

## Determine the Influence of Prenatal Stress on Fetal Development

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### Abstract:

Prenatal stress is an epigenetic factor which can produce long-lasting alterations in brain structures and body functions. The objective of this was to examine the ratio of prenatal stress among pregnant women. It is necessary to assess stress separately at each trimester of pregnancy to differentiate chronic from acute stress in order to evaluate the effects on child development. Prenatal stress can alter neurotropic growth factors, synapse development, neurotransmitter levels and also adult neuron development. Prenatal stresses significantly influence the development of the brain and the organisation of behaviour. Prenatal stress can also be the main cause of hypertension, type 2 diabetes, schizophrenia and cardiac disorders in adulthood. But the impact of stress is not very clear. The survey based on a cross-sectional study was conducted in Karachi. The sample size calculated for the survey is 45. The pregnant women were asked to fill the questionnaire of 23 questions.

**Keywords:** Prenatal stress, maternal stress, antenatal stress, fetal development & depression.

### Introduction

Prenatal stress (or antenatal maternal stress) is exposure of the associated expectant mother to worry, which might be caused by disagreeable life events or by environmental hardships<sup>1</sup>. The ensuing changes in the mother's secretion and the system might hurt the fetuses (and when birth, the infant's) immune perform and brain development<sup>2</sup>

Prenatal stress is shown to possess many effects in vertebrate brain development. Within the hippocampus of male rats, antenatal stress has shown to decrease the speed of proliferation and necrobiosis within the hypothalamus-pituitary axis<sup>3,4</sup>. Antenatal stressed animals have prolonged glucocorticoid response. Removing the adrenal glands of the mother eliminates the impact of the pup's glucocorticoid response. Supplementing the adrenalectomized mother with glucocorticoid, saved the hypothalamic-pituitary-axis response to maternal stress for prenatally stressed offspring<sup>5</sup>. Antenatal stress caused high glucocorticoids that successively affect the hypothalamic- pituitary-axis feedback<sup>6</sup>. A study by García-Cáceres et al. showed that antenatal stress decreases cell turnover and proliferation

within the neural structure of adult rats that reduces structural physical property and reduces the response to worry in adulthood <sup>7</sup>. This study conjointly showed that once prenatally stressed rats were stressed in adulthood the females showed a rise in corticotrophin-releasing internal secretion suggesting it to be associate up-regulation within the hypothalamic-pituitary adrenal axis<sup>8</sup>. Males showed no elevation of glucocorticoid levels. Increase in adrenocorticotrophic internal secretion adrenocorticotrophic hormone ACTH hormone, endocrine internal secretion} with no impact of adult stress and a decrease within the corticotrophin-releasing hormone ribonucleic acid within the neural structure showed a down-regulation. The author concludes that this makes prenatally stressed females less reactive to later life stressors than males. 9-11

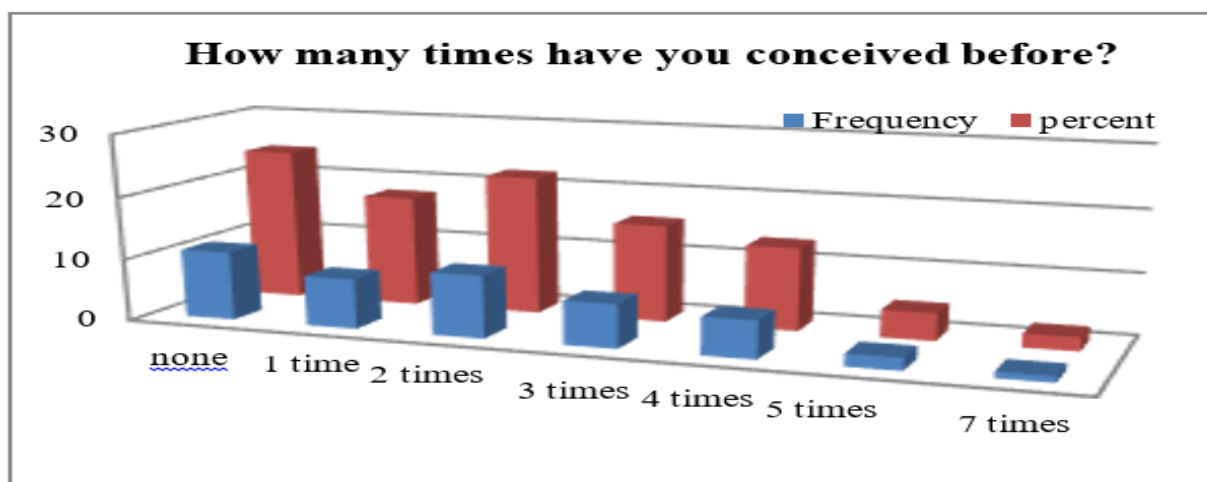
## Methodology

The cross-sectional study was conducted in Karachi in November 2016, the surveillance study was conducted including pregnant women in the city. The sample size calculated for the survey was 45. A survey questionnaire was developed to address the study questions and was disseminated among the local population. The respondents were asked to answer 23 open- ended questions.

