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Study on Cause-Effect Relationship of Antenatal Maternal Emotional State with Neurodevelopmental Disorders

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Abstract

Neuro developmental disorders (NDDs) include developmental brain dysfunction, which can manifest as neuropsychiatric problems or impaired motor function, learning, language or non-verbal communication i.e. intellectual disability, attention deficit hyperactivity disorder, communication disorders, epilepsy, emotional disorders, etc. This study wants to throw light on the fact that *mother and fetus are one entity* and whatever affects the mother will affect the child. The aim of the study is to find the cause-effect relationship of antenatal maternal emotional state with neurodevelopmental disorders. A sample of 60 cases was obtained with neurodevelopmental disorders (NDDs) which had a stressful antenatal maternal emotional history. Proper diagnostic tools such as Vanderbilt ADHD diagnostic parent rating scale, Screen for child anxiety related emotional disorders (SCARED), developmental screening test (DST), Vinland social maturity scale (VSMS) and basic IQ tests like draw a man test, gazelle drawing, Seguine Form Board (SFB) test, etc. were used for the specific diagnosis of each NDD. Details regarding the antenatal history were elicited such as family stressors, financial problems, interpersonal relationships and any other stressful events. Not only the stressful event/situation but also the type of response/emotions given by the mother during pregnancy period was elicited. The most common emotion causing NDDs was anxiety/worry/fear in the antenatal period and was about 41.66%. In most cases there was intermingling of different emotions also. According to the study, the commonest cause for such negative emotions during pregnancy for the mother was found to be because of the problems created by the alcoholic husband and this cause was identified in almost 25 cases i.e., 41.66%. Intellectual disability and ADHD were found to be the most common outcome. *Homoeopathy is one of the best therapeutic modalities in promoting emotional healing* and also in helping the process of holistic child development.

Keywords

Neuro Developmental Disorders (NDDs), Antenatal Maternal Emotional State, Homoeopathy

1. Introduction

- Neuro developmental function is a basic process needed for learning and productivity. Its dysfunction reflects disruptions of neuro anatomic structure or psychophysiologic function and places a child at-risk for *developmental, cognitive, emotional, behavioural, psychosocial and adaptive challenges.* Therefore, ***neuro developmental disorders*** (NDDs) include developmental brain dysfunction, which can manifest as neuropsychiatric problems or impaired motor function, learning, language or non-verbal communication i.e. intellectual disability, attention deficit hyperactivity disorder, communication disorders, epilepsy, emotional disorders, etc.

Need of the study:

- The prevalence of NDDs was found to be nearly 12% in Indian children aged 2 - 9 years. Nearly 1 in every 8 children might be suffering from at least one of the NDDs "as given in India bioscience news 2018" (Urvashi, 2018).
- Every child's development starts from the mother's womb itself. Therefore, every developmental disorder has to be considered from antenatal period.
- Today's antenatal check-ups are only focusing on the physical factors affecting the mother.
- In recent years there is no much concern over the behavioural or emotional teratogenicity and its possible effects on the offspring even though several studies have found a correlation between prenatal stress and child development.
- This study also tries to throw light on the probable risk factors so that it can be avoided and necessary measures can be taken to avoid such effects in the offspring.
- This study may motivate every system of medicine to find a therapeutic aid to treat such developmental disorders where cause lies in the emotional level.

Does the environment affect CNS during fetal development?

- Early influences, particularly those producing toxic levels of stress modify gene expression (epigenetic change) which is a result of environmental insults.
- According to Kleigman (2015), "*Neuronal plasticity* permits the CNS to recognize neuronal networks in response to environmental stimulation, both positive and negative. Thus experience (environment) has a direct effect on the physical and therefore functional properties of the brain (genetics)".
- According to Inderbir Singh & Pal (1976), "Apart from this, a major part of the nervous system develops by around 4 months of gestation and therefore

the environment of the fetal can affect the development of its nervous system as well" (p. 297).

How antenatal maternal emotional states affect the offspring?

The "prenatal environment" (the environment inside the uterus) of the developing child is important because everything experienced by the mother is experienced by the fetus as well. The hormones produced in a mother during any emotions passes through the placenta and will alter the character of the developing child's physiology.

According to Anindya Kumar Gupta, Monica Mongia, & Ajoy Kumar Garg, (2017), "It is also said that the fetus develops a range of behavioural responses from early gestation itself and therefore the behavioural teratogenicity is very important" (p. 91-94).

