

Psychological impact on women after second and third trimester termination of pregnancy due to fetal anomalies versus women after preterm birth—a 14-month follow up study

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Abstract The objective of this study was to compare psychiatric morbidity and the course of posttraumatic stress, depression, and anxiety in two groups with severe complications during pregnancy, women after termination of late pregnancy (TOP) due to fetal anomalies and women after preterm birth (PRE). As control group women after the delivery of a healthy child were assessed. A consecutive sample of women who experienced a) termination of late pregnancy in the 2nd or 3rd-trimester ($N=62$), or b) preterm birth ($N=43$), or c) birth of a healthy child ($N=65$) was investigated 14 days (T1), 6 months (T2), and 14 months (T3) after the event. At T1, 22.4% of the women after TOP were diagnosed with a psychiatric disorder compared to 18.5% women after PRE, and 6.2% in the control group. The corresponding values at T3 were 16.7%, 7.1%, and 0%. Shortly after the event, a broad spectrum of diagnoses was found; however, 14 months later only affective and anxiety disorders were diagnosed. Posttraumatic stress and clinician-rated depressive symptoms were highest in women after TOP. The short-term emotional reactions to TOP in late

pregnancy due to fetal anomaly appear to be more intense than those to preterm birth. Both events can lead to severe psychiatric morbidity with a lasting psychological impact.

Keywords Termination of pregnancy · Fetal anomaly · Preterm birth · Psychiatric morbidity · Posttraumatic stress

Introduction

Pregnancy and giving birth are major life events, sometimes with unexpected severe complications for the child, like severe fetal anomalies or very low birth weight, and in turn with traumatic impact on the parents. Developments in prenatal diagnostics have increasingly allowed fetal abnormalities to be diagnosed and prognostically assessed in the first and second trimester of pregnancy, yet the opportunities of prenatal therapy remain limited. Once the diagnoses have been made, parents are confronted with a traumatic reality and a difficult emotional choice: to continue or to end the pregnancy. While the diagnosis alone imposes a severe strain on any woman, the question of whether or not to terminate the pregnancy is a crucial decision to be made. To continue the pregnancy has far-reaching effects, but to terminate the pregnancy implies opting for the death of her own fetus, followed by an agonizing waiting for labour pains to set in and the delivery of a stillborn fetus. However, most pregnancies are terminated when prenatal severe fetal anomalies are diagnosed (Kramer et al. 1998, Mansfield et al. 1999).

Several studies have reported negative reactions of women after the traumatic experience of a termination of pregnancy due to fetal anomaly (TOP) (Iles and Gath 1993,

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Salvesen et al. 1997, Geerinck-Vercammen and Kanhai 2003, Korenrump et al. 2005a). The results of retrospective studies have shown that especially second trimester TOP is an emotionally traumatic major life event leading to severe posttraumatic stress responses and intense grief reactions still evident years later (Kersting et al. 2005, Korenrump et al. 2005b). One prospective study demonstrated that TOP due to fetal anomaly in the second trimester is associated with an increased risk for post-traumatic symptomatology compared to TOP in the first trimester (Davies et al. 2005). However, most of the present studies demonstrate methodological shortcomings that reduce the generalizability of the results: Some investigations are based on a relatively small numbers of cases (Salvesen et al. 1997, Geerinck-Vercammen and Kanhai 2003), some lack validated measurement (Geerinck-Vercammen and Kanhai 2003) or clinician rated instruments (Geerinck-Vercammen and Kanhai 2003, Korenrump et al. 2005a, b, Davies et al. 2005). Control groups of women who had given spontaneous birth to healthy children were also frequently not available (Salvesen et al. 1997, Geerinck-Vercammen and Kanhai 2003, Korenrump et al. 2005a, b, Davies et al. 2005); further, in the studies published so far, no instruments have been applied to diagnose psychiatric disorders according to DSM-IV.

For many women, the birth of a preterm infant may also be burdening. Because of medical advances in neonatal intensive care and management of high-risk pregnancy very low-birth-weight (VLBW) delivery has become increasingly more common. However, the birth of a VLBW infant still represents a stressful event for parents who now have to cope with the life-threatening immaturity of their child and the possible consequences, i.e. handicaps or even death. The focus of scientific interest has been on maternal psychological stress responses to this ongoing traumatic experience such as anxiety and depression (Gennaro et al. 1990) or psychological distress (Thompson et al. 1993, Singer et al. 1999). In a study investigating mothers of preterm infants, 40% reported significant depressive symptoms one month after preterm birth (Miceli et al. 2000). Another study indicates that mothers of premature infants have significantly higher values for traumatic experiences, depressive symptoms and anxiety 6 months as well as 14 months after the birth compared to women having given birth to a healthy child (Affleck et al. 1984). To our knowledge, the extent of psychiatric disorders in women after preterm birth has not been investigated so far.

