CLINICAL PROFILE AND THE PREDICTORS OF SEVERITY IN CHILDREN WITH ASTHMA IN A TERTIARY CARE CENTRE

Dissertation submitted to

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In partial fulfillment of the regulations for the award of the degree of

MD BRANCH VII

PAEDIATRICS

GOVT STANLEY MEDICAL COLLEGE & HOSPITAL

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CERTIFICATE

This is to certify that the dissertation titled "CLINICAL PROFILE AND THE PREDICTORS OF SEVERITY IN CHILDREN WITH ASTHMA IN A TERTIARY CARE CENTRE" is the bonafide work of Dr N.Shajathi Begum in partial fulfillment of the requirements for the Doctor Of Medicine in Pediatrics Examination of the Tamilnadu Dr M.G.R Medical University to be held in April 2013

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DECLARATION

I Dr N.Shajathi Begum, solemnly declare that the dissertation titled **"CLINICAL PROFILE AND THE PREDICTORS OF SEVERITY IN CHILDREN WITH ASTHMA IN A TERTIARY CARE CENTRE"** is a bonafide work done by me at the Institute Of Social Pediatrics, Govt. Stanley Medical College & Hospital during the year 2010-2013 under the guidance and supervision of Dr G.Karunakaran M.D., D.C.H Director in charge, Institute of Social Pediatrics, Stanley Medical College, Chennai – 600 001.

The dissertation is submitted to the Tamilnadu Dr MGR Medical University, towards the partial fulfillment of the requirement for the award of M.D degree (Branch–VII) in Pediatrics.

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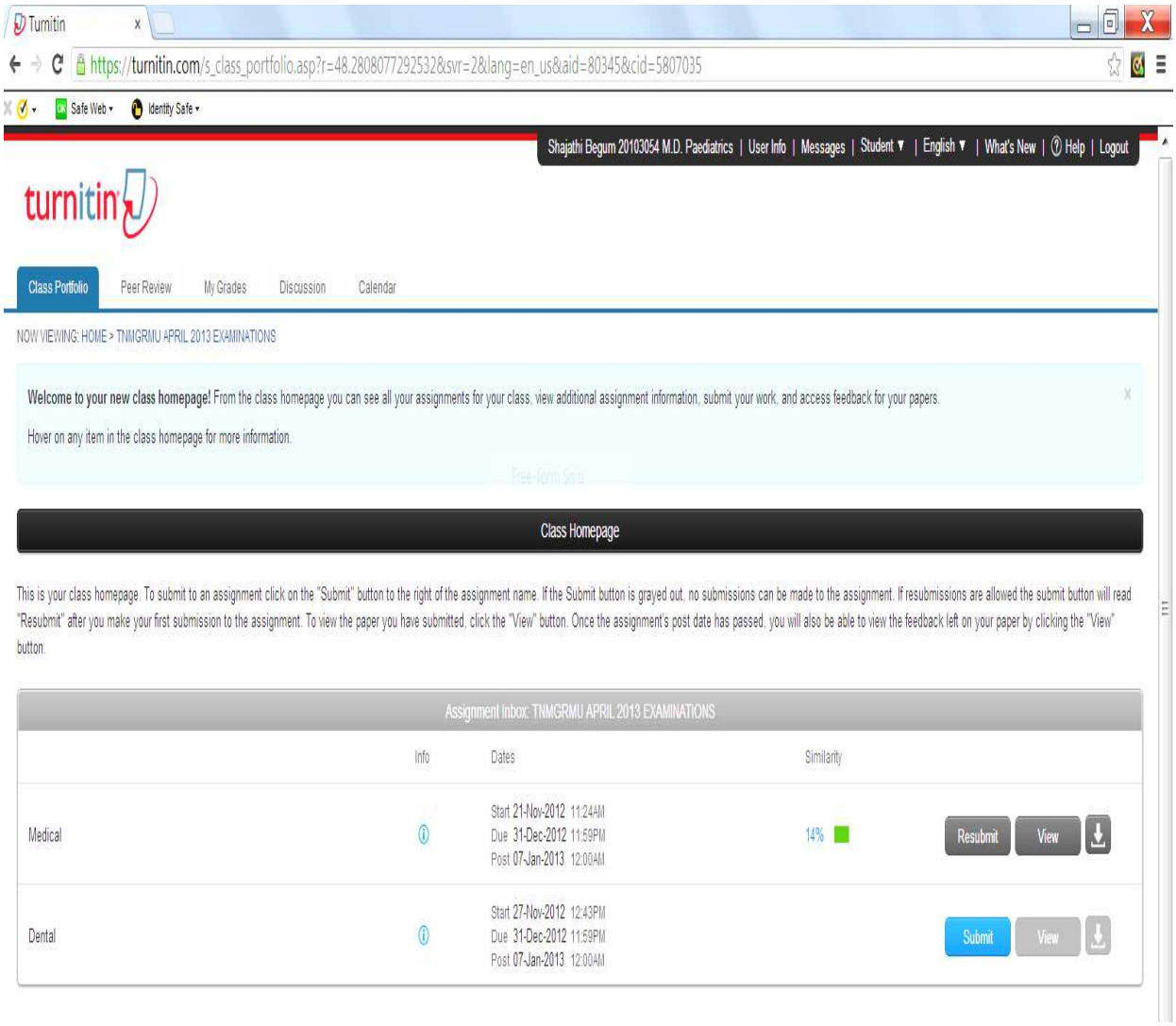
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CONTENTS

INTRODUCTION

Asthma is a chronic inflammatory condition of the lung airways resulting in episodic airflow obstruction. This condition is associated with considerable morbidity. There is a wide variation of 1.6-36.8% globally in childhood asthma prevalence among different locales. Even though there has been a considerable improvement in management of asthma, childhood asthma appears to be increasing in prevalence.

The cause of childhood asthma has not been determined till date, but various studies point towards a combination of environmental exposures and inherent biological and genetic vulnerabilities. Various studies and present available literature show that asthma prevalence correlated well with reported allergic rhino-conjunctivitis and atopic eczema. Allergy has been identified as the major risk factor associated with the persistence of childhood asthma in young children. Thus repeated exposure to an allergic agent leads to episodes of asthma attacks.

The surrounding environment with its allergens stimulates a genetically predisposed individual to activate his immune responses for a prolonged pathogenic inflammation and aberrant repair of injured airways tissues. The various common environmental agents leading to such aberrant inflammatory repair include inhaled allergens, respiratory

viral infections, chemical and biological air pollutants such as environmental tobacco smoke and air pollution. Repeated home allergen exposure in sensitized individuals has been shown to be strongly linked to disease persistence.

The same allergen causes different response in different individuals. Each may have varying severity. In addition multiple factors related to the environment may lead to a protracted episode. It is accepted that only genetically prone individuals develop manifestation of asthma. The disease may be either maternally or paternally linked or both.

In the treatment of asthma, identification of the risk factors associated with the disease exacerbation is of prime concern. Avoidance of the aggravating factors and the drug therapy is central to the management of the disease. Hence evaluation of the risk factors associated with development of asthma and to predict the severity in a particular individual is mandatory for every treating physician.

It is well known that asthma prone individuals develop episodes of exacerbation in different regions of the world depending on the particular allergens accounting for the regional and global variation. This study is meant to evaluate the risk factors associated with asthma

and predictors of severity in the group of the study patients representing a sample of population.

REVIEW OF LITERATURE

Definitions of asthma-

Asthma is defined as a chronic inflammatory disorder of the airways in which many cells and the cellular elements play a role, in particular mast cells, eosinophils, T lymphocytes, macrophages, neutrophils and epithelial cells. In susceptible individuals, this inflammation causes repeated episodes of wheezing, breathlessness, chest tightness and coughing, particularly in the night or in the early morning. These symptoms are usually associated with widespread but variable airway obstruction that is often reversible either spontaneously or with treatment. The inflammation also causes an associated increase in the existing bronchial hyper responsiveness to a variety of stimuli. (WHO/GINA).

The pediatric asthma consensus group defined asthma as cough and /or wheeze in a setting where asthma is likely and other rarer conditions have been excluded. Asthma should be considered as a clinical syndrome witch has three components. The components are bronchial hyper responsiveness, airway inflammation, and changes in base line airway caliber and compliance. There are a number of different asthma syndromes that fit in the young children by this above

clinical definition, with different contribution from these three components.

Most young children with a clinical diagnoses of asthma are hyper responsive to a wide range of allergens. The extent of this responsiveness correlates with the clinical severity. There are various allergens identified and studied. The list of allergens is quite large and testing all the children can be time consuming and not cost effective. The ideal method would be to prepare a chart or a questionnaire including the most common allergens in the surrounding house hold and advising the parents to identify the agent which led to a development of the disease exacerbation.

The lack of a gold standard makes it impossible to devise and validate a questionnaire for asthma in the strict sense. Several authors have nevertheless devised standard questionnaires and tested against airway responsiveness. There is also a wide variability in the way the subjects report physiological changes. Hence all the questionnaire methods of assessment have their limitations and some cases reported as asthma in all the studies may not really in picture be that of asthma. Peak flow measurements are difficult to obtain in the pediatric population. Broncho-dilator test are also used in the clinical settings to test for asthma. A parental reported diagnosis of asthma as recorded in this study can be generally confirmed as correct. This may identify a

select group which has been in contact with the health services and who have received treatment.

PATHOGENESIS OF ASTHMA

Asthma is not a single disease but is a spectrum of disorders characterized by airway obstruction that varies spontaneously and with treatment. Asthma is characterized by hyper responsiveness of the airway to a wide variety of exogenous and endogenous stimuli. The mucosal inflammation has a specific pattern with activated mast cells, eosinophils and T lymphocytes.

Asthma has been divided to have an extrinsic and an intrinsic component. The extrinsic component is basically the environment and the associated agents from the surroundings, while the intrinsic component is the non allergenic or the cryptic factors within an individual. It is highly possible that both the factors play a role in the development and manifestation of asthma in a person. It is basically important to differentiate between factors which induce an asthmatic state and those that precipitate an acute attack in the susceptible individual.

Most of the children are found to have asthma in association with atopy. This is a type of extrinsic asthma which has its basis form the environmental sources like house dust, pollen, fungal spores and

animal dander. This leads to an immunological reaction which leads to a cascade of immune related cellular activation. While in contrast the intrinsic factors are less known and severe.

Asthma and genetics-

There is a recognized feature that 50-60% of asthma has a hereditary basis. The following chromosomes have been studied for the presence of asthma and atopy related genetic transmission. The genes regulating the IgE and the interleukins in the region of chromosome 5q has been reported in the pathogenesis of asthma. The second region of interest is in the chromosome 11 which has been appropriately named the atopy gene at the 11q13 site. The protein product of the gene after linkage disequilibrium leads to amplification of the signal after antigen and antibody mediated reaction. The other region of significant association is in the chromosome 12q. The chromosome 6 is the site of major histo compatibility complex and also has a gene for tumor necrosis factor. Significant association among the HLA alleles has been identified among the highly purified allergens. Chromosomes 7 and 14 have the T cell receptor (TCR) proteins. Immunoglobulin E and the above T cell receptors have been identified and recognized in the genetic association of asthma.

Response of the bronchus-

There is an altered response of the bronchial smooth muscle to the exogenous stimuli like cold air, exercise irritant fumes, smoke etc. This though typical of asthma, is not exclusively associated with the disease. It is not necessary for the degree of hyper responsiveness to one provocative factor to correlate with another. That is various stimuli have different components to the overall irritability of the airways. The other components of the attack like airway edema and the hyper secretion of the mucus play an additional role in the symptom presentation of asthma.

It is already described that the atopic or the extrinsic form of asthma is the most common form of childhood asthma. There is an overproduction of IgE directed to specific environmental allergens in this form. The produced IgE binds to the surface of mast cells and basophils and thus these cells are activated on exposure to a specific allergen.

Phases of asthma-

There are two phases in the response to the inhaled allergens which are the early and the late asthmatic responses. The early response reaches a maximum within 15-30 minutes, which is basically a type 1 anaphylactic reaction and there is a recovery within the next hour. The

late response develops after 8 hours occurs in over 50% of the patients. This late response is due to the increase in the non specific airway responsiveness.

Cells of inflammation in asthma-

Nearly all the immunity related cells have been associated with asthma. The most important have been the mast cells and the eosinophils. The T lymphocytes have been identified in modulating the activity of other cells. The mast cells are central in the pathogenesis of asthma. They produce a wide range of pro inflammatory substances after the trigger response from the IgE mediated binding after exposure to allergen. The mediator stored and realeased by the mast cells after the trigger is histamine. Histamine is also synthesized by the basophils. There are 3 histamine receptors. H1 receptor causes profound broncho-constriction after activating the receptors in the bronchial smooth muscles and also by activating the afferent nerves in the airways. The role of H2 receptor is unclear in the airways, but H3 receptors have been identified to modulate the release of histamine from the mast cells. There are other proteases released by the mast cells like the tryptase which has been found to add on to micro vascular leakage. It has also been found that the mast cells are the source of interleukins and tumor necrosis factor in the airways of the patients with asthma. The basophils

have been identified in the late response of asthma with the production of prostaglandin D2 in addition to the similar early response seen above like the mast cells with the production of histamine. The eosinophils are the source of the charcot leyden crystals charcteristically associated with asthma. The eosinophils are the predominant cells in the airway of the asthmatics. The eosinophils have been identified to be an important source of the oxygen free radicals. This causes bronchospasm and inflammation. The role of other cells like the neutrophils, macrophages has not been as clearly established as above.

Role of lymphocytes-

The mast cells, eosinophils, epithelial cells and the fibroblasts are influenced by the T cells. There is a lot of evidence on the role of T cells in the IgE mediated reactions in the asthmatic. The factors like IL-4 and 13 magnify the antigen driven B cell synthesis of IgE.

PATHOLOGY OF ASTHMA-

The pathology of asthma basically deals with the airway remodeling and associated inflammation. As the duration of asthma increases, the thickness of the airway increases sometimes up to 300 times that of the normal. This is aggravated by the edema during an acute attack producing severe narrowing. The definition of remodeling

is that“during growth and repair a change in the size, mass and number of tissue components as a response to injury and or inflammation- it is termed as appropriate in normal lung development or it may transiently occur as in the case of normal repair, it has been termed as inappropriate when it occurs chronically with an abnormal alteration of the structure of the tissue.

Sputum and the bronchial secretions in asthma

The various structures seen in the sputum of the asthmatic patients are as follows

Curschmann’s spirals- They are corkscrew shaped twists of condensed mucus.

Creola bodies- These are clusters of surface epithelial cells of the airway.

Charcot-Leyden crystals- These are crystals composed of eosinophils and metachromatic cells with the granule membrane lysophospholipase. The presence of the above crystals is characteristic of asthmatic patients.

Airway-

The lungs are hyper inflated. The airways are jammed with thick tenacious secretions which are sticky. On histology, these plugs are mostly mucus with different necrotic cells of both inflammatory and

epithelial origin. There is also a concentric and multi lamellar arrangement of the thick mucus plug which is due to repeated episodes and layering one over the other. This is especially seen in cases of fatal asthma.

Epithelium and the connective tissue

There is damage and loss of the surface epithelium with loss of the epithelial cell tight junctions. There is a characteristic homogenous thickening of the reticular basement membrane. This condition has been termed as sub-epithelial fibrosis. This fibrosis is due to thickening of the lamina reticularis which contains the collagen III and V along with tenascin and fibronectin. The inflammatory cells can migrate easily in the bronchus even though the thickening is present through the pre existing channels.

Bronchial smooth muscle

There is an increase in the mass of the smooth muscle cells in the large bronchus of the lungs.

Submucosal and goblet cells

There is an enlargement of the submucosal cells and goblet cell hyperplasia producing large quantities of thick tenacious sputum.

RISK FACTOR EVALUATION AND PREVENTION OF ASTHMA-

There is an increasing prevalence of asthma in the new generation. There have to be factors other than genetic in this observed increase in the prevalence. It is possible that this phenomenon may be partly due to a more susceptible population or to that of a toxic environment.

The concept related to immunity (T-helper-1/T–helper-2):

The improvement in hygienic conditions in this era reduces the exposure to microbial presence. This results in a slow post natal maturation of the immune system. Hence there is late development of an optimal balance between T helper-1 and T helper-2 immune responses. The T helper-1 response is induced by the microbes and their products- an absence of which leads to an excessive T-helper-2 response. The natural targets of the T helper -2 responses are the parasites but may be directed towards common antigens such as dust mites and pets, resulting in the increase in allergy.

Early life 'window of opportunity' for sensitization concept:

There is a strong T-helper-2 bias at birth. The cytokine profile reveals a low level Th1 cytokine interferon at birth. This type of a

greater T-helper-2 with a lower level of T-helper-1 (IFN-gamma) is exaggerated in neonates with family history of allergy. This reduced interferon gamma production by cord mono nuclear cells has been associated with subsequent development of allergic disease. It has been proposed that there is a gradual shift from a Th2 to Th1 response profiles over the first few years of life. The exposure to common allergens during this vulnerable period may result in persistent Th2 like responses and the development of allergy. Fetal Th2 like responses, rather than being down regulated, are boosted and consolidated by early allergen exposure with subsequent development of atopic symptoms. The results of recent studies suggest that the pattern of T-h cell memory that determines the phenotype of response to allergen in later life is developed during the period between the birth and the start of primary school, and the absence of atopy is associated with post natal up-regulation of Th1 like immunity, which prevents the consolidation of Th2 like responses. Thus the question whether the increase in asthma is due to more susceptible population or a toxic environment is too inflexible- the probable answer is that both are important.

ADDRESSING RISK FACTOR WITH AN AIM OF REDUCING THE SEVERITY:

Family history:

In general, the preventive aspects need to address to the whole population. In the terms of prevention, pre- marital counseling may be suggested. But multiple risk factors play a role in the history of the disease in the family, who on the top may be exposed to environmental insult.

Tobacco smoke:

Tobacco smoke is associated with all forms of respiratory complaints. There is a worsening of respiratory symptoms in children with pre existing conditions such as asthma. When children are compared with regard to the exposure of the tobacco smoke in the house, the maximum affected are seen in the houses where both the parents smoke and the least respiratory symptoms in those children from families with no exposure to tobacco smoke.

Breast feeding:

There is a controversy whether breast feeding helps to prevent asthma. It is also unethical to randomize infants to breast

feeding and formula feeding. But it is accepted with the help of non randomized studies that there is a beneficial effect of prolonged breast feeding (>4-6 months) and late introduction of solid food.

Indoor allergens:

There is indirect evidence that indoor allergens are the cause of increased prevalence of asthma. The primary exposure leads to the development of IgE mediated sensitization, this sensitization progresses to allergic disease (secondary exposure) and is followed by severe symptoms in patients with established disease (tertiary exposure). Primary sensitization occurs in early infancy. Evidence to support this view comes from studies relating atopy to month of birth, and importance of early exposure to mite allergen in primary sensitization has been well established. After sensitization these individuals develop more severe disease. Thus the focus is to reduce primary sensitization in infancy to reduce the prevalence of asthma.

Family size:

There is an inverse association between family size and manifestations of atopy in early life and there is more history of atopy in older siblings compared to the younger ones.

Perinatal history-

There is an indication that preterm deliveries and low birth weight are associated with asthma development in children.

Socio economic factors-

A low socio economic background has been associated with increased prevalence of asthma.

Infection:

Bacterial, viral infections and the intestinal micro flora exert a continuous stimulation of the immune system. The early childhood is important in the development of the optimal balance between the Th-1 and the Th-2 like immune responses. This is disrupted by fewer rates of infections and antibiotic usage in early childhood. The debate is still unresolved as to whether early childhood respiratory infections have a harmful or protective effect on the development of asthma and allergic diseases.

Diet:

The role of diet is also controversial with suggestions and studies depicting low prevalence and severity of asthma in areas with intake of a less fatty diet.

In the international study of asthma and allergies in childhood, asthma prevalence was found to be lowest in the countries with lowest fat intake. The countries with high fat intake had increased prevalence of asthma. Among these countries with high fat intake, the Mediterranean diet based on olive oil had lower rates of asthma.

CAUSES OF SEVERE ASTHMA-

Acute exacerbations can occur in asthmatic patients irrespective of their clinical grades. There are many factors which are associated with the onset of a severe exacerbation of asthma. The most common trigger is an acute viral respiratory infection. The symptoms of infection precede the onset of a severe attack of asthma.

The other causes include exposure to an allergen and environmental pollution. The disease is aggravated if exposure to the sensitizing agents persists.

AIM OF THE STUDY

To study the risk factors among children with Asthma

&

To analyse the various predictors of severity of Asthma.

MATERIALS AND METHODS

Design of the study:

This study employed a combination of both quantitative and qualitative methods. It is a cross sectional, prospective survey using face to face administered questionnaire proforma. The quantitative format is the accumulation of the data regarding the present and the past attacks of asthma. The qualitative assessment is by base line investigations and the peak flow metric analysis.

Place of Study:

Asthma clinic at a tertiary care centre

Period of Study:

Jan 2011-June2012

Study Population:

Children presenting in the asthma clinic at the centre.

Inclusion Criteria:

All children aged more than one year presenting with clinical features of asthma and physician diagnosed asthma.

Exclusion Criteria:

1) Children less than 1year of age.

2) Children with congenital anomalies of the thorax.

