STRESSFUL LIFE EVENTS, SOCIAL SUPPORT, AND MOOD DISTURBANCE IN HOSPITALIZED AND NON-HOSPITALIZED WOMEN WITH PREGNANCY-INDUCED HYPERTENSION

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Women who are hospitalized for treatment of complications of pregnancy experience stress resulting from hospitalization, in addition to stress generated by their high risk pregnancy. Stressors associated with antepartum hospitalization include separation from home and family, health concerns, loss of control, isolation, and boredom (Becker, 1984; Waldron & Asayama, 1985; White & Ritchie, 1984). Research investigating the impact of these stressors reveals that hospitalized high risk pregnant women exhibit greater manifestations of stress than non-hospitalized low-risk pregnant women. Hospitalized pregnant women report greater anxiety and depression, lower self- esteem, and less optimal family functioning than low risk pregnant women (Becker, 1984; Mercer & Ferketich, 1988; Mercer, Ferketich, DeJoseph, May & Sollid, 1988). This evidence has led to concern about the effects of hospitalization on the pregnant woman and her family.

The recent trend toward the development of antepartum home care programs offers an alternative to hospitalization (Dahlberg, 1988; Miller, 1990). These programs allow high risk pregnant women to be cared for in the familiar environment of their homes, with access to social support from their families. Social support has been found to buffer, or mediate, the effects of stressful life events on emotional disequilibrium and complications of pregnancy in low risk pregnant women (Norbeck & Tilden, 1983; Nuckolls, Cassell & Kaplan, 1972). However, few investigations have been conducted to determine the effect of social support in high risk pregnancies. This study was designed to explore whether women with pregnancy-induced hypertension (PIH), cared for in an antepartum home care program, would experience lower levels of stressful life events and mood disturbance, mediated by increased access to social support, when compared to women with PIH cared for in a hospital setting. A comparison group of pregnant women not experiencing any complications (low risk) was also incorporated

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to unravel further the effects of pregnancy risk status and location of care on manifestations of stress. In addition, the study was designed to examine the relationships between the variables of stressful life events, social support, and mood disturbance in pregnant women.

Conceptual Framework

The conceptual framework for this research was derived from Pearlin, Menaghan, Lieberman and Mullan's (1981) description of the process of social stress, which combines three major conceptual domains: sources of stress, mediators of stress and manifestations of stress. The source of stress studied was negative life events (including high-risk pregnancy), the mediator of stress was social support, and the manifestation of stress was mood disturbance.

Literature Review

Social support is a multidimensional concept (Gottlieb, 1983; Hogue, 1985) for which the amount, type and sources of support are all important to consider (Thoits, 1982). A distinction is usually made between perceived social support (the person's perception of the supportive value or functional content of relationships) and the social network (the structure and number of relationships a person has) (Schaefer, Coyne & Lazarus, 1981). Researchers have hypothesized that social support has direct effects on health, and also buffers or mediates the relationship between stress and health (House, 1981; Wilcox, 1981). Several extensive reviews of the literature have provided evidence for both direct and buffering effects of social support on health and well-being (Broadhead et al., 1983; DiMatteo & Hays, 1981; Gottlieb, 1983; Kessler & McLeod, 1985). Because there are almost as many measures of social support as there are studies, it is difficult to compare studies and to determine why support acts as a buffer in some instances and has a direct effect in others (Cohen, Mermelstein, Kamarck & Hoberman, 1985).

Six pregnancy studies have been conducted that are particularly relevant to this research project. Nuckolls et al. (1972) investigated the relationships between psycho-social assets, social stressors as measured by a cumulative life change score, and the prognosis of pregnancy in 170 primigravidas. In the presence of a high number of stressors, pregnant women with high psychosocial assets, including social support, had only one-third the complication rate of women whose psychosocial assets were low. In the absence of stressors, there was no significant relationship between psychosocial assets and complications. Thus a buffering effect of psychosocial assets was supported.

Tilden's (1983) study of 141 medically normal pregnant women in the second trimester of pregnancy found significant and separate effects of stressful

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life events and social support on emotional disequilibrium during pregnancy. Stressful life events accounted for 29.7% and social support for 3.1% of the variance in emotional disequilibrium. The interaction of stressful life events and social support was not significant.

