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# Social environment and depression among pregnant women in urban areas of Pakistan: Importance of social relations

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## Abstract

Aspects of the social environment, including social conditions (socio-economic status, household situations, chronic illnesses) and social relations (attitude and behaviors of relations) are major determinants of depression among women. This study evaluates the relative power of social relations and social conditions in predicting depression among pregnant women in Pakistan. In the qualitative phase of the study, social environmental determinants were identified through literature search, and experts' opinions from psychologists, psychiatrists, gynecologists, sociologists and researchers. Along with this, 79 in-depth interviews were conducted with pregnant women drawn from six hospitals (public and private) and two communities in Karachi, Pakistan. Identified determinants of depression were grouped into themes of social conditions and social relations and pregnancy-related concerns. In the study's quantitative phase, the relative power of the identified themes and categories, based on their scores for predicting depression (determined by the Center for Epidemiological Studies—Depression Scale (CES-D scale)), was determined through multivariate linear regression. Social environmental determinants of pregnant women were described under the themes and categories of (1) social relations: involving husband, in-laws and children; (2) social conditions: involving the economy, illness, life events, household work, environmental circumstances and social problems; and (3) pregnancy-related concerns i.e. symptoms of pregnancy, changes during pregnancy, dependency and concern for unborn baby. Multivariate analysis found that among these themes, social relations and pregnancy-related concerns were significantly associated with total CES-D scores. Among the categories besides increasing age and less education, husband, in-laws, household work and pregnancy symptoms were significantly associated with total CES-D scores. The study highlights the importance of social relations compared to social conditions for determining depression in pregnant women.

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*Keywords:* Pakistan; Social environment; Pregnancy; Social conditions; Social relations; Urban area

## Introduction

The studies have found high a prevalence of depression (28–57%) among women in Pakistan

(Husain, Creed, & Tomenson, 2000; Mumford, Minhas, Akhtar, Akhter, & Mubbashar, 2000; Ali et al., 2002). The social environment has been identified as one of the major determinants of depression among women (Rabbani & Raja, 2000; Husain, Gater, Tomenson, & Creed, 2004; Niaz, 2001; Riso, Miyatake, & Thase, 2002), Social

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environment is often hostile to women in Pakistan (Husain et al., 2000; Mumford et al., 2000; Mumford, Nazir, Jilani, & Baig, 1996; Mumford, Saeed, Ahmad, Latif, & Mubbashar, 1997). Women are encouraged to be subservient, and wife battering, conflict with spouse and in-laws are common problems in Pakistan (Niaz, 2001).

Although it was thought that pregnancy may act as a protection against mental illnesses, a high prevalence of depression among pregnant women contradicts such beliefs (Bennett, Einarson, Taddio, Koren, & Einarson, 2004). A study conducted in a rural area of Pakistan found that 25% of women during pregnancy and 28% in the postpartum period suffered from depression (Rahman, Iqbal, & Harrington, 2003). Pregnant women who were depressed had more likely experienced life-threatening events and lack of social support (Rahman et al., 2003). Studies indicate that depression leads to adverse pregnancy outcomes such as preterm and low birth weight babies (Dole et al., 2003; Mulder et al., 2002; Wadhwa et al., 2001). In spite of this high prevalence, no study has looked at the relative importance of various determinants in the social environment in predicting depression among pregnant women in Pakistan.

Many studies have measured social environmental variables in terms of income, education, occupation and number of social supports (Koniak-Griffin, Lominska, & Brecht, 1993). These might be called social conditions which include socio-economic status (SES), major life events, relatives' health status, household responsibilities and supports (Nilsson, Engberg, Nilsson, Karlsmose, & Lauritzen, 2003). In addition, a woman's social relations should be such as the quality of relationship with her husband, in-laws, parents and children (Barnet, Joffe, Duggan, Wilson, & Repke, 1996; Nitz, Ketterlinus, & Drandt, 1995; Stuchbery, Matthey, & Barnett, 1998). Concerns related to pregnancy are an added burden during pregnancy and may include signs and symptoms of pregnancy, changes due to pregnancy and concern for the baby (Huizink, Robles de Median, Mulder, Visser, & Buitelaar, 2003; Stotland, 1995). Therefore, it is prudent to study pregnant women's perceptions of social conditions, social relations and pregnancy-related concerns together as potential determinants of depression.