Data collection:

The institutional review board approved the study protocol. After obtaining the consent from the head of the departments and with their help a questionnaire was prepared. This pre designed questionnaire (Proforma) was maintained in the functioning asthma clinic of the institute. The data collection in the proforma is divided. The consent of the parents was taken. Parents were encouraged to give a reliable re collection of the events in the growth of the child from the history since conception till the time of inclusion in the study. The following details are set in the questionnaire

1) **Prenatal history**-

The Childs attender was asked about the mothers weight gain during pregnancy which was divided into less than or more than 8kgs. It has been assessed that a full term pregnancy leads to 6kgs of weight from the uterus, fetus, placenta and the amniotic fluid [(22)]. Considering women to gain at least 2 more kilograms during pregnancy an 8kgs cut off has been taken. The second question was the exposure to tobacco smoke during pregnancy.

2) Natal history-

The period of gestation is divided into term and preterm deliveries considering term deliveries as 37 weeks and above, the mode of delivery either LSCS or by normal vaginal was noted and the birth weight was recorded.

3) Post natal history-

The feeding habits after birth were noted. The children were divided as on breast feeds or artificial feeds or on both. The duration of exclusive breast feeding was also noted. The other records in this period were about the history of recurrent infections, atopy, allergic rhinitis, GERD and associated episodes of wheeze.

4) **Wheeze history-**

The parents were asked when they came to know of the physician confirmed wheeze and since when their children were suffering from similar episodes. When they were confident about the earliest such episode it was recorded .The frequency of attacks, the possible trigger for wheeze exacerbation, and if any hospitalization for exacerbation were documented.

5) Family history-

The socio economic condition of the children with which they were living, history of asthma and atopy in parents and siblings was noted.

6) Environmental history-

The exposure of the children to various forms of smoke in their surroundings was asked for. The factors like tobacco smoke, usage of smoke producing mosquito repellants and smoke from the kitchen was noted. In the kitchen, it was noted whether it was separate or not and whether the stoves in the kitchen produced smoke or not. The presence of cockroaches in the house and the type of house was recorded.

7) Clinical examination-

The nutritional status, the body mass index, features of allergic rhinitis, atopy, and the grade of the asthma at presentation was noted with help of history and if possible with the help of peak flowmeter. The respiratory system examination was done.

8) Investigations-

Routine investigation like complete blood count, urine and stool examination is done for all the children. The absolute eosinophil count

is looked for. A chest x-ray, mantoux, and if possible a peak flowmetry is done.

Asthma clinic:

The asthma clinic functions in this institute every week. The children who have been diagnosed with features of asthma visit the clinic. The proforma is entered and filled up with the history and the data given by the parents of the children. A detailed clinical examination is done. Relevant investigations are done as a set for all the children. The peak flow metric assessment of the eligible and cooperative children was done.

Proforma (questionnaire) -

The proforma is the basis of all the data recorded in this study. After the data is entered, the variables in the association of asthma are tabulated and the risk factors mentioned are studied. The samples of cases in the study are assessed for severity and the cases are divided as per the severity. Four grade system using the GINA criteria as shown below is used to grade the severity of asthma.

GINA CRITERIA FOR ASTHMA SEVERITY STAGING

	Symptoms/Day	Symptoms/Night	PEF or FEV_1	PEF variability
STEP 1 Intermittent	< 1 time a week Asymptomatic and normal PEF between attacks	</= 2 times a month	>/= 80%	< 20%
STEP 2 Mild Persistent	> 1 time a week but < 1 time a day Attacks may affect activity	> 2 times a month	>/= 80%	20-30%
STEP 3 Moderate Persistent	Daily Attacks affect activity	> 1 time a week	60%-80%	> 30%
STEP 4 Severe Persistent	Continuous Limited physical activity	Frequent	</= 60%	> 30%

PEF- Peak Expiratory Flow; FEV1. Forced Expiratory Volume in the first second.

• The presence of one of the features of severity is sufficient to place a patient in that category.

• Patients at any level of severity-even intermittent asthma-can have severe attacks.

Peak expiratory flow recording-

The personal best of the patient was calculated from 6 recordings taken over a period of 3 days when the patient was symptom free. Again the PEFR was recorded when the patient was symptomatic to grade the severity. But as it is difficult to take the measurement of the PEF in most of the children , the symptoms (though basically subjective) are used to grade the severity of asthma .Where ever possible peak flow metry was used to classify the children into various grades of severity.

The cases which are termed as severe on a single cross sectional analysis are studied with the cases in the mild and moderate group as a sample to analyse the risk analysis for severity. The data is pooled and the factors in the severe group are analyzed to see the factors which lead to an association of high severity in the disease.

RESULTS AND OBSERVATIONS

Study population- A total of 186 cases have been registered and analyzed.

CLINICAL PROFILE OF THE STUDIED PATIENTS

- **Symptom presentation**

The children presenting with clinical features of asthma were enquired about the presenting symptoms and the results tabulated as below.

S.no	Symptom	Number of cases
1	Breathlessness	171 (92%)
2	Recurrent cough	182 (97.8%)
3	Nocturnal cough	186 (100%)
4	Chest tightness	111 (59.8%)
5	Other Symptoms	22 (11.8%)

The most common symptom which was present in all the cases is nocturnal cough, and the next common symptom was recurrent cough which is present in 182 cases. Breathlessness was reported in 171 cases. There were other symptoms reported in 22 cases which ranged from vomiting during sleep, difficulty in eating, loss of sleep etc.

- **Grading of severity of asthma-according to GINA guidelines**

Grade	Number of cases
Grade I	98 (52.7%)
Grade II	68 (36.6%)
Grade III	12 (6.5%)
Grade IV	08 (4.3%)

Using the clinical history and the above relevant method the children were classified according the grade of severity and a total of 98 cases were grade I, 68 were grade II, 12 were grade III, and 8 were grade IV.

- **Investigations**

All following investigations were done and all the relevant data were tabulated as below. The complete blood count other than eosinophils was normal in all the children; the eosinophil count was abnormal in 46 of the children. Examination of the stool for parasites showed that 31 children had an abnormality with most of the children having amoebic cysts. The Mantoux test was normal in 180 children. The chest x-ray was normal in 101 children. The most common abnormality was a hyper inflated lung.

	Investigations	Normal	Abnormal
1	CBC other than eosinophils	186	0 (0%)
2	Stool for parasites	155	31 (16.7%)
3	Eosinophil count	140	46 (24.7%)
4	Mantoux	180	6 (3.2%)
5	Chest X- Ray	101	85 (45.7%)

ANALYSIS OF THE RISK FACTOR AND THEIR ASSOCIATION WITH SEVERITY

SEX:

There were 102 (54.83%) male and 84 (45.17%) female children presenting in the asthma clinic during the period of study.

Analysis of the sex of the children and the associated severity-

	Total	G I	G II	GIII	G IV	X^2	Pvalue
Males	102	55 (53.9%)	34 (33.3%)	08 (7.8%)	05 (4.9%)	1.576	0.67
Females	84	43 (51.2%)	34 (40.5%)	04 (4.8%)	03 (3.6%)		

There are 55 grade I, 34 grade II, 8 grade III and 5 grade IV among the 102 male children and there are 43 grade I, 34 grade II, 4 grade III and 3 grade IV among the 84 female children.

The p value is 0.67 which is not significant. Hence though in the observed data, there are more males with a greater percentage of severe presentation, there is no significance regarding a higher presentation of more severe disease in the males.

AGE:

The youngest patient was- 1 ½ years and the oldest was 14 years old.

Age group of patients studied

Age in years	Total	GI	GII	GIII	GIV	P Value
1-5	86	52 (60.4 %)	31 (36%)	02 (2.3%)	01 (1.1%)	<0.05
5-10	64	31 48.4%	23 35.9%	06 9.3%	04 6.2%	
> 10	36	15 41.7%	14 39%	04 11.1%	03 8.3%	

There were 86 children in the age group of 1-5 years, 64 in the age group of 5-10 years and 36 in the age group of more than 10 years.

In the age group of 1-5 years 2 cases were grade III and 1 case was grade IV of the 86 sampled cases while in comparison 6 cases were grade III and 4 cases were grade IV of the 64 children in the age group of 5-10 years and 4 cases of grade III and 3 cases of grade IV of the 36 children in more than 10 years age group.

The above table shows that more cases of severe disease grades are seen in the older age groups. The p value is less than 0.05 which is significant. This result also suggests that as the children grow older lesser grade of asthma may be controlled well compared to the higher grade.

SOCIO ECONOMIC STATUS

The children presenting in this centre are usually in the lower socio economic group. There were only few children belonging to he lower middle class.

Table of Socio economic status

Socio economic status	Total	GI	GII	GIII	GIV	P value
Lower class	171	90 52.6%	62 36.3%	11 6.4%	8 4.7%	0.86
Lower middle class	15	8 53.3%	6 40.0%	1 6.7%	0 .0%	

As seen in the data 171 children are of the lower class and the other 15 belong to the lower middle class. All the patients in the grade IV group belonged to the lower socioeconomic group, a higher percentage was also noted in the grade 3. But there is no statistical significance as the p value is 0.86.l

PRE NATAL HISTORY

Maternal weight gain was known in only 72 cases. Hence maternal weight tables or statistics could not be fully recorded.

NATAL HISTORY

1) **GESTATIONAL HISTORY**:

a) **Birth period history:**

One hundred and sixty four children were born of a term gestation and 22 children were preterm.

Duration of gestation

	Total	GI	GII	GIII	GIV	X^2	P
Term	164	83 (50.6%)	65 (39.6%)	10 (6.1%)	6 (3.7%)	6.323	0.097
Pre term	22	15 (68.2%)	3 (13.6%)	2 (9.1%)	2 (9.1%)		

Of the 164 term children, 10 cases were grade III and 6 cases were grade IV compared to 2 cases of grade III and 2 cases of grade IV of the 22 preterm cases. The p value is 0.097 and the difference is not statistically significant.

b) **Mode of delivery**

One hundred and fifty six children were born of labor natural and the rest 30 were delivered by LSCS.

	Total	GI	GII	GIII	GIV	X^2	p
Natural	156	80 (51.3%)	61 (39.1%)	8 (5.1%)	7 (4.5%)	4.778	0.189
LSCS	30	18 (60%)	7 (23.3%)	4 (13.3%)	1 (3.3%)		

Among the 156 natural deliveries, 8 cases were grade 3 and 7 cases were grade 4, compared to 4 cases of grade III and 1 case of grade IV in the 30 deliveries by LSCS. The p value is 0.189 and it is not statistically significant.

C**) Birth weight**

There were 24 children with birth weight less than 2 kgs, 40 children with birth weight between 2-2.5kgs and 122 children with more than 2.5kgs.

Birth weight

Weight	Total	G1	G2	G3	G4	X^2	p
< 2kgs	24	8 **(33.3%)**	10 (41.6%)	4 (16.7%)	2 (8.3%)	29.42	<0.001
2-2.5kgs	40	12 (30%)	19 (47.5%)	7 (17.5%)	2 (5%)		
> 2.5kgs	122	78 (64%)	39 (32%)	1 (0.8%)	4 (3.3%)		

Among the 122 children with birth weight more than 2.5kgs, there was a single case with grade 3 severity and 4 cases with grade 4 severity, compared to 7 cases of grade 3 severity and 2 cases of grade 4 severity among the 40 children in the 2-2.5kgs birth weight, and in the 24 children with birth weight <2 kgs, there were 4 children of grade 3 and 2 children of grade 4 severity. The p value is less than 0.001 and thus statistically significant.

POST NATAL HISTORY

1) Feeding habits:

There were 131 children who had been fed exclusively with breast milk in the study. Of the remaining, 35 children had only artificial

feeds. The rest of the 20 children had breast milk along with artificial feeds.

Feeding habits after birth

Feeding Habits	Total	GI	GII	GIII	GIV	X^2	P value
E B F	131	77 58.8%	43 32.8%	6 4.6%	5 3.8%	7.533	0.27
Artificial Feeding	35	13 37.1%	16 45.7%	4 11.4%	2 5.7%		
Both	20	8 40.0%	9 45.0%	2 10.0%	1 5.0%		

There are 131 children who had been exclusively breast fed of the 186 children studied. The remaining children had artificial feeds (n=35) or both breast and artificial feeds (n=20).The relationship between type of feeds and severity of asthma is not significant and the p value is 0.27.

Duration of exclusive breast feeding

There are 131 children who had exclusive breast feeds. Among the 131 children, 88 were fed for a period of less than 6 months and 43 for more than 6 months.

Duration of exclusive breast feeding	Total	GI	GII	GIII	GIV	X2	P value
Below 6 months	88	57 64.8%	24 27.3%	4 4.5%	3 3.4%	4.274	0.23
Above 6 months	43	20 46.5%	19 44.2%	2 4.7%	2 4.7%		

The relationship between the duration of exclusive breast feeding and grading of asthma is not significant with a p value is 0.23.

2) **Age of presentation with wheez**e:

There were 68 children who had history of wheeze in infancy itself. There were 64 children presenting with the first episode of

wheeze between 1-3 years and the remaining 54 presented after 3 years of age.

Analysis with relation to age of onset

Age in Years	Total	GI	GII	GIII	GIV	p
< 1	68	32 (47%)	24 (35.3%)	4 (5.9%)	8 (11.7%)	<0.01
1-3	64	29 (45.3%	30 (46.8%)	5 (7.8%)	0 (0%)	
>3	54	37 (68.5%	14 (25.9%)	3 (5.5%)	0 (0%)	

All the cases in the grade IV have presented with episodes of wheezing since infancy. The p value relating the age of onset of wheeze and severity is less than 0.01 and thus significant. Thus children prone to develop a higher grade of asthma can be identified in infancy with a history of wheeze in infancy.

3) **History of atopy**

Fifty eight children had history suggestive of atopy

Atopy	Total	GI	GII	GIII	GIV	X2	p
Present	58	17 (29.3%)	31 (53.4%)	7 (12.1%	3 (5.2%	19.59	<.001
Absent	128	81 (63.3%)	37 (28.9%)	5 (3.9%)	5 (3.9%)		

There are 58 children who had associated history of atopy, compared to 128 without history of atopy. Among the 58 children with history of atopy, there were 17 in grade I and 31 in grade II severity, 7in grade III and 3 in grade IV. In comparison, of the 128 children who had no history of atopy, there were 81 in grade I and 37 in grade II, 5 each in grade III and IV.

Analyzing the data there is significant p value of less than 0.001. Thus patients having atopy have more severe disease compared to children who do not have history of atopy.

4) **History of allergic rhinitis**

AR	Total	GI	GII	GIII	GIV	X2	p
Present	54	**14 (25.9%)**	**29 (53.7%)**	**6 (11.1%)**	**5 (9.3%)**	23.4	<.0001
Absent	132	**84 (63.6%)**	**39 (29.5%)**	**6 (4.5%)**	**3 (2.3%)**		

There were 54 children who had a history of allergic rhinitis in which 14 had grade I and 29 had grade II, 6 had grade III and 5 had grade IV severity. There were 132 children who did not have history of allergic rhinitis among whom 84 had grade I, 39 had grade II, 6 had grade III and 3 had grade IV severity. The p value is < 0.0001 and the association is statistically significant.

5) **History of Gastro Esophageal Reflux Disease**

There were 30 children who had a history suggestive of GERD among the 186 children in the study group.

These children were divided as per the severity and the grading as tabulated is shown below.

Gastro Esophageal Reflux Disease

GERD	Total	GI	GII	GIII	GIV	X2	p
Present	30	11 (36.7%)	7 (23.3%)	8 (26.7%)	4 (13.3%)	32.89	<0.001
Absent	156	87 (55.8%)	61 (39.1%)	4 (2.6%)	4 (2.6%)		

Of the 30 children with GERD, 11 had grade I, 7 had grade II, 8 had grade III and 4 had grade IV. Of the remaining 156 children without history of GERD, there were 87 with grade I, 61 with grade II and 4 each with grade III and IV. The statistical value is significant with a p value of < 0.0001.

6) **Recurrent infections:**

Nearly all the children had recurrent infections. There were only 18 children who did not have history of recurrent infections. Respiratory infections were the most common recurrent infections in 104 children. Other infections related to GI tract and skin were seen in 64 children.

History of recurrent infections

Infections	Total	GI	GII	GIII	GIV	P
Respiratory	104	55 52.9%	37 35.6%	7 6.7%	5 4.8%	
Other	64	32 50.0%	25 39.1%	5 7.8%	2 3.1%	0.9

Respiratory infections were the commonest infection in all the grades. A higher percentage of respiratory infections were found in the grade 3 and 4 group compared to the lesser grade by a small percent margin. The p value is not significant when respiratory and other infection were compared with respect to severity.

WHEEZE HISTORY

1) **Triggering factors:**

The most common reported triggering factor was the intake of cold items followed by history of allergens. Various allergens were

identified in 112 cases. Infections in 94, exercise in 51, seasonal changes in 97, Intake of cold items in 116, sweets in 72 and intake of citrus fruits in 42 were reported as triggering factors. Intake of drugs was not found to be a factor in the history recorded.

Triggering factors

Index	Triggering factors	Number of cases
1	Allergens-	112 (60.2%)
2	Exercise-	51 (27.8%)
3	Infections	94 (50.5%)
4	Seasonal changes	97 (52.1%)
5	Intake of cold items	117 (62.9%)
6	Sweets	71 (38.7%)
7	Citrus fruits	45 (24.19%)

Grade and the relation with exacerbating factors

1) **Allergens**:

Allergens	Total	GI	GII	GIII	GIV	X2	p
Present	112	58 51.8%	40 35.7%	9 8.0%	5 4.5%	1.211	0.750
Absent	74	40 54.1%	28 37.8%	3 4.1%	3 4.1%		

Allergens are found in 112 cases as the trigger for acute exacerbation but analyzing it relating to the severity of the disease, the p value is not significant.

2**) Exercise**:

Exercise	Total	GI	GII	GIII	GIV	X2	p
Present	51	25 49.0%	22 43.1%	4 7.8%	0 .0%	4.244	0.236
Absent	135	73 54.1%	46 34.1%	8 5.9%	8 5.9%		

Exercise induced asthma is noted in 51 cases. All the 8 cases with grade IV severity did not have exercise induced asthma and 8 out of the 12 grade III cases also did not have history of asthma. The p value is 0.236 which is not significant.

3) **Infection**

There were 94 cases with history of infections as a triggering factor for the onset of an asthmatic attack.

Infection	Total	G I	G II	GIII	GIV	X2	p
Present	94	52 55.3%	33 35.1%	5 5.3%	4 4.3%	0.738	0.864
Absent	92	46 50.0%	35 38.0%	7 7.6%	4 4.3%		

There were 4 cases with grade IV and 5 cases with grade III severity who had a history of infection as a triggering factor. The p

value of the above data is 0.864 which is not significant.

4**) Seasonal changes**:

Seasonal changes	Total	GI	GII	GIII	GIV	X2	p
Present	97	50 51.5%	38 39.2%	7 7.2%	2 2.1%	2.977	0.395
Absent	89	48 53.9%	30 33.7%	5 5.6%	6 6.7%		

There are 97 children who had seasonal changes as a trigger for asthma. Six among the 8 cases of grade IV and 5 of the 12 grade III cases did not have seasonal changes as the triggering factor for asthma. The p value is 0.395 which is not significant.

5) **Cold items**:

There are 117 cases with cold triggering an asthmatic attack. The remaining 69 did not give cold to be a factor in the trigger of asthma

Cold items	Total	GI	GII	GIII	GIV	X2	p
Present	117	58 49.6%	48 41.0%	7 6.0%	4 3.4%		
Absent	69	40 58.0%	20 29.0%	5 7.2%	4 5.8%	2.98	0.395

There were 4 of the 8 grade IV and 5 of the 12 grade III cases who did not have cold items as a triggering factor for asthma. The p value is 0.395 which is not significant.

6) **Sweets :**

Sweet	Total	GI	GII	GIII	GIV	X2	p
Present	71	39 54.9%	25 35.2%	3 4.2%	4 5.6%	1.523	0.677
Absent	115	59 51.3%	43 37.4%	9 7.8%	4 3.5%		

There were 4 of the 8 grade IV and 9 out of the 12 grade III cases who did not have sweets as a triggering factor of asthma. The p value regarding intake of sweets as a cause of severity of asthma is 0.677. This is not significant.

6) Citrus fruit intake:

Citrus fruit intake	Total	GI	GII	GIII	GIV	X2	p
Present	45	25 55.6%	16 35.6%	3 6.7%	1 2.2%	0.710	
Absent	141	73 51.8%	52 36.9%	9 6.4%	7 5.0%		0.871

There are 45 children reporting citrus fruit intake causing an exacerbation. Among the 45 there were 7 children out of 8 in grade IV and 9 children out of 12 in grade III who did not have citrus fruits as trigger for asthma. The p value is 0.871 which is not significant.

Hospitalization:

There were 69 cases who reported to have hospitalization for acute exacerbation and 117 cases did not have history of

hospitalization for an exacerbation. There were 30 in grade I, 20 in grade II, 11 in grade III and 8 in grade IV who needed hospitalization.

Hospitalization for exacerbation

Criteria	Total	GI	GII	GIII	GIV	p
Presence	69	30 (43.5%	20 (29%)	11 (15.9%)	8 (11.6%)	<0.001
Absence	117	68 (53%)	48 (38.5%)	1 (4.3%)	0 (0%)	

Hospitalization for exacerbation-

There are a higher percentage of grade III and IV children being admitted for an acute exacerbation. There is significant p value showing that most of the children who get admitted with acute exacerbation are usually of higher grade.