Animal studies: [According to Vivette Glover, (1997)]

- The hypothalamo-pituitary adrenal (HPA) axis has been shown to be affected, showing increased responsiveness to a particular stimulus. For example, stressing the mother monkey, by exposure to unpredictable noise, resulted in the offspring having raised basal cortisol levels, and a raised adrenocorticotropin response during stress (Clarke et al, 1994). Similar findings have been obtained with rodents.
- Henry et al. (1994) have shown that prenatal stress of the mother caused an elevated corticoster one response in the offspring during exposure to a novel environment. Levels of both glucocorticoid type I and type II receptors were reduced in the hippocampus at 90 days, showing a possible mechanism for the long-lasting effects on the HPA axis.

Human studies:

- According to Vivette Glover, (1997), "Lou et al, 1994 conducted a study and examined the links between life events, or prenatal stressors, and fetal brain development. They compared the 70 most stressed with 50 controls from the sample. They found that both antenatal stress contributed significantly to a lower gestational age, lower birth weight, and smaller head circumference when corrected for birth weight. Prenatal stress also significantly worsened the scores on the neonatal neurological examination" (p-105-6).
- According to Schulz, Pearson, Neeley, et al., (2011). "Studies indicate that brain development, specifically that of the hippocampal system which is heavily involved in learning and memory, is adversely affected by prenatal stress and stress hormones during gestation, creating lasting effects on learning and memory" (p. 340).

According to Tandu-Umba et al., (2014) "It is also proposed that emotional stress or insult incites an adaptive response involving the hypothalamic pituitary-adrenal axis, with release of various immune (Interleukins 1, 6, and Tumor Necrosis Factor-alpha), hormonal (prostaglandins) and neurohormonal (corticotrophin-releasing hormone, hence cortisol and catecholamines) mediators along with heavy production of free radicals or reactive oxygen species (ROS) which will cause oxidation of essential macromolecules and DNA" (p. 361-370).

Acoording to Lobo et al., (2010). "this in turn will result in alteration of vital cell functions along with systemic inflammatory state, causing long term effects" (p. 118-126)

Different emotions have different hormones

According to Vineetha Sreekumar, (2017). "Not only stress but also all the negative and positive emotions of a mother during pregnancy has some effects in the offspring. It is said so because during each emotion the hormones produced are different."

- ✓ ***Acetylcholine*** is active when a person is angry which then trigger one to feel anxious or depressed and later leading to sudden outburst of tears.
- ✓ ***Norepinephrine*** or noradrenalin is high at the time of panic or anxiety.
- ✓ ***Epinephrine*** is increased during emotions of fear, anger, amusement.
- ✓ ***Estrogen*** level is high at the time of anxiety.
- ✓ ***Serotonin*** levels are decreased at the time of depression and sensitivity.
- ✓ ***GABA*** (gamma-butyric acid) becomes low when a person is anxious.
- ✓ ***Oxytocin*** is called "love hormone" and so it is lowered when there is no good interpersonal relationship.

Role of Homoeopathic medicine

- According to Rajalakshmi (2016). "In Homoeopathy, holistic means treating the individual as a whole and not just the different parts. *Homoeopathy looks at the root of the problem*. If there is a behavioural issue the Homoeopath will first *look at the circumstances that led to the behaviour*. For example if the child has temper tantrums it may be due to a hypersensitivity to the environment or some internal discomfort."
- The history taking is also a very important aspect of the Homoeopathic consultation. Here the entire history including the state of the mother during pregnancy is taken. Homoeopathy helps with ***emotional healing***.
- Homoeopathy believes in *restoring homeostasis or external and internal equilibrium and harmony.*
- There are a number of research studies that help to prove that Homoeopathic remedies act not just because of the placebo effect but can also *help in changing gene expression and reduce genetic transmission of diseases and disorders* (research studies by Marzatto et al. 2013 and Khuda Baksha AR, Santu Kumar Saha et al. 2013).
- Homoeopathic treatment during pregnancy can help in emotional healing and also in preventingintra uterine growth retardation. ***It can also help as a protective measure to prevent the bad effects of stress.***

One research study by Prakash DJ et al. (2010) studied the *protective role of Hypericum Perfolatium (Homoeopathic remedy) in stress induced behavioural and biochemical alterations in albino mice*. The pure extract of Hypericum and Nanoparticles of Hypericum were used. It was found that both the extract and the nanoparticles significantly reduced stress induced behavioural and oxidative damage. The effect of Hypericum nanoparticle was more than that seen with the

extract. The study showed significant *improvement in memory and recall that was stress induced.*

2. Materials and Methods

2.1. Study Setting

A sample of 60 cases was obtained from Sarada Krishna Homoeopathic Medical College, Kanniyakumari with neurodevelopmental disorders (NDDs) which had a stressful antenatal maternal emotional history.