The aim of the prospective longitudinal study presented here was to compare the course of posttraumatic stress responses, depression and anxiety in women after TOP and in women after VLBW delivery. In that, we expected high psychopathological symptoms in women of both clinical groups shortly after the event (women after TOP; women with VLBW infants). We

further expected across time a moderate decrease of psychopathological symptoms in these two groups, but no remission of the symptoms to the level of the control group. Additionally, for the first time, we examined the extent of psychiatric disorders after second- and third-trimester termination of pregnancy due to fetal anomalies and after preterm birth.

Material and methods

Participants

Data of 62 women after termination of pregnancy, of 43 women after preterm birth, and of 65 women after a spontaneous delivery of a healthy child serving as controls were collected. TOP was performed between the 15th and the 32nd week of pregnancy ($M=20.2$, $SD=3.8$). The fetal diagnoses were chromosomal anomalies or multiple fetal deformations. VLBW was defined by a birth-weight less than 1,500 g or birth before the 32nd completed gestational week ($M=29.0$, $SD=2.2$). The ethics committee of the Medical Faculty of the University of Muenster approved the study protocol which was performed in accordance with the ethical standards as laid down in the Declaration of Helsinki. Written informed consent was given before participation. All interviews were conducted by trained clinicians. The characteristics of the study sample are shown in Table 1. Study groups differed according to age ($F=3.08$, $df=(2, 167)$, $p<.05$), number of living children ($F=15.50$, $df=(2, 167)$, $p<.01$), and educational level ($\chi^2=26.90$, $df=4$, $p<.001$); no significant differences were found regarding marital status

Table 1 Demographic characteristics of the study groups

	TOP (N=62)	PRE (N=43)	CON (N=65)
Age Mean years (SD)	34.3 (5.0)	33.2 (5.0)	32.1 (4.7)
Marital status (in %)			
Single	19.4	20.9	15.4
Married	75.8	72.1	78.5
Divorced / Separated	4.8	4.7	3.1
Widowed	0.0	2.3	3.1
Children Mean number (SD)	0.8 (1.0)	1.7 (1.4)	1.9 (1.1)
Educational level (in %)			
Low	24.6 [2.3] ^a	23.3	3.1 [-3.6] ^a
Middle	42.6	41.9	24.6 [-2.3] ^a
High	32.8 [-3.1] ^a	34.9 [-2.1] ^a	72.3 [4.9] ^a
Week of Gestation Mean (SD)	20.2 (3.8)	29.0 (2.2)	40.0 (1.3)

^a Standardized residuals with an absolute value > 2 are denoted in []

($\chi^2=3.05$, $df=6$, $p=.848$, n.s.), and percentage of lifetime psychiatric disorders as evaluated by the SCID interview ($\chi^2=1.25$, $df=2$, $p=.535$, n.s.).

Of the 62 women after TOP, 47 (=76%) completed interviews and questionnaires at T2, and 36 (=58%) at T3; of the 43 women with preterm birth, 33 (=77%) completed T2, and 28 (=65%) T3, and in the control group 57 (=88%) completed T2, and 53 (=82%) T3. There were no significant differences between completers and drop outs on the relevant criteria; only women after preterm birth who dropped out after T1 were significantly more depressed and anxious in clinician ratings.

Dependent variables assessing psychiatric diagnoses, posttraumatic stress, depressive and anxious symptoms were performed 14 days (T1), 6 months (T2), and 14 months (T3) after the event.

Clinician rating instruments or interviews: Psychiatric diagnoses (acute and life-time diagnoses) were obtained by means of the Structured Clinical Interview for DSM-IV—patient edition (SCID-IV-P First et al. 1996, Wittchen et al. 1997). The SCID-Interview is an internationally applied semi-structured interview to diagnose psychiatric disorders according to the Diagnostic and Statistical Manual IV (DSM-IV) providing good psychometric values (Williams et al. 1992). The Montgomery-Asberg Depression Rating Scale (MADRS) is a 10-item rating scale to record the severity of depressive symptoms; it is widely applied because of its high sensitivity and inter-rater reliability (Montgomery and Asberg 1979, Neumann and Schulte 1988, Neumann and Schulte 1989, Korner et al. 1990). With the Hamilton Anxiety Scale (HAMA, Hamilton 1959, CIPS 1996) the severity of somatic (muscular, sensory or autonomic symptoms) and psychological aspects (e.g. anxious mood, tension, depressed mood and strain) of anxiety are assessed by means of 14 items using five-point Likert-scales.