FAMILY HISTORY:

There was a family history of asthma in 98 cases

F/H asthma

F/H asthma	GI	GII	GIII	GIV	Total	X2	p
Total	98	68	12	8	186		
Present	50 51.0%	31 45.6%	11 91.7%	6 75.0%	98 52.7%	10.4	0.015
Absent	48 49.0%	37 54.4%	1 8.3%	2 25.0%	88 47.3%		

Of the 8 cases in grade IV, 6 had family history of asthma and of the 12 in grade III, 11 had positive family history. Of the 98 cases in grade I, 50 had family history and of the 68 with grade II, 31 had positive family history.

There is a significant p value in the measure of 0.015.

2) **Family history of atopy**

F/H atopy

There are 85 children with family history of atopy compared to 101 children with out the history of atopy in the family. Comparing the severity and analyzing the data, the p value is 0.42. This is not significant. Association of family history of atopy does not lead to development of more severe form of asthma.

F/H atopy	Total	GI	GII	GIII	GIV	X2	P value
Total	186	98	68	12	8		
Present	85	41	32	8	4		
	45.7%	41.8%	47.1%	66.7%	50.0%	2.825	0.42
Absent	101	57	36	4	4		
	54.3%	58.2%	52.9%	33.3%	50.0%		

There were 85 children who had a family history of atopy. Among the 85 children with family history of atopy, there were 41 with grade I, 32 with grade2 II, 8 with grade 3 III, and 4 had grade IV. Of the 101 children without family history of atopy, there were 57 children with grade I, 37 with grade II, 4 each with grade III and grade IV severity. The p value is 0.42 and is not significant.

HISTORY OF EXPOSURE TO TOBACCO SMOKE

Of the 186 cases, 132 children were exposed to tobacco smoke in the house and 54 children had not been exposed.

Exposure to tobacco smoke	GI	GII	GIII	GIV	X2	P
Total	98	68	12	8		
Present	67 66.3%	48 70.6%	10 83.3%	7 87.5%	4.26	0.64
Absent	31 31.6%	20 29.4%	2 16.7%	1 12.5%		

About 87.5 %of those in grade IV were exposed to tobacco smoke as against to about 66.3% of those in grade I. The p value is 0.641 and is not significant.

ENVIRONMENTAL HISTORY:

Environmental history related to the cases

Index	Environmental factor	Number of cases
1	No separate kitchen	105
2	Firewood/kerosene stove producing smoke	108
3	Mosquito repellant used	97
4	Cockroaches in house	133
5	Mud house	93,
6	No house	6

Environment associated risk factors were present in 133 cases. A separate kitchen was not present in 105 cases. Smoke producing stoves were used in 108 cases. Mosquito repellant was used by 97 cases. There were cockroaches in the houses of 112 cases. Ninety two cases were living in mud houses and 6 cases were without house

1) **Separate kitchen at home**:

There were 81 families who had a separate kitchen at home as against 105 families who did not.

Separate kitchen	Total	GI	GII	GIII	GIV	X2	p
Present	81	39 48.1%	35 43.2%	3 3.7%	4 4.9%		
Absent	105	59 56.2%	33 31.4%	9 8.6%	4 3.8%	4.11	0.25

There were 4 out of the 8 grade IV and 9 out of the 12 grade III cases who did not have a separate kitchen in the house.

Evaluating the absence of separate kitchen with respect to severity, the p value is 0.25 and thus not significant.

2) **Type of stove used**

There were 78 families who use LPG stoves in their house. The others use either firewood or kerosene stoves for cooking.

Type of stove used	Total	GI	GII	GIII	GIV	X2	P
LPG-Smokeless	78	46 59.0%	27 34.6%	1 1.3%	4 5.1%	6.924	0.074
Fire wood and kerosene-smoke	108	52 48.1%	41 38.0%	11 10.2%	4 3.7%		

There were 4 among the 8 grade IV children who were exposed to the smoke producing stoves and among the grade III children there were 11 out of the 12 who were exposed to the smoke producing stoves. There was no statistical significance with the p value of 0.074.

3) **Use of mosquito repellents**

There were 97 families using smoke producing mosquito repellant during sleep.

Use of mosquito repellents	Total	GI	GII	GIII	GIV	X2	Total
Yes	97	50 51.5%	38 39.2%	7 7.2%	2 2.1%	2.977	0.395
No	89	48 53.9%	30 33.7%	5 5.6%	6 6.7%		

There are 7 children with grade III and 2 children with grade IV who were exposed to the smoke producing mosquito repellents. The p value of the above data is 0.395 which is not significant.

4) **Exposure to cockroaches**

There were 133 children who were exposed to the cockroaches in the house.

Exposure to cockroaches	Total	GI	GII	GIII	GIV	X2	p
Yes	133	70 52.6%	51 38.3%	8 6.0%	4 3.0%	2.362	0.501
No	53	28 52.8%	17 32.1%	4 7.5%	4 7.5%		

There were 4 out of the 8 grade IV and 8 out of the 12 grade III children exposed to the cockroaches. The p value is 0.501 which is not significant.

5**) Housing**

There were 87 children living in concrete houses, 93 in mud houses and 6 of the children had no house.

Housing	Total	GI	GII	GIII	GIV	X2	p
Concrete	87	45 51.7%	34 39.1%	6 6.9%	2 2.3%	4.469	0.614
Mud	93	51 54.8%	31 33.3%	5 5.4%	6 6.5%		
No house	6	2 33.3%	3 50.0%	1 16.7%	0 .0%		

There were 6 out of the 8 grade IV and 5 of the 12 grade III children living in the mud houses. The p value of the above data in relation to the housing is 0.614 which is not significant.

CLINICAL FEATURES

Features of allergic rhinitis

Allergic rhinitis	GI	GII	GIII	GIV	Total
Present	12	21	5	3	41
Absent	86	47	7	5	145

During clinical examination of the children, a total of 41 children had features of allergic rhinitis at the time of evaluation. The clinical correlate showed less number of children had allergic rhinitis at the time of presentation than the actual history, which showed a higher number.

Features of atopy

Atopy	GI	GII	GIII	GIV	Total
Present	17	31	7	3	58
Absent	81	37	5	5	128

Similarly on clinical evaluation, 58 children had features of atopy at the time of evaluation. All the children who gave history of atopy presented with the features of atopy at the time of presentation. The above table shows similarity to the table recorded with history alone.

BODY MASS INDEX

Of the 186 children, 100 were found to be overweight and 6 were obese.

BMI percentile	Total	GI	GII	GIII	GIV	X2	p
< 84th	80	32 40.0%	40 50.0%	4 5.0%	4 5.0%	65.1	<0.001
85th-94th	100	66 66.0%	28 28.0%	4 4.0%	2 2.0%		
> 95th	6	0 .0%	0 .0%	4 66.7%	2 33.3%		

In the obese category, there were none in grade I and II but 4 in grade III and 2 in grade IV. The p value is less than 0.001 which is significant.

Absolute eosinophil count

The absolute eosinophil count was found to be abnormal in 17 of the studied cases.

AEC	Total	GI	GII	GIII	GIV	X2	p
Normal	169	93 55.0%	64 37.9%	8 4.7%	4 2.4%	27.334	<0.001
Abnormal	17	5 29.4%	4 23.5%	4 23.5%	4 23.5%		

Of the 17 children with an abnormal AEC, there were 4 each in grade III and grade IV. This shows a statistical significance with a p value of less than 0.001.

Peak Flowmetry

PEF	GI	GII	GIII	GIV	Total
Below 60 %	0	0	0	6	6
60-80 %	0	0	10	0	10
Above 80 %	34	31	0	0	65
Total	34	31	10	6	81

We could perform the peak flow metric analysis in only 81 cases. The results are shown as above. When done has been useful to corroborate with the clinical finding and for grading the cases.

DISCUSSION AND ANALYSIS

Discussion of the observed data

There is a wide variation in the data analyzed. There are various parameters which show a consistent relation with severity. Most of the analyzed data show an association with asthma but do not statistically support the theory that presence of such risk factors leads to higher severity in all cases.

Data showing significant statistical association with severity of asthma

The overall analysis reveals significant proportion of children having a genetic background develop severe grade of asthma. Family history of asthma leads to higher grade of asthma in the affected children. In continuation of the above genetic traits history of associated atopy, GERD, allergic rhinitis predisposes the affected children to develop a more severe grade of asthma as significant association are found in children having history of above disorders.

A history of wheeze in infancy shows that there are a significant number of such children progressing to develop more severe grades of asthma. Such affected children have a significantly higher positive history of admission to the hospital for acute exacerbation of asthma.

Risk parameter	Number of cases Grade III & IV	Number of cases in grade I&II	P value
Family history of asthma	17/20	81/166	<0.015
History of atopy	10/20	48/166	<0.001
History of allergic rhinitis	11/20	43/166	<0.001
History of GERD	12/20	18/166	<0.001
Wheeze in infancy	12/20	56/166	0.015
Birth weight <2 kgs	15/20	49/166	<0.001
Body mass index > 95^{th} percentile	6	0	<0.001
Hospitalization	19/20	50/166	<0.001
Absolute eosinophil count	8/20	9/166	<0.001

Increasing body mass index also shows a significant trend

towards the development of severe asthma, a higher BMI predisposing to more severe grade of asthma. In gestational history, only birth weight has a significant statistical association. A low birth weight below 2kgs leads to more severe grade of asthma. Absolute eosinophil count has shown to be raised in severe cases and this has statistical significance.

Data showing higher number of cases in the severe grade but without statistical significance

More number of male children are having a history of severe grade of asthma but there is no statistical significance. None of the environmental factors studied including smoking show any statistical significance to predisposing to a higher grade. Exposure of children to tobacco smoke in the household show higher number children with more severe asthma but again this has no statistical correlation. The other analyzed forms of smoke like mosquito repellents and smoke from the kitchen also do not show higher degree of asthma severity. Nearly all the children presenting in our centre are of lower socioeconomic conditions group hence a statistical correlation cannot be made in the above group.

Risk parameter	Number of cases Grade III & IV	Number of cases in grade I&II	P value
Sex	M-13/20	M-89/166	0.67
	F-7/20	77/166	
Duration of gestation	Term-16/20	Term-148/166	0.097
	Preterm- 4/20	Preterm-18/166	
Nature of delivery	L.N-15/20	L.N-141/166	0.189
	LSCS- 5/20	LSCS-15/166	
Allergens	14/20	98/166	0.75
Infections	9/20	85/166	0.864
Exercise	4/20	47/166	0.236
Seasonal changes	9/20	88/166	0.395
Citrus fruits	4/20	41/166	0.871
Sweets	7/20	64/166	0.677
Cold items	11/20	106/166	0.395
No separate kitchen	13/20	92/166	0.25
Smoke producing stoves	15/20	93/166	0.074

Risk parameter	Number of cases Grade III & IV	Number of cases in grade I&II	P value
Mosquito repellants smoke	9/20	88/166	0.395
Cockroaches	12/20	121/166	0.501
Non concrete Housing	12/20	87/166	0.614
Exposure to tobacco smoke	17/20	115/166	0.25
F/H atopy	12/20	73/166	0.64
Exclusive breast feeds < 6 months	11/20	120/166	0.27
EBF > 6 months	7/20	81/166	0.23

The distribution of asthma

Ambiguities in definition of asthma pose considerable difficulties in t comparing different studies. Males have a higher incidence than the females in the childhood, a ratio that reverses in the adolescence. This general pattern is reflected in the history of asthma in a large number of the industrialized nations. Among the asthmatic children, boys have more airway responsiveness than the girls.

Breast feeding

Vinod et al [23] showed that exclusive breast feeding for more than 4 months helped in preventing the development of asthma. The studies also show a protective value of breast feeding against the development of asthma. Studies of relationship[24] between asthma severity and breast feeding have not been mentioned. Our study doesn't show significant correlation between the types of feeds or the duration of breast feeding and asthma severity.

Socio economic status

A Study by Duran Tauleria[5] and Salmond[6] et al showed that persistent wheeze is more common in the areas of low socio economic status. A parallel study by Dawson et al also showed that there is evidence of severe disease in children of low socio economic background. Another study from Aberdeen published 35 years ago shows that among children with asthma, severe asthma is most prevalent in the lower social class.

Perinatal factors

A study by Darlow[(20)] et al suggested that asthma risk was associated with low birth weight among all the perinatal factors studied.

Our study also correlates with the above study.

Infections

It has been noted that Mycobacterium can exert a Th-1 priming effect in children. Different studies from Japan have reported a significant association between a positive tuberculin response and less atopy. The authors have suggested that the early life exposure to Mycobacterium tuberculosis infection might result in less atopic diseases. In contrast Alm et al compared children with atopic parents who received BCG vaccination at less than 6 months of age and matched controls without BCG vaccination and found no difference in atopy between the two groups.

Respiratory syncytial viral bronchiolitis is an example of an early infection that promotes recurrent wheeze and atopic sensitization. However in the prospective Tucson Cohort study, the children with non wheezing lower respiratory infections during the first three years of life had reduced skin test reactivity and a lower Ig-E at the age of 6 years. Our study also does not show any significant correlation between recurrent respiratory infections and severity of asthma.

Wheeze in infancy

A study by Vinod H [23] et al done at AIIMS shows that on multivariate analysis, the only factor associated with severe asthma was onset of wheeze before 4 years of age. Our study shows that onset of wheeze in infancy is associated with severe asthma.

Environmental allergens

The above study by Vinod [23] et al also showed that the severity of asthma was not influenced by air pollution, kitchen or smoking. Similarly our study does not show any statistically significant effect of kitchen, environmental allergens or tobacco smoking on the severity of asthma in the study group.

Other similar studies

Pamela Sangelote Higgins[19] et al reported a cross sectional study involving 19,076 children living in 146 non urban communities.

On univariate analysis –

A higher asthma frequency was associated with a positive family history of asthma, low Socio economic status, non-Caucasian ethnicity, and exposure to tobacco smoke, dust, solvents, cockroach, and rodents.

On multiple logistic regression analysis, a higher asthma severity was associated with

1) Positive family history of asthma
2) Non-Caucasian ethnicity
3) Presentation age ≤ 4 years and
4) Exposure to dust

A higher asthma severity was not associated with

1) Socioeconomic status
2) Gender
3) Exposure to tobacco smoke
4) Cockroaches
5) Rodents
6) Pets
7) Solvents
8) Gas stove

Risk parameters	**Our study (p)**	**Pamela et al (p)**
Family history	**Significant <0.015**	**Significant**
Age of onset	**Significant < 1year**	**Significant < 4years**
Housing and dust	**Not significant 0.501**	**Significant**

Risk parameters	Our study (p)	Pamela et al (p)
SES	Not significant	Not significant (0.72)
Gender	Not significant	Not significant (0.92)
Tobacco smoke	Not significant (0.64)	Not significant (0.36)
Cockroaches	Not significant (0.501)	Not significant (0.72)
Gas stoves	Not significant (0.074)	Not significant (0.45)
Birth weight	Significant (<0.001)	NA
BMI	Significant (<0.001)	NA
History of atopy	Significant (<0.001)	NA
History of allergic rhinitis	Significant (<0.001)	NA
History of GERD	Significant (<0.001)	NA

Comparing the above study with our study shows a significant contribution of the family history of asthma and age of onset of wheeze in leading to a situation of increased severity of asthma. The other parameters also are comparable to our study where there is no

significance except that of the exposure to dust and the type of housing. The above parameter could be explained in the fact that all our cases had nearly the same socio economic background. Hence the housing and the dust exposure would have been similar in all the subjects in our study.

CONCLUSION

Asthma is a disease associated with various factors. These factors could be genetic or environmental or both. The environmental insult has increased the prevalence of the disease with more susceptible individuals presenting with asthmatic manifestations. In the above study, we have seen that the environmental factors are associated with all grades of disease. The conditions producing a more severe grade of asthma according to our study are family history of asthma, obesity, associated allergic conditions like atopy and allergic rhinitis, GERD, low birth weight and age of onset of less than 1 year of age. The above findings show that intrinsic factors are associated with severity and extrinsic factors are associated with disease manifestations in life.

LIMITATIONS

The study sample is a representation of those children who seek health care.

The sample size is only 186 with the limited number of children attending the asthma clinic.

There is no equal representation of the all the grades of severity.

There is no representation from the higher socioeconomic group.

All the children could not do the peak flow metry.

Suggestions

A larger community based study involving the higher socio economic strata also would be more useful to decide about the role of environmental factors on the severity of asthma if any.

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PROFORMA

5) Name CODE NO.
6) Age
7) Sex
8) Father's name
9) Mother's name
10) Address
11) Complaints

HISTORY

1)Breathlessness	2)Recurrent cough	3)Nocturnal cough	4)Chest tightness	5)others

9) PRENATAL HISTORY

10) Parental smoking

1)Mother	2)Father	3)NIL

11) Maternal weight gain

1)<8 KG	2)>8KG

12) NATAL HISTORY

13) Period of Gestation

1)Preterm	2)Term

7) Mode of delivery

1)Labour natural	2)LSCS

8) Birth weight

1)<2KG	2)2-2.5KG	3)>2.5KG

14) POSTNATAL HISTORY

9) Feeding habits

1)Exclusive breast feeding	2)Artificial feeding	3)Both

10) Duration of exclusive breast feeding

a)<6 months	b)> 6 months

11) History of recurrent infections

1)Respiratory	2)Others	3)NIL

12) Chest congestion/Wheeze in infancy

1)Yes	2)No

13) History suggestive of Atopy

1)Yes	2)No

14) History suggestive of allergic rhinitis

1)Yes	2)No

15) History suggestive of GERD

1)Yes	2)No

15) WHEEZE HISTORY

33) Age at onset

<1 year	1-3 years	>3 years

34) Frequency of attacks at onset

1)Mild intermittent	2) Mild persistent	3)Moderate persistent	4)Severe persistent

35) Trigger induced exacerbation

1)Allergens	2)Exercise	3)Infection	4)Seasonal	5)Cold items	6)sweets	7) citrus fruits

36) Hospitalization for exacerbation

1)Yes	2)No

1) FAMILY HISTORY

Socio economic status

1)Low	2)Medium	3)High

H/O asthma

1)Mother	2)Father	3)Siblings	4)Nil

H/O atopy

1)Mother	2)Father	3)Siblings	4)Nil

ENVIRONMENTAL HISTORY

Tobacco smoking

1)Mother	2)Father	3)Others at home	4)Neighbors	5)Nil

Separate kitchen at home

1)Yes	2)No

Type of stove used

1)Smokeless	2)Producing smoke

Use of mosquito repellents

1)Yes	2)No

Exposure to cockroaches

1)Yes	2)No

Housing

1)Concrete	2)Mud house	3)No house

O/E

2) BMI

1)<84th percentile	2)85-95th P	3)>95th P

3) F/o Allergic Rhinitis

1)Yes	2)No

4) F/o Atopy

1)Skin allergy	2)Allergic shiners	3)Allergic salute	4)No

5) Grading of Asthma

1)Intermittent	2)Mild persistent	3)Moderate persistent	4)Severe persistent

6) RS Examination

1)Normal	2)B/L Wheeze

7) INVESTIGATIONS

7) Complete blood count- 1)normal, 2)abnormal

s.no	Investigation	Value
1	Hb%	
2	Total count	
3	Differential count	
4	E.S.R	
5	Others	