2.2. Selection of Samples

A sample size of 60 cases with neurodevelopmental disorders (NDDs) which had a stressful antenatal maternal emotional history were selected using purposive sampling technique. For that every child will be screened for neurodevelopmental disorders using basic diagnostic tools and cases with stressful antenatal maternal emotional history will be selected from it through detailed case taking.

2.3. Inclusion Criteria

- Patients of paediatric age group between 6 yrs and 18 yrs.

2.4. Exclusion Criteria

- Patients with antenatal maternal history of some other physical causes like exposure to radiation or chemicals.

2.5. Study Design

Observational study.

2.6. Brief of Procedures

Every case is subject to screening using basic diagnostic tools and those cases identified with NDDs will be sent for detailed case taking which includes the mothers's antenatal emotional aspect as well. Out of this a sample of 60 cases with neurodevelopmental disorders (NDDs) which had a stressful antenatal maternal emotional history. All details regarding the antenatal history was properly elicited such as family stressors, financial problems, interpersonal relationships and any other stressful events. Not only the stressful event/situation but also the type of response/emotions given by the mother during pregnancy period was elicited. All cases were not just diagnosed as NDDs but were specifically diagnosed using proper diagnostic tools such as Vanderbilt ADHD diagnostic parent rating scale, Screen for child anxiety related emotional disorders (SCARED), developmental screening test (DST), Vinland social maturity scale (VSMS) and basic IQ tests like draw a man test, gazelle drawing, Seguine Form Board (SFB) test etc. Apart from the antenatal history, details regarding the occupation of the parents, economic status, religion, age/sex of the affected child were also collected. Finally the data collected is analyzed properly and tabulated.

2.7. Data Collection

Data is obtained from the patient, patient's mother and other bystanders through interview technique. The diagnosis is done through proper screening and assessment of the patient using proper diagnostic tools.

2.8. Data Analysis

Data is presented using charts and Tables 1-5.

Table 1. Age-wise stratification.

Age in years	Total number of children with NDDs with stressful antenatal emotional history
6 - 8	18
9 - 11	22
12 - 14	13
15 - 17	7

Table 2. Types of emotions of mother in the antenatal period.

Type of emotion	No. of cases
Depressed	3
Weeping	5
Lack Of Care	7
Worried/Anxious/Fear	25
Suppression of Emotions	3
Sad	5
Stressed	10
Unwanted Child (Attempt to Abort)	6
Helplessness	5
Grief	1
Insulted Feeling	1
Mental Shock	2
Fright	1
Loneliness	3
Unsecured feeling	2

Table 3. Specific type of NDD as an outcome of stressful antenatal emotional history.

Types of NDDs as an outcome of antenatal emotional history	No. of cases
Intellectual Disability	15
Anxiety Disorder	9
Attention Defiant Disorder	9
Learning Disability	7
Attention Deficit Hyperactivity Disorder	12
Slow Learner	5
Oppositional Defiant Disorder	6
Disruptive Behavioural Disorder	1
Expressive Language Disorder	1
Epilepsy	3

Table 4. Distribution according to the occupation of parent.

Occupation of parent	Number of cases
Coolie/Labourer	19
Driver	3
Fishermen	8
Workshop Worker	6
Businessmen	6
Carpenter	2
Cashewnut Factory Worker	6
Farmer	1
Teacher	3
Military	1
Working in Private Sector	4
Unemployed	1

Table 5. Distribution according to religion.

Religion	No. of cases
Hindu	45
Muslim	4
Christian	11

3. Results

Age-wise stratification:

Children with NDDs who had a stressful antenatal maternal emotional history were stratified on the basis of their age into four groups such as 6 - 8, 9 - 11, 12 - 14, 15 - 17.18 (30%) of them belonged to 6 - 8 age group, 22 (36.66%) belonged to 9 - 11 age group, 13 (21.66%) of them belonged to 12 - 14 age group and 7 (11.66%) of them belonged to 15 - 17 age group. Prevalence of NDDs with stressful antenatal emotional history was found to be highest among the children of age 9 to 11 years.

