous children.

Before initiating the study a power calculation was performed. To detect a difference at the 0.05 level with a power of 80 % at least 16 women were needed for treatment, determining the effect size as a reduction of 15 (55 to 30) on the IPSA score.

Ethics

The study was approved by the Regional Ethics Committee of the Faculty of Health Sciences, Linköping University (No. M192-04).

Results

All 30 women who received CBT group treatment attended both sessions in full and also participated at the follow-up evaluation, which took place 3 months after delivery. The mean age was 28.5 years (SD = 5.03), and 21 (70%) were first-time mothers while nine women had given birth to one or two previous children. All but two women had normal vaginal deliveries (93%).

Out of 46 untreated women with blood-and injection phobia 44 answered all the questionnaires without any missing data. The mean age were 30.5 years (SD= 4.09) and 25 (54.3 %) were nullipara. Thirty-five (76.1%) of the 46 untreated women had normal vaginal deliveries, seven (15.2%) a cesarean section and four women (8.7%) were delivered with a vacuum extraction. In the non-phobic and healthy control group the mean age was 30.7 years (SD = 4.22). Of these 70 women, 42 (60.0%) were nullipara and 56 (80%) had vaginal deliveries, seven (10.0 %) a cesarean section and eight (11.4%) were delivered with a vacuum extraction. One woman had both a vacuum extraction that failed and was thereafter delivered with a cesarean.

In Table 1 the mean scores on the IPSA for all three groups are displayed and in Table 2 the mean scores on the IPSAV for the treated women are shown. The scores of the treatment

group on the IPSA and the IPSAV were reduced both over the whole study period ($p < 0.001$ and $p < 0.001$) as well as when the scores before and after the two treatment sessions were compared (Table 1 and 2), even though some women still scored relatively high. Adjusting for parity and age did not change the results (data not shown). The scores were also reduced at the follow-up 3 months postpartum, compared to both the first and second occasions ($p < 0.001$ and $p < 0.001$). During the first session, 29 out of 30 participants scored lower on the IPSA after the treatment was completed, compared with before the treatment, while one woman reported the same score before and after. The corresponding numbers for the IPSAV during the first session was that 20 out of 30 participants scored lower, nine participants reported the same score before and after and one woman scored one point higher after the treatment session compared to before. During the second session the treatment effect was more marked; all women scored lower after the second treatment session, compared with before on both the phobia scales.

Both within the group with untreated blood-and injection phobia and within the healthy group of women (controls) there was a tendency towards a reduction of scores on the IPSA over time ($p = 0.04$ and $p = 0.067$). When comparing the three groups of women on the three different occasions, respectively, the CBT treated women had significantly higher scores of phobic symptoms, compared to both untreated women and controls, before the first treatment session ($p < 0.001$). However, at the postpartum follow-up, the CBT treated women scored significantly lower than the untreated women, but higher than the healthy controls ($p < 0.001$).

In Table 3 the mean scores on the BAI and EPDS for all three groups are displayed. All of the women in the CBT treatment group scored higher than or equal to 10 (i.e. had clinical symptoms of anxiety) on BAI before the first treatment session, compared with 80% (24/30) before the second session and 41% (12/29) at the postpartum follow-up.

Table 1: The women's scores on the "Injection Phobia Scale-Anxiety" before and after the both treatment sessions as well as during the postpartum follow-up.

| | Treated women (n=30) | | | Untreated women (n=44) | | Controls (n=70) | |
|-----------------------------|----------------------|------|----------------|------------------------|-------|-----------------|------|
| | Mean | SD | p [*] | Mean | SD | Mean | SD |
| First treatment | | | | | | | |
| Before session | 52.8 | 6.52 | < 0.001 | 44.8 | 11.24 | 3.9 | 5.39 |
| After session | 45.0 | 6.26 | | | | | |
| Second treatment | | | | | | | |
| Before session | 42.0 | 6.54 | < 0.001 | 43.5 | 12.27 | 3.1 | 5.53 |
| After session | 25.0 | 6.23 | | | | | |
| <i>Postpartum follow-up</i> | 18.6 | 5.12 | | 40.3 | 12.19 | 2.5 | 5.06 |

* p-value for the difference before and after each treatment session.

