PAPERS AND ORIGINALS

Psychosocial stress in pregnancy and its relation to the onset of premature labour*

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Summary and conclusions

A modified life events inventory was presented over a four-month period to 132 consecutive women going into spontaneous labour in Hull and Manchester. Three study groups were identified according to the duration of pregnancy. The levels of psychosocial stress in pregnancy were found to be particularly high in the mothers whose babies were born preterm. Stressful events may precipitate preterm labour in some women.

The concept of antenatal care may have to be broadened if the incidence of premature labour and resulting perinatal mortality are to be reduced.

Introduction

The "battered fetus" was a concept first outlined by Pugh[1] when he described the possible disastrous consequences to the fetus of physical violence to the pregnant abdomen. The well-being of the infant may also be affected when the mother is subjected to psychosocial stress during her pregnancy: pyloric stenosis[2] and peptic ulceration[3] have been cited as examples. A mother with a negative attitude to her pregnancy often continues to have a negative attitude to her baby once it is born.[4]

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A complex picture thus emerges of how fetal and infant well-being may be affected by physical and emotional factors operating during pregnancy. The purpose of our study was to define to what extent psychosocial stress determined the onset of premature labour.

Patients and methods

The most satisfactory tool used to measure levels of stress is the Life Events Inventory (LEI) devised by Cochrane and Robertson.[5] A LEI is a check list of the relative severity of psychosocial stresses. Each item is scored on a 1-100 scale according to the amount of "turmoil, disturbance, or upheaval" it would cause were it to happen. Getting married scores arbitrarily as 50 to establish a reference point half way up the scale. The LEI of Cochrane and Robertson was validated by a group of psychiatrists, psychiatric patients, and university students. Each group scored the inventory independently, yet remarkably similarly.[2] Certain aspects, however, made it unsuitable for use for pregnant women. Not only had the LEI never been validated by a group of pregnant women but also many of the items were inappropriate to pregnancy—for example, retirement and miscarriage.

Thus before we carried out the main study we modified the LEI and validated the modified inventory.

Modification of LEI—Those items inappropriate to a population of pregnant women were discarded and additional items deemed relevant included. The result was an inventory containing 59 life events, four more than the original (see appendix).

Validation of modified inventory—The modified inventory was scored by 100 women at the Hull Maternity Hospital and 60 women at St Mary's Hospital, Manchester. They scored each item according to the amount of "worry, disruption, or upheaval" the event would cause were it to happen, as had been done with the original inventory. Revill and Dodge[2] defined a life event as major when it carried a score of at least 60 out of 100. We retained this definition using the mean of the scores for Hull and Manchester. The women in the two cities scored the modified LEI remarkably similarly, and both groups produced an identical list of 28 major life events—for example, death of husband or husband made unemployed (appendix).

THE STUDY

The validated, modified LEI was presented to consecutive women in each gestational group going into labour at Hull Maternity Hospital and St Mary's Hospital, Manchester, over a four-month period. We

excluded any women in whom labour had been induced or a language problem made communication difficult; and any in whom labour had been premature for a clear obstetric reason, such as cervical incompetence or multiple pregnancy.

We found the women particularly ready to talk about stress during their pregnancies three to four days after delivery, and we interviewed 132 women at this time over the four months. We defined three study groups according to the duration of pregnancy. Eighty-three women were at full term (≥ 37 weeks' gestation), 30 had preterm babies (33-36 weeks'), and 19 had very preterm babies (< 33 weeks'). The mothers of the term babies were interviewed by whichever of us happened to conduct the routine medical examination of the newborn baby, so that some rapport with the mother was already established. The mothers of preterm babies were interviewed by either RWN or PACW.

A record of maternal age, marital state, gravidity, parity, and social class was made. A yes/no answer was recorded against each item on the modified LEI. A positive answer was accompanied by the timing of the event in relation to the onset of labour.

Student's t test was used for comparison of means between groups, and a two-tailed χ^2 test for a comparison of frequencies between groups.

Results

There was no significant difference between the three study groups in age, gravidity, or parity (table I). Table II shows the social-class distribution of the two groups. The proportions of women from social classes IV and V in the term group and the preterm groups combined were similar. Table III records the number of major life events according to the stage of pregnancy and compares the three study groups. No particular pattern of the timing of the major life events emerges, but the number of major life events in the one week immediately preceding the onset of labour was far higher in the preterm groups.