8) Urine analysis

1) normal- 2) abnormal

s.no	Investigation	Value
1	Albumin	
2	Sugar	
3	Deposits	

9) Stool examination

1) normal- 2) abnormal

s.no	Investigation	Value
1	Ova	
2	Cyst	
3	Parasites	

10) Absolute eosinophil count ---

1) normal- 2) abnormal

11) Mantoux---1) non reactive, 2) reactive

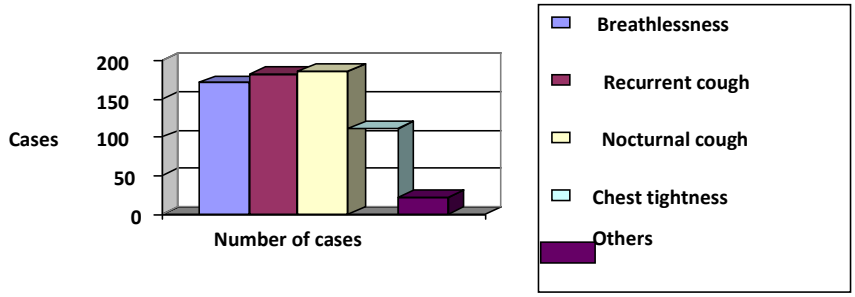
12) X-Ray chest---1) normal, 2)abnormal

13) Peak flowmetry

Abbreviations for master sheet

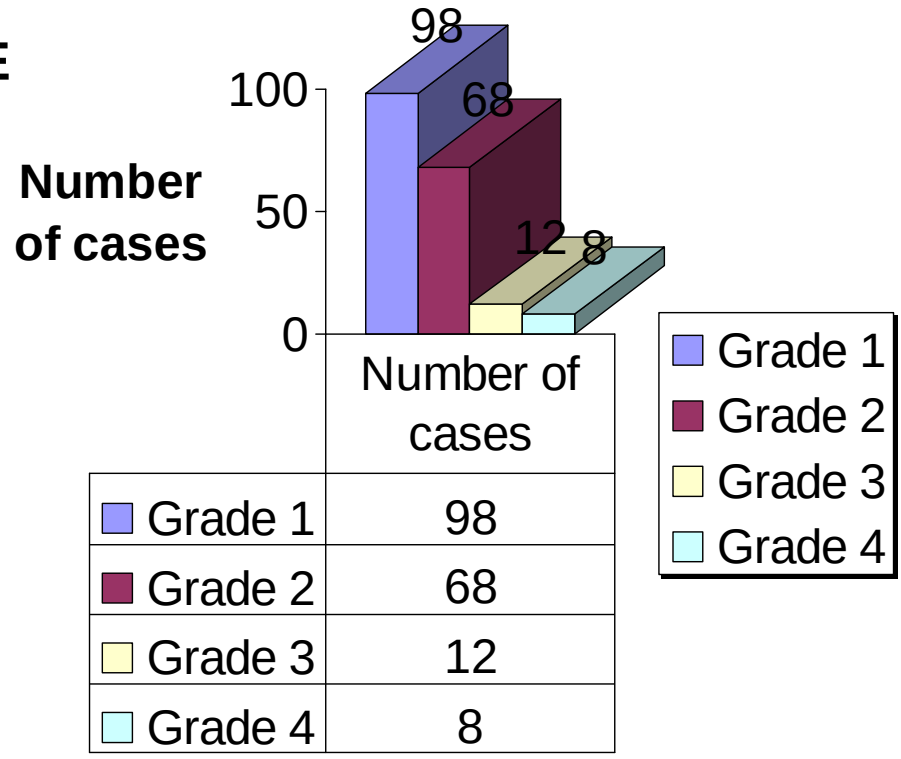
a/s- age/sex
g- Grade
s- Tobacco exposure as smoke
T- Duration of gestation—p-preterm, t-term
D- Type of delivery- N-labor natural, L- lower section caesarean section
W- Birth weight- 1)<2kgs, 2)2-2.5kgs,3)>2.5kgs
At- History of atopy- a) absent, p) present
AR- History of allergic rhinitis- a) absent, p) present
GE- history of GERD a) absent, p) present
As- family history of asthma 1) mother 2) father 3) siblings 4) nil
F- feeding history 1a) exclusive breast feeds less than 6 months, 1b) exclusive breast feeds more than 6 months, 2) artificial breast feeds, 3) bothe breast abd artificial feeds.
Fa- family history of atopy-- a) absent, p) present
BMI- body mass index- 1) <84th percentile, 2) 84-95th 0ercentile, 3) > 95th percentile
Car- clinical features of allergic rhinitis a) absent, p) present
Cat- clinical features of atopy- a) absent, p) present
Com- complaints 1)Breathlessness 2)Recurrent cough 3)Nocturnal cough 4)Chest tightness 5)others
RI- recurrent infection 1)Respiratory 2)Others 3)NIL
W- wheeze in infancy 1) present 2) absent
Tr- exact triggering factor 1) allergens 2)exercise, 3) infections, 4)seasonal, 5) cold items, 6) sweets, 7) citrus fruits.
H- history of hospitalization for exacerbation 1) present, 2) absent.
SES – socio economic status- 1)low, 2) medium, 3) high.
K- Separate kitchen in house1) present, 2) absent
Sm- type of stove in house 1) smokeless, 2) smoke producing
M.R- use of mosquito repellents producing smoke 1) yes, 2) no
C- cockroaches in the house- 1) yes, 2) no
Ho- type of housing- 1) concrete, 2) mud, 3) no house.
Nu- Nutritional status 1) normal,2) grade I PEM, 3) grade II PEM, 4) grade III PEM, 5) grade IV PEM.
CBC- complete blood count- 1) normal- 2) abnormal
UE- urine examination- 1) normal- 2) abnormal
SE- stool examination 1) normal- 2) abnormal
AEC- absolute eosinophil count 1) normal- 2) abnormal
Mx mantoux 1) reactive, 2) non reactive-
CXR- chest x-ray- 1) normal- 2) abnormal
PEF- peak expiratory flow rate.

SYMPTOMS



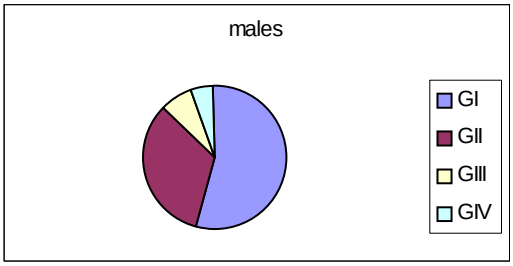
,

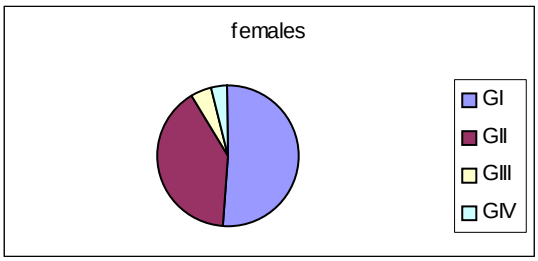
GRADE

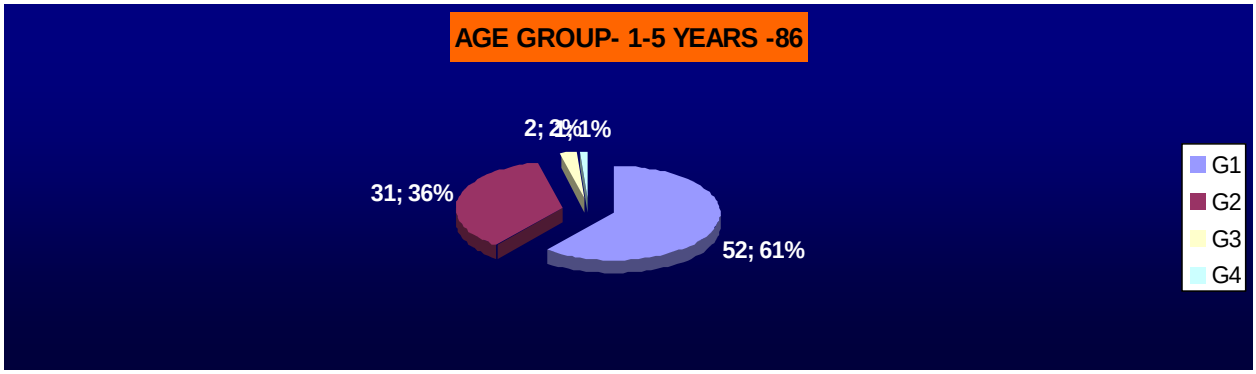


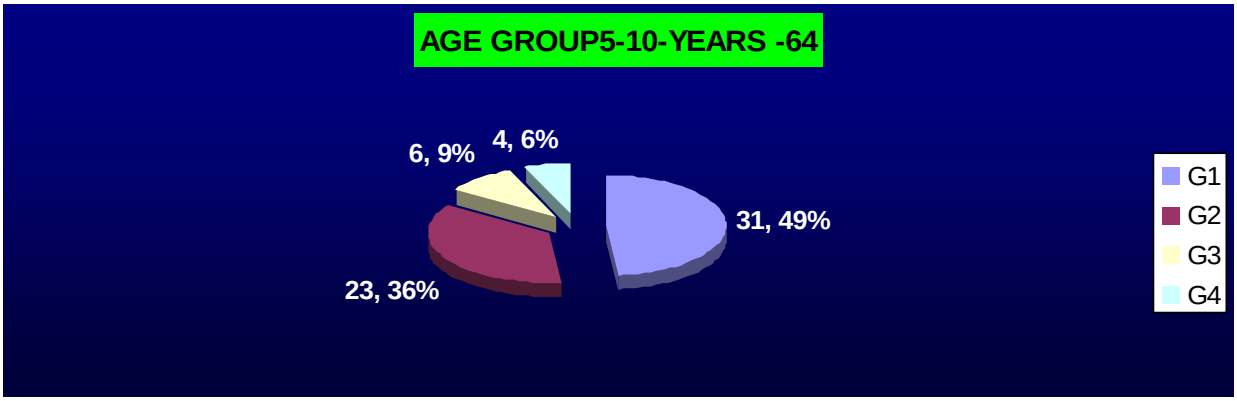
	Number of cases
Grade 1	98
Grade 2	68
Grade 3	12
Grade 4	8