The objective of this study was to measure the prevalence of depression among pregnant women and to determine the relative importance

of social conditions, social relations and pregnancy-related concerns for predicting depression among pregnant women in Karachi, an urban area of Pakistan.

## Methods

The study was conducted in Karachi, the capital city of the province of Sindh, Pakistan, during December 2003 to September 2004. While most of the residents of Karachi are Urdu-speaking, it has considerable socio-economic and ethnic diversity and has a population of more than 14 million. The majority of the women typically stay at home and their lives are centered on their families. Girls and boys receive different levels of education: 70% of males and 57% of female are literate in Karachi (Government of Pakistan, 1998).

The study had two parts the qualitative part during which social environmental determinants were identified and the quantitative part during which prevalence of depression and relative importance of social determinants for depression were analyzed. Phase 1 was conducted from July 2003 to May 2004. Phase 2 was undertaken during June–September 2004.

### *Phase 1—Qualitative study*

Initially, textbooks and published literature regarding social environment were reviewed. Interviews were conducted with 25 experts to identify determinants. These experts included psychologists, psychiatrists, gynecologists, sociologists, social workers and researchers. Many of these experts were working at Aga Khan University & Hospital and had more than 10 years experience of working with pregnant women. In addition, gynecologists belonging to the study hospitals and organizations were also approached for their expert opinion (list of the organizations is given in Table 1).

### *Interviews with pregnant women*

Based on initial work, semi-structured guidelines were developed to interview pregnant women. Guidelines included inquiry into all the issues which pregnant women perceived as “difficulties” or “stressful situations” in their life. Seventy-nine in-depth interviews were conducted with pregnant women in the local language, Urdu, by a female to generate a list of determinants. Women who had difficulty in understanding or speaking Urdu were

not included in the study. On an average, each interview took one to one and a half hour. Sample size was based on sampling to redundancy, i.e. interviews were stopped when no new determinants were being identified. Also pregnant women coming for their antenatal checkup were selected from six hospitals (public and private) (Table 1). Pregnant women in the two communities were approached with the help of the local organizations working in the area (see Table 1). These sites were purposely selected to include socio-economically diverse population in order to capture a wide range of determinants. Written consent was taken from the pregnant women and their husbands (when requested by women) after explaining the purpose of the study. Consideration was also given to include pregnant women of all parities and trimesters. Socio-demographic profile of pregnant women for the qualitative phase is given in Table 2.

#### *Pretesting and phrasing of items on determinants*

Identified determinants were pretested on a separate sample of 70 pregnant women. After every 10 interviews, identified problems were discussed by the research team and determinants were rephrased and tested again for clarity and content. Overlapping statements were dropped and eventually 89 items were finalized with the help of the experts (mentioned above).

#### *Phase 2—Quantitative study*

During this phase, 292 pregnant women were interviewed during their antenatal visits. They were selected from four hospitals in Karachi catering to different socio-economic groups. Among the four hospitals, Public Health School provides outpatient maternal and child care preventive and curative services free-of-charge to women and children of lower socio-economic group. Aziza Husseini Hospital and Aga Khan Hospital for Women, Karimabad are two private hospitals that provide fee-based services to the middle socio-economic strata of pregnant women. Mid-East Hospital Clifton is a private hospital that serves higher socio-economic group of pregnant women (Table 1).