A similar study was conducted by Norbeck and Tilden (1983) using a sample of 117 medically normal pregnant women. Life stress was measured using a negative life events score. High life stress and low social support were significantly related to high emotional disequilibrium, but the interaction between life stress and social support was not significant. High life stress from the prior year was significantly related to overall complications. The interaction of life stress during pregnancy and the tangible support factor was a significant predictor of gestational and infant complications, with subjects in the high stress/low support quadrant having the highest rate of complications.

Barrera (1981) studied the role of social support in the adjustment of 86 pregnant adolescents. Support needs and negative life events were positively correlated with depression and anxiety, while satisfaction with social support bore a significant negative correlation with depression and anxiety. Total network size was the only support variable to have a stress-buffering effect, and accounted for 4% of the variance in depression.

Few studies have investigated the effect of stressful life events and social support on psychological distress in both high-risk and low-risk pregnant women. Mercer and Ferketich (1988) studied 153 high-risk (hospitalized) pregnant women and 218 low-risk (non-hospitalized) pregnant women between the 24th and 34th week of gestation. The high-risk pregnant women reported greater negative life events and greater anxiety and depression than low-risk pregnant women. Perceived social support was not a significant predictor of anxiety or depression in the high-risk group, but it was a significant predictor of anxiety and depression in low-risk women. Neither received support nor network size entered the regression models for either group. Contrary to the hypothesis, high-risk women received more support than low-risk women, but the received support did not effect their anxiety status.

Ford and Hodnett (1990) studied perceived stressors, social support and adaptive responses in 27 hospitalized antepartum women. A positive relationship was found between social support and adaptation, but no significant relationship was found between perceived stressors and adaptation. Multiple regression analysis revealed that social support, length of hospitalization and risk status were significant predictors of adaptation; social support accounted for 17% of the variance in adaptation. However, these results should be interpreted with caution because of limited testing of the reliability and validity of the instruments.

The above studies provide conflicting results about the effectiveness of social support in reducing the impact of stressors on pregnant women. Further investigation into the relationships between sources of stress, mediators of stress and manifestations of stress in both high-risk and low-risk pregnant women is needed.

Hypotheses

The following hypotheses were tested.

1. Women with PIH cared for in a hospital setting will have higher levels of stressful life events, lower levels of social support and higher levels of mood disturbance than women with PIH cared for in a home care program.

2. Women with PIH cared for in a hospital setting will have higher levels of stressful life events, lower levels of social support and higher levels of mood disturbance than low-risk pregnant women.

3. Women with PIH cared for in a home care program will have higher levels of stressful life events, similar levels of social support and higher levels of mood disturbance than low-risk pregnant women.

4. Stressful life events will be positively related and social support will be negatively related to mood disturbance in pregnant women.

5. The effect of stressful life events on mood disturbance will be buffered by social support.

Method

Sample

The sample consisted of 60 women in the third trimester of pregnancy. Non-probability sampling was employed to obtain twenty subjects in each of three groups. Group I subjects were women with PIH, obtained from the antepartum unit of an urban acute care hospital. Group II subjects were obtained from an antepartum home care program in which women with PIH were cared for at home with daily supervision from specially trained Public Health Nurses (Manitoba Health, 1987). Subjects in both Group I and II had to meet the criteria for referral to the antepartum home care program to ensure both groups had only mild pre-eclampsia. Eligibility criteria included: sitting blood pressure <150/100 mm Hg, proteinuria <100 mg/dl and absence of headache, visual disturbances, epigastric pain or hyperreflexia. Group III consisted of low-risk pregnant women recruited from childbirth education classes.

All subjects were married and resided within the city limits; the majority were Caucasian (91.7%). The age of the subjects ranged from 20 to 42 years

(M=28.2, SD=4.9). The majority of the women (91.7%) had achieved Grade 12 education or better (M=13.1, SD=2.3). Gestational age ranged from 31 to 40 weeks (M=35.7, SD=2.2). There were no significant differences between the three groups in age (F ratio=.470, p=.627), education (F ratio=.376, p=.688) or gestational age (F ratio=2.67, p=.078). The median family income was $35,000.00 to $39,999.00 per year. Forty-two women (70%) were primigravidas, while 18 women (30%) were multigravidas. For subjects with PIH, there was no significant difference in the number of days admitted to the hospital (M=3.6, SD=1.9) or to the home care program (M=4.3, SD=1.7) (t=-1.21, p=0.233). There were no significant differences between Group I and II in levels of proteinuria or edema, but Group I had significantly higher mean sitting diastolic blood pressures (M=87.5, SD=9.5) than Group II (M=76.2, SD=10.5) (t=3.27, p=0.002).