Table 2: The treated women's (n = 26) scores on the "Injection Phobia Scale-Avoidance" before and after the both treatment sessions as well as during the postpartum follow-up.

| | Mean | SD | p [*] |
|-----------------------------|------|------|----------------|
| First treatment | | | |
| Before session | 24.7 | 2.53 | < 0.001 |
| After session | 23.4 | 1.81 | |
| Second treatment | | | |
| Before session | 18.9 | 3.05 | < 0.001 |
| After session | 10.5 | 2.85 | |
| <i>Postpartum follow-up</i> | 10.0 | 2.65 | |

* p-value for the difference before and after each treatment session.

Table 3: BAI and EPDS scores on the three different occasions for each group of women, respectively.

| | First treatment session | | Second treatment session | | Post partum follow-up | |
|--------------------------|-------------------------|------|--------------------------|------|-----------------------|------|
| | Mean | SD | Mean | SD | Mean | SD |
| Score on the BAI | | | | | | |
| Treated (n = 29) | 22.2 | 6.41 | 16.3 | 6.10 | 9.9 | 4.60 |
| Untreated (n = 44) | 10.6 | 7.29 | 12.1 | 9.39 | 8.7 | 9.22 |
| Controls (n = 70) | 2.9 | 3.37 | 4.5 | 5.59 | 2.5 | 3.35 |
| Score on the EPDS | | | | | | |
| Treated (n = 30) | 10.3 | 3.13 | 7.8 | 2.61 | 7.2 | 2.21 |
| Untreated (n = 44) | 8.4 | 5.10 | 9.1 | 5.85 | 7.5 | 5.57 |
| Controls (n = 70) | 3.9 | 3.01 | 3.8 | 3.70 | 3.6 | 3.65 |

In the untreated group with blood-and injection phobia 19% scored higher than or equal to 10 at gestational week 25 compared to 52.2% at gestational week 36 and 28.3% at the postpartum assessments. In the healthy control group all women scored less than 10.

In all the three groups the score on the BAI scale was significantly reduced over time, in the untreated blood-and injection phobic group ($p=0.006$) and in the healthy control group ($p=0.001$) with the most dramatic change in the CBT treatment group ($p<0.001$), even after adjustments for parity and age. In the healthy control group the reduction of anxiety levels among nulliparas ($p<0.001$) was stronger compared to multiparas ($p=0.038$). The BAI scores were higher among the treated women, as compared to the other two groups of women, during both treatment sessions ($p < 0.001$). However, no significant differences were evident between the two groups of phobic women at the post partum check-up.

Twenty out of 30 women in the CBT treatment group (67%) showed depressive symptoms (i.e. scored higher than or equal to 10 on the EPDS) before the first treatment, compared with 7 women (23%) before the second session and 3 women (10%) at the postpartum follow-up. In the untreated group of women with blood-and injection phobia 17% scored higher than or equal to 10 at gestational week 25 on the EPDS compared with 45.7% at gestational week 36 and 17% at the postpartum assessments. In the healthy control group all women scored less than 10 at all occasions. In the CBT treatment group a reduction in the EPDS score was observed over time ($p<0.001$), especially among nullipara, even after adjustments for age. No change was found in the untreated group of women with blood-and injection phobia ($p=0.408$) or in the healthy control group ($p=0.606$). The EPDS scores were higher among the treated women, as compared to the other two groups of women, during the first treatment session ($p < 0.001$). But, no significant differences were evident between the two groups of phobic women at the second treatment session or at the post partum check-up.

The repeated measures ANOVA with baseline measurements of IPSA to account for regression to the mean did not change any of the presented results. The analyses were performed for the two groups, treated and untreated women, as well as for all three groups. In both cases, group (i.e. CBT treated, untreated, and controls), was found to have a significant effect as well as the interaction between time of assessment and group. Data not shown.

Discussion

We have shown that it is possible to treat pregnant women with blood- and injection phobia by CBT in groups in an antenatal care setting and to achieve a good outcome. We were able to reduce the pregnant women's level of phobic symptoms significantly with a maintained low level for at least three months postpartum. The anxiety levels were reduced in all three groups of women, but the most dramatic reduction was found in the CBT treatment group. The explanation for a decrease in all three groups could be that the natural level of anxiety developing during pregnancy is highest in late pregnancy and is diminished after the child has been born. The CBT treatment group is probably beneficial in reducing women's anxiety levels during pregnancy and during the intensive period of treatment but probably not over an extended period.