Female psychologists and sociologists were provided with a week long training for conducting the interviews. Interviews were conducted in the while women were waiting for their antenatal checkup. Women who had difficulty in speaking or understanding Urdu were not included in the study. Each woman was first approached by the study coordinator who explained the study purpose and asked for a written consent. If a woman consented, she was guided to a separate room for the detailed interview. On average, each interview lasted 45 min. The interviewer read out 89 questions concerned with the 13 categories of potential determinants. Women responses were marked (1) if the item was

Table 1  
Institutions and hospitals taken in the study to interview pregnant women during the Qualitative and Quantitative phases in Karachi

	No. of pregnant women
Phase 1—Qualitative study	
(a) Communities	
1. Malir colony	9
2. Zia colony of Landhi	12
(b) Hospitals and MCH centers	
1. Lyari Community Development Program maternal and child health center	12
2. Civil Hospital Karachi	8
3. Jinnah Postgraduate Medical Center	8
4. Aga Khan Maternity Health Center Karimabad	7
5. Liaquat National Hospital	11
6. Aga Khan University Hospital	12
Total	79
Phase 2—Quantitative study	
1. Aga Khan Maternity Center (AKMC) Karimabad (middle SES)	50
2. Aziza Husseini Hospital, Gulberg (middle SES)	70
3. Public Health School (lower SES)	101
4. Mideast Hospital (high SES)	71
Total	292

Table 2  
Socio-demographic profile of pregnant women in phase 1 and 2 in Karachi, Pakistan

Phase 1—Qualitative study	<i>n</i> = 79(%)
Age (mean)	27.3 (SD 4.7) years
Educational status of women	
No Schooling	29 (36.7)
Primary (1–5)	11 (13.9)
Secondary (6–10)	12 (15.1)
Graduation (11–14)	16 (20.2)
Professional	11 (13.9)
Mother tongue	
Urdu	37 (46.8)
Sindhi	14 (17.8)
Balochi	14 (17.8)
Punjabi	7 (8.8)
Miscellaneous <sup>a</sup>	7 (8.8)
Educational status of husband	
No Schooling	25 (31.6)
Primary (1–5)	4 (5.0)
Secondary (6–10)	21 (26.5)
Graduation (11–14)	10 (12.6)
Professional	19 (24.0)
Occupation of women	
Housewives	50 (63.2)
Working	29 (36.8)
Occupation of husband	
White collar workers	25 (31.6)
Blue collar workers	49 (62.0)
Jobless	5 (6.3)
Income group <sup>b</sup>	
≤ 5000 Pak rupees (60 Pak Rs = 1US \$)	28 (37.8)
> 5000 Pak rupees	46 (62.2)
Gravida	
Primigravida (first pregnancy)	27 (34.2)
Multigravida (2–4 pregnancies)	39 (49.4)
Grand-multigravida (5th or more pregnancies)	13 (16.4)
Trimester of pregnancy	
1st (1–3 months)	12 (15.2)
2nd (4–6 months)	17 (21.5)
3rd (7–9 months)	50 (63.3)
Phase 2—Quantitative study	<i>n</i> = 292(%)
Age (mean)	25.8 (SD 4.5) years
Education	
No Schooling	39 (13.4)
Primary (1–5)	21 (7.3)
Secondary (6–10)	57 (19.6)
Graduation (11–14)	140 (48.6)
Professional	33 (11.4)
Trimester of pregnancy <sup>b</sup>	
1st (1–3 months)	42 (16)
2nd (4–6 months)	100 (38)
3rd (7–9 months)	121 (46)

Table 2 (continued)

Gravida	
Primigravida (first pregnancy)	116 (39.7)
Multigravida (2nd onwards pregnancy)	176 (60.3)
History of abortion	74 (26.0)

<sup>a</sup>Include Pushto, Memon, Gujrati, Bengali.

<sup>b</sup>Missing number are due to non-response.

applicable (1) and (0) if not applicable in the past month. An index was developed by calculating the total score for each of the three themes and 13 categories as in Appendix A. For example, in the *husband* category, there were 10 questions; therefore, the possible score for a pregnant woman would range between 0 and 10. The refusal rate < 5%.