Self-report questionnaires: The Impact-of-Event-Scale-Revised (IES-R) is used to assess posttraumatic stress reactions after major life events based on three categories of responses: intrusive experiences, avoidance of thoughts and images associated with the event, and symptoms of hyperarousal. The 22 items are linked to a particular event and assessed according to the frequency of symptoms in the past 7 days on a 4-point measurement scale (Weiss and Mamar 1997, Maercker A 1998). The IES is a reliable index indicating the degree of subjective distress associated with a particular trauma providing good psychometric properties (Creamer et al. 2003). Women were instructed to relate the assessment in the IES-R to the particular event of giving birth. The Beck Depression Inventory (BDI, Beck et al. 1961, Hautzinger et al. 1994) has been widely used as a well validated 21-item self-report questionnaire measuring severity of depressive symptoms in the past week ranging from 0 to 63 and provides good

internal consistency and convergent validity (Beck et al. 1988, Richter et al. 1998). Self-reported anxiety was assessed with the Spielberger State-Trait Anxiety Inventory (STAI, Laux et al. 1981, Spielberger and Gorsuch 1983) comprising two 20-item scales that measure state and trait anxiety. Items are rated on a 4-point scale giving scores ranging from 20 to 80, higher scores indicating greater anxiety. Previous studies proved good psychometric properties of the STAI (Glanzmann and Laux 2002, Stanley et al. 1996). In order to improve the validity of the assessment, self- and clinician rated instruments were used where available (depression and anxiety).

Statistics

χ^2 -tests were used to analyse differences on nominal data between the three study groups. Standardized residuals (SR) greater than 2 in absolute value were considered as significant contributor (Pett 1997). Cochran's Q tests were used to analyse differences within the groups. Single time-point data on metric variables were compared by use of univariate ANOVAs using the Welch-statistic (denoted as $F^{\#}$) for a robust analysis of variance (Algina and Olejnik 1984, Buening 1997) because of violations of homogeneity of variances. Planned Tukey's HSD tests (in the case of variance-homogeneity) or Tamhane tests (in the case of inhomogeneous variances) were applied where appropriate to further analyse the group factor. Repeated-measure analysis of variance (ANOVA) with the between-subjects factor group (TOP, PRE, CON) and the within-subjects factor time (T1 vs. T2 vs. T3; repeated measures)—in case of violation of sphericity with the Greenhouse-Geisser correction—was used to evaluate the differences among the three subject groups and effects across time on interval scaled measures. Tukey's HSD post-hoc tests or Bonferroni tests were applied where appropriate to further analyse the group or time factor. Post-hoc analysis compared all possible pair differences using modified Bonferroni's correction by Keppel (1991) to compensate for the alpha inflation (α -level obtained after correction: 0.0410; $p<0.041$, significant). Partial η^2 were denoted to estimate effect sizes in ANOVAs. Significance for all other analyses was set at the 0.05 level. Statistical analysis was performed by SPSS Windows (Version 12.0.1 for Windows).

Results

Psychiatric diagnoses

Percentages of psychiatric life-time diagnoses as assessed by the SCID interview did not differ between groups ($\chi^2=1.25$, $df=2$, $p=.535$, n.s.); however, there was a

significant difference 14 days post partum ($\chi^2=7.10$, $df=2$, $p<.029$): 18.6% of the women after preterm birth fulfilled diagnostic criteria according to DSM-IV, marginally significant more women after TOP (22.6%, $SR=2.0$), and significantly less women in the control group (6.2%, $SR=2.6$) were diagnosed with a psychiatric disorder. Especially affective disorders were found in all groups fourteen days post partum. Furthermore, a relevant number of women after TOP demonstrated acute-stress disorder or adjustment disorder. Percentages and groups of psychiatric diagnoses are presented in Table 2.