Gender difference:

NDDs were more prevalent in the males than in the females. Out of the 60 children, 46 (77%) were males and 14 (23%) were females.

Different type of emotions of the mother in the antenatal period:

Out of the 60 cases 25 (41.66%) had anxiety, worry or fear, 10 (16.66%) was stressed mentally, 7 (11.66%) had a feeling of lack of care, 6 (10%) did not wanted a child & attempted to abort, 5 (8.33%) were sad, wept, had helpless feeling each, 3 (5%) were depressed, had suppression of emotions & felt lonely each, 2 (3.33%) had a mental shock & unsecured feeling each, 1 (1.66%) had grief, insulted feeling & a fright each. But most of the case had a mix of many types of emotions in the antenatal period.

Specific type of NDD as an outcome of stressful antenatal emotional history:

From the 60 cases, 15 cases had intellectual disability, 12 were identified with ADHD, 9 had anxiety disorder and attention defiant disorder each, 7 of them had learning disability, 6 had oppositional defiant disorder, 5 were diagnosed as slow learners, 3 had epilepsy, and 1 had disruptive behavioural disorder and expressive language disorder each. It was found that in many cases more than one type of NDDs were identified in a single child or it can be said that most of the types of NDDs are co-morbidity of each others.

NDDs with stressful antenatal emotional history and socio-economic status:

There was a significant difference in the prevalence of NDDs with stressful antenatal emotional history between the children belonging to poor and average socio-economic status. Out of 60 cases, 29 (48.33%) belonged to poor socio-economic status, 9 (15%) cases belonged to average socio-economic status and 22 (36.66%) cases belonged to good socio-economic status.

Distribution according to the occupation of parent:

Out of the 60 cases of children with NDDs, the occupation of 19 (31.66%) of their parents were coolie, 8 (13.33%) were fishermen, 6 (10%) were workshop worker, businessmen, cashew nut factory worker each, 4 (6.66%) of them worked in private sector, 3 (5%) were teachers, drivers each, 2 (3.33%) were carpenters, 1 (1.66%) was a farmer and 1 (1.66%) was unemployed.

Distribution according to the religion:

Out of the 60 cases with NDDs with a stressful antenatal emotional history, 45 (75%) were Hindus, 11 (18.33%) were Christians and 4 (6.66%) were Muslims.

4. Discussion

According to this study the prevalence of NDDs with stressful antenatal emotional history was found to be highest among the children of age 9 to 11 years (Table 1, Figure 1). NDDs were more prevalent in males than in females i.e., 77% were males and 23% were females (Figure 2).

The different types of emotions of mothers in the antenatal period in the study were found to be emotional states such as anxiety/worry/fear, stress, lack of care, an attempt to abort the child from unwanted pregnancy, weeping, sad, helplessness, depressed, suppression, loneliness, mental shock, unsecured

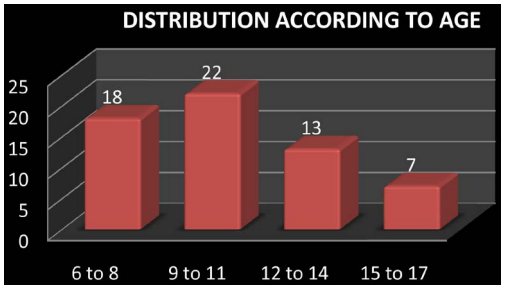

Figure 1. Age-wise stratification.

feeling, grief, fright and unsecured feeling (Appendix). The most common emotion was anxiety/worry/fear in the antenatal period and was about 41.66% (Table 2, Figure 3). In most cases there was intermingling of different emotions also.

According to the study the most common cause for such negative emotions during pregnancy or antenatal period for the mother was found to be because of the problems created by the alcoholic husband and this cause was identified in almost 25 cases i.e., 41.66%. Other causes were financial stress, problems with husband's family or mother-in-laws, death of any family members, fright/any mental shock etc (Appendix).

The outcome of a stressful antenatal emotional history were found to be as different types of NDDs such as intellectual disability, ADHD, anxiety disorder, attention defiant disorder, learning disability, oppositional defiant disorder, slow learners, epilepsy, disruptive behavioural disorder and expressive language disorder (Figure 4). In the study almost many cases had co-morbidity among themselves. Intellectual disability and ADHD was found to be the most common outcome of these (Table 3, Figure 3).

There was no much difference in the prevalence of NDDs in children belonging to poor and good socio-economic status as the percentage was 48.33% and 36.66% respectively (Figure 5). It was estimated also from identifying the occupation of parents (Table 4, Figure 6).