The translated version (in Urdu language) of Center for Epidemiological Studies—Depression (CES-D) scale was administered by a separate interviewer (blind) to the same women. CES-D is a multicultural validated instrument and has been used in many countries including India and Bangladesh to measure depression among a variety of populations including pregnant women (Gavin et al., 2005; Jain, Sanon, Sadowski, & Hunter, 2004; Orr, James, & Blackmore Prince, 2002; Sharp & Lipsky, 2002; Tsutsumi et al., 2004). CES-D consists of 20 items. Each item has a score range of 0–3. Therefore, an individual score of women on the CES-D scale may range from 0 to 60. A cut-off of 16 and above has been recommended to diagnose depression. Below this level, the scale determines milder depressive symptoms (Radloff, 1977). The alpha coefficient of the translated version of CES-D scale among Karachi sample was 0.88.

Data were analyzed with identifier numbers by a separate person to maintain confidentiality. Counseling was provided to those women who were diagnosed as depressed by the psychologist or they were referred for further assessment and treatment. The study was started after getting approval from the Ethical Review Committee of the Aga Khan University.

### Analysis plan

The identified potential determinants were grouped into themes of: social relations, social conditions and pregnancy-related concerns. Infrequent determinants (< 5%) were not included in the

list. Within each theme, categories were identified for similar issues (see Appendix B).

The scores on all quantitatively assessed variables were analyzed as continuous variables. Univariate linear regressions between scores of major themes and categories and total CES-D scale scores were conducted to investigate at the association between the determinants and depression. In addition, associations between age, education and total CES-D scores were also determined.

Finally, two separate multivariate analysis models were developed to determine the independent effect of the identified determinants with total CES-D scores, with major themes and categories, separately.

**Results**

*Phase 1—Qualitative results*

In qualitative phase, the mean age of pregnant women was 27.3 (SD 4.7) years. The majority were Urdu speaking. About 37% were uneducated and 63% were housewives and 34% were primigravida (Table 2).

The social environmental framework for pregnant women (with themes and categories) is presented in Fig. 1. The determinants were reviewed in depth by 25 experts (see “methodology” for details) to categorize them into themes of *Social Conditions*, *Social Relations* and *Pregnancy-Related Concerns*. The items related to the pregnant women’s social relationship with her husband, children, parents and in-laws, in a Pakistani context,

were included under Social Relations. Determinants related to the characteristics of the pregnant woman and her environment were called Social Conditions and included economic problems, health status, household issues, personal and social problems. Pregnancy-related concerns included general appraisal of pregnancy such as pregnancy symptoms, pregnancy-related changes, dependency due to pregnancy and concern for unborn baby.

Descriptive statistics (mean, SD and range) of the index of determinants for themes and categories are given in Table 3. Out of 88, 18 determinants were related to social relations, 44 to social conditions and 26 to pregnancy-related concerns.

Among social relations, husband-related issues were more common than in-laws or children issues. Concerns related to the personal and the parents category were identified through the in-depth interviews but they were less <5% frequent. Among the social conditions, economy-related issues were the most common. Results for pregnancy-related concerns found that symptoms of pregnancy and changes due to pregnancy were the most common issues, whereas dependency and concern for unborn were comparatively less common.

*Phase 2—Quantitative results*

The mean age of 292 pregnant women for quantitative phase was 25.8 (SD 4.5) years and their mean education (in years) were 10.31 (SD 5.1). Other descriptors are found in Table 2.