Psychopathology

ANOVAs revealed significant group differences in all psychopathological symptoms two weeks after the event. According to Cohen (1988), estimated effect sizes on posttraumatic stress (IES-R, intrusion, avoidance and hyperarousal: Partial η^2 ranging between 0.388 to 0.480), on depression (BDI and MADRS: $\eta^2=0.207$ and 0.227), and anxiety (Stai-state, Stai-trait: partial $\eta^2=0.259$ and 0.201, HAMA-total score, HAMA-ps: $\eta^2<0.2$) were medium to small. Only for the somatic subscale of the HAMA no main effect was found (TOP: 2.73 (3.19), PRE: 1.56 (1.74), CON: 2.11 (2.77), $F=2.39$, $df=(2, 167)$, $p=.095$, n.s.). Highest posttraumatic stress was found in women after TOP (Tamhane on all IES-scales: all $ps <0.001$); however, women after preterm birth were similarly burdened as women after TOP with regard to depressive and anxious symptoms (Tamhane: all n.s.). As expected, women in the control group were significantly less stressed

with regard to all psychopathological measures. All results on psychopathological symptoms 14 days after the event with planned post hoc analysis are presented in Table 3.

Participants with more than 19 points on either of the subscales of the IES are commonly referred to as “cases”, thus demonstrating a clinically relevant level of posttraumatic stress (Broen et al. 2004). Groups differed significantly according to those IES-cases ($\chi^2=62.40$, $df=2$, $p<.001$), being significantly highest in women after TOP (64.5%; $SR=7.5$), and significantly lowest in the control group (0%; $SR=-6.8$) compared to 27.9% after preterm birth.

Psychiatric diagnoses as a function of time

Analysis on completers revealed relevant proportions of psychiatric diagnoses in women after TOP (25% at T1 and T2, 16.7% at T3) and in women after preterm birth (14.3% at T1, 7.1% at T2 and T3). Groups differed significantly at all points in time (χ^2 from 6.80 to 15.95, $df=2$, p between 0.001 and 0.003). Especially, across time no significant reduction in percentage of psychiatric diagnoses was found, neither in women after TOP ($Q=1.06$, $df=2$, $p=.589$, n.s.), nor in women after preterm birth ($Q=1.14$, $df=2$, $p=.569$, n.s.). Results of nonparametric testing between groups and within groups are given in Table 4.

Psychopathology as a function of time

Temporal course of psychopathological symptoms was analysed with repeated Measures-ANOVAs on posttrau-

Table 2 Percentages and types of SCID-I diagnoses for each group and time point

Time	Group	%	Affective	Types of SKID-I diagnoses		
				Anxiety	Adj./Acute	Others
Lifetime	TOP (N=62)	35.5	21.0	6.5	1.6	6.5
	PRE (N=43)	34.9	20.9	7.0	2.3	4.7
	CON (N=65)	26.2	19.4	1.5	3.1	3.1
T1	TOP (N=62)	22.6	11.3	1.6	8.0	1.6
	PRE (N=43)	18.6	11.6	4.7	0	2.3
	CON (N=65)	6.2	6.2	0	0	0
T2	TOP (N=47)	21.3	10.6	8.5	0	2.1
	PRE (N=33)	9.1	6.1	3.0	0	0
	CON (N=57)	0	0	0	0	0
T3	TOP (N=36)	16.7	11.1	5.6	0	0
	PRE (N=28)	7.1	7.1	0	0	0
	CON (N=53)	0	0	0	0	0

Affective = Major depressive disorders, both single episodes and recurrent, or Dysthymic disorder; Anxiety = Phobic and panic disorders, Obsessive compulsive disorders, Posttraumatic Stress disorder. Adj./Acute = Adjustment disorder, Acute stress disorder. Others = Other disorders (Eating disorders, Somatoform disorder, Substance dependence)

Table 3 Mean scores (standard deviation) and test-statistics of all groups for T1

Scale (T1)	TOP (N=62) M (SD)	PRE (N=43) M (SD)	CON (N=65) M (SD)	F ^{#a} Statistic	TOP vs PRE ^d
IES-R	44.1 (18.96)	27.3 (21.17)	8.0 (8.03)	103.51**	**
IES-intrusion	18.8 (7.77)	11.4 (9.12)	4.6 (4.68)	78.78**	**
IES-avoidance	11.3 (7.43)	6.0 (6.53)	1.2 (2.20)	59.26**	**
IES-hyperarousal	14.0 (8.22)	10.0 (7.86)	2.2 (2.64)	72.04**	**
IES-cases %	64.5 [7.5] ^b	27.9	0 [6.8] ^b	62.40 ^{c**}	**
BDI	13.1 (8.77)	10.6 (7.77)	5.1 (3.77)	27.64**	n.s.
MADR-S	15.6 (9.19)	12.8 (9.06)	6.2 (4.85)	30.62**	n.s.
STAI-state	47.5 (12.18)	47.0 (12.73)	34.5 (7.05)	36.88**	n.s.
STAI-trait	44.7 (10.47)	44.8 (10.57)	35.0 (6.84)	26.65**	n.s.
HAMA-ge	10.4 (6.86)	8.0 (5.65)	6.5 (5.02)	6.59**	n.s.
HAMA-ps	7.7 (4.60)	6.4 (4.73)	4.4 (3.07)	11.81**	n.s.