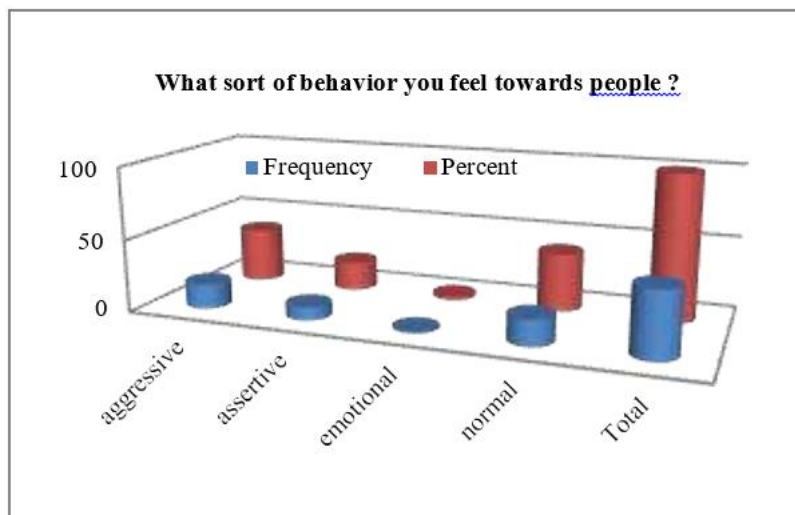
According to our estimation, we analyzed that majority of pregnant women are the prey of prenatal stress. Most of them didn't know about prenatal stress as well as its adverse effects that come in the form of fetal abnormalities.

## Result

According to our report, 40% women feel changes in their behaviour due to prenatal stress and 60% have normal behaviour. Only 40% women during pregnancy feel changes in appetite, 24.4% don't feel changes in appetite. In our sample size 11.1% suffers environmental stress, 22.2% feels stress due to personal issues and 17.8 % suffers stress due to financial problem. In their relations with family and spouse, only 4.4% have a harsh relation, 11.1% have a good relationship with their family and spouse while others have a normal relation. The stress due to baby's gender, 51.1% pregnant women have stress about baby's gender from their family. There is a good ratio that 57.8 pregnant women are aware of abnormality of the fetus due to stress.



Questions	Frequency %	Significance Value
Do you feel craving towards anything?	53.3	0.467
Do you feel that your sense of smell is increased during pregnancy?	46.7	0.199
Do you feel of being strictly spic and span?	40	0.511
Do you feel of being more forgetful?	42.2	0.557
Do you feel any kind of breathing problems?	46.7	0.15
Do you feel any sort of problem in sleeping?	44.4	0.91
Do you feel of being chronic towards any disease?	22.2	0.596
Do you feel pain in any part of your body?	71.1	0.437
Any sort of pressure you feel from your family?	60	0.258
Do you have pressure about baby's gender from your in-laws?	51.1	0.776
Do you know that stress during pregnancy can cause abnormality in your child?	57.8	0.792



## Discussion

According to CharilA et'al <sup>12</sup> reports that maternal mood is affected by stress during pregnancy and the physiology of fetus. As per our reports, we concluded that 40% maternal mood is affected by prenatal stress. In April 1991, a longitudinal study was conducted by T Deaveet'al <sup>13</sup>. The report suggests that prenatal stress is the cause of child development abnormality. As per our report, we concluded that 57.8% maternal stress can cause abnormality in child development. Laura Palagini <sup>14</sup> in August 2014 in a review article suggested that insomnia in pregnancy is a determinant of pregnancy outcome. As per our reports, 44.4% suffered from insomnia during pregnancy. Helen Christensen <sup>15</sup> in their reports suggested that pregnancy mothers become forgetful during pregnancy. As per or reports, 42.2% mothers become forgetful due to stress. W. Hofhuis and his team <sup>16</sup> in their research suggested that breathing problems like apnea occurs during pregnancy and also due to maternal smoking. As per our reports, 46.7% pregnant women suffer breathing problems. Matthew W Gillman <sup>17</sup> in his reports showed that chronic diseases can be the cause of prenatal stress. As per or reports, we concluded that 22.2% maternal women are being chronic towards diseases like hypertension, diabetes type 2 and glucose intolerance. According to our reports; 53.3% feel craving towards anything, 71.1% feel pain in the body, 60% feel some sort of pressure from family and 51.1% have pressure about baby's gender from their in-laws.

## Conclusion

As per our reports, we come up with the conclusion that: Excessive use of abuse material such as alcohol, cocaine, caffeine, or tobacco is one of the major causes of fetus growth retardation. Unhealthy relationships, physical or mental abuse, breakups of the relations or persistent hypertension also play a major role in fetus retardation and in depressed fetal physical or mental growth. By this cross-sectional

study, we have tried to aware the majority of women about prenatal stress and its consequences regarding fetal development. To overcome the consequences and inconveniences of prenatal stress, we have to take some healthy and beneficial steps, in order to let the people know about it, awareness programs, seminars, and workshops should be arranged, NGO's should be run to eliminate the marital abuse from the society, special units should be developed in the rehabilitation centers for pregnant women.

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