Prevalence of depression, based on the cut-off score of 16 or more on CES-D scale, was 39.4%

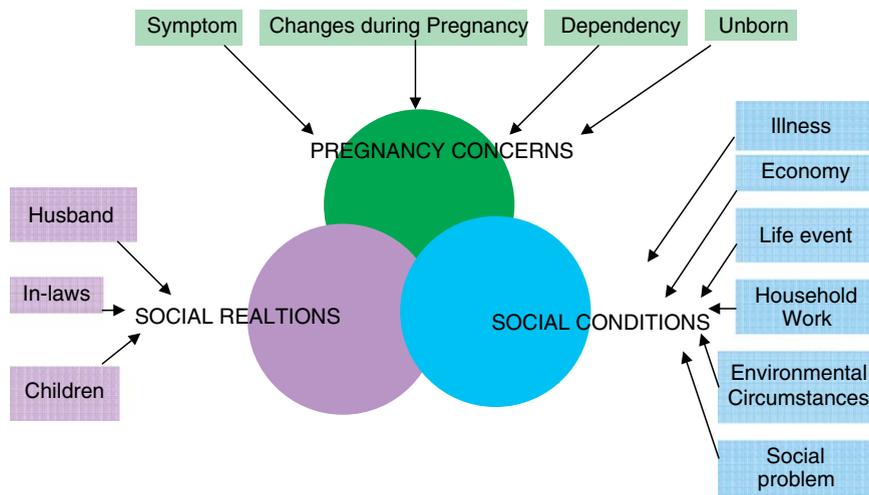


Fig. 1. Social environment framework for pregnant women.

Table 3  
Descriptive statistics of total, categories and subcategories of social environmental determinants among pregnant women in Karachi, Pakistan

No.	Determinants <sup>a</sup>	No. of determinants	Mean	SD	Range
	<i>Total determinants</i>	88	20.23	11.38	0–55
	<i>Themes</i>				
	Social relations	18	2.93	2.57	0–12
	Social conditions	44	7.78	5.75	0–29
	Pregnancy-related concerns	26	9.39	4.71	0–21
	<i>Categories</i>				
1	Husband	10	1.40	1.50	0–7
2	In-laws	6	0.66	0.91	0–4
3	Children	2	0.72	0.86	0–2
4	Illness	7	1.35	1.27	0–6
5	Economy	15	3.02	3.55	0–14
6	Life events	7	1.17	1.02	0–4
7	Household work	5	0.98	1.07	0–5
8	Environmental circumstances	6	0.75	0.92	0–4
9	Social problems	4	0.52	0.78	0–3
10	Pregnancy symptoms	8	3.07	1.71	0–7
11	Concern for changes during pregnancy	10	2.94	1.89	0–8
12	Dependency due to pregnancy	4	1.38	1.30	0–4
13	Concerns of unborn baby	4	2.0	1.06	0–4

<sup>a</sup>Details of determinants under categories and subcategories are given in Appendix.

(112/292) among pregnant women. The mean CES-D score (SD) was 14.53 (12.43).

Univariate linear regression (see Table 4) showed significant association between scores of themes of social relations, social conditions and pregnancy-related concerns and total CES-D score. Results found that with one unit increase in the scores for social relation, social conditions and pregnancy concerns there was 0.64, 0.50, 0.55 increase in the score on the CES-D scale. With each year of increase in education, there was a 0.17 decrease in scores on the CES-D scale, while age of mother, number of alive children and gestational age (in weeks) were not associated significantly with CES-D score. With increasing number of gravidity and abortion, there was an increase in CES-D scores.

Univariate linear regression showed significant association between categories and total CES-D scores (see Table 4). Increase in the scores on husband, in-laws and children categories led to 0.58, 0.52 and 0.17 increase in the CES-D score, respectively. Among the social conditions categories, illness, economy, life events, household work, environmental circumstances and social problems led to an increase in the CES-D score.

Finally, among the pregnancy-related categories, pregnancy symptoms, pregnancy changes, dependency and unborn baby led to increases in the CES-D scores.

Multivariate analysis results are presented in Table 5. In the first model, only major themes were entered. Among these, social relations and pregnancy-related concerns were significantly associated with total CES-D scores, whereas social conditions were not associated significantly. The adjusted  $R^2$  for themes model was 46%, meaning these variables explained approximately 46% of variance in depression among pregnant women.