The reason for significantly higher scores on the IPSA and EPDS in the CBT treatment group comparing with the untreated phobic women at the first assessment could be explained by the fact that the CBT treatment group knew that they were soon to be exposed to a phobic situation. One could assume the same explanation for the higher score on the BAI in the CBT group compared with the untreated group at both the first and second treatment session but as the participants were not randomized to a treatment/control group there might be a systematic difference between the groups that account for the baseline measures.

The frequency of depressive symptoms as shown on the EPDS was higher among both of the two groups of women with blood- and injection phobia. The women with blood-and injection phobia who received CBT treatment showed a significant decrease of depressive symptoms over time compared with the untreated group.

In the postpartum follow-up no difference between the CBT treatment group and the untreated phobic group was shown regarding symptoms of anxiety or depression, probably because no specific treatment against these two conditions was given. A possible limitation

when interpreting the results postpartum is that the controls follow-up coincided with the regular postnatal check-up at 6-8 weeks postpartum and the treated women were assessed at 3 months postpartum. This time span can theoretically have an impact on the three groups' frequency of anxiety and depression symptoms.

Studies have also shown that maternal stress during pregnancy can result in changes in the hypothalamic-pituitary-adrenal-axis and elevated levels of stress hormones (particularly cortisol) with premature labor, shortened pregnancy length, low-birth weight and impaired fetal brain development as a consequence (Obel C et al 2005; Sandman CA et al. 1994; Wadha PD et al. 1993; Gitau R et al. 1998; Copper RL et al. 1996; Weinstock M 2005; Diego MA et al. 2006; Field T et al. 2006). In this study we did not sample salivary cortisol among the participants before and after treatment sessions which would have been interesting. Hence, the possible rise in cortisol due to the therapy among the women in the treatment group and its feasible effect on the fetus is unknown but it is plausible to believe that an untreated woman with blood- and injection phobia would have had a continuous stress and hence an elevation of stress hormones throughout the pregnancy. The CBT treated group of women with blood- and injection phobia showed an improvement when assessed with both the IPSA and the IPSAV. The reasons for the successful outcome of the CBT group treatment are probably four-fold; all participants in the group were highly motivated, they were all pregnant with an upcoming delivery in the near future, they all had the same type of phobias and the exposures to the phobic situations were extensive. Being attended to by an experienced and specifically trained midwife during the treatment sessions is probably also of great importance. Part of the treatment sessions is also on a psycho-educative level where the midwife explains the different utensils and their functions, since most of the participants only had a vague idea of how things were used and for what reasons.

The next step during the treatment was to watch and later on to actually receive an injection or a vein puncture while the rest of the group was watching. This was a very central step in treating the phobic symptoms while it was in addition the hardest to overcome.

In a systematic review by Patel et al 2005 on injection phobia they were only able to find 3 studies on adults with more than five participants who received at target intervention. Eighty-four publications were identified in the systematic review and only three met the inclusion criteria (Patel et al. 2005).

It has been shown that one individual CBT session is the treatment of choice for blood- and injection phobia (Öst et al. 1992). We have shown that a two-session CBT group for pregnant women with blood-and injection phobia is effective. Furthermore, we suggest that midwives can be trained to do this group therapy under supervision from a CBT therapist but further studies are needed. Yet, an authorized professional, i.e. a CBT therapist should have assessed a correct diagnosis of phobia beforehand. In order to verify these results randomized clinical trials are required on group treatment of blood-and injection phobia in pregnant women.

Except from the open design of this study a potential weakness is that the women who received treatment and the two control groups were recruited from two parallel studies which could constitute a source of biases. However all three groups were diagnosed by the same psychotherapist, they were observed during the same period of time and came from the same geographic area.

In conclusion, our results show that a two-session CBT group for pregnant women with blood-and injection phobia is valuable and stable at least up to 3 months after delivery. It also seems to reduce anxiety and depressive symptoms during pregnancy, which is beneficial for both mother and fetus/neonate. To minimize phobic symptoms, depression and anxiety in pregnant women with blood- and injection phobia this method could be applied.

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