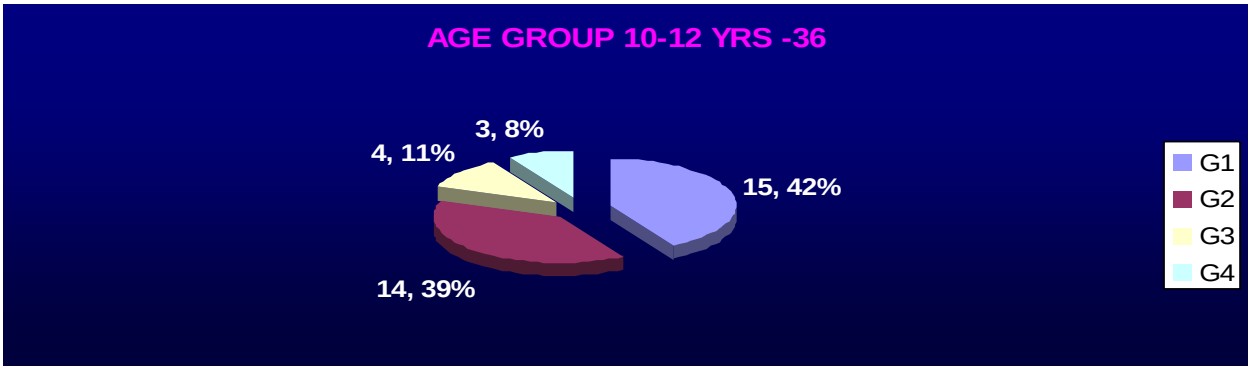
Severity- sex and age distribution



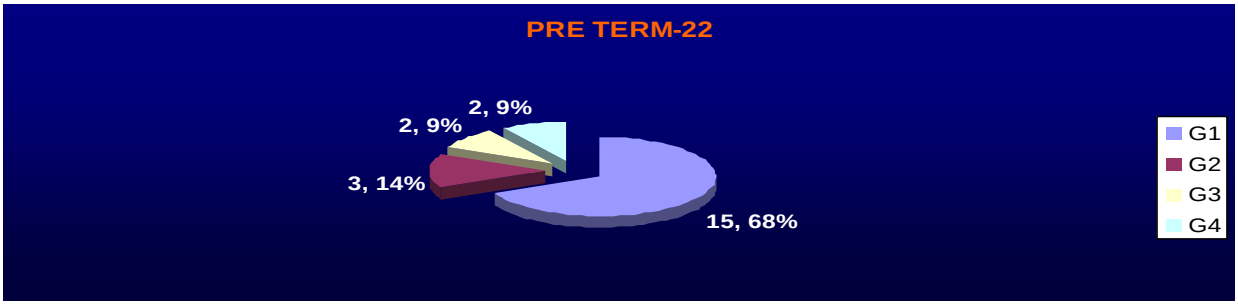


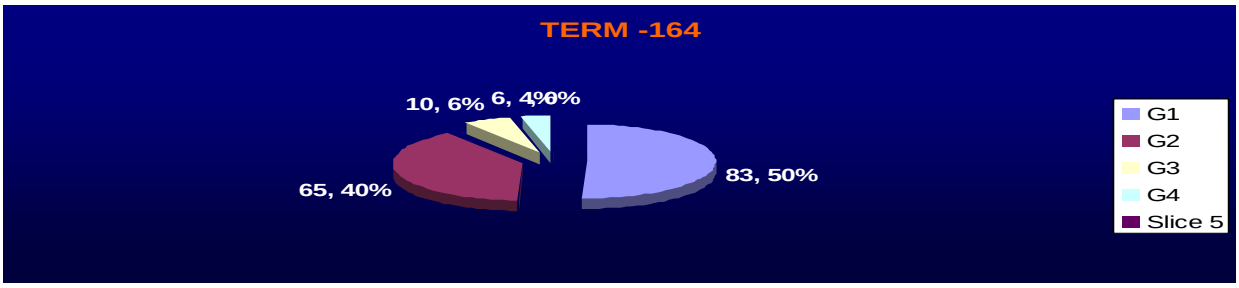




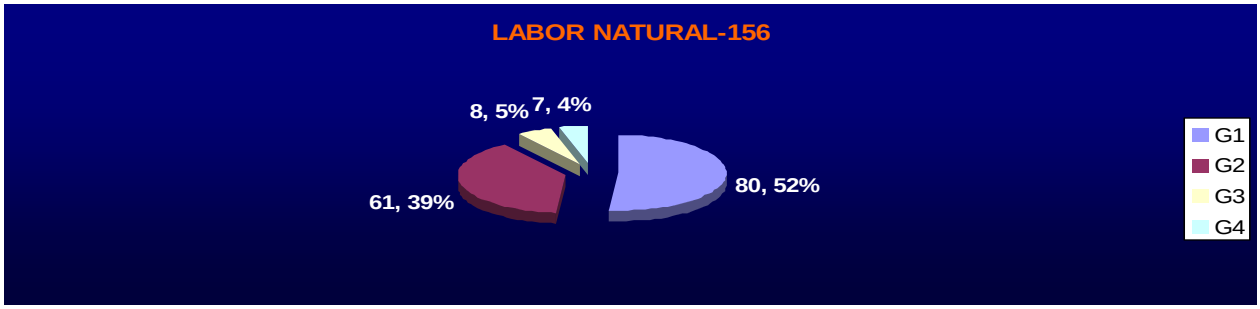


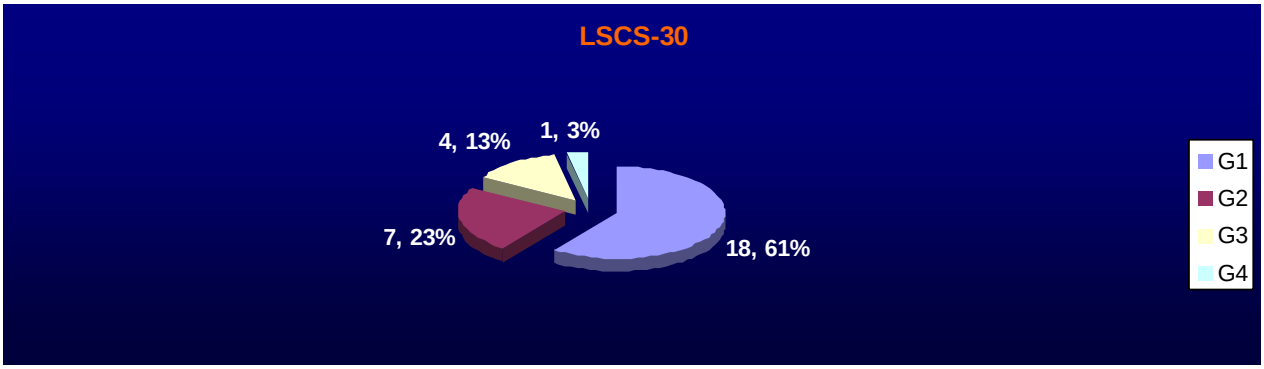
Period of Gestation



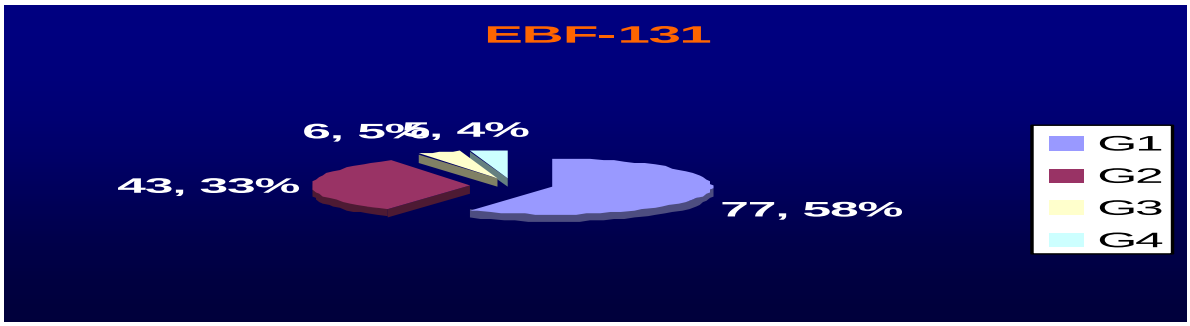


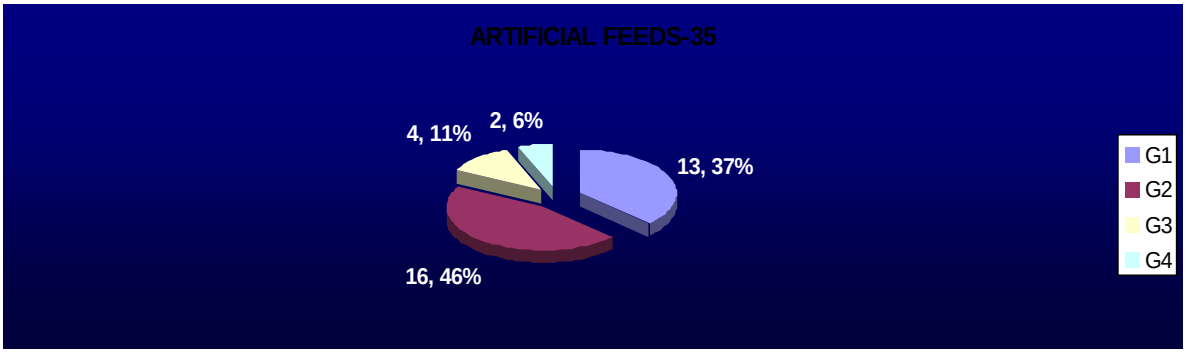
Nature of delivery

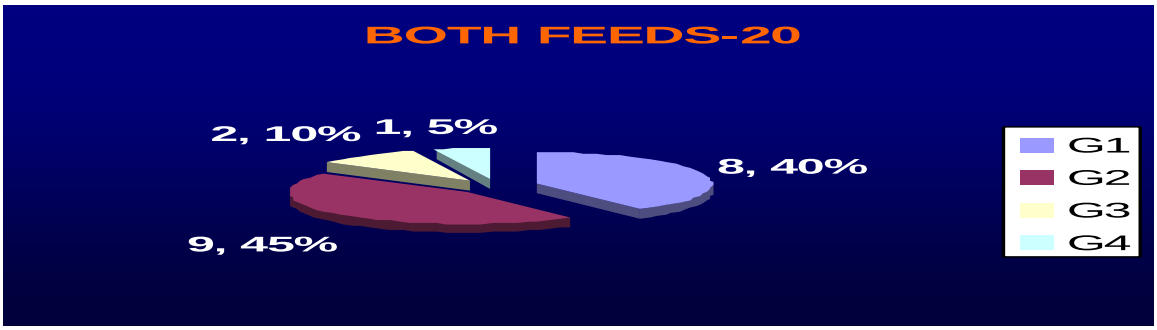


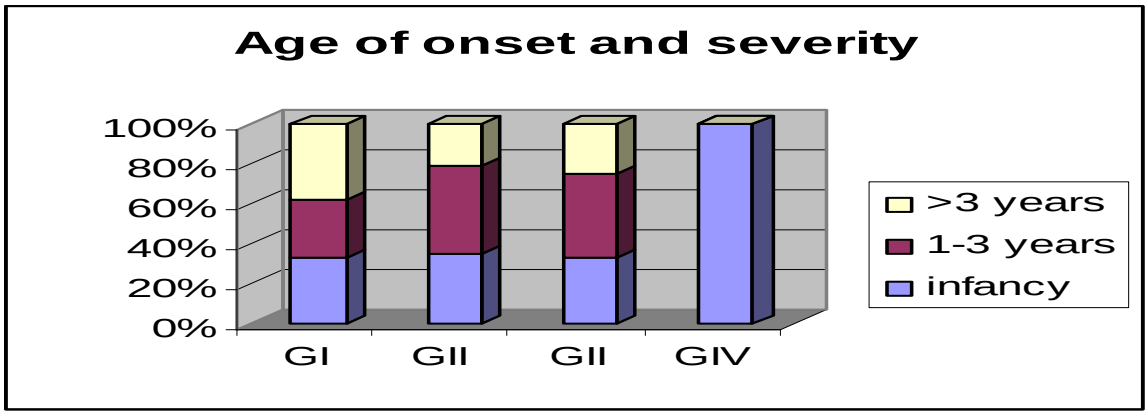


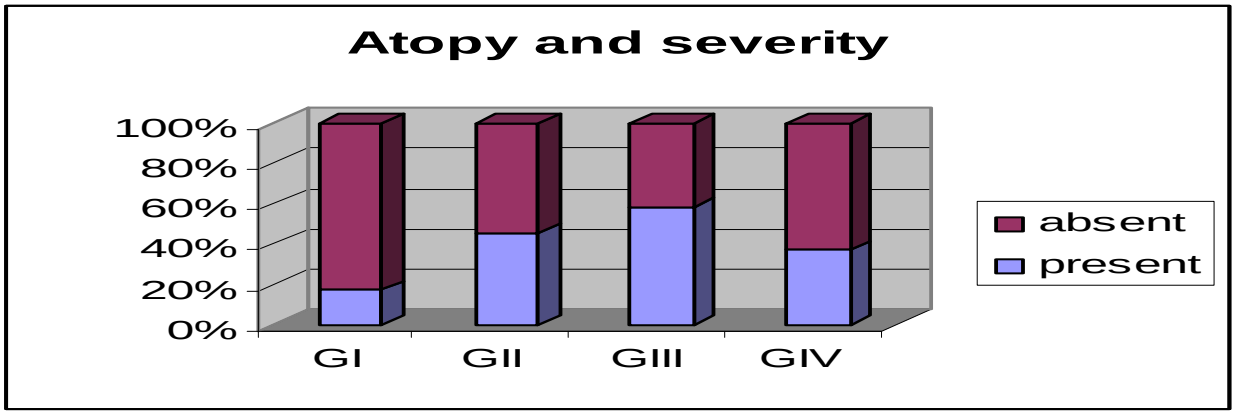
Feeding habits

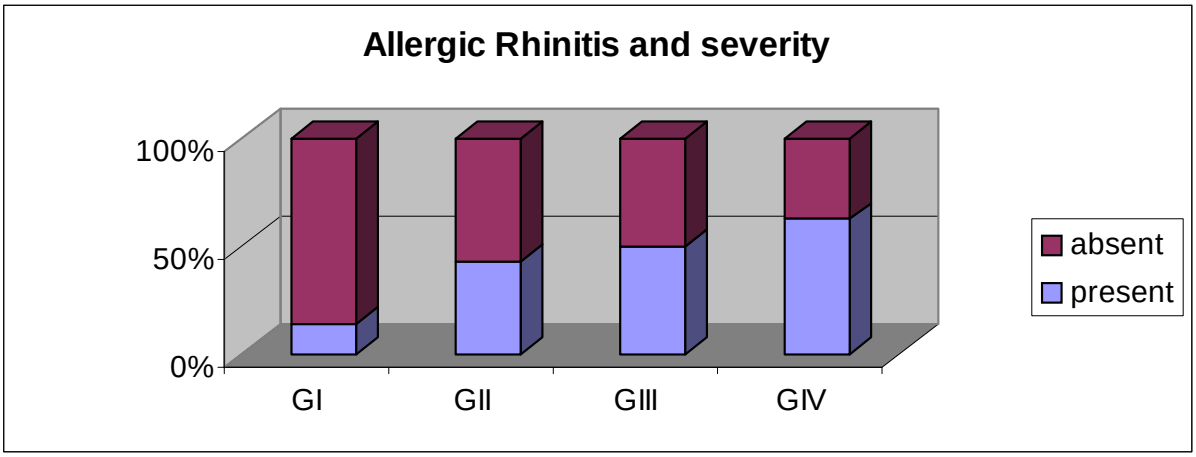


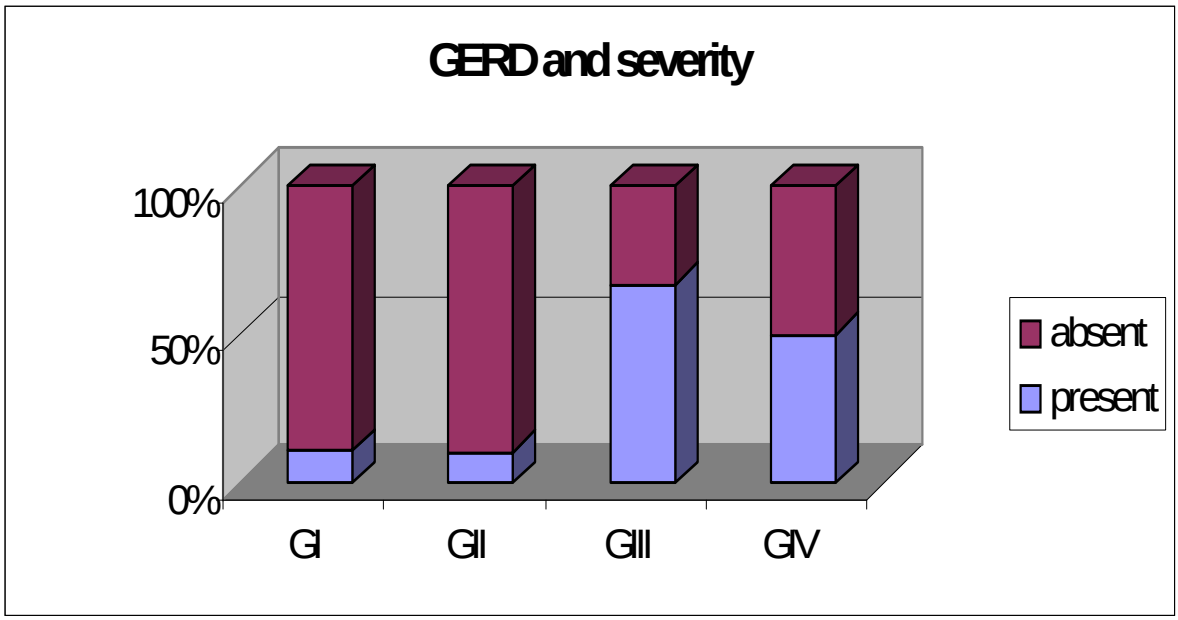


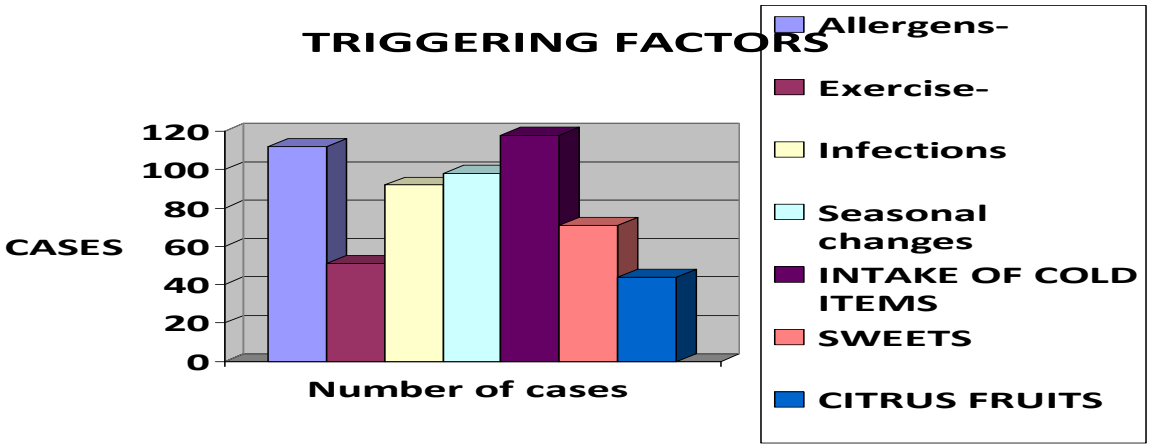


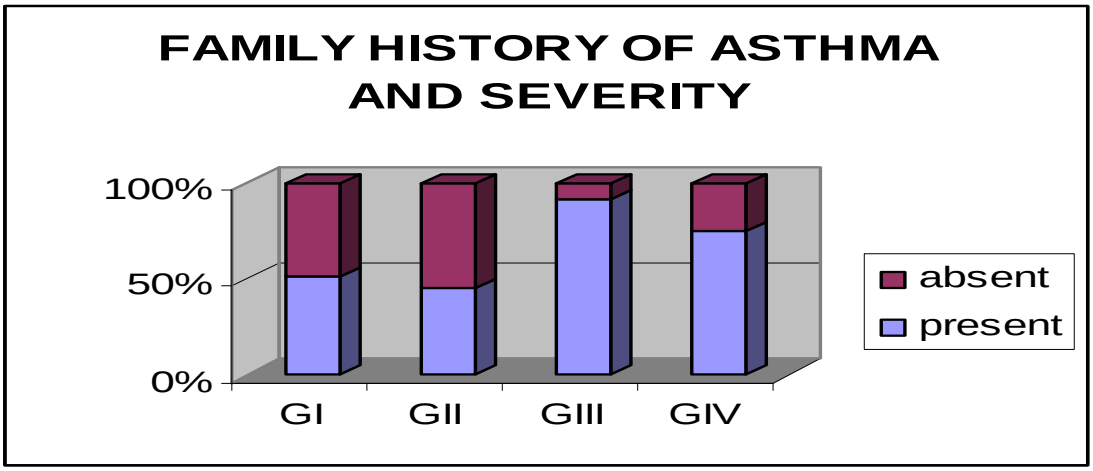


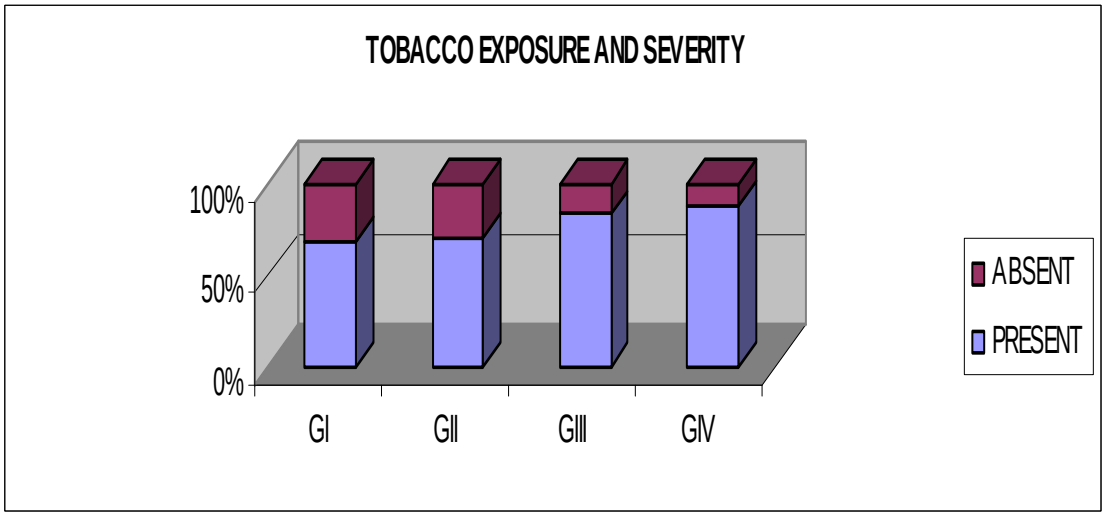

Atopy and severity
100%
80%
60%
40%
20%
0%
GI
GII
GIII
GIV
absent
present


Allergic Rhinitis and severity
100%
50%
0%
GI
GII
GIII
GIV
absent
present

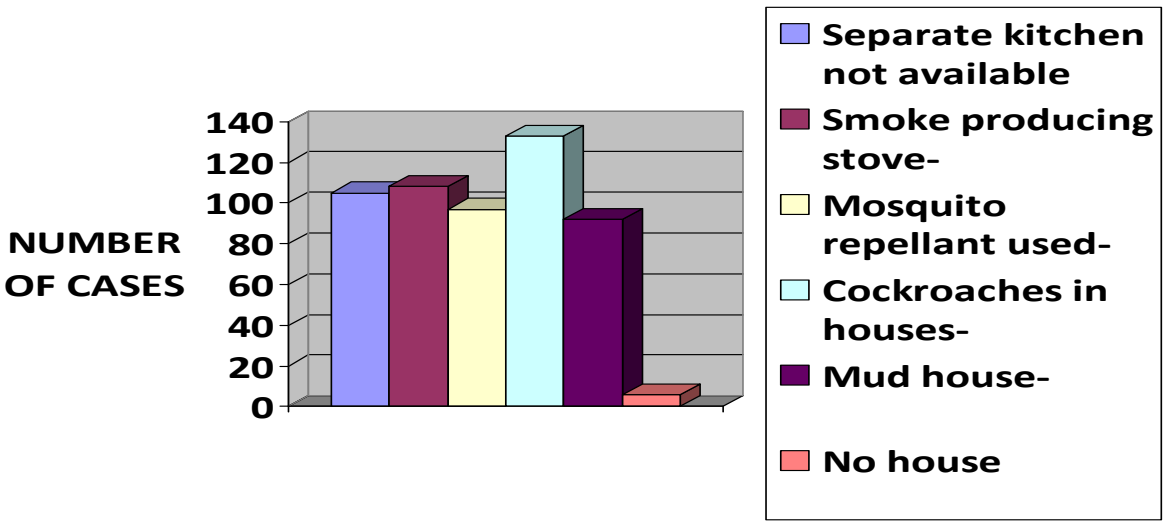

GERD and severity
100%
50%
0%
GI
GII
GIII
GIV
absent
present

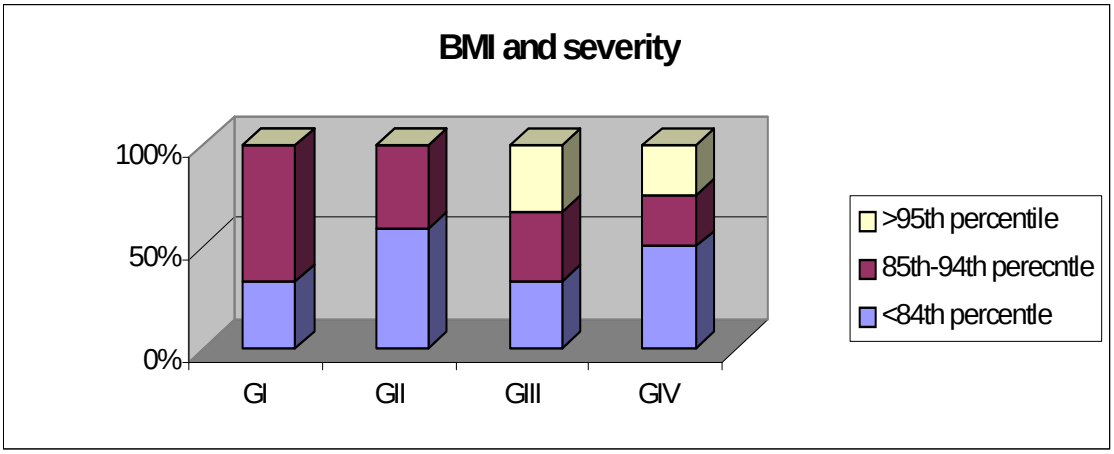

TRIGGERING FACTORS
CASES
120
100
80
60
40
20
0
Number of cases
Allergens-
Exercise-
Infections
Seasonal changes
INTAKE OF COLD ITEMS
SWEETS
CITRUS FRUITS

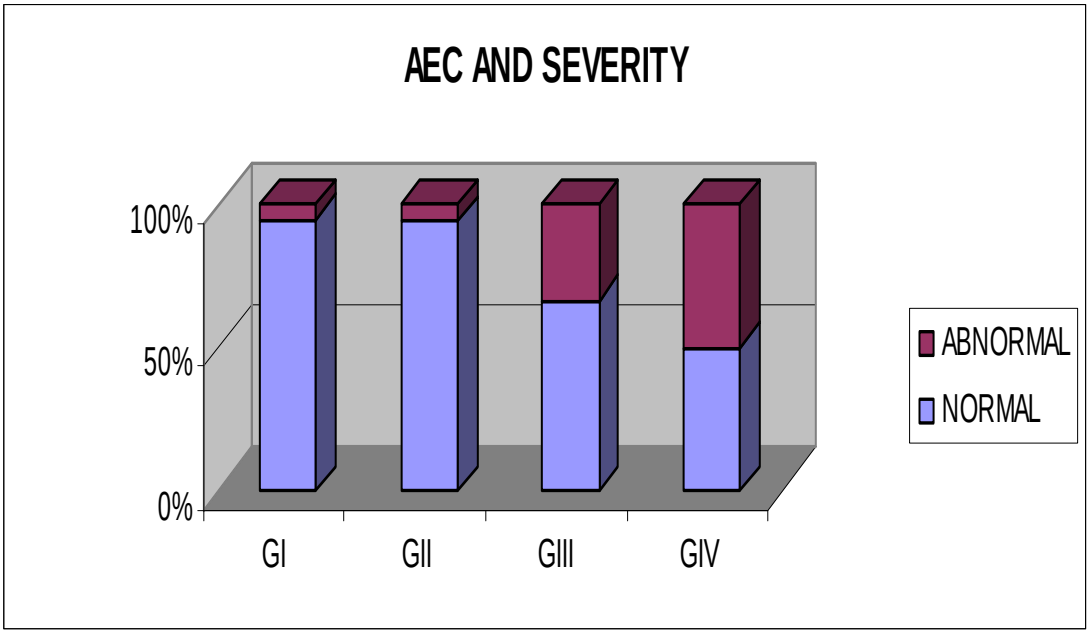

FAMILY HISTORY OF ASTHMA AND SEVERITY
100%
50%
0%
GI
GII
GIII
GIV
absent
present


TOBACCO EXPOSURE AND SEVERITY
100%
50%
0%
GI
GII
GIII
GIV
ABSENT
PRESENT

ENVIRONMENT







pt	a/s	com	RI	W	Tr	H	SES	K	Sm	M.R	C	Ho	Nu	g	s	T	D
1	6/f	1,2,3,4	1	2	1,4,6,7	2	2	2	2	1	1	1	2	1	3	p	N
2	7/f	1,2,3,4	1	1	1,2,3,4	2	1	1	2	1	1	2	2	2	2	p	N
3	8/f	1,2,3,4,5	1	1	1,3,6	1	1	2	2	2	1	3	2	3	2	t	N
4	14/f	1,2,3,4,5	2	1	1,3,4,5,7	1	1	1	2	1	1	1	2	2	2	t	L
5	9/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	2	2	t	L
6	8/m	2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	3	2	t	N
7	4/m	1,2,3,4,5	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	3	t	L
8	9/m	1,2,3,4	1	1	1,2,3	2	1	2	2	1	1	1	1	2	2	t	L
9	8/m	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	2	2	t	L
10	4/f	1,2,3,4	1	1	1,7	2	1	2	2	1	1	1	2	2	2	p	N
11	5/f	1,2,3	2	2	1,3,5	2	1	2	1	2	2	2	2	1	3	t	L
12	4/f	1,2,3,4	1	2	2,4,5,6	1	2	1	2	1	1	1	2	2	2	t	N
13	4/m	1,2,3	1	1	4,7	2	1	2	2	1	1	2	3	1	2	t	N
14	3/f	1,2,3,4	1	1	1,3,5	2	1	1	2	2	2	1	2	1	3	t	N
15	3/m	1,2,3,4	1	2	1,2,4,5	2	1	2	2	1	1	2	2	2	2	t	N
16	12/m	2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	3	p	N
17	10/m	1,2,3,4	2	2	1,3,4,6	2	1	2	2	2	1	2	2	1	3	t	N
18	11/f	1,2,3,4	1	2	1,3,5	2	1	1	1	1	1	1	1	2	2	t	L
19	8/m	1,2,3,4	1	2	4,5,6	1	1	2	2	1	1	3	3	2	3	t	N
20	4/m	1,2,3,4	2	2	1,3,5	2	1	1	1	2	1	1	2	2	2	t	N
21	5/m	2,3	2	2	5,6	1	1	2	2	1	2	2	2	3	2	p	N
22	7/f	1,2,3,4	2	1	1,4,5	1	2	1	1	2	2	1	2	2	3	t	N
23	3/m	1,2,3,4	2	2	4,5,6	1	1	2	2	1	1	2	2	2	3	t	N
24	6/f	1,2,3	2	2	5,7	1	1	1	2	2	1	1	2	1	2	t	N
25	10/f	1,2,3	3	2	1,2,3	2	1	2	1	2	1	2	2	1	2	p	N
26	4/m	1,2,3,4	3	1	1,6	1	1	1	1	2	2	2	2	1	3	t	N
27	5/f	1,2,3	1	2	3,4,5	1	1	2	1	1	2	1	2	1	3	p	N
28	10/f	1,2,3,4	2	2	1,3,4	1	1	2	2	2	2	2	3	3	3	t	N
29	9/f	1,2,3,4	1	2	1,4,5	2	1	2	2	2	1	1	2	2	2	t	L
30	4/f	1,2,3	1	2	1,4,6,7	2	1	2	2	1	1	1	2	1	3	t	N
31	5/f	1,2,3	1	1	1,2,3,4	2	1	1	2	1	1	2	2	1	2	t	N
32	4/f	2,3,4,5	1	1	1,3,6	1	1	2	2	2	1	2	2	1	3	t	N
33	4/m	1,2,3,4,5	2	2	1,3,4,5,7	1	1	1	2	1	1	1	1	1	3	t	N
34	3/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	3	2	1	3	t	L
35	3/m	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	1	3	t	N
36	6/f	1,2,3,4	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	3	t	N
37	7/f	1,2,3,4,5	1	1	1,2,3	2	1	2	2	1	1	1	1	1	2	t	N
38	8/f	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	1	3	t	N
39	14/m	1,2,3,4	1	2	1,4,5,7	2	2	2	2	1	1	1	2	3	2	t	N
40	9/f	1,2,3,4	2	2	1,3,5	2	1	2	1	2	2	2	2	1	3	t	N
41	8/m	1,2,3,4	1	2	2,4,5,6	1	1	1	2	1	1	1	2	1	3	t	N
42	4/m	1,2,3	1	2	4,7	2	1	2	2	1	1	2	3	1	3	t	N
43	9/m	1,2,3	1	1	1,3,5	2	2	1	2	2	2	1	2	1	2	t	N
44	8/m	1,2,3,4	1	2	1,2,4,5	1	1	2	2	1	1	2	2	3	2	t	N
45	4/f	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	2	t	N
46	5/m	1,2,3	2	2	1,3,4,6	2	1	2	2	2	1	2	2	1	3	p	N
47	4/m	1,2,3	1	2	1,3,5	2	1	1	1	1	1	1	1	1	2	t	N
48	4/m	1,2,3,4	1	1	4,5,6	2	1	2	2	1	1	2	3	1	3	t	N
49	3/f	1,2,3	2	2	1,3,5	2	2	1	1	2	1	1	2	1	3	t	N
50	3/m	1,2,3	2	2	5,6	1	1	2	2	1	2	2	2	1	3	p	N
51	12/m	1,2,3,4	2	1	1,4,5	1	1	1	1	2	2	1	2	3	2	t	N