All the categories along with age and education were entered in the second model. With increasing years in age, there was an increase in depression scores, while with increasing years in education, there was a decrease in the depression scores. Among the categories husband, in-laws, household work, pregnancy symptoms and pregnancy changes, there were increases in the CES-D scores, respectively. The adjusted  $R^2$  for the categories model was 51%. The categories related to children, illness, economy, life events, environmental circumstances, social problems, dependency and unborn child were not significant in the multivariate model.

Table 4

Univariate linear regression analysis between categories and major themes of social environmental determinants and CES-D among pregnant women in Karachi

	<i>B</i>	Beta	95% CI	<i>P</i> value
<b>Themes</b>				
Social relations	3.05	0.64	2.63, 3.47	<.0001
Social conditions	1.08	0.50	0.86, 1.29	<.0001
Pregnancy-related concerns	1.45	0.55	1.20, 1.71	<.0001
<b>Categories</b>				
Age (years)	0.18	0.06	−0.13, 0.49	0.26
Education of women (years)	−0.42	−0.17	−0.70, −0.14	0.003
Gestational age (weeks)	−0.07	−0.05	−0.24, 0.08	0.36
Number of alive children	0.91	0.08	−0.28, 2.1	0.13
Abortion	3.45	0.20	1.49, 5.41	0.001
Gravida	1.47	0.18	0.56, 2.37	0.002
Husband	4.81	0.58	4.05, 5.59	0.00
In-laws	7.2	0.52	5.85, 8.54	0.00
Children	2.4	0.17	0.80, 4.07	0.004
Illness	2.51	0.25	1.42, 3.60	0.00
Economy	1.41	0.40	1.04, 1.78	0.00
Life event	3.1	0.25	1.74, 4.46	0.00
Work related	4.5	0.39	3.27, 5.73	0.00
Environmental circumstances	3.06	0.22	1.55, 4.58	0.00
Social problems	4.99	0.31	3.25, 6.73	0.00
Symptom	3.30	0.45	2.56, 4.05	0.00
Concern for changes during Pregnancy	3.23	0.49	2.57, 3.89	0.00
Dependency	4.47	0.46	3.49, 5.44	0.00
Unborn baby	3.26	0.27	1.96, 4.56	0.00

## Discussion

This is the first study to identify and study in detail the framework for social environmental determinants associated with depression among pregnant women in an urban area in Karachi, Pakistan. Consistent with the (Rahman et al., 2003) study in Pakistan, we also found a high prevalence of depression among pregnant women. Of the three social environmental themes, we found social relations and pregnancy concerns to be the most predictive of depression, whereas social conditions were not. This finding is also supported by other studies conducted elsewhere (Stevenson, Maton, & Teti, 1999; Aro, Nyberg, Absetz, Henriksson, & Lonnqvist, 2001; Lee & Powers, 2002).

This study found that poor social relations with husband and in-laws were strongly related with depression among pregnant women, as has been found in other cultures as well (Barnet et al., 1996; Jain et al., 2004; Nitz et al., 1995; Stuchbery et al., 1998). Poor relationship with husband may be because of his extramarital affairs, physical and verbal abuse, not spending enough time with the family and putting unnecessary restriction on the

women. Similarly, the study found that physical or verbal abuse and too much interference by the in-laws, either by living in a joint family system or by their influence over the household, affected the relationship. Another factor identified by the study is competition among different female members belonging to the same family, such as mother-in-law or sister-in-law. Competition is related to who has the more say in the family and whose decisions are being accepted. These again result in having a poor relationship with in-laws. Positive social relations have a protective effect against depression (McCormick et al., 1990; Mubarak, 1997; Norlander, Dahlin, & Archer, 2000; Sprusinska, 1994; Wilkinson & Marmot, 1998).