^a F[#] Welch F-statistic, *df* ranging from (2;74) to (2;101); ^b Standardized residuals with an absolute value >2 are denoted in []; ^c Chi²; ^d planned t-test TOP vs. PRE

***p*<0.01; **p*<0.05;

matic stress, depression, and anxiety for completers of all three groups. Results are given in Table 5. Significant interactions between group and time were revealed on IES-R total ($F=3.87$, $df=(3.62, 114)$, $p=.0006$), IES-intrusion ($F=5.27$, $df=(3.65, 114)$, $p=.0001$), and IES-hyperarousal ($F=2.76$, $df=(3.71, 114)$, $p=.033$). Estimated effect sizes according to Cohen³⁹ were rather small (partial η^2 ranging between 0.046 and 0.085), however significant. Figure 1 illustrates different levels of posttraumatic stress in the study groups and its course across time. Following post-hoc analyses, posttraumatic stress decreased significantly in women after TOP [especially on IES-R and intrusion: from T1 to T2 and from T1 to T3; Bonferroni: all $ps<0.01$] and in the control group [from T1 to T2 and from T1 to T3 on

IES-R, Bonferroni: all $ps<0.041$], whereas women after preterm birth did not change significantly on any scale measuring posttraumatic stress [(Bonferroni: all ps n.s.)]. Only on the subscale avoidance no significant interaction was found ($F=1.10$, $df=(3.71, 114)$, $p>.10$, n.s.). Women after TOP showed significantly higher posttraumatic stress at all measuring points than women in the other groups (Bonferroni all $ps<0.041$).

Percentage of IES-cases differed significantly at all three points in time between groups (Chi² from 12.15 to 47.16, $df=2$, ps between 0.001 and 0.002). Standardized residuals show women after TOP having significantly highest clinically relevant posttraumatic stress at all points in time ($SR=4.7$, $SR=2.8$, $SR=2.2$). IES-cases did not change

Table 4 Percentages of psychiatric disorders and IES-cases and test-statistics on completers

	TOP (N=36) M (SD)	PRE (N=28) M (SD)	CON (N=53) M (SD)	Chi ² (2) ^a
SKID (in %)				
t1	25.0	14.3	5.7	6.80, $p=0.033^*$
t2	25.0 [3.1] ^b	7.1	0.0 [-2.2] ^b	15.95, $p=0.000^{**}$
t3	16.7 [2.3] ^b	7.1	0.0	9.35, $p=0.009^{**}$
Q (2) ^c	1.06, $p=0.589$, n.s.	1.14, $p=0.569$, n.s.	6.00, $p=0.050^*$	
IES Cases (in %)				
t1	63.9 [4.7] ^b	21.4	0.0 [-3.6] ^b	47.16, $p=0.000^{**}$
t2	22.2 [2.8] ^b	7.1	0.0 [-2.1] ^b	13.64, $p=0.001^{**}$
t3	22.2 [2.2] ^b	14.3	0.0 [-2.3] ^b	12.15, $p=0.002^{**}$
Q (2) ^c	20.46, $p=0.000^{**}$	2.40, $p=0.301$, n.s.	-	

^a Chi²: between groups changes; ^b Standardized residuals with an absolute value >2 are denoted in []

^c Cochran's Q: within groups changes,

***p*<0.01; **p*<0.05;

Table 5 Mean scores (standard deviation) and test-statistics of posttraumatic stress, depression and anxiety scores by group as a function of time