Table IV depicts numbers of pregnancies in each study group accompanied by no major life events at one end of the scale and five major life events at the other. Only 36 (43%) of the 83 mothers whose pregnancies went to term experienced any major life events compared with 20 of the 30 (67%) who went into preterm labour and 16 of the 19 (84%) whose babies were very preterm.

When the results are presented, as in table V, in terms of the mean number of life events per pregnancy it is apparent that the more premature the onset of labour the higher the level of psychosocial stress is likely to be. Significantly more major life events occurred in the preterm than the term group ($P < 0.02$), and the difference between the very preterm and the term groups was highly significant ($P < 0.01$). There was no statistical difference, however, between the two preterm groups, though the clear trend was shown, and because of this we combined these two groups to explore the influence of social class on our results. Table VI shows how descending socio-economic group is associated with an increase in the mean number of major life events recorded per pregnancy in the term and preterm groups. A contingency table was drawn up relating social class to major life events and the term and two preterm groups compared using a χ^2 test. Our results were shown to be independent of the influence of the social-class make-up of our study groups.

TABLE I—*Age, gravidity, and parity in groups studied according to gestational age*

	Age (years)	Gravidity	Parity
	≥37 weeks' gestation		
Range	14–38	1–7	1–6
Mean	24·5	1·8	1·8
SD	4·9	1·2	1·0
	33–36 weeks' gestation		
Range	17–36	1–10	1–5
Mean	25·3	2·2	1·8
SD	4·7	1·8	1·1
	<33 weeks' gestation		
Range	18–34	1–8	1–6
Mean	24·4	2·2	1·8
SD	5·7	1·9	1·3

TABLE II—*Social-class distribution in study groups. (Figures are numbers (%) of mothers)*

Gestation	Social-class distribution				
	I	II	III	IV	V
≥37 weeks	2 (7)	17 (20)	23 (28)	6 (7)	37 (45)
33–36 weeks		4 (14)	12 (41)	2 (7)	9 (31)*
<33 weeks		1 (7)	6 (33)	2 (13)	9 (46)*

*Social class not recorded in two preterm pregnancies.

TABLE III—*Incidence of major life events and their timing in pregnancy. (Figures are numbers of events)*

	Group		
	≥37 weeks (n = 83)	33–36 weeks (n = 30)	<33 weeks (n = 19)
1st trimester	16	12	14
2nd trimester	14	7	10
3rd trimester	22	21	13
1 week before delivery	3	8	8
Total	52	40	37

TABLE IV—*Numbers of women in each group who experienced up to five major life events*

Group	No of major life events					
	0	1	2	3	4	5
≥37 weeks (n = 83)	47	26	5	4	1	
33–36 weeks (n = 30)	10	8	6	4	2	
<33 weeks (n = 19)	3	5	4	4	2	1

TABLE V—*Mean number of major life events per pregnancy in three study groups*

	≥37 weeks (n = 83)	33–36 weeks (n = 30)	<33 weeks (n = 19)
Mean No of life events per pregnancy	0·63	1·33	1·95
Mean No of life events in last week per pregnancy	0·04	0·27	0·42

TABLE VI—*Mean number of major life events per pregnancy according to social class in groups with gestation under or over 37 weeks*

	Social class				
	I	II	III	IV	V
≥37 weeks		0·43	0·44	0·75	0·84
<37 weeks	1·0	1·2	1·35	2·00	2·13

Discussion

Our results clearly show that those pregnancies resulting in premature labour are far more likely to have been stressful. This is particularly striking because in a shortened pregnancy fewer major life events would generally be expected. Our groups were well matched for age, gravidity, and parity, and the results were independent of any effect social-class composition of the study groups might have had.

The incidence of major life events in the one week immediately preceding the onset of labour was much higher in the preterm groups. It might be concluded that in eight of the 30 women in the preterm group and eight of the 19 in the very preterm group a major life event actually precipitated labour (table III). Levels of stress in the home may perhaps be important in inducing labour at term as well. Macfarlane[6] showed how relatively few births occurred at weekends and Bank holidays. The pattern is not wholly accounted for by obstetric practice, as it is preserved

when home deliveries are considered as well. It is at weekends and Bank holidays, when all her family are close by, that an expectant mother feels least stressed and perhaps least likely to go into labour.

If, indeed, we accept that high levels of psychosocial stress in pregnancy bear an important influence on the likelihood and timing of the onset of premature labour we should explore ways of reducing stress. In our study we were measuring the incidence of major life events, and it is unlikely, on the whole, that we could adopt a preventive role. An effort could be made, however, to reduce some of the stresses created by the major life events, by giving either moral support or financial help. Importantly, many of the women interviewed had been having continuous worry for many months during their pregnancy, totally unbeknown to the antenatal clinic team of midwives, junior medical staff, and obstetricians.