Instruments

Instruments were selected to operationalize three major concepts in the conceptual framework: sources of stress, mediators of stress and manifestations of stress. A demographic information form was also completed by the subjects.

Source of stress: stressful life events

The *Life Events Questionnaire* (LEQ) is an 82-item questionnaire that was developed by modifying existing life-event questionnaires to increase their relevance for adult female respondents of childbearing age (Norbeck, 1984). For each life event experienced during the past year, the respondent indicates his/her perception of the event ("good" or "bad") and then rates the impact of the event on a 4-point scale ranging from "no effect" to "great effect". The negative events score (the sum of the effect ratings from items designated as "bad") was used as the measure of stressful life events in this study because negative scores are a better measure of life stressors (Sarason, Johnson & Siegel, 1978) and are the most useful in predicting psychological symptoms (Zuckerman, Oliver, Hollingsworth & Austrin, 1986). The negative events score of the LEQ has an acceptable level of test-retest reliability (.78). Predictive validity has been demonstrated by significant correlations between the negative events score and measures of psychological and psychiatric symptoms.

Mediator of stress: social support

The *Norbeck Social Support Questionnaire* (NSSQ) is an instrument designed to measure multiple dimensions of social support (Norbeck, Lindsey & Carrieri, 1981, 1983), which is based on Kahn's (1979) definition of social support. Three functional properties of social support - affect, affirma-

tion and aid - are measured, as well as the network properties of size (number listed in the network), duration of relationships and frequency of contact. Scoring yields a total functional support score and a total network score.

High levels of internal consistency have been found for the functional (.72 to .98) and network (.88 to .96) properties. Over a one-week interval, test-retest reliability for these scores ranged from .85 to .92. Validity of the NSSQ has been tested in relation to response bias and concurrent, construct and predictive validity.

Manifestations of stress: mood disturbance

The *Profile of Mood States* (POMS) was developed to assess transient, fluctuating affective states (McNair, Lorr & Droppleman, 1971). The POMS consists of 65 adjective rating scales that measure six identifiable mood states: tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia and confusion-bewilderment. Subjects are asked to rate "how you have been feeling during the past week including today". The adjectives are rated on a five-point intensity scale from "not at all" to "extremely" and assigned weights from 0 to 4. In addition to scores for each mood factor, a "Total Mood Disturbance Score" (TMDS) is obtained by summing the scores (with vigor weighted negatively) on the six primary mood factors.

Predictive, construct and concurrent validity have been established. Internal consistency within the six mood scales is high (.84 to .95). Lower test-retest reliability coefficients (.65 to .74) were reported, as would be expected in an instrument sensitive to fluctuations in a transient state like mood.

Procedure

Following approval of the study by a university ethical review committee, permission to recruit study subjects was obtained from hospital and public health administrators. Potential subjects were approached in their hospital rooms (Group I) or visited in their homes following a telephone call to establish a mutually agreeable time to meet (Group II and III). Only two women (one in the hospital and one in the home program) refused to participate. A written explanation of the study was provided by the investigator, and subjects who agreed to participate signed a consent form.

Results

Prior to analysis of data, frequency distributions were examined for the presence of outliers or extreme data points (Shelley, 1984). Four deviant scores were discovered when compared to the rest of the sample. Four subjects (1 from Group I and 3 from Group II) had total mood disturbance

scores (M=86.8, SD=29.5) that were more than two standard deviations above the mean for the remainder of the sample (M=24.7, SD=25.0). As per Bhattacharyya (1991), the question of whether these four scores were true outliers rested upon the identification of a theoretical reason that these four scores differed from all the others. Upon further investigation, it was found that these four subjects were the only ones who rated pregnancy on the LEQ as a "bad" event that had a "great effect" on their lives. These four subjects with outliers were not typical of the remainder of the sample, and rating pregnancy as a "bad" event seemed to have a significant effect on responses; as such, the decision was made to delete these subjects from further analyses, leaving N=56 for hypothesis testing.