When studied separately, by various researchers, social conditions such as poverty, lack of education, unemployment, living in poor housing, life events and working conditions contribute individually and synergistically to depression among women (Bobak, Pikhart, Hertzman, Rose, & Marmot (1998); Nilsson et al., 2003; Zimmermann-Tansella et al., 1991). This study also suggests that poor social conditions are related with increased depression among pregnant women but only in the univariate

Table 5

Two multivariate linear regression models between categories and major themes of social environmental determinants and CES-D among pregnant women in Karachi

	<i>B</i>	Beta	95% CI	<i>P</i> value
Model for themes <sup>a</sup>				
Social relations	2.25	0.47	1.68, 2.82	<.0001
Pregnancy problems	0.71	0.27	0.42, 1.01	<.0001
Model for categories <sup>b</sup>				
Age	0.38	0.14	0.15, 0.61	0.001
Education of women	-0.25	-0.10	-0.45, -0.04	0.02
Husband	2.63	0.32	1.81, 3.44	<.0001
In-laws	2.37	0.17	0.95, 3.79	0.001
Children	0.28	0.02	-1.16, 1.72	ns
Illness	-0.43	0.49	-1.41, 0.54	ns
Economy	0.03	0.01	-0.35, 0.42	ns
Life events	0.90	0.07	-0.17, 1.98	ns
Work related	1.51	0.13	0.41, 2.61	0.007
Environmental circumstances	-0.65	-0.04	-1.91, 0.61	ns
Social problems	0.36	0.02	-1.14, 1.86	ns
Symptoms	1.18	0.16	0.47, 1.89	0.001
Concern for changes during pregnancy	0.67	0.10	-0.05, 1.39	ns
Dependency	0.76	0.08	-0.34, 1.87	ns
Unborn	-0.72	-0.06	-1.88, 0.44	ns

<sup>a</sup>Adjusted  $R^2$  for themes = 46%.

<sup>b</sup>Adjusted  $R^2$  for categories = 51%.

analysis. However, in the multivariate model, only two of the social conditions namely household work and illness of the relatives were significantly associated with depression. Very few responsibilities and too many responsibilities have been found elsewhere to be associated with depression, while moderate responsibilities are favorable for women (Lee & Powers, 2002). It has been argued that number of household responsibilities and illness of the relatives in Pakistani culture are more strongly associated with quality of social relations (Niaz, 2000). The better the social relations are with in-laws, husband and children, the more evenly the work is distributed in terms of responsibilities.

To date, no study in Pakistan has looked at pregnancy-related concerns in predicting depression. In the multivariate analysis, pregnancy symptoms and changes due to pregnancy were significantly associated with depression. A pregnant woman not only undergoes physical changes but along with this she has to make several adjustments to cope with the other daily responsibilities. Physical changes may cause her to become dependent on others for carrying out daily household chores, which also affects her socialization. The condition of pregnancy has been found to be associated with increased depression in many other studies con-

ducted elsewhere (Dole et al., 2003; Mulder et al., 2002; Wadhwa et al., 2001).

This study supports the hypothesis that increasing age and lower levels of education are associated with increasing depression. Increasing biological age has been found to be associated with increased depression in other studies conducted in Pakistan (Husain et al., 2004; Nisar, Billoo, & Gadit, 2004). Increasing level of education lead to increased social capital and that may increase the capability of women to cope with the social environment (Averina et al., 2005; Chaaya et al., 2002; Husain et al., 2004).

Depression refers to a clinical spectrum that ranges from a clinical syndrome (disorder) to the milder symptom of feeling down (Carson, Butcher, & Mineka, 1998). The CES-D scale has been used cross-culturally and has shown good reliability for measuring depression among pregnant women and the general population (Gavin et al., 2005; Jain et al., 2004; Orr et al., 2002; Radloff, 1977; Sharp & Lipsky, 2002; Tsutsumi et al., 2004). Depressive symptoms have been found to have the same economic burden on health care as the depressive disorders (Johnson, Weissman, & Klerman, 1992). Therefore, it is important to note that use of continuous score of CES-D in the analysis not only

determines the factors associated with depressive disorders but also those which are associated with depressive symptoms. These have a similar burden on the population and the same policy implications.