52	10/m	2,3	2	1	4,5,6	1	1	2	2	1	1	2	2	1	2	t	N
53	11/f	1,2,3,4	2	2	5,7	1	1	1	2	2	1	1	2	2	2	t	L
54	8/m	1,2,3,4	3	2	1,2,3	2	1	2	1	2	1	2	2	1	2	t	N
55	4/m	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	1	2	p	N
56	5/m	1,2,3,4	1	2	3,4,5	1	1	2	1	1	2	1	2	2	2	p	N
57	7/f	1,2,3	2	2	1,3,4	1	1	2	2	2	2	2	3	1	2	t	L
58	3/m	1,3	1	2	1,4,5	2	2	2	2	2	1	1	2	1	2	t	L
59	6/f	1,2,3,4	1	2	1,4,6,7	2	1	2	2	1	1	1	2	1	2	t	N
60	10/f	1,2,3	1	2	1,2,3,4	2	1	1	2	1	1	2	2	2	2	t	N
61	4/m	1,2,3,4	1	2	1,3,6	1	1	2	2	2	1	2	2	1	2	t	N
62	5/f	1,2,3,4,5	2	2	1,3,4,5,7	1	2	1	2	1	1	1	1	1	3	t	L
63	10/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	2	3	t	N
64	9/f	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	2	3	t	N
65	4/m	1,2,3,4	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	2	t	N
66	5/f	1,2,3,4,5	1	2	1,2,3	2	1	2	2	1	1	1	1	1	2	t	N
67	4/f	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	2	3	t	N
68	4/m	2,3	1	2	1,4,5,7	2	2	2	2	1	1	1	2	2	2	t	N
69	3/f	1,2,3,4	2	2	1,3,5	2	1	2	1	2	2	2	2	1	2	t	N
70	3/m	1,2,3,4	1	2	2,4,5,6	1	1	1	2	1	1	1	2	2	2	t	N
71	6/f	1,2,3	1	1	4,7	2	1	2	2	1	1	2	3	1	2	t	N
72	7/f	1,2,3,4	1	1	1,3,5	2	1	1	2	2	2	1	2	1	2	t	N
73	8/m	1,2,3	1	2	1,2,4,5	2	1	2	2	1	1	2	2	1	2	t	N
74	14/f	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	2	t	N
75	9/f	1,2,3,4	2	2	1,3,4,6	2	1	2	2	2	1	3	2	1	2	t	L
76	8/m	1,2,3	1	2	1,3,5	2	1	1	1	1	1	1	1	1	3	t	N
77	4/m	1,2,3	1	2	4,5,6	1	1	2	2	1	1	2	3	1	2	t	L
78	9/m	1,2,3,4	2	2	1,3,5	2	1	1	1	2	1	1	2	1	3	t	N
79	8/m	1,2,3	2	2	5,6	1	1	2	2	1	2	2	2	2	2	t	N
80	4/f	2,3,4	2	1	1,4,5	1	1	1	1	2	2	1	2	1	2	t	N
81	5/f	1,2,3	2	2	4,5,6	1	1	2	2	1	1	2	2	1	3	t	L
82	4/f	1,2,3,4	2	2	5,7	1	1	1	2	2	1	1	2	1	2	t	N
83	4/m	1,2,3,4	1	2	1,2,3	2	1	2	1	2	1	2	2	1	2	t	N
84	3/f	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	1	3	t	L
85	3/m	1,2,3	1	2	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N
86	12/m	1,2,3	2	3	1,3,4	1	1	2	2	2	2	2	3	3	3	t	L
87	10/m	1,2,3	1	2	1,4,5	2	1	2	2	2	1	1	2	1	2	p	N
88	11/m	1,2,3,4	1	3	1,4,6,7	1	1	2	2	1	1	1	2	3	2	t	L
89	8/m	1,2,3,4	1	1	1,2,3,4	2	1	1	2	1	1	2	2	1	2	t	L
90	4/m	2,3,4,5	1	2	1,3,6	1	1	2	2	2	1	2	2	1	2	t	N
91	5/m	1,2,3,4,5	2	1	1,3,4,5,7	1	1	1	2	1	1	1	1	2	2	t	N
92	7/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	1	2	p	N
93	3/m	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	1	2	t	L
94	6/f	1,2,3,4,5	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	2	2	t	N
95	10/f	1,2,3,4	1	1	1,2,3	1	1	2	2	1	1	1	1	3	2	t	L
96	4/m	1,2,3,4	2	2	3,5,6	2	1	1	1	2	1	2	2	2	3	t	N
97	5/f	1,2,3,4	1	1	1,4,5,7	2	1	2	2	1	1	1	2	1	2	p	N
98	10/f	1,2,3	2	1	1,3,5	1	1	2	1	2	2	2	2	4	3	t	N
99	9/f	2,3,4	1	2	2,4,5,6	1	1	1	2	1	1	1	2	2	2	t	N
100	4/f	1,2,3,4	1	2	4,7	2	1	2	2	1	1	2	3	1	3	t	N
101	5/m	1,2,3,4	1	1	1,3,5	1	1	1	2	2	2	1	2	4	2	p	N
102	4/f	1,2,3	1	3	1,2,4,5	1	1	2	2	1	1	2	2	3	2	t	L
103	4/m	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	3	t	N

104	3/f	1,2,3,4	2	2	1,3,4,6	2	1	2	2	2	1	2	2	2	2	t	N
105	3/m	1,2,3,4	1	2	1,3,5	2	1	1	1	1	1	1	1	1	2	p	N
106	6/f	1,3,4	1	1	4,5,6	1	1	2	2	1	1	2	3	1	2	t	N
107	7/f	1,2,3	2	2	1,3,5	2	1	1	1	2	1	1	2	1	2	t	L
108	8/f	1,2,3	2	1	5,6	1	1	2	2	1	2	2	2	2	2	t	N
109	14/m	1,2,3,4	2	1	1,4,5	1	1	1	1	2	2	1	2	1	2	p	N
110	9/f	1,2,3	2	1	4,5,6	1	1	2	2	1	1	2	2	4	2	t	L
111	8/m	1,2,3	2	1	5,7	1	1	1	2	2	1	1	2	3	2	p	N
112	4/m	1,2,3	1	2	1,2	2	1	2	1	2	1	2	2	1	2	t	L
113	9/m	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	2	2	t	N
114	8/m	1,2,3	1	1	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N
115	4/f	1,2,3	2	2	1,3,4	1	1	2	2	2	2	2	3	1	2	t	N
116	5/f	1,2,3,4	1	2	1,4,5	2	1	2	2	2	1	1	2	2	2	t	N
117	4/f	1,2,3	1	2	1,4,6,7	2	2	2	2	2	1	1	2	1	2	t	L
118	4/m	1,2,3,4	1	1	1,2,3,4	2	1	1	2	1	1	2	2	2	2	t	N
119	3/f	2,3,4	1	2	1,3,6	1	1	2	2	2	1	2	2	1	2	t	N
120	3/m	1,2,3,4	2	2	1,3,4,5,7	1	1	1	2	1	1	1	1	2	3	t	N
121	12/m	1,2,3,4	1	2	1,4,6	2	1	2	1	1	1	2	2	1	2	t	N
122	10/m	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	1	2	t	L
123	11/f	1,2,3,4	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	2	2	t	N
124	8/m	1,2,3,4	1	2	1,2,3	2	1	2	2	1	1	1	1	2	3	t	N
125	4/m	1,2,3,4	2	2	3,5,6	2	1	1	1	2	1	2	2	1	2	t	N
126	5/m	1,2,3	1	2	1,4,5,7	2	1	2	2	1	1	1	2	2	2	t	N
127	7/f	1,2,3,4	2	1	1,3,5	2	1	2	1	2	2	2	2	2	3	t	N
128	3/m	1,2,3,4	1	1	2,4,5,6	1	2	1	2	1	1	1	2	2	2	t	N
129	6/f	1,2,3	1	1	4,7	1	1	2	2	1	1	2	3	4	2	p	N
130	10/f	1,2,3	1	1	1,3,5	2	1	1	2	2	2	1	2	2	2	t	N
131	4/m	1,2,3,4	1	2	1,2,4,5	2	1	2	2	1	1	2	2	2	3	t	N
132	5/m	1,2,3	3	1	2,3,5,7	2	1	2	1	1	1	1	2	2	2	t	N
133	10/f	1,2,3	2	2	1,3,4,6	2	1	2	2	2	1	2	2	2	3	t	N
134	9/f	1,2,3	1	1	1,3,5	2	1	1	1	1	1	1	1	1	2	p	N
135	4/f	1,3,4	1	2	4,5,6	1	1	2	2	1	1	2	3	1	3	t	L
136	5/m	1,2,3,4	2	1	1,3,5	2	1	1	1	2	1	1	2	2	2	t	N
137	4/f	1,2,3	2	2	5,6	2	1	2	2	2	2	2	2	1	2	t	N
138	4/m	1,2,4	2	2	1,4,5	1	1	1	1	2	2	1	2	1	2	p	N
139	3/f	1,3,4	2	2	4,5,6	1	1	2	2	1	1	2	2	1	2	t	N
140	3/m	1,2,3,4	2	1	5,7	1	1	1	2	2	1	1	2	2	2	t	N
141	6/f	1,2,3,4	1	2	1,2,3	2	1	2	1	2	1	2	2	2	3	t	N
142	7/m	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	1	2	t	N
143	8/f	1,2,3	1	2	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N
144	14/f	1,2,3	2	1	1,3,4	1	1	2	2	2	2	2	3	2	2	t	N
145	9/m	1,2,3	1	2	1,4,5	2	1	2	2	2	1	1	2	1	2	t	N
146	8/m	1,2,3,4	1	2	1,4,6,7	2	1	2	2	1	1	1	2	2	2	t	N
147	4/m	1,2,3	1	2	1,2,3	2	1	1	1	1	1	2	2	1	2	t	L
148	9/m	1,2,3,4	1	1	1,3,6	1	1	2	2	2	1	2	2	4	2	t	N
149	8/m	1,2,3,4	2	2	1,3,4,5,7	1	2	1	2	1	1	1	1	2	2	t	N
150	4/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	1	2	p	N
151	5/f	1,2,3,4	1	1	2,3,5	2	1	1	2	1	1	1	2	2	2	t	N
152	4/m	1,2,3,4,5	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	3	t	N
153	4/m	1,2,3,4,5	1	2	1,2,3	2	1	2	2	1	1	1	1	1	2	t	N
154	3/m	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	2	2	t	N
155	3/m	1,2,3,4	1	2	1,4,5,7	2	1	2	2	1	1	1	2	2	3	t	N

156	12/m	1,2,3,4	2	2	1,3,5	2	1	2	1	2	2	2	2	1	2	t	N
157	12/m	1,2,3,4	1	2	2,4,5,6	1	1	1	1	1	1	1	2	1	2	t	N
158	11/f	1,2,3	1	1	4,7	2	1	2	2	1	1	2	3	2	2	t	N
159	12/m	1,2,3,4	1	2	3,5	2	2	1	1	2	2	1	2	1	2	t	N
160	4/m	1,2,3,4	1	1	1,2,4,5	2	1	2	2	1	1	3	2	2	2	t	N
161	5/m	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	2	2	t	N
162	12/m	1,2,3	2	1	1,3,4,6	2	1	2	2	2	1	2	2	1	2	t	N
163	3/m	1,2,3	1	1	1,3,5	2	1	1	1	1	1	1	1	2	2	t	N
164	6/f	1,2,3,4	1	1	4,5,6	1	1	2	2	1	1	2	3	2	2	t	N
165	12/f	1,2,3	2	2	1,3,5	2	1	1	1	2	1	1	2	2	2	t	N
166	4/m	1,2,3,4	2	1	5,6	1	1	2	2	1	2	2	2	2	2	t	N
167	5/f	1,2,3,4	2	2	1,4,5	1	1	1	1	2	2	1	2	2	3	t	N
168	11/m	1,2,3	2	1	4,5,6	1	1	2	2	1	1	2	2	1	2	t	N
169	11/m	1,2,3,4	2	2	5,7	1	1	1	2	2	1	1	2	1	2	t	N
170	4/f	1,2,3	3	2	1,2,3	2	1	2	1	2	1	2	2	2	2	t	N
171	5/f	1,2,3	3	1	1,6	2	1	1	1	2	2	2	2	2	3	t	N
172	11/m	1,2,3,4	3	2	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N
173	12/m	1,2,3	2	1	1,3,4	2	1	2	2	2	2	2	3	1	2	t	N
174	11/f	1,2,3	2	2	1,4,5	2	1	2	2	2	1	1	2	2	2	t	N
175	12/m	1,2,3,4	3	1	1,6	1	1	1	1	2	2	2	2	4	2	t	N
176	11/m	2,3	2	2	2,7	2	1	2	2	2	2	2	1	1	2	t	N
177	12/m	1,2,3	1	2	3,5,7	2	2	1	1	1	2	1	3	1	2	t	N
178	11/f	2,3,4	3	1	1,2,6	2	1	1	1	2	2	2	2	2	2	t	N
179	12/m	1,2,3,4	1	2	3,4	2	1	1	1	2	2	3	2	2	3	t	N
180	11/f	2,3	1	2	3,5	1	1	2	2	2	2	2	2	2	2	t	N
181	12/m	2,3	2	2	1,2,6	2	1	2	2	1	2	2	3	2	3	t	N
182	11/m	1,2,3	1	1	1,5	1	1	1	1	2	1	1	2	4	2	t	N
183	12/m	1,2,3	2	1	1,6	2	1	1	1	1	2	2	2	1	2	t	N
184	11/m	2,3	1	1	4,5	2	1	1	1	2	2	2	2	2	3	t	N
185	12/m	1,2,3	1	1	3,6	1	1	1	1	2	2	2	2	4	2	t	N
186	11/m	1,2,3	1	1	4,5	2	2	1	1	2	2	1	3	2	3	t	N

W	At	AR	GE	As	F	Fa	BMI	Car	Cat	CBC	UE	SE	AEC	Mx	CXR	PEF
2	a	a	p	2	3	a	1	a	a	1	1	1	1	1	1	NA
1	p	p	p	2	3	p	1	p	p	1	1	1	1	1	1	NA
3	p	a	p	2	1a	p	3	a	p	1	1	1	2	1	2	70.00%
1	a	a	a	3	2	a	1	a	a	2	1	1	2	1	2	80%
1	p	a	a	1	2	p	1	a	p	1	1	1	1	1	1	80%
2	p	p	p	1	1a	p	3	a	p	2	1	1	2	1	2	70%
3	a	a	a	1	2	a	2	a	a	1	1	1	1	1	1	NA
3	p	p	p	3	1a	p	1	p	p	1	1	1	1	1	2	80%
3	a	a	a	2	1a	a	1	a	a	1	1	1	1	1	2	80%
1	p	a	a	1	1a	p	1	a	p	1	1	1	1	1	1	NA
3	a	a	a	4	1b	a	2	a	a	1	1	1	1	1	1	NA
1	p	p	a	4	3	p	1	p	p	1	1	1	1	1	2	NA
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA
3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	NA
3	a	a	a	4	2	a	1	a	a	1	1	1	2	1	2	NA
2	a	a	a	4	3	a	1	a	a	1	1	1	1	1	1	80%
3	p	a	a	3	2	p	2	a	p	1	1	1	1	1	1	85%
2	p	p	a	1	1a	p	1	p	p	1	1	1	1	1	1	80%
2	a	a	a	4	1b	a	1	a	a	1	1	1	2	1	2	80%
2	p	p	a	4	1b	p	1	p	p	1	1	1	1	1	1	NA
1	a	a	a	2,3	2	p	1	a	a	1	1	1	2	1	2	NA
3	a	p	a	4	1a	a	1	p	a	1	1	1	1	1	1	NA
3	a	p	a	2	1a	a	1	p	a	1	1	1	2	1	1	NA
3	a	a	p	2	2	a	2	a	a	1	1	1	1	1	1	NA
2	a	a	a	4	3	a	1	a	a	1	1	1	1	1	1	85%
3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	NA
2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	NA
2	a	a	p	1	1b	a	3	a	a	2	1	1	2	1	2	70%
2	p	a	a	3	2	p	1	a	p	1	1	1	1	1	1	80%
3	a	a	a	3	1a	a	2	a	a	2	2	2	1	1		NA
3	a	p	a	3	1a	a	2	p	a	1	1	1	1	1	2	NA
3	a	a	a	3	2	a	2	a	a	1	1	1	1	1	2	NA
3	a	a	p	4	1b	a	2	a	a	2	1	1	1	1	1	NA
3	a	a	a	4	3	a	2	a	a	1	2	1	1	1	1	NA
3	a	a	a	4	1a	a	2	a	a	1	1	2	1	1	2	NA
3	a	p	a	4	1a	a	2	p	a	2	1	1	1	1	1	NA
3	a	a	a	3	1a	a	2	a	a	1	1	1	1	1	1	NA
3	a	a	a	3	2	a	2	a	a	1	1	1	1	1	2	85%
2	p	a	p	3	1a	p	2	a	p	2	1	2	1	1	1	75%
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	85%
3	a	a	a	2,3	1b	a	2	a	a	1	1	1	1	1	2	85%
3	a	p	a	4	1a	a	2	p	a	1	1	1	1	1	1	NA
3	a	a	p	3	1a	a	2	a	a	2	1	2	1	1	1	85%
2	a	p	p	2	2	a	2	p	a	1	2	1	1	1	2	70%
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA
2	a	a	a	1	1a	a	1	a	a	1	1	1	1	1	2	NA
3	a	p	a	2	1b	a	2	p	a	2	1	2	1	1	1	NA
3	a	a	p	4	1a	a	2	a	a	1	1	1	1	1	2	NA
3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	NA
2	a	a	a	2	1a	a	1	a	a	1	2	2	1	1	2	NA
2	p	a	a	2,3	3	p	3	a	p	2	1	1	1	1	1	70%

3	a	a	a	2	2	p	2	a	a	1	1	1	1	1	1	85%
1	p	p	a	2,3	3	p	1	p	p	1	1	1	1	1	2	80%
3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	85%
2	a	a	a	2	1a	a	1	a	a	2	2	2	2	1	1	NA
1	p	a	a	1	2	p	1	p	p	1	1	1	1	1	2	NA
3	a	a	a	4	1b	a	2	a	a	1	1	1	1	1	1	NA
3	a	p	a	4	1b	a	2	p	a	1	1	1	1	1	1	NA
3	a	a	a	2	2	p	2	a	a	2	2	1	1	1	2	NA
1	p	p	a	2,3	1a	p	1	p	p	1	1	2	1	1	1	80%
3	a	a	a	2	1a	p	2	a	a	1	1	1	1	1	2	NA
3	p	a	a	4	1a	p	2	a	p	1	2	1	1	1	1	NA
3	a	p	a	3	1a	a	2	a	a	2	1	1	1	1	2	80%
3	a	p	a	2,3	2	a	1	a	a	1	1	2	1	1	1	80%
3	a	a	a	4	2	a	2	a	a	1	2	1	1	1	2	NA
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	2	NA
3	p	p	a	1	1b	p	2	p	p	2	1	1	1	1	1	NA
3	a	a	p	3	2	a	1	a	a	1	1	1	1	1	1	NA
3	p	a	a	4	1a	p	2	a	p	1	1	2	1	1	2	NA
3	p	p	a	4	3	p	2	p	p	1	1	1	1	2	1	NA
3	a	a	a	2	1a	a	1	a	a	2	2	1	2	1	1	NA
3	a	a	a	1	1a	a	2	a	a	1	1	1	1	1	2	NA
3	a	a	p	2	1a	a	2	a	a	1	1	1	1	1	1	85%
3	a	a	a	1	1a	a	2	a	a	1	1	2	1	1	1	85%
2	a	a	a	3	1b	p	1	a	a	1	2	1	1	1	2	85%
3	a	a	a	2	1a	p	2	a	a	2	1	1	1	1	1	85%
3	a	p	a	1	3	p	2	p	a	1	1	1	1	1	1	NA
3	a	a	a	4	1a	p	1	a	a	1	2	1	1	1	2	85%
2	p	p	a	4	3	p	1	p	p	1	1	2	1	1	1	85%
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA
3	a	a	a	2	1a	a	2	a	a	2	2	1	1	1	2	NA
3	a	a	a	3	1b	a	2	a	a	1	1	1	1	1	1	NA
3	a	a	a	1	1a	a	2	a	a	1	1	1	2	1	2	NA
3	a	a	a	2	1a	a	2	a	a	1	1	2	1	1	2	NA
3	a	p	a	2	2	a	2	p	a	1	1	1	1	1	1	NA
1	p	a	p	4	1b	p	1	a	p	2	2	1	1	1	2	70%
1	p	a	a	2	1b	p	1	a	p	1	1	1	1	1	1	85%
2	a	p	p	2,3	1a	a	2	p	a	1	1	2	1	1	2	70%
3	a	a	a	3	1a	a	2	a	a	1	1	1	1	1	1	85%
3	a	a	a	1	3	a	2	a	a	2	2	1	1	1	1	NA
2	p	p	p	2,3	3	p	1	p	p	1	1	1	1	1	2	NA
1	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	NA
3	a	a	p	2	1a	a	2	a	a	1	2	1	1	1	2	NA
3	p	p	a	2	2	p	2	p	p	1	1	1	1	1	1	NA
2	p	p	p	1	2	p	2	p	p	2	1	2	1	1	2	70%
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA
1	p	a	a	4	2	p	1	a	p	1	1	1	1	1	1	NA
3	a	p	p	4	3	a	2	p	a	1	1	1	2	1	2	<60%
3	p	p	a	3	2	p	2	p	p	2	1	1	1	1	1	80%
3	p	p	a	4	1a	p	2	p	p	1	2	1	2	1	2	NA
1	a	p	a	2,3	1a	a	1	p	a	1	1	2	1	1	1	NA
1	a	p	a	2,3	2	a	1	p	a	1	1	1	1	1	2	NA
3	p	a	a	4	1b	p	2	a	p	2	1	1	1	1	2	NA