We apply the terms caring and caretaking to the mothers of growing children. Clearly, these terms could be applied to the guardians of the growing fetus too, including the mothers, fathers, close relatives, and attending physicians. At the moment the antenatal service in Britain is a good caretaking service, but most would agree that it falls short of being a good caring service too. Providing an understanding ear, with perhaps more specially trained social workers in all antenatal clinics, might well be an effective initial step. If we ignore the facts as presented here then we must accept that the prevalence of premature labour cannot be further reduced and that the perinatal mortality and morbidity resulting will soon be at an irreducible minimum.

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Appendix

MODIFIED LIFE EVENTS INVENTORY (scored on 1-100 scale)

	Hull (n=100)	Manchester (n=60)
Illness/Family/Personal		
*1 Serious physical illness or injury requiring hospital treatment	69	69
*2 Sudden or serious impairment of vision or hearing	68	77
3 Unwanted pregnancy	58	63
4 Unwanted sexual intercourse with partner	51	49
5 Sexual difficulties	55	52
6 Sexual intercourse with partner	42	29
*7 Immediate family member seriously ill	76	75
8 Immediate family member starts drinking heavily	52	62
*9 Immediate family member attempts suicide	79	83
*10 Immediate family member dies	91	89
*11 Husband dies	98	96
*12 Death of close friend	72	77
*13 Prolonged ill health in close relative requiring treatment by doctor	62	69
*14 Increase in number of family arguments (with close family—for example, children)	61	60
15 Increase in arguments or trouble with other relatives—for example, in-laws)	48	47
*16 Undue worry over having a handicapped child	74	76
*17 Worry over care of children while in hospital	65	59
Relationship with husband		
*1 Your husband uses harsh words to you, is cruel or sarcastic (mental cruelty)	70	77
*2 Your husband is physically cruel to you	81	85
*3 Increase in number of arguments with husband	72	69
*4 Marital separation	87	86
*5 Divorce	90	87
*6 Extramarital sexual affair	76	73
7 Your extramarital affair breaks up	50	54
*8 Your husband is unfaithful	89	84
9 You are reconciled after a break in your marriage	58	51
Relationship with boyfriend		
*1 Your boyfriend uses harsh words to you, is cruel or sarcastic (mental cruelty)	69	64
*2 Your boyfriend is physically cruel to you	79	74
*3 Increase in number of arguments with your boyfriend	57	63
*4 You split with your boyfriend	71	67
5 You are unfaithful to your boyfriend	56	54
*6 Your boyfriend is unfaithful	67	67
7 You make things up after a split with your boyfriend	53	43
Work/Finance A		
1 You move house	38	43
2 Take out a mortgage or buy your own house	42	43
3 Quarrel with your neighbours	32	34
*4 You are made homeless (or have to sleep in hostel or sleep rough)	82	80
5 You are forced, owing to circumstances, to be away from home	58	43
6 Just been on holiday	26	18
7 You have had a serious restriction in social life	36	31
8 A recent event of unusual excitement or a fright	25	43
9 An unusual amount of exercise	31	32
10 Dietary indiscretion (food)	37	33
11 Dietary indiscretion (alcohol)	36	31
*12 You are involved in a fight	61	64
*13 You are arrested	73	76
*14 Your husband is arrested	77	78
*15 You have to make a court appearance	69	65
*16 You are convicted of an offence	79	78
*17 Your husband (or head of household) is sent to jail	89	86
Work/Finance B		
1 You become unemployed	42	48
*2 Your husband or head of household becomes unemployed	72	79
3 You get a new job in the same line of work	35	26
4 You get a new job in a new line of work	38	34
5 A change in hours or conditions in your present job	32	26
6 Promotion or change in responsibilities at work	37	34
7 Your husband (or head of household) gets a new job, same line of work	34	24
8 Your husband (or head of household) gets a new job, new line of work	38	29
9 Your husband (or head of household) has a change in hours or conditions in his present job	35	30
10 Your husband (or head of household) gets promotion or a change in responsibilities at work	39	29
11 You have trouble with superiors at work	43	38
12 Your husband (or head of household) has trouble with superiors at work	44	40
13 Income increased substantially (by 25%)	35	16
*14 Income decreased substantially (by 25%)	64	56
*15 Getting into debt beyond your means of repayment	80	74
16 You give up your job	35	36

*Major life event.

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