Hypotheses 1, 2 and 3

One purpose of this study was to compare levels of stressful life events, social support and mood disturbance among the three groups of pregnant women. One way analysis of variance (ANOVA) was used to test the significance of differences between the three group means. Refer to Table 1.

Table 1

Group Comparisons by ANOVA for Negative Life Events, Social Support, and Mood Disturbance Variables

| | Independent Variable: Group Membership | | | | | | | |
| | Group I PIH-Hospital (n=19) | | Group II PIH-Home Care (n=17) | | Group III Low-risk (n=20) | | | |
Dependent Variable	Mean	SD	Mean	SD	Mean	SD	F	p
Negative life events	9.37	7.40	10.82	8.06	6.00	3.58	2.69	.077
Functional support	185.32	73.04	224.65	73.57	216.95	71.25	1.53	.227
Network support	100.32	33.40	127.18	41.22	122.40	36.95	2.75	.073
Total mood disturbance	38.11	31.27	16.06	20.19	19.20	16.18	4.82	.012*
Anxiety	12.68	5.88	8.00	3.64	8.85	3.23	5.92	.005*
Depression	12.58	9.71	6.12	4.94	5.95	3.91	6.01	.004*
Confusion	7.16	3.80	4.76	1.82	5.15	3.08	3.29	.045*
Anger	8.00	5.90	4.41	3.86	5.85	4.07	2.66	.080
Fatigue	9.32	7.18	5.82	5.33	10.25	4.44	2.95	.061
Vigor	11.63	5.10	13.06	6.77	16.85	4.56	4.71	.013*

*Significant

When a significant F-ratio was obtained, the Newman-Keuls post hoc comparison test was applied to verify the location of specific significant differences among the groups (Shelley, 1984). There were no significant differences in negative life events, functional support or network support among the three groups. There were, however, significant differences in the Total Mood Disturbance Score (TMDS) between Group I and II, and between Group I and III. The hospitalized subjects had higher TMDSs than either the Home Care subjects or the low-risk subjects. The differences between Group II and III were not significant; that is, subjects cared for on the Home Care Program had similar TMDSs to those of low-risk women.

Of the POMS subscales, the anger and fatigue scores did not differ significantly among the three groups. However, a significant F-ratio was obtained for the anxiety, depression, confusion and vigor subscales, indicating that a significant difference existed between at least two of the three groups. Post hoc comparison indicated that Group I had significantly higher anxiety and depression scores than Group II and Group III, and a higher confusion score than Group III. Conversely, the low-risk pregnant women (Group III) had significantly higher vigor scores than either the hospitalized women (Group I) or women on the Home Care Program (Group II).

Hypothesis 4

My fourth hypothesis was that stressful life events would be positively related and social support would be negatively related to mood disturbance in pregnant women. The total sample of pregnant women (n=56) was used to test this hypothesis. Bivariate correlation techniques (Pearson r) were used to examine the nature and extent of the relationships between the variables. Correlations are presented in Table 2.

Table 2

Pearson r correlations between independent and dependent variables for pregnant women (n=56).

Independent Variables	Total mood disturbance	Anxiety	Depression	Confusion	Anger	Fatigue	Vigor
			Dependent Variables				
Negative life events	.491*	.427*	.397*	.293**	.332*	.436*	--
Functional support	-.102	-.060	-.033	-.144	-.119	.028	.196
Network support	-.194	-.161	-.122	-.256**	-.213	-.032	.196

*p<.01; **p<.05

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Moderate correlations existed between the negative life events score and the TMDS (r=.491), the anxiety subscale (r=.427) and the depression subscale (r=.397). Therefore the hypothesis that stress would be positively related to mood disturbance was supported.

There was little evidence to support the hypothesis that social support would be negatively related to mood disturbance. Neither the functional nor the network support variables achieved a significant correlation with the TMDS, although the correlations were in a negative direction. Of the POMS subscales, only confusion showed a significant negative relationship to the Total Network score (r=-.256). No other relationships between social support and the POMS subscales were significant.