		TOP (N=36) M (SD)	PRE (N=28) M (SD)	CON (N=53) M (SD)	F ^a (df)	p	Partial η^2
IES-R total	t1	45.0 (17.54)	25.8 (18.63)	7.7 (8.03)	72.75 (2,114)	(Group) <0.001,**	0.561
	t2	35.3 (21.53)	22.0 (16.00)	3.9 (4.04)	16.89 (1.81114)	(Time) <0.001,**	0.129
	t3	30.9 (21.35)	21.1 (19.06)	4.3 (4.42)	3.87 (3.62114)	(Int.) 0.006, Int.**	0.056
IES intrusion	t1	19.2 (7.18)	10.9 (8.22)	4.5 (4.65)	56.01 (2,114)	(Group) <0.001,**	0.496
	t2	14.0 (8.30)	10.6 (6.87)	3.0 (3.14)	14.75 (1.83114)	(Time) <0.001,**	0.115
	t3	12.6 (8.33)	9.9 (8.02)	2.9 (3.28)	5.27 (3.65114)	(Int.) 0.001,**	0.085
IES avoidance	t1	11.8 (7.55)	5.6 (5.49)	1.2 (2.18)	62.60 (2,114)	(Group) <0.001,**	0.523
	t2	9.5 (7.41)	4.6 (4.66)	0.4 (1.29)	6.08 (1.85114)	(Time) 0.003**	0.051
	t3	8.8 (7.39)	4.5 (5.11)	0.4 (1.26)	1.10 (3.71114)	(Int.), n.s.	-
IES hyperarousal	t1	14.0 (8.14)	9.3 (7.50)	2.1 (2.63)	46.52 (2,114)	(Group) <0.001,**	0.449
	t2	6.8 (6.80)	11.9 (8.84)	0.5 (1.01)	16.26 (1.86114)	(Time) <0.001**	0.125
	t3	9.6 (8.20)	6.7 (7.58)	1.0 (1.76)	2.76 (3.71114)	(Int.) 0.033*	0.046
BDI	t1	12.3 (7.54)	9.5 (7.21)	5.3 (3.92)	10.96 (2,114)	(Group) <0.001,**	0.161
	t2	7.7 (8.11)	7.1 (6.37)	4.1 (3.09)	16.66 (1.80114)	(Time) <0.001**	0.128
	t3	7.6 (6.45)	8.3 (8.24)	4.0 (3.40)	3.21 (3.60114)	(Int.) 0.017*	0.053
MADRS	t1	15.7 (9.39)	10.9 (8.40)	6.4 (4.85)	13.96 (2,114)	(Group) <0.001,**	0.197
	t2	11.0 (9.95)	9.2 (7.58)	5.3 (4.00)	10.76 (2,114)	(Time) <0.001**	0.086
	t3	8.9 (8.74)	10.6 (6.74)	4.9 (5.201)	4.38 (4,114)	(Int.) 0.002**	0.071

^aF (F-Statistic) Int. = Interaction;

** $p < 0.01$, * $p < 0.05$

across time in women after preterm birth ($Q=2.40$, $df=2$, $p=.301$, n.s.), but in women after TOP ($Q=20.46$, $df=2$, $p=.001$) a significant decrease between 14 days and 6 months post loss was observed (Bonferroni $p < .001$).

Significant interactions of group and time were discovered on BDI and MADRS, indicating a differen-

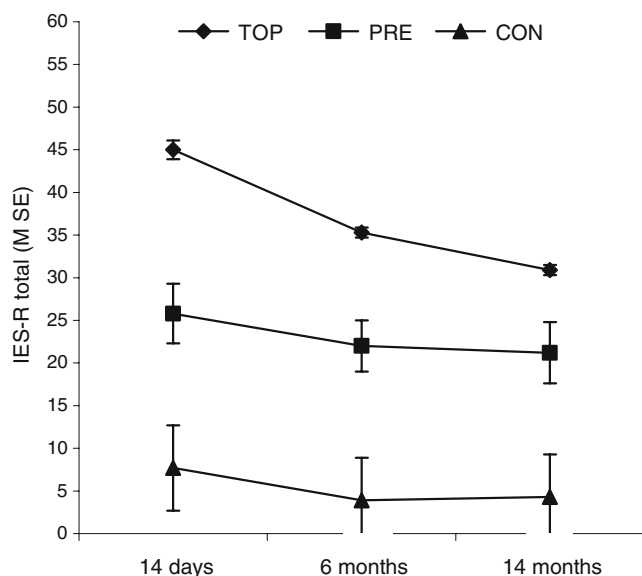


Fig. 1 Levels of posttraumatic stress in the study groups as a function of time

tial course of depressive symptoms across time in the groups, again with small but significant effect sizes (Partial η^2 : 0.053 and 0.071). Depression in women after TOP and women after spontaneous delivery decreased significantly from T1 to T2 and from T1 to T3 (BDI & MADRS: Bonferroni, all $ps < 0.01$), whereas women with preterm birth showed no significant changes of depressive symptoms as measured by any scale (Bonferroni: all $ps > 0.04$, n.s.). Women in clinical groups did not differ significantly according to depressive symptoms at any time (Tukey's HSD: all $ps > 0.05$, n.s.), but were significantly more depressed than the controls: women after TOP at all time points (Tukey' HSD: all $ps < 0.05$), women with VLBW infant at T1 and T3, but not at T2.