2	p	p	a	1	3	p	1	p	p	1	1	1	1	1	1	NA
1	a	a	a	4	1a	a	1	a	a	1	2	1	1	1	1	NA
3	a	a	a	4	1a	a	2	a	a	1	1	2	1	1	2	NA
3	a	p	a	2	1a	p	2	p	a	2	1	1	1	1	1	NA
3	a	p	a	2	2	a	2	a	a	1	1	1	1	1	2	80%
1	p	a	a	2	1b	p	1	a	p	1	1	1	1	1	1	80%
3	p	p	a	1	1a	p	2	p	p	1	1	1	2	1	1	<60%
1	p	p	a	2	3	p	1	p	p	2	2	2	1	1	1	75%
3	p	a	a	1	3	p	2	a	p	1	1	1	1	1	2	NA
3	p	a	a	3	2	p	2	p	p	1	1	1	1	1	1	80%
3	a	p	a	2	1a	a	2	p	a	1	1	1	1	1	2	85%
3	a	a	a	2	1a	a	2	a	a	2	2	1	1	1	1	NA
3	p	p	a	2,3	1a	p	2	p	p	1	1	2	1	1	2	NA
3	p	a	a	3	1b	p	2	a	p	1	1	1	1	2	2	NA
3	a	p	a	4	1b	a	2	a	a	2	2	1	1	1	1	NA
3	p	a	a	1	1a	p	1	a	p	1	1	1	1	1	2	NA
1	a	p	a	4	1a	a	1	a	a	1	1	1	1	1	2	NA
3	a	a	a	2	1a	a	1	a	a	2	2	2	1	1	1	85%
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	85%
3	p	p	a	4	1b	p	2	p	p	1	1	1	1	1	2	85%
2	a	p	a	4	2	a	1	a	a	2	1	1	1	1	1	80%
3	p	a	a	4	2	p	2	a	p	1	1	1	1	1	2	NA
3	p	a	a	4	2	p	2	p	p	1	1	1	1	1	1	NA
3	p	a	a	4	3	p	2	a	p	2	2	2	1	1	2	NA
2	a	a	a	4	1b	a	1	a	a	1	1	1	1	1	1	NA
1	p	a	p	4	1a	p	1	a	p	1	1	1	2	1	1	NA
3	p	a	a	4	1b	p	2	a	p	1	1	1	1	1	2	80%
3	a	a	a	4	1a	a	2	a	a	2	1	2	1	1	1	NA
3	p	a	a	4	2	p	2	a	p	1	1	1	1	1	2	NA
3	a	a	a	2,3	1b	a	2	a	a	1	2	1	1	1	1	80%
1	a	a	p	4	1a	a	1	a	a	1	1	1	1	1	2	85%
3	a	a	a	4	1a	a	2	a	a	2	1	1	1	1	1	NA
3	p	a	a	4	1a	p	2	a	p	1	1	2	1	1	1	NA
3	a	p	a	4	1b	p	2	p	a	1	1	1	1	2	2	NA
1	a	a	a	4	1a	p	1	a	a	1	2	1	1	1	1	NA
3	a	a	a	4	1a	p	2	a	a	2	1	1	1	1	2	NA
2	p	a	a	2	1a	p	1	a	p	1	1	2	1	1	1	NA
3	a	a	a	3	3	a	1	a	a	1	1	1	1	1	1	NA
2	a	a	a	4	1a	p	1	a	a	2	2	1	1	1	2	NA
3	a	p	a	4	1a	p	1	p	a	1	1	1	1	1	1	85%
3	p	p	a	4	2	p	2	a	p	1	1	1	1	1	2	80%
3	a	p	a	2	1b	p	1	a	a	2	2	2	1	1	1	85%
1	p	p	a	2	1a	p	1	a	p	1	1	1	1	1	2	80%
3	a	a	a	4	1b	p	1	a	a	1	1	1	2	1	2	NA
3	a	p	p	2	2	a	3	a	a	1	2	1	1	1	1	<60%
3	p	a	a	4	1b	p	2	a	p	1	1	1	1	1	2	80%
1	a	a	p	4	2	p	1	a	a	2	1	2	1	1	1	NA
3	p	p	a	4	2	p	2	a	p	1	1	1	1	1	2	NA
2	a	a	a	4	3	p	1	a	a	1	1	1	1	2	2	NA
3	a	a	a	4	1b	p	2	a	a	2	1	1	1	1	2	NA
2	a	a	a	3	1a	a	1	a	a	1	1	1	1	1	2	NA
3	a	a	a	4	1a	a	2	a	a	1	1	2	1	1	2	NA

3	a	a	a	4	1a	p	2	a	a	2	2	1	1	2	1	85%
3	a	a	a	1,3	1a	p	2	a	a	1	1	1	1	1	2	85%
2	a	p	p	1	1b	a	1	a	a	1	1	1	1	1	1	80%
3	p	a	a	4	1b	p	1	a	p	1	1	2	1	1	1	85%
3	a	a	a	4	1b	a	2	a	a	2	1	1	1	1	2	NA
3	a	a	a	4	1b	a	2	a	a	1	2	1	1	1	1	NA
2	p	p	a	2,3	1b	p	1	a	p	1	1	2	1	1	2	85%
2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	NA
3	a	a	a	4	1b	a	1	a	a	2	1	1	1	1	1	NA
2	a	a	p	4	1a	a	1	a	a	1	1	1	1	1	2	80%
3	a	a	a	4	1b	a	2	a	a	1	2	1	1	1	1	NA
3	a	p	a	2,3	1a	a	1	a	a	1	1	2	1	1	2	NA
3	a	a	p	4	2	p	1	a	a	2	1	1	1	1	1	85%
3	a	a	a	4	1b	p	2	a	a	1	1	1	1	1	2	85%
3	a	a	a	4	1b	a	1	a	a	1	2	1	1	1	1	NA
2	a	a	a	2,3	1b	a	1	a	a	2	1	1	1	1	2	NA
3	p	a	a	4	1a	p	1	a	p	1	2	1	1	1	2	85%
3	a	a	a	2,3	1a	p	2	a	a	2	1	1	1	1	1	85%
3	a	a	a	4	1b	a	2	a	a	2	1	1	1	1	2	85%
2	a	a	p	1,2,3	1b	a	1	a	a	1	2	1	2	1	1	<60%
3	p	a	a	4	1a	p	1	a	p	1	1	1	1	1	2	85%
3	a	a	a	4	1a	p	1	a	a	2	1	2	1	1	1	85%
3	a	a	p	4	1b	a	2	a	a	1	2	1	1	1	2	80%
2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	80%
3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	2	80%
2	a	a	a	4	1b	a	1	a	a	2	1	1	1	1	1	80%
3	a	p	a	2,3	2	p	3	a	a	1	1	1	1	1	2	<60%
2	p	a	p	4	1b	p	1	a	p	2	1	1	1	2	2	85%
2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	2	80%
2	p	a	a	1,3	1b	p	1	a	p	2	1	1	1	1	2	<60%
2	a	a	a	4	1a	p	1	a	a	1	1	1	1	1	2	80%

MASTER CHART

pt	a/s	com	Rl	W	Tr	H	SES	K	Sm	M.R	C	Ho	Nu	g	s	T	D	W	At	AR	GE	As	F	Fa	BMl	Car	Cat	CBC	UE	SE	AEC	Mx	CXR	PEF
1	6/f	1,2,3,4	1	2	1,4,6,7	2	2	2	2	1	1	1	2	1	3	p	N	2	a	a	p	2	3	a	1	a	a	1	1	1	1	1	1	NA
2	7/f	1,2,3,4	1	1	1,2,3,4	2	1	1	2	1	1	2	2	2	2	p	N	1	p	p	p	2	3	p	1	p	p	1	1	1	1	1	1	NA
3	8/f	1,2,3,4,5	1	1	1,3,6	1	1	2	2	2	1	3	2	3	2	t	N	3	p	a	p	2	1a	p	3	a	p	1	1	1	2	1	2	70.00%
4	14/f	1,2,3,4,5	2	1	1,3,4,5,7	1	1	1	2	1	1	1	2	2	2	t	L	1	a	a	a	3	2	a	1	a	a	2	1	1	2	1	2	80%
5	9/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	2	2	t	L	1	p	a	a	1	2	p	1	a	p	1	1	1	1	1	1	80%
6	8/m	2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	3	2	t	N	2	p	p	p	1	1a	p	3	a	p	2	1	1	2	1	2	70%
7	4/m	1,2,3,4,5	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	3	t	L	3	a	a	a	1	2	a	2	a	a	1	1	1	1	1	1	NA
8	9/m	1,2,3,4	1	1	1,2,3	2	1	2	2	1	1	1	1	2	2	t	L	3	p	p	p	3	1a	p	1	p	p	1	1	1	1	1	2	80%
9	8/m	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	2	2	t	L	3	a	a	a	2	1a	a	1	a	a	1	1	1	1	1	2	80%
10	4/f	1,2,3,4	1	1	1,7	2	1	2	2	1	1	1	2	2	2	p	N	1	p	a	a	1	1a	p	1	a	p	1	1	1	1	1	1	NA
11	5/f	1,2,3	2	2	1,3,5	2	1	2	1	2	2	2	2	1	3	t	L	3	a	a	a	4	1b	a	2	a	a	1	1	1	1	1	1	NA
12	4/f	1,2,3,4	1	2	2,4,5,6	1	2	1	2	1	1	1	2	2	2	t	N	1	p	p	a	4	3	p	1	p	p	1	1	1	1	1	2	NA
13	4/m	1,2,3	1	1	4,7	2	1	2	2	1	1	2	3	1	2	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA
14	3/f	1,2,3,4	1	1	1,3,5	2	1	1	2	2	2	1	2	1	3	t	N	3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	NA
15	3/m	1,2,3,4	1	2	1,2,4,5	2	1	2	2	1	1	2	2	2	2	t	N	3	a	a	a	4	2	a	1	a	a	1	1	1	2	1	2	NA
16	12/m	2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	3	p	N	2	a	a	a	4	3	a	1	a	a	1	1	1	1	1	1	80%
17	10/m	1,2,3,4	2	2	1,3,4,6	2	1	2	2	2	1	2	2	1	3	t	N	3	p	a	a	3	2	p	2	a	p	1	1	1	1	1	1	85%
18	11/f	1,2,3,4	1	2	1,3,5	2	1	1	1	1	1	1	1	2	2	t	L	2	p	p	a	1	1a	p	1	p	p	1	1	1	1	1	1	80%
19	8/m	1,2,3,4	1	2	4,5,6	1	1	2	2	1	1	3	3	2	3	t	N	2	a	a	a	4	1b	a	1	a	a	1	1	1	2	1	2	80%
20	4/m	1,2,3,4	2	2	1,3,5	2	1	1	1	2	1	1	2	2	2	t	N	2	p	p	a	4	1b	p	1	p	p	1	1	1	1	1	1	NA
21	5/m	2,3	2	2	5,6	1	1	2	2	1	2	2	2	3	2	p	N	1	a	a	a	2,3	2	p	1	a	a	1	1	1	2	1	2	NA
22	7/f	1,2,3,4	2	1	1,4,5	1	2	1	1	2	2	1	2	2	3	t	N	3	a	p	a	4	1a	a	1	p	a	1	1	1	1	1	1	NA
23	3/m	1,2,3,4	2	2	4,5,6	1	1	2	2	1	1	2	2	2	3	t	N	3	a	p	a	2	1a	a	1	p	a	1	1	1	2	1	1	NA
24	6/f	1,2,3	2	2	5,7	1	1	1	2	2	1	1	2	1	2	t	N	3	a	a	p	2	2	a	2	a	a	1	1	1	1	1	1	NA
25	10/f	1,2,3	3	2	1,2,3	2	1	2	1	2	1	2	2	1	2	p	N	2	a	a	a	4	3	a	1	a	a	1	1	1	1	1	1	85%
26	4/m	1,2,3,4	3	1	1,6	1	1	1	1	2	2	2	2	1	3	t	N	3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	NA
27	5/f	1,2,3	1	2	3,4,5	1	1	2	1	1	2	1	2	1	3	p	N	2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	NA
28	10/f	1,2,3,4	2	2	1,3,4	1	1	2	2	2	2	2	3	3	3	t	N	2	a	a	p	1	1b	a	3	a	a	2	1	1	2	1	2	70%
29	9/f	1,2,3,4	1	2	1,4,5	2	1	2	2	2	1	1	2	2	2	t	L	2	p	a	a	3	2	p	1	a	p	1	1	1	1	1	1	80%
30	4/f	1,2,3	1	2	1,4,6,7	2	1	2	2	1	1	1	2	1	3	t	N	3	a	a	a	3	1a	a	2	a	a	2	2	2	1	1		NA

31	5/f	1,2,3	1	1	1,2,3,4	2	1	1	2	1	1	2	2	1	2	t	N	3	a	p	a	3	1a	a	2	p	a	1	1	1	1	1	2	NA	
32	4/f	2,3,4,5	1	1	1,3,6	1	1	2	2	2	1	2	2	1	3	t	N	3	a	a	a	3	2	a	2	a	a	1	1	1	1	1	2	NA	
33	4/m	1,2,3,4,5	2	2	1,3,4,5,7	1	1	1	2	1	1	1	1	1	3	t	N	3	a	a	p	4	1b	a	2	a	a	2	1	1	1	1	1	NA	
34	3/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	3	2	1	3	t	L	3	a	a	a	4	3	a	2	a	a	1	2	1	1	1	1	NA	
35	3/m	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	1	3	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	2	1	1	2	NA	
36	6/f	1,2,3,4	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	3	t	N	3	a	p	a	4	1a	a	2	p	a	2	1	1	1	1	1	NA	
37	7/f	1,2,3,4,5	1	1	1,2,3	2	1	2	2	1	1	1	1	1	2	t	N	3	a	a	a	3	1a	a	2	a	a	1	1	1	1	1	1	NA	
38	8/f	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	1	3	t	N	3	a	a	a	3	2	a	2	a	a	1	1	1	1	1	2	85%	
39	14/m	1,2,3,4	1	2	1,4,5,7	2	2	2	2	1	1	1	2	3	2	t	N	2	p	a	p	3	1a	p	2	a	p	2	1	2	1	1	1	75%	
40	9/f	1,2,3,4	2	2	1,3,5	2	1	2	1	2	2	2	2	1	3	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	85%	
41	8/m	1,2,3,4	1	2	2,4,5,6	1	1	1	2	1	1	1	2	1	3	t	N	3	a	a	a	2,3	1b	a	2	a	a	1	1	1	1	1	2	85%	
42	4/m	1,2,3	1	2	4,7	2	1	2	2	1	1	2	3	1	3	t	N	3	a	p	a	4	1a	a	2	p	a	1	1	1	1	1	1	NA	
43	9/m	1,2,3	1	1	1,3,5	2	2	1	2	2	2	1	2	1	2	t	N	3	a	a	p	3	1a	a	2	a	a	2	1	2	1	1	1	85%	
44	8/m	1,2,3,4	1	2	1,2,4,5	1	1	2	2	1	1	2	2	3	2	t	N	2	a	p	p	2	2	a	2	p	a	1	2	1	1	1	2	70%	
45	4/f	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	2	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA	
46	5/m	1,2,3	2	2	1,3,4,6	2	1	2	2	2	1	2	2	1	3	p	N	2	a	a	a	1	1a	a	1	a	a	1	1	1	1	1	2	NA	
47	4/m	1,2,3	1	2	1,3,5	2	1	1	1	1	1	1	1	1	2	t	N	3	a	p	a	2	1b	a	2	p	a	2	1	2	1	1	1	NA	
48	4/m	1,2,3,4	1	1	4,5,6	2	1	2	2	1	1	2	3	1	3	t	N	3	a	a	p	4	1a	a	2	a	a	1	1	1	1	1	2	NA	
49	3/f	1,2,3	2	2	1,3,5	2	2	1	1	2	1	1	2	1	3	t	N	3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	NA	
50	3/m	1,2,3	2	2	5,6	1	1	2	2	1	2	2	2	1	3	p	N	2	a	a	a	2	1a	a	1	a	a	1	2	2	1	1	2	NA	
51	12/m	1,2,3,4	2	1	1,4,5	1	1	1	1	2	2	1	2	3	2	t	N	2	p	a	a	2,3	3	p	3	a	p	2	1	1	1	1	1	70%	
52	10/m	2,3	2	1	4,5,6	1	1	2	2	1	1	2	2	1	2	t	N	3	a	a	a	2	2	p	2	a	a	1	1	1	1	1	1	85%	
53	11/f	1,2,3,4	2	2	5,7	1	1	1	2	2	1	1	2	2	2	t	L	1	p	p	a	2,3	3	p	1	p	p	1	1	1	1	1	2	80%	
54	8/m	1,2,3,4	3	2	1,2,3	2	1	2	1	2	1	2	2	1	2	t	N	3	a	a	a	2	1a	a	2	a	a	1	1	1	1	1	1	85%	
55	4/m	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	1	2	p	N	2	a	a	a	2	1a	a	1	a	a	2	2	2	2	1	1	NA	
56	5/m	1,2,3,4	1	2	3,4,5	1	1	2	1	1	2	1	2	2	2	p	N	1	p	a	a	1	2	p	1	p	p	1	1	1	1	1	2	NA	
57	7/f	1,2,3	2	2	1,3,4	1	1	2	2	2	2	2	3	1	2	t	L	3	a	a	a	4	1b	a	2	a	a	1	1	1	1	1	1	NA	
58	3/m	1,3	1	2	1,4,5	2	2	2	2	2	1	1	2	1	2	t	L	3	a	p	a	4	1b	a	2	p	a	1	1	1	1	1	1	NA	
59	6/f	1,2,3,4	1	2	1,4,6,7	2	1	2	2	1	1	1	2	1	2	t	N	3	a	a	a	2	2	p	2	a	a	2	2	1	1	1	2	NA	
60	10/f	1,2,3	1	2	1,2,3,4	2	1	1	2	1	1	2	2	2	2	t	N	1	p	p	a	2,3	1a	p	1	p	p	1	1	2	1	1	1	80%	
61	4/m	1,2,3,4	1	2	1,3,6	1	1	2	2	2	1	2	2	1	2	t	N	3	a	a	a	2	1a	p	2	a	a	1	1	1	1	1	2	NA	
62	5/f	1,2,3,4,5	2	2	1,3,4,5,7	1	2	1	2	1	1	1	1	1	3	t	L	3	p	a	a	4	1a	p	2	a	p	1	2	1	1	1	1	NA	