Majority of the children NDDs and with a stressful antenatal emotional history belonged to the Hindu religion (75%), (18.33%) were Christians and 6.66% were Muslims (Table 5, Figure 7).

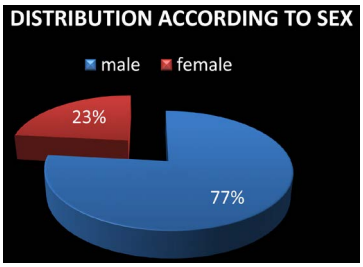

Figure 2. Distribution according to sex.

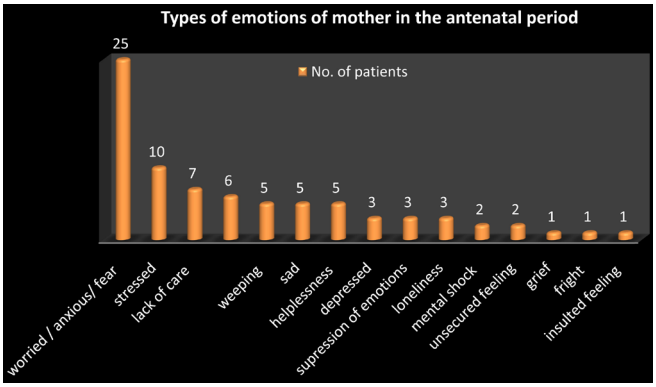

Figure 3. Types of emotions of mother in the antenatal period.

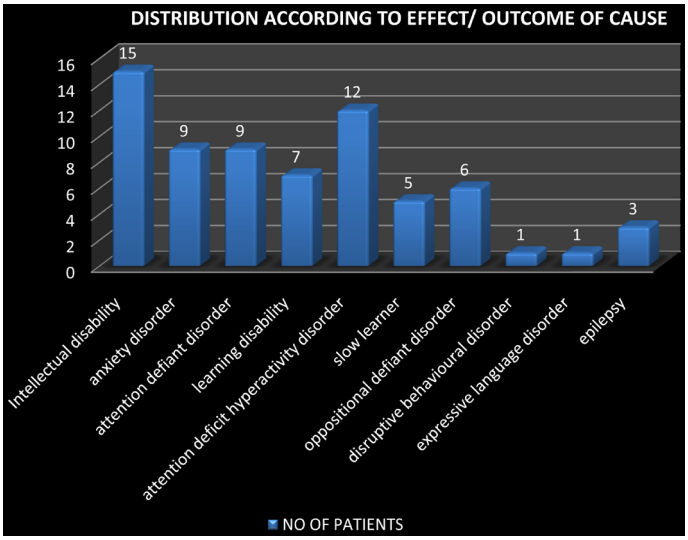

Figure 4. Distribution according to effect/outcome of cause.

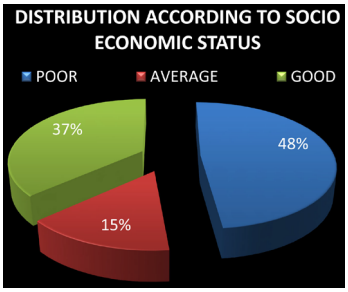

Figure 5. Distribution according to socio-economic status.

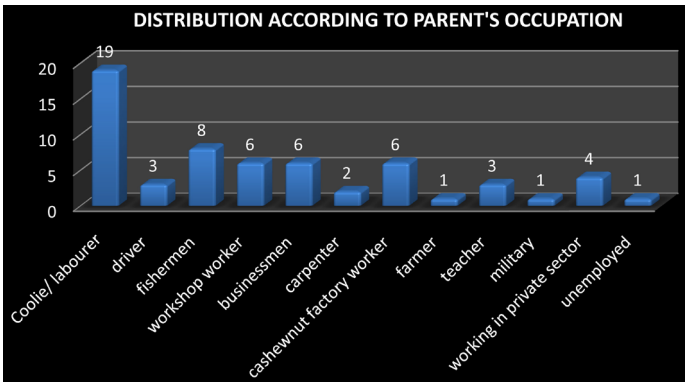

Figure 6. Distribution according to parent's occupation.