Concerning the temporal course of anxiety, no significant interactions between group and time were found on the STAI or on the HAMA.

Discussion and conclusion

This study was designed to assess psychological consequences in women after the focussed traumatic experience of second and third trimester TOP due to fetal malformation compared to the ongoing traumatic experience after delivery of a very low birth weight infant. A control group of women after delivery of a full-term

healthy child was included to control for the psychological effects of a non-complicated ending of a pregnancy.

Research on TOP has so far reported heterogeneous results. Geerincx-Vercammen and Kanhai (2003) investigated 89 couples six weeks and six months after TOP and came to the conclusion that feelings such as doubt, guilt, shame, and anxiety were experienced during the period of TOP and the following weeks but disappeared after six months. However, this investigation was based solely on a non-validated semi-structured interview, thus limiting the validity of the results achieved. Furthermore, the traumatic experience, which seems to be of importance in coping with loss, was not recorded. In a Dutch sample women demonstrated symptoms of posttraumatic stress and depression even years after TOP due to fetal malformation (Korenromp et al. 2005a, b). Because of the instruments employed, only pathological scores of the corresponding symptoms were obtained; instruments allowing a psychiatric diagnosis according to DSM IV were not applied. Correspondingly, our study is, to the best of our knowledge, the first prospective longitudinal study focusing on applying standardized assessment techniques for the diagnoses of psychiatric disorders in women after TOP due to fetal malformation or after pre-term birth.

The main results of our investigation comprise a high number of psychiatric disorders as well as high scores for posttraumatic experience and depressive symptoms, which we found in the group of women after TOP as well as in the group after pre-term birth.

Fourteen days after TOP, 22.6% of these women were diagnosed with a psychiatric disorder, compared to 18.6% of women after delivery of a VLBW-infant, whereas significantly less, i.e. 6.2%, women in the control group had a psychiatric disorder at that point. It is interesting to note that the three groups did not differ significantly with regard to life-time psychiatric diagnoses prior to this event. In the course of observation over a period of 14 months, the groups differed with regard to psychiatric disorders at each point in time. However, no significant improvement of psychiatric disorders could be demonstrated neither for women after TOP nor for women with VLBW infants over this course of time. Fourteen months after the event, a psychiatric disorder could be diagnosed in 16.7% of the women after TOP, whereas in women with a pre-term birth this rate was 7.1%, and in the control group no psychiatric disorder was diagnosed.

It is a remarkable finding that the spectrum of diagnoses changed for women after TOP in the course of time. Whereas the prevalent diagnoses in this group shortly after the loss included a spectrum of acute stress disorders, eating disorders, affective disorders and anxiety, 14 months after the loss exclusively depression and anxiety predominated the spectrum of psychiatric disorders. Despite the

development of intense posttraumatic symptoms in the affected women that are also demonstrated by the high number of IES-cases (64.5%), the traumatic loss did not result in post traumatic stress disorders. The percentage of women with clinically relevant posttraumatic symptoms in this study is distinctly higher than the 30% identified IES-cases 10 days after the loss in 80 women investigated by Broen et al. (2004). This discrepancy in IES-cases could possibly be due to the differences in the intensity of the mother-child relationship: 1.) The reason for the termination of pregnancy in the sample of Broen et al. was an unwanted child; in our investigation, however, termination of pregnancy was due to severe fetal malformation, the pregnancy as such had been planned. Compared to those women with an unwanted pregnancy in the first trimester, the women we investigated probably had a much more intensive emotional relationship to their unborn child. 2.) In our investigation exclusively women were investigated who lost their child in the second and third trimester, whereas the women investigated by Broen et al. had their pregnancy terminated in the first trimester (mean duration of pregnancy 9.6 weeks). Besides the longer duration of pregnancy, the child's movements, and ultrasound investigations, i.e. a visual perception of the child, allowed for a more intense relationship to develop between mother and child (Johnson and Puddifoot 1998). 3.) Women we investigated had to cope with having given birth to a dead child after the decision to terminate the pregnancy; this must possibly also be considered to be a further traumatic experience. These factors could account for the high extent of traumatic stress in our investigation. Results are partly supported by Davies et al. (2005), who found that second trimester termination was more stressful compared to first trimester termination.