Hypothesis 5

My final hypothesis was that the effect of stressful life events on mood disturbance would be buffered by social support. I investigated this hypothesis with the construction of a multiple regression model, using a hierarchical analytic strategy (Cohen & Cohen, 1983). The predictor variables of negative life events, social support and the interaction of negative life events and social support were entered into the equation. The criterion (dependent) variable was mood disturbance. This technique is similar to that employed by other investigators to test the buffering hypothesis (Norbeck & Tilden, 1983; Tilden, 1983; Wilcox, 1981). Volicer (1984) states that the contribution of interaction between two independent variables to prediction of the dependent variable is handled by including a multiplicative term in the regression equation. The multiplicative term is the product of the two independent variables and represents the effect of the two variables jointly, in addition to their independent effects.

Prior to performing the hierarchical regressions, correlations were performed to screen for possible covariates with the criterion variable of mood disturbance. No significant covariates emerged, as neither age (r=-.131, p=.335), gestational age (r=.127, p=.352), admission days (r=.115, p=.503), education (rho=.160, p=.223) or sitting diastolic blood pressure (r=.238, p=.176) were related to mood disturbance. Blood pressure was not significantly correlated with mood disturbance; as such, the finding that blood pressures were significantly higher in the hospitalized group assumed less importance.

The results of the hierarchical multiple regression analyses are presented in Table 3. The negative life events score was a significant predictor of mood disturbance, accounting for 24.1% of the variance in the total mood disturbance score (TMDS). Neither functional or network support was a significant predictor of mood disturbance; therefore a direct effect of social sup-

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port was not supported. The interaction term, representing the effect of negative life events and social support jointly, was also not significant; therefore a buffering effect of social support was not supported.

Table 3

Multiple Regression Analysis for Negative Life Events, Social Support, and the Interaction of Negative Life Events and Social Support on Mood Disturbance During Pregnancy (n=56)

Variance source	Beta	Multiple R	R^2 Change	F	p
Negative life events	3.410	.491	.241	17.111	.000*
Functional support	.033	.498	.008	.537	.467
Interaction (Neg. life events x functional support)	-.000	.512	.014	.978	.327
Negative life events	2.660	.491	.241	17.111	.000*
Network support	-.054	.525	.035	5.524	.118
Interaction (Neg. life events x network support)	-.008	.529	.004	.320	.574

* Significant

Limitations

The results of this study should be interpreted with caution, as the small, relatively homogeneous convenience sample limits generalizability to other pregnant women. While suggesting that location of care may be related to mood disturbance in women with PIH, the design of the study does not permit the determination of cause and effect relationships. The sample was also of insufficient size to perform multiple regressions for each of the three groups; therefore, the relationships among the variables had to be studied using the total sample of pregnant women.

Discussion

The results of this study suggest that antepartum hospitalization is a significant stressor for pregnant women, because the hospitalized subjects exhibited the greatest manifestations of stress. Hospitalized women had significantly higher Total Mood Disturbance, anxiety and depression scores than either the women with PIH cared for in the antepartum home care program or the low-risk pregnant women. These findings validate those of Mercer and Ferketich (1988), who reported that hospitalized high-risk pregnant women had greater anxiety and depression than non-hospitalized low-risk pregnant women.

Benefits of an Antepartum Home Care Program as an alternative approach to care for high-risk pregnant women are also evident. For women with PIH, being cared for at home was associated with less Total Mood Disturbance, anxiety and depression than being cared for in the hospital setting. In fact, women on the home care program had levels of anxiety and depression similar to those of low-risk pregnant women. This suggests that being high risk is not necessarily associated with high stress, depending on the location of care. These results provide justification for a randomized contolled trial of "location of care" for women with PIH. Random assignment of high-risk pregnant women to either the hospital or home care group would reduce selection bias and permit investigation of causal hypotheses. Research is also needed to determine whether benefits of antepartum home care can be replicated for complications of pregnancy other than PIH.

Contrary to what was expected, there were no significant differences in levels of negative life events between the three groups. This may have occurred because the LEQ is a general assessment tool exploring a broad range of stressful life events experienced during the past year. An instrument that explored stressful life events specific to a woman's pregnancy might have been more sensitive in discerning differences between the three groups. Although preliminary efforts have been made to identify stressful events related to pregnancy and childbearing (Arizmendi & Affonso, 1987), further work is needed to develop a reliable and valid questionnaire.