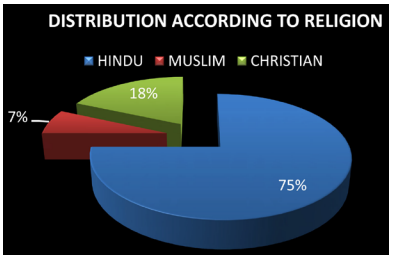

Figure 7. Distribution according to religion.

Many research studies have proven that Homoeopathy has an emotional healing ability and also have proofs to show that it has protective ability to prevent the bad effects of stress. Also that Homoeopathy can reduce genetic transmission of diseases and disorders and help in changing gene expression.

5. Conclusion

The study clearly shows a strong cause-effect relationship between antenatal maternal emotional state and neurodevelopmental disorders. It is found that with different negative emotions in the mother due to different causes can create different types of NDDs such as *intellectuall disability, ADHD, anxiety disorders, oppositional defiant disorder, epilepsy, attention defiant disorder, learning disability, slow learners, disruptive behavioural disorder and expressive language disorder*. It was found that one of the major causes for the stress in the mother was the *alcoholic husband* and most of them were from poor socio-economic status.

Further studies must be done to know what exactly each emotions in the mother during pregnancy can have on the offspring and its mechanism of transmission.

This study is done to stress on the importance of antenatal period for the mother not only regarding the physical health but also in the mental sphere so that more care can be given to the mother during this period. This is to highlight that "*Happy mothers have healthy children*".

Homoeopathy is one of the best therapeutic modalities in promoting emotional healing and also in helping the process of holistic child development in this modern day where environment promotes a faster pace of living and where stress has become a natural component of people's lives. Homoeopathy can be a helping hand for the children who grow up with the anxiety and the emotionally stressed environment.

It is of high time that every system of medicine includes the alternative system to contribute to the ways to prevent such behavioural teratogenic effect on the offspring and also to have a therapeutic solution for such emotional causes as well in order to have a healthy generation ahead.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

Master Chart

Sl. No	Op No	Name	Age/Sex	Maternal Antenatal Emotional Status	Diagnosis	Family socio-economic status	Occupation (parents)	Religion
1	8979/16	S Aravind	11/M	Mother had fights with mother in law and once had an attack of epilepsy – She was ***depressed*** and used to ***weep*** daily when there was conflicts in family	Moderate ID	Poor	Coolie	Hindu
2	9220/16	R A Sukunram	10/M	Mother had undergone torture from husband's family. She was not provided with basic food & water (1st trimester)-she had ***feeling of lack of care***	Anxiety disorder (social anxiety)	Average	Driver	Hindu
3	8740/16	C Edwin Sam Raj	12/M	Mother suffered from financial tension and was ***worried***	ADD	Poor	Fisherman	Christian
4	9482/16	Ashik	10/M	Husband was alcoholic and the mother was ***worried that he may harm her***	Moderate ID	Poor	Coolie	Hindu
5	9490/16	Mahesh	9/M	Mother was ***depressed*** about her father's death	Moderate ID	Average	Workshop worker	Hindu
6	9700/16	A Ajay	10/M	Husband was alcoholic due to which the mother had undergone ***stress*** as she ***was not able to react*** in any way	Mild ID	Poor	Coolie	Hindu
7	11901/16	M Mohammed Fasath	9/M	Mother was ***tensed and worried*** about financial problems	ADD	Average	Worker in PVC company	Muslim
8	11289/16	K Harish	7/M	Mother was ***worried*** as her husband was an alcoholic	Selective mutism (anxiety disorder)	Poor	Fisherman	Hindu
9	11911/16	F Abisha	15/F	Husband was cheated by someone for some financial issues and so mother was ***worried and anxious*** about that	IDD	Poor	Coolie	Christian
10	12181/16	Ajisha	8/F	Mother was ***sad*** and was ***stressed*** as her husband was an alcoholic	Epilepsy	Poor	Coolie	Hindu
11	7679/16	V Pradheesha	13/F	Mother suffered ***mental & physical torture(stressed)*** from her husband who was an alcoholic and used to beat her after drinking	Learning disability	Average	Workshop	Hindu
12	7800/16	Siva Prakash	9/M	Husband used to beat her as he was an alcoholic and once she had fallen down – ***stressed and worried about the child***	ADHD	Average	Welding (workshop)	Hindu
13	7801/16	Siva Lakshmy	7/F	Husband used to beat her as he was an alcoholic even at the last trimester – was ***worried***	ADHD	Poor	Coolie	Hindu
14	7875/16	Adly Rijoe	8/M	Husband has once beat her for some conflict with mother in law and because of that she had not taken food for some days – was ***angry*** towards them	SLD	Poor	Fisherman	Christian
15	8104/16	Anusha	11/F	Mother was so ***distressed*** due to family problems at husband's house, she came back to her home and ***tried to abort the child as she didn't like and want the child***	ADHD, Mild IDD	Good	Teacher	Hindu