The study emphasizes the importance of social relations, which may be modifiable through interventions such as counseling and family support. Depression during pregnancy leads to adverse pregnancy outcomes such as low birth weight and preterm birth (Dole et al., 2003; Mulder et al., 2002; Wadhwa et al., 2001). Therefore, antenatal care programs may include counseling services for pregnant women in Pakistan. Intervention programs have successfully utilized traditional birth attendants and other health workers to develop support system for women in urban and rural areas (Jokhio, Winter, & Cheng, 2005).

In this study, the sample of pregnant women was varied in terms of socio-economic status, trimester and parity. This provides an opportunity to determine factors of social environment in a comprehensive way and enables a framework to be generalized to a larger population. This is a cross-sectional study and it is therefore not able to establish a temporal relationship between the determinants and depression. We inquired about the difficult experiences perceived by woman during the last month in order to minimize recall bias. The refusal rate was not significant and analysis shows that a varied group with different parities, trimesters and social class was captured.

In conclusion, this study found high prevalence of depression among pregnant women of Karachi, Pakistan; the study highlights the importance of social relations compared to social conditions for determining depression in pregnant women.

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### Appendix

#### Determinants of social relations

##### 1. *Husband*

- Second marriage by husband
- Extramarital affair by husband
- General worries of husband
- Woman's restriction in making decision
- No access to husband's money

- Attention not given by husband
- Restrictions of woman by husband
- Verbal abuse by husband
- Physical abuse by husband
- Husband not having time for family

##### 2. *In-laws*

- Competition with in-laws
- In-laws visiting at odd times
- Physical abuse by in-laws
- Interference by in-laws
- Quarrel with relative
- Major quarrel with in-laws

##### 3. *Children*

- Concern for children's education
- Concern for children's future

#### Determinants of social conditions

##### 4. *Illness*

- Looking after sick relative
- Parent's illness or injury
- Sibling illness or injury
- In-laws serious illness or injury
- Children serious illness or injury
- Husband's illness
- Personal illness

##### 5. *Economy*

- Rented home
- Owing money
- Parent's financial problem
- Non-earning member in the family
- Less money for paying house rent
- Having a small house
- Husband's job security
- Need money for food
- Husband not doing any job
- Need money for health facilities
- Need money for buying house
- Inflated prices of common goods
- Need money for clothing
- Need money for children's education
- Future financial needs

##### 6. *Life events*

- Death of parents
- Death of child
- Abortion
- Death of close relative
- Getting married to someone outside family
- Suicidal attempt
- Birth of handicapped child

7. *Household work*  
Too many responsibilities  
Preparing meals  
Problem with maid  
Looking after the children  
Job problem
8. *Environmental circumstances*  
Parent's living far  
Troublesome neighbors  
Living alone  
Safety and security  
Husband being abroad  
Problem due to shifting
9. *Social problems*  
Husband addicted to drugs  
Too many people in the house  
Living with in-laws  
Sibling marriage

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#### Determinants of pregnancy-related concerns

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10. *Pregnancy symptoms*  
Weight gain  
Headache  
Feeling unwell  
Eating preferences  
Difficulty in sleep  
Bleeding per vagina  
Vomiting during pregnancy  
Not feeling baby's movement
11. *Changes during pregnancy*  
Physical appearance  
Discontinuation of job  
Shopping for the unborn baby  
Access to health care  
Late for work  
Unwanted pregnancy  
Difficulty in getting up in the morning  
Difficulty in prayers  
First pregnancy  
Previous delivery by caesarian-section  
Previous delivery outcome
12. *Dependency due to pregnancy*  
Restricted socialization  
Dependency for doing household work  
Difficulty in traveling  
General dependence
13. *Concern of unborn baby*  
Fear of baby girl  
Concerns about well-being of the baby

#### Concerns about bringing up of the baby Appearance of the baby

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