63	10/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	2	3	t	N	3	a	p	a	3	1a	a	2	a	a	2	1	1	1	1	2	80%
64	9/f	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	2	3	t	N	3	a	p	a	2,3	2	a	1	a	a	1	1	2	1	1	1	80%
65	4/m	1,2,3,4	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	2	t	N	3	a	a	a	4	2	a	2	a	a	1	2	1	1	1	2	NA
66	5/f	1,2,3,4,5	1	2	1,2,3	2	1	2	2	1	1	1	1	1	2	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	2	NA
67	4/f	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	2	3	t	N	3	p	p	a	1	1b	p	2	p	p	2	1	1	1	1	1	NA
68	4/m	2,3	1	2	1,4,5,7	2	2	2	2	1	1	1	2	2	2	t	N	3	a	a	p	3	2	a	1	a	a	1	1	1	1	1	1	NA
69	3/f	1,2,3,4	2	2	1,3,5	2	1	2	1	2	2	2	2	1	2	t	N	3	p	a	a	4	1a	p	2	a	p	1	1	2	1	1	2	NA
70	3/m	1,2,3,4	1	2	2,4,5,6	1	1	1	2	1	1	1	2	2	2	t	N	3	p	p	a	4	3	p	2	p	p	1	1	1	1	2	1	NA
71	6/f	1,2,3	1	1	4,7	2	1	2	2	1	1	2	3	1	2	t	N	3	a	a	a	2	1a	a	1	a	a	2	2	1	2	1	1	NA
72	7/f	1,2,3,4	1	1	1,3,5	2	1	1	2	2	2	1	2	1	2	t	N	3	a	a	a	1	1a	a	2	a	a	1	1	1	1	1	2	NA
73	8/m	1,2,3	1	2	1,2,4,5	2	1	2	2	1	1	2	2	1	2	t	N	3	a	a	p	2	1a	a	2	a	a	1	1	1	1	1	1	85%
74	14/f	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	2	t	N	3	a	a	a	1	1a	a	2	a	a	1	1	2	1	1	1	85%
75	9/f	1,2,3,4	2	2	1,3,4,6	2	1	2	2	2	1	3	2	1	2	t	L	2	a	a	a	3	1b	p	1	a	a	1	2	1	1	1	2	85%
76	8/m	1,2,3	1	2	1,3,5	2	1	1	1	1	1	1	1	1	3	t	N	3	a	a	a	2	1a	p	2	a	a	2	1	1	1	1	1	85%
77	4/m	1,2,3	1	2	4,5,6	1	1	2	2	1	1	2	3	1	2	t	L	3	a	p	a	1	3	p	2	p	a	1	1	1	1	1	1	NA
78	9/m	1,2,3,4	2	2	1,3,5	2	1	1	1	2	1	1	2	1	3	t	N	3	a	a	a	4	1a	p	1	a	a	1	2	1	1	1	2	85%
79	8/m	1,2,3	2	2	5,6	1	1	2	2	1	2	2	2	2	2	t	N	2	p	p	a	4	3	p	1	p	p	1	1	2	1	1	1	85%
80	4/f	2,3,4	2	1	1,4,5	1	1	1	1	2	2	1	2	1	2	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA
81	5/f	1,2,3	2	2	4,5,6	1	1	2	2	1	1	2	2	1	3	t	L	3	a	a	a	2	1a	a	2	a	a	2	2	1	1	1	2	NA
82	4/f	1,2,3,4	2	2	5,7	1	1	1	2	2	1	1	2	1	2	t	N	3	a	a	a	3	1b	a	2	a	a	1	1	1	1	1	1	NA
83	4/m	1,2,3,4	1	2	1,2,3	2	1	2	1	2	1	2	2	1	2	t	N	3	a	a	a	1	1a	a	2	a	a	1	1	1	2	1	2	NA
84	3/f	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	1	3	t	L	3	a	a	a	2	1a	a	2	a	a	1	1	2	1	1	2	NA
85	3/m	1,2,3	1	2	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N	3	a	p	a	2	2	a	2	p	a	1	1	1	1	1	1	NA
86	12/m	1,2,3	2	3	1,3,4	1	1	2	2	2	2	2	3	3	3	t	L	1	p	a	p	4	1b	p	1	a	p	2	2	1	1	1	2	70%
87	10/m	1,2,3	1	2	1,4,5	2	1	2	2	2	1	1	2	1	2	p	N	1	p	a	a	2	1b	p	1	a	p	1	1	1	1	1	1	85%
88	11/m	1,2,3,4	1	3	1,4,6,7	1	1	2	2	1	1	1	2	3	2	t	L	2	a	p	p	2,3	1a	a	2	p	a	1	1	2	1	1	2	70%
89	8/m	1,2,3,4	1	1	1,2,3,4	2	1	1	2	1	1	2	2	1	2	t	L	3	a	a	a	3	1a	a	2	a	a	1	1	1	1	1	1	85%
90	4/m	2,3,4,5	1	2	1,3,6	1	1	2	2	2	1	2	2	1	2	t	N	3	a	a	a	1	3	a	2	a	a	2	2	1	1	1	1	NA
91	5/m	1,2,3,4,5	2	1	1,3,4,5,7	1	1	1	2	1	1	1	1	2	2	t	N	2	p	p	p	2,3	3	p	1	p	p	1	1	1	1	1	2	NA
92	7/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	1	2	p	N	1	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	NA
93	3/m	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	1	2	t	L	3	a	a	p	2	1a	a	2	a	a	1	2	1	1	1	2	NA
94	6/f	1,2,3,4,5	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	2	2	t	N	3	p	p	a	2	2	p	2	p	p	1	1	1	1	1	1	NA
95	10/f	1,2,3,4	1	1	1,2,3	1	1	2	2	1	1	1	1	3	2	t	L	2	p	p	p	1	2	p	2	p	p	2	1	2	1	1	2	70%
96	4/m	1,2,3,4	2	2	3,5,6	2	1	1	1	2	1	2	2	2	3	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	NA

97	5/f	1,2,3,4	1	1	1,4,5,7	2	1	2	2	1	1	1	2	1	2	p	N	1	p	a	a	4	2	p	1	a	p	1	1	1	1	1	1	NA
98	10/f	1,2,3	2	1	1,3,5	1	1	2	1	2	2	2	2	4	3	t	N	3	a	p	p	4	3	a	2	p	a	1	1	1	2	1	2	<60%
99	9/f	2,3,4	1	2	2,4,5,6	1	1	1	2	1	1	1	2	2	2	t	N	3	p	p	a	3	2	p	2	p	p	2	1	1	1	1	1	80%
100	4/f	1,2,3,4	1	2	4,7	2	1	2	2	1	1	2	3	1	3	t	N	3	p	p	a	4	1a	p	2	p	p	1	2	1	2	1	2	NA
101	5/m	1,2,3,4	1	1	1,3,5	1	1	1	2	2	2	1	2	4	2	p	N	1	a	p	a	2,3	1a	a	1	p	a	1	1	2	1	1	1	NA
102	4/f	1,2,3	1	3	1,2,4,5	1	1	2	2	1	1	2	2	3	2	t	L	1	a	p	a	2,3	2	a	1	p	a	1	1	1	1	1	2	NA
103	4/m	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	1	3	t	N	3	p	a	a	4	1b	p	2	a	p	2	1	1	1	1	2	NA
104	3/f	1,2,3,4	2	2	1,3,4,6	2	1	2	2	2	1	2	2	2	2	t	N	2	p	p	a	1	3	p	1	p	p	1	1	1	1	1	1	NA
105	3/m	1,2,3,4	1	2	1,3,5	2	1	1	1	1	1	1	1	1	2	p	N	1	a	a	a	4	1a	a	1	a	a	1	2	1	1	1	1	NA
106	6/f	1,3,4	1	1	4,5,6	1	1	2	2	1	1	2	3	1	2	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	2	1	1	2	NA
107	7/f	1,2,3	2	2	1,3,5	2	1	1	1	2	1	1	2	1	2	t	L	3	a	p	a	2	1a	p	2	p	a	2	1	1	1	1	1	NA
108	8/f	1,2,3	2	1	5,6	1	1	2	2	1	2	2	2	2	2	t	N	3	a	p	a	2	2	a	2	a	a	1	1	1	1	1	2	80%
109	14/m	1,2,3,4	2	1	1,4,5	1	1	1	1	2	2	1	2	1	2	p	N	1	p	a	a	2	1b	p	1	a	p	1	1	1	1	1	1	80%
110	9/f	1,2,3	2	1	4,5,6	1	1	2	2	1	1	2	2	4	2	t	L	3	p	p	a	1	1a	p	2	p	p	1	1	1	2	1	1	<60%
111	8/m	1,2,3	2	1	5,7	1	1	1	2	2	1	1	2	3	2	p	N	1	p	p	a	2	3	p	1	p	p	2	2	2	1	1	1	75%
112	4/m	1,2,3	1	2	1,2	2	1	2	1	2	1	2	2	1	2	t	L	3	p	a	a	1	3	p	2	a	p	1	1	1	1	1	2	NA
113	9/m	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	2	2	t	N	3	p	a	a	3	2	p	2	p	p	1	1	1	1	1	1	80%
114	8/m	1,2,3	1	1	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N	3	a	p	a	2	1a	a	2	p	a	1	1	1	1	1	2	85%
115	4/f	1,2,3	2	2	1,3,4	1	1	2	2	2	2	2	3	1	2	t	N	3	a	a	a	2	1a	a	2	a	a	2	2	1	1	1	1	NA
116	5/f	1,2,3,4	1	2	1,4,5	2	1	2	2	2	1	1	2	2	2	t	N	3	p	p	a	2,3	1a	p	2	p	p	1	1	2	1	1	2	NA
117	4/f	1,2,3	1	2	1,4,6,7	2	2	2	2	2	1	1	2	1	2	t	L	3	p	a	a	3	1b	p	2	a	p	1	1	1	1	2	2	NA
118	4/m	1,2,3,4	1	1	1,2,3,4	2	1	1	2	1	1	2	2	2	2	t	N	3	a	p	a	4	1b	a	2	a	a	2	2	1	1	1	1	NA
119	3/f	2,3,4	1	2	1,3,6	1	1	2	2	2	1	2	2	1	2	t	N	3	p	a	a	1	1a	p	1	a	p	1	1	1	1	1	2	NA
120	3/m	1,2,3,4	2	2	1,3,4,5,7	1	1	1	2	1	1	1	1	2	3	t	N	1	a	p	a	4	1a	a	1	a	a	1	1	1	1	1	2	NA
121	12/m	1,2,3,4	1	2	1,4,6	2	1	2	1	1	1	2	2	1	2	t	N	3	a	a	a	2	1a	a	1	a	a	2	2	2	1	1	1	85%
122	10/m	1,2,3,4	1	2	2,3,5	1	1	1	2	1	1	1	2	1	2	t	L	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	1	85%
123	11/f	1,2,3,4	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	2	2	t	N	3	p	p	a	4	1b	p	2	p	p	1	1	1	1	1	2	85%
124	8/m	1,2,3,4	1	2	1,2,3	2	1	2	2	1	1	1	1	2	3	t	N	2	a	p	a	4	2	a	1	a	a	2	1	1	1	1	1	80%
125	4/m	1,2,3,4	2	2	3,5,6	2	1	1	1	2	1	2	2	1	2	t	N	3	p	a	a	4	2	p	2	a	p	1	1	1	1	1	2	NA
126	5/m	1,2,3	1	2	1,4,5,7	2	1	2	2	1	1	1	2	2	2	t	N	3	p	a	a	4	2	p	2	p	p	1	1	1	1	1	1	NA
127	7/f	1,2,3,4	2	1	1,3,5	2	1	2	1	2	2	2	2	2	3	t	N	3	p	a	a	4	3	p	2	a	p	2	2	2	1	1	2	NA
128	3/m	1,2,3,4	1	1	2,4,5,6	1	2	1	2	1	1	1	2	2	2	t	N	2	a	a	a	4	1b	a	1	a	a	1	1	1	1	1	1	NA

129	6/f	1,2,3	1	1	4,7	1	1	2	2	1	1	2	3	4	2	p	N	1	p	a	p	4	1a	p	1	a	p	1	1	1	2	1	1	NA	
130	10/f	1,2,3	1	1	1,3,5	2	1	1	2	2	2	1	2	2	2	t	N	3	p	a	a	4	1b	p	2	a	p	1	1	1	1	1	2	80%	
131	4/m	1,2,3,4	1	2	1,2,4,5	2	1	2	2	1	1	2	2	2	3	t	N	3	a	a	a	4	1a	a	2	a	a	2	1	2	1	1	1	NA	
132	5/m	1,2,3	3	1	2,3,5,7	2	1	2	1	1	1	1	2	2	2	t	N	3	p	a	a	4	2	p	2	a	p	1	1	1	1	1	2	NA	
133	10/f	1,2,3	2	2	1,3,4,6	2	1	2	2	2	1	2	2	2	3	t	N	3	a	a	a	2,3	1b	a	2	a	a	1	2	1	1	1	1	80%	
134	9/f	1,2,3	1	1	1,3,5	2	1	1	1	1	1	1	1	1	2	p	N	1	a	a	p	4	1a	a	1	a	a	1	1	1	1	1	2	85%	
135	4/f	1,3,4	1	2	4,5,6	1	1	2	2	1	1	2	3	1	3	t	L	3	a	a	a	4	1a	a	2	a	a	2	1	1	1	1	1	NA	
136	5/m	1,2,3,4	2	1	1,3,5	2	1	1	1	2	1	1	2	2	2	t	N	3	p	a	a	4	1a	p	2	a	p	1	1	2	1	1	1	NA	
137	4/f	1,2,3	2	2	5,6	2	1	2	2	2	2	2	2	1	2	t	N	3	a	p	a	4	1b	p	2	p	a	1	1	1	1	2	2	NA	
138	4/m	1,2,4	2	2	1,4,5	1	1	1	1	2	2	1	2	1	2	p	N	1	a	a	a	4	1a	p	1	a	a	1	2	1	1	1	1	NA	
139	3/f	1,3,4	2	2	4,5,6	1	1	2	2	1	1	2	2	1	2	t	N	3	a	a	a	4	1a	p	2	a	a	2	1	1	1	1	2	NA	
140	3/m	1,2,3,4	2	1	5,7	1	1	1	2	2	1	1	2	2	2	t	N	2	p	a	a	2	1a	p	1	a	p	1	1	2	1	1	1	NA	
141	6/f	1,2,3,4	1	2	1,2,3	2	1	2	1	2	1	2	2	2	3	t	N	3	a	a	a	3	3	a	1	a	a	1	1	1	1	1	1	NA	
142	7/m	1,2,3	3	1	1,6	1	1	1	1	2	2	2	2	1	2	t	N	2	a	a	a	4	1a	p	1	a	a	2	2	1	1	1	2	NA	
143	8/f	1,2,3	1	2	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N	3	a	p	a	4	1a	p	1	p	a	1	1	1	1	1	1	85%	
144	14/f	1,2,3	2	1	1,3,4	1	1	2	2	2	2	2	3	2	2	t	N	3	p	p	a	4	2	p	2	a	p	1	1	1	1	1	2	80%	
145	9/m	1,2,3	1	2	1,4,5	2	1	2	2	2	1	1	2	1	2	t	N	3	a	p	a	2	1b	p	1	a	a	2	2	2	1	1	1	85%	
146	8/m	1,2,3,4	1	2	1,4,6,7	2	1	2	2	1	1	1	2	2	2	t	N	1	p	p	a	2	1a	p	1	a	p	1	1	1	1	1	2	80%	
147	4/m	1,2,3	1	2	1,2,3	2	1	1	1	1	1	2	2	1	2	t	L	3	a	a	a	4	1b	p	1	a	a	1	1	1	2	1	2	NA	
148	9/m	1,2,3,4	1	1	1,3,6	1	1	2	2	2	1	2	2	4	2	t	N	3	a	p	p	2	2	a	3	a	a	1	2	1	1	1	1	<60%	
149	8/m	1,2,3,4	2	2	1,3,4,5,7	1	2	1	2	1	1	1	1	2	2	t	N	3	p	a	a	4	1b	p	2	a	p	1	1	1	1	1	2	80%	
150	4/f	1,2,3,4,5	1	2	1,4,6	2	1	2	1	1	1	2	2	1	2	p	N	1	a	a	p	4	2	p	1	a	a	2	1	2	1	1	1	NA	
151	5/f	1,2,3,4	1	1	2,3,5	2	1	1	2	1	1	1	2	2	2	t	N	3	p	p	a	4	2	p	2	a	p	1	1	1	1	1	2	NA	
152	4/m	1,2,3,4,5	1	2	2,4,5,6,7	2	1	1	1	2	1	2	2	1	3	t	N	2	a	a	a	4	3	p	1	a	a	1	1	1	1	2	2	NA	
153	4/m	1,2,3,4,5	1	2	1,2,3	2	1	2	2	1	1	1	1	1	2	t	N	3	a	a	a	4	1b	p	2	a	a	2	1	1	1	1	2	NA	
154	3/m	1,2,3,4,5	2	1	3,5,6	2	1	1	1	2	1	2	2	2	2	t	N	2	a	a	a	3	1a	a	1	a	a	1	1	1	1	1	2	NA	
155	3/m	1,2,3,4	1	2	1,4,5,7	2	1	2	2	1	1	1	2	2	3	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	2	1	1	2	NA	
156	12/m	1,2,3,4	2	2	1,3,5	2	1	2	1	2	2	2	2	1	2	t	N	3	a	a	a	4	1a	p	2	a	a	2	2	1	1	2	1	85%	
157	12/m	1,2,3,4	1	2	2,4,5,6	1	1	1	1	1	1	1	2	1	2	t	N	3	a	a	a	1,3	1a	p	2	a	a	1	1	1	1	1	2	85%	
158	11/f	1,2,3	1	1	4,7	2	1	2	2	1	1	2	3	2	2	t	N	2	a	p	p	1	1b	a	1	a	a	1	1	1	1	1	1	80%	

159	12/m	1,2,3,4	1	2	3,5	2	2	1	1	2	2	1	2	1	2	t	N	3	p	a	a	4	1b	p	1	a	p	1	1	2	1	1	1	85%
160	4/m	1,2,3,4	1	1	1,2,4,5	2	1	2	2	1	1	3	2	2	2	t	N	3	a	a	a	4	1b	a	2	a	a	2	1	1	1	1	2	NA
161	5/m	1,2,3	3	2	2,3,5,7	2	1	2	1	1	1	1	2	2	2	t	N	3	a	a	a	4	1b	a	2	a	a	1	2	1	1	1	1	NA
162	12/m	1,2,3	2	1	1,3,4,6	2	1	2	2	2	1	2	2	1	2	t	N	2	p	p	a	2,3	1b	p	1	a	p	1	1	2	1	1	2	85%
163	3/m	1,2,3	1	1	1,3,5	2	1	1	1	1	1	1	1	2	2	t	N	2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	NA
164	6/f	1,2,3,4	1	1	4,5,6	1	1	2	2	1	1	2	3	2	2	t	N	3	a	a	a	4	1b	a	1	a	a	2	1	1	1	1	1	NA
165	12/f	1,2,3	2	2	1,3,5	2	1	1	1	2	1	1	2	2	2	t	N	2	a	a	p	4	1a	a	1	a	a	1	1	1	1	1	2	80%
166	4/m	1,2,3,4	2	1	5,6	1	1	2	2	1	2	2	2	2	2	t	N	3	a	a	a	4	1b	a	2	a	a	1	2	1	1	1	1	NA
167	5/f	1,2,3,4	2	2	1,4,5	1	1	1	1	2	2	1	2	2	3	t	N	3	a	p	a	2,3	1a	a	1	a	a	1	1	2	1	1	2	NA
168	11/m	1,2,3	2	1	4,5,6	1	1	2	2	1	1	2	2	1	2	t	N	3	a	a	p	4	2	p	1	a	a	2	1	1	1	1	1	85%
169	11/m	1,2,3,4	2	2	5,7	1	1	1	2	2	1	1	2	1	2	t	N	3	a	a	a	4	1b	p	2	a	a	1	1	1	1	1	2	85%
170	4/f	1,2,3	3	2	1,2,3	2	1	2	1	2	1	2	2	2	2	t	N	3	a	a	a	4	1b	a	1	a	a	1	2	1	1	1	1	NA
171	5/f	1,2,3	3	1	1,6	2	1	1	1	2	2	2	2	2	3	t	N	2	a	a	a	2,3	1b	a	1	a	a	2	1	1	1	1	2	NA
172	11/m	1,2,3,4	3	2	3,4,5	1	1	2	1	1	2	1	2	1	2	t	N	3	p	a	a	4	1a	p	1	a	p	1	2	1	1	1	2	85%
173	12/m	1,2,3	2	1	1,3,4	2	1	2	2	2	2	2	3	1	2	t	N	3	a	a	a	2,3	1a	p	2	a	a	2	1	1	1	1	1	85%
174	11/f	1,2,3	2	2	1,4,5	2	1	2	2	2	1	1	2	2	2	t	N	3	a	a	a	4	1b	a	2	a	a	2	1	1	1	1	2	85%
175	12/m	1,2,3,4	3	1	1,6	1	1	1	1	2	2	2	2	4	2	t	N	2	a	a	p	1,2,3	1b	a	1	a	a	1	2	1	2	1	1	<60%
176	11/m	2,3	2	2	2,7	2	1	2	2	2	2	2	1	1	2	t	N	3	p	a	a	4	1a	p	1	a	p	1	1	1	1	1	2	85%
177	12/m	1,2,3	1	2	3,5,7	2	2	1	1	1	2	1	3	1	2	t	N	3	a	a	a	4	1a	p	1	a	a	2	1	2	1	1	1	85%
178	11/f	2,3,4	3	1	1,2,6	2	1	1	1	2	2	2	2	2	2	t	N	3	a	a	p	4	1b	a	2	a	a	1	2	1	1	1	2	80%
179	12/m	1,2,3,4	1	2	3,4	2	1	1	1	2	2	3	2	2	3	t	N	2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	1	80%
180	11/f	2,3	1	2	3,5	1	1	2	2	2	2	2	2	2	2	t	N	3	a	a	a	4	1a	a	2	a	a	1	1	1	1	1	2	80%
181	12/m	2,3	2	2	1,2,6	2	1	2	2	1	2	2	3	2	3	t	N	2	a	a	a	4	1b	a	1	a	a	2	1	1	1	1	1	80%
182	11/m	1,2,3	1	1	1,5	1	1	1	1	2	1	1	2	4	2	t	N	3	a	p	a	2,3	2	p	3	a	a	1	1	1	1	1	2	<60%
183	12/m	1,2,3	2	1	1,6	2	1	1	1	1	2	2	2	1	2	t	N	2	p	a	p	4	1b	p	1	a	p	2	1	1	1	2	2	85%
184	11/m	2,3	1	1	4,5	2	1	1	1	2	2	2	2	2	3	t	N	2	a	a	a	4	1a	a	1	a	a	1	1	1	1	1	2	80%
185	12/m	1,2,3	1	1	3,6	1	1	1	1	2	2	2	2	4	2	t	N	2	p	a	a	1,3	1b	p	1	a	p	2	1	1	1	1	2	<60%
186	11/m	1,2,3	1	1	4,5	2	2	1	1	2	2	1	3	2	3	t	N	2	a	a	a	4	1a	p	1	a	a	1	1	1	1	1	2	80%