Continued

16	8383/16	R Sajin	16/M	Mother had tried to ***abort the child*** at 7th month of pregnancy	ADD, Borderline IDD	Poor	Fisherman	Christian
17	8253/16	S S Abilash	9/M	Mother was ***worried*** about the child because her husband was an alcoholic & scolds her always. She was also malnourished	ADD	Poor	Coolie	Hindu
18	7846/16	S Sreeja	10/F	Husband used to beat her after drinking alcohol ***worried***	Mild IDD	Average	Business	Hindu
19	1012/16	Mohammed Thousif	11/M	Mother faced too much problems from husband's family for not having children for long even though the husband had oligospermia. Still after conceiving she was always blamed for every small issue. She uses to ***weep*** most of the days feeling sad for blaming her.	ADD/SLD	Good	Business	Muslim
20	2594/16	Abin	7/M	Mother was not mentally ready for a baby. Had uterine bleeding at 2th month of pregnancy – ***unwanted child***	ADHD/ODD	Poor	Fisherman	Christian
21	3363/16	Santhosh	8/M	Mother was beaten by her husband as he was an alcoholic – ***stress& lack of care***	ADHD	Average	Business	Hindu
22	7843/16	V Akash	9/M	Mother was ***worried*** about her husband as he was alcoholic	Mild ID	Poor	Coolie	Hindu
23	3295/16	V Vinish Raj	11/M	Mother ***feared*** her husband who was an alcoholic and use to beat her	Mild ID	Poor	Driver	Hindu
24	4565/16	S Santhosh	6/M	Husband was a drunkard. Mother's basic needs & desires were not satisfied. She had to go for work during pregnancy.-***lack of care***	Moderate ID	Poor	Coolie	Hindu
25	5826/16	S Ajith	14/M	Husband was a drunkard and so the mother was ***worried***	SLD	Average	Cashew factory	Hindu
26	3456/16	Renjin Karthik	8/M	During 4th month of pregnancy, mother's father in law suddenly got sick and she was ***sad*** about that	Expressive language disorder	Good	Business	Hindu
27	6189/16	Nithish	11/M	Husband was a drunkard and so the mother was ***worried***	ADHD/ODD	Poor	Coolie	Hindu
28	6320/16	R A Akash	6/M	Mother had ***suppression of anger*** from the behavior of her husband as he was a drunkard	ADHD	Average	Workshop worker	Hindu
29	7828/16	Renjith	11/M	Mother had ***emotional stress*** as her husband was an alcoholic and use to beat her. She was ***sad***.	Epilepsy	Average	Carpenter	Christian
30	7829/16	R Abinesh	12/M	Mother was under ***stress*** as she was ***helpless*** that her husband was an alcoholic and use to beat her	ADD	Average	Cashew nut factory	Christian
31	1264/16	Kebin Sharon	7/M	Mother had ***suppression of emotions*** as her husband was an alcoholic and use to beat her	LD	Poor	Fishermen	Christian
32	8093/16	S Arshika	12/F	Mother was depressed as her mother died when she was pregnant – ***grief***	ODD/LD	Average	Workshop	Hindu
33	163/16	Sujin	15/M	Husband use to beat her constantly and she didn't even went to hospital for regular checkups – ***lack of care***	ADHD/LD	Poor	Coolie	Christian
34	994/16	Sreeraj	16/M	Husband was suspicious and she was ***sad and helpless and use to weep*** many days	LD	Average	Employee in cashew factory	Hindu