A significant difference in social support between the three groups was also not detected, although examination of the mean scores for the NSSQ variables and subscales indicated that, in all instances, Group I (hospitalized subjects) had lower scores than the other two groups. This suggests that hospitalization might reduce access to a person's social supports.

This study provides further support for the likelihood of a direct relationship between sources of stress and mood disturbance in pregnant women, as negative life events were significantly correlated with total mood disturbance ($r=.491$). This result is similar to that obtained by Tilden (1983). Stronger correlations seem to be obtained by using life events questionnaires that differentiate between positive and negative events and permit the subject to rate the impact of the event, rather than using predetermined weighting for events (Sarason, Sarason & Johnson, 1985).

Neither a direct or a buffering effect of social support was demonstrated in this study. These results are comparable to those of Mercer and Ferketich (1988), in which both received support and network size failed to enter the regressions predicting anxiety and depression in high-risk and low-risk pregnant women. One possible explanation for the nonsignificant effects of social support in this study is the use of a cross-sectional design, which may

not be well suited for detecting the buffering effects of social support (House, 1981; Thoits, 1982). A prospective, longitudinal study should be undertaken to test the buffering hypothesis and to obtain more conclusive evidence with regard to the cause-effect relationships between stressful life events, social support and mood disturbance in pregnancy. The research design and instrumentation also did not permit detection of specific stressor-support relationships, in which the type of support provided should match the adaptational requirements elicited by a particular stressor (Cohen & McKay, 1984; Wilcox & Vernberg, 1985).

The conceptual framework for this study classified the components of the process of social stress as sources of stress, mediators of stress and manifestations of stress. Various types of mediators, such as social support, coping and personality variables, may reduce the impact of stressors (Wheaton, 1985). The possibility exists that one of the other mediating resources may have acted as a confounding variable or obscured the effect of social support. Further research is needed to increase our understanding of the role of other mediators in helping women adapt to the stressful event of high-risk pregnancy. Pearlin et al. (1981) suggest that negative life events and the role strains they generate are more likely to produce stress when they result in a decreased sense of mastery and self-esteem. Mastery and self-esteem are also incorporated into the theoretical model for studying the effect of antepartum stress proposed by Mercer, May, Ferketich & DeJoseph (1986). These variables would thus be important to measure in future studies of antepartum stress.

Implications for nursing

Nurses must remain sensitized to the fact that antepartum hospitalization may be a stressful experience that is associated with increased levels of mood disturbance in pregnant women. Hospitalized pregnant women should be assessed for manifestations of stress, such as anxiety and depression.

Because antepartum hospitalization is associated with high levels of mood disturbance in pregnant women, I recommend that more home care programs be developed as an alternative setting of care for high-risk pregnant women. The results of this study indicate that being cared for at home may be associated with lower levels of anxiety than being cared for in the hospital. Home care may thus have beneficial effects for the pregnancy because anxiety has been consistently associated with the development of maternal and fetal complications (Crandon, 1979; Glazer, 1980; Gorsuch & Key, 1974).

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RÉSUMÉ

Evénements stressants, appui social et agitations d'humeur chez les femmes hospitalisées et non-hospitalisées souffrant d'hypertension provoqué par la grossesse

On a comparé les événements stressants de la vie, l'appui social et les perturbations de l'humeur chez trois groupes de femmes dans leurs trois derniers mois de la grossesse. Ces groupes comprenaient : 19 femmes souffrant d'hypertension causée par la grossesse soignées dans un hôpital, 17 femmes souffrant d'hypertension causée par la grossesse qui participaient au programme de soins à domicile avant l'accouchement et 20 femmes enceintes à faible risque. Les femmes souffrant d'hypertension causée par la grossesse soignées dans un hôpital, démontraient un niveau plus élevé de perturbations de l'humeur que les femmes qui participaient au programme de soins à domicile avant l'accouchement et que les femmes enceintes à faible risque. Chez les trois groupes, on n'a pas constaté un gros écart entre les niveaux d'événements stressants de la vie ou de l'appui social. De plus, on a aussi étudié la corrélation entre les variables en se servant du nombre total de femmes enceintes. L'hypothèse qui soutenait que les événements stressants de la vie sont absolument liés aux perturbations de l'humeur, a été fondée (r=.491, p<.01). On n'a découvert aucun effet direct ou indirect produit par l'appui social.