In women after pre-term birth, the extent of IES-cases shortly after birth is significantly lower (27.9%) as it is the case for women with TOP (64.5%), but nevertheless relevant. The experience of the traumatizing event of giving birth to a very premature child together with the initial worrying about its surviving might account for this elevated level of IES-cases. Observing the course of traumatic experience in women after a preterm birth, a distinct reduction of traumatic experience could be noted for T2 (7.1%, IES cases), assumingly reflecting the relief experienced with the surviving of the child during this time. However, in contrast to those women after TOP, there was a renewed increase at T3 to 14.3% IES cases. Many parents might have realized that VLBW also involves neurological disturbances and extensive developmental impairments.

Furthermore, the low extent of avoidance in women after preterm birth differs significantly at all points in time to that of women after TOP. This may be explained by the fact that mothers of preterm infants are confronted every day with an ongoing traumatizing reality while caring for their infant.

Because of the numerous medical and supportive measures that they are confronted with, they are face to face with their child's situation.

Additionally to the reported percentages of psychiatric disorders, the burden involved with TOP and giving birth to a VLBW infant is also emphasized by the high level of depression and anxiety in these groups. Women after TOP and women with a VLBW infant were significantly more depressed and demonstrated significantly higher anxiety values than women in the control group immediately after the birth event as well as 14 months later.

The results presented here indicate the necessity for appropriate psychotherapeutic monitoring and support of these women. Recent investigations have shown that women are vulnerable to PTSD in the pregnancy subsequent to stillbirth, particularly when conception occurs soon after the loss (Turton et al. 2001) and that the mother's behaviour influences the development of children born after stillbirth or preterm child (Hughes et al. 2001). Hughes et al. reported in their study on disorganized attachment behaviour among infants born subsequent to stillbirth that siblings of stillborn infants are at risk of an increase in psychological and behavioural problems in later childhood (Hughes et al. 2001). However, the disorganised attachment behaviour of these infants born subsequent to stillbirth did not correlate with maternal PTBS (Turton et al. 2004).

Focussing on unresolved grief and its impact on prenatal attachment in the subsequent pregnancy, O'Leary (2004) argues, that parents after the loss of a child should at least be offered support. Since studies of healthy term infants have shown that maternal depression is linked to negative effects on cognition, and emotional and behavioural development in the child (Dodge 1997, Field 1995), the posttraumatic stress response of mothers seems likely to have effects on preterm children. This is also indicated by the results published by Miceli et al. (2000), suggesting that 36 months after birth children's developmental outcomes are more closely related to early social environment than to early physiological factors.

With regard to the limitations of the study we must note the final response rates of those women after TOP (58% at T3) and those women after preterm birth (65% at T3), both being lower than the response rate of the control group (82%). Women who dropped out of the investigation did not differ significantly from women who continued to participate with regard to social parameters and the severity of the symptoms. Nevertheless, it cannot be ruled out that the former experience their symptoms as more hurtful and impairing.

Such selective drop out could explain the distinctly higher response rate of the control group who were particularly less impaired by symptoms than the women after TOP and after preterm birth. Assuming this relation-

ship between the seriousness of traumatic symptoms and the unwillingness to participate as has been described by Weisaeth (1989), a lower participation rate would lead to an underestimation rather than an overestimation of the associated problems. Further explanations for the low response rates may be shame and perceived stigma. However, compared to the results of other investigations with this target groups, the response rate in our study is on a similar level (Korenromp 2005a, b: 61%; Broen et al. 2004: 46%).

In this study, the psychological status of women after TOP due to fetal anomaly was compared with women after the delivery of a healthy child. In further studies, the specific factor of terminating the pregnancy due to fetal anomaly by choice should be assessed in detail by comparison with a group of parents after miscarriage, stillbirth, or after unexpected infant loss.

In conclusion: For most women, termination of pregnancy due to fetal anomaly in the 2nd and 3rd trimester as well as giving birth to a very low-birth weight infant are major life events and can cause sustained psychiatric morbidity in a relevant number of women even 14 months post-event. The present results clearly indicate the need for specific supportive interventions to diminish psychological distress reactions in these women and to weaken dysfunctional effects on existing or future children.

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