Continued

35	2116/16	Vinoj	15/M	Mother was ***worried*** as her husband was an alcoholic and use to beat her	LD	Poor	Coolie	Hindu
36	2586/16	Akash	7/M	Mother was ***mentally stressed*** because of her husband who uses to injure her. She was ***afraid*** of him	Anxiety disorder	Poor	Coolie	Hindu
37	2595/16	Vishnu	8/M	Mother was very ***depressed*** that there was ***no one to take care*** of her	Mild IDD	Average	Working in a small private company	Hindu
38	2599/16	J Ashwin	13/M	At 2nd month of pregnancy, mother had ***tried to abort the child*** Due to some family issues, she had an ***insulted feeling*** during pregnancy	ODD	Average	Carpenter	Hindu
39	1281/16	Bavith	11/M	Mentally upset for early conception – ***unwanted child***	LD	Poor	Laborer/ coolie	Hindu
40	1493/16	Sajin	12/M	Mother was ***stressed*** (***weeping & not reacting – emotional suppression***) because of the drunkard husband	SLD	Poor	Farmer	Hindu
41	1776/16	K Sindu	15/F	Mother was ***sad*** that she was ***not taken care*** by her husband	Moderate IDD	Poor	Coolie	Hindu
42	1233/17	S Adith	12/M	Mother had a ***fright*** on seeing a stranger at 5th month of pregnancy	Anxiety disorder	Poor	Laborer/ coolie	Hindu
43	1568/17	Sreerag	6/M	Mother was ***stressed*** as her husband was a drunkard. She got ***worried*** when she had uterine bleeding at 5th month of pregnancy	ADHD/DBD	Average	Workshop employee	Hindu
44	6784/17	S S Sobin mon	11/M	At 4th month of pregnancy, Mother had a ***mental shock*** on knowing that her husband has an extra marital relationship	Anxiety disorder	Average	Driver	Hindu
45	6949/17	Nandana Krishnan	11/F	Mother was under ***stress*** from the husband's family and had a feeling that she was not able to do anything (***helpless***)	ADHD	Average	Farmer	Hindu
46	7006/17	Abhishek R S	13/M	Husband was a drunkard and also he was staying at another place during time of pregnancy. She felt as if she was ***not cared*** by him	SLD	Poor	Coolie	Hindu
47	7010/17	R S Arun Krishna	15/M	Husband lost his job and mother was ***anxious about future*** during pregnancy	ADD, Anxiety disorder	Poor	Unemployed	Hindu
48	397/17	Akshayath	12/M	Mother was ***worried*** as her husband was an alcoholic and beat her	ADD, ODD	Average	Working in cashew factory	Hindu
49	871/17	Abinesh	11/M	Husband was a drunkard and mother felt ***helpless and lonely***	IDD, ADHD	Average	Driver	Hindu
50	6028/17	J S Ashinth	11/M	Mother was ***anxious about future*** due to financial debts	ADD, ODD	Poor	Farmer	Hindu
51	9499/17	Akena Roshan	13/M	At 4th month of pregnancy, was a victim of a natural calamity (tsunami) and mother was ***depressed***	Moderate IDD	Poor	Fisherman	Christian
52	7845/16	Aasima Beevi	12/F	Mother had disputes with husband's family & ***felt sad and use to weep***. They live separately till then	Moderate ID, anxiety disorder (selective mutism)	Good	Business	Muslim

Continued

53	6208/17	Vinosh	10/M	***Unwanted pregnancy***-mother had tried to abort the child	ADHD, LD, Anxiety disorder	Good	Teacher	Hindu
54	2948/18	Arshika	12/F	Mother was ***tensed*** & ***worried*** since her father suffered from cancer & died next day of delivery	Epilepsy, moderate IDD, Anxiety disorder	Poor	Laborer/ coolie	Hindu
55	716/17	Nisreen Farhath	6/F	At 8th month of pregnancy, brother met with an accident and was ***anxiou***s about that	ADD, Anxiety disorder (selective mutism)	Good	Business	Muslim
56	3554/17	Tharun	6/M	At 2nd month of pregnancy, mother saw one of her sister burnt in front of her ***shock***	Anxiety disorder	Average	Coolie	Hindu
57	3417/10	Devika	8/F	At 1month of pregnancy, patient's father went abroad & returned back only after when the patient was 1 yr of age and the mother had ***lonely and insecure feeling***	Anxiety disorder	Good	Military	Hindu
58	4198/13	J B Vrindha	10/F	Mother had financial problems and was ***anxious*** about it. Husband work in military and was not with her during pregnancy period (***felt insecured***)	Anxiety disorder (social & panic anxiety)	Good	Teacher	Hindu
59	9159/12	Vijo W	8/M	Mother was at husband's home with mother in law which was a new environment for her and was ***anxious and fearful*** during pregnancy	Anxiety disorder (social & separation)	Average	Fisherman	Christian
60	6305/18	Rohith Krishna	6/M	Mother ***felt lonely*** as her husband went abroad during pregnancy period	Anxiety disorder	Good	Working in IT company	Hindu