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RESEARCH ARTICLE

ANALYTICAL PILOT PROJECT ON "POSER-PEDIATRIC ORTHOPAEDIC SURGERIES BASED ON ETIOLOGY RETROSPECTIVELY" AT A TERTIARY REFERRAL HEATH CARE CENTER IN NORTH EASTERN INDIA.

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Abstract

Introduction: The various pediatric problems encountered in children fall into the categories of trauma, metabolic disorders, infections and congenital groups etc. The management of these conditions varies from medical to surgical or both, based on requirements of the presenting problem.

Aim: The study aims at finding out the demographic profile and aetiology of various paediatric orthopaedic problems for which surgical interventions are undertaken at North Eastern Indira Gandhi regional Institute of Health & Medical sciences (NEIGRIHMS), Shillong.

Materials and Methods: The retrospective study for **"POSER-Paediatric Orthopaedic Surgeries Based on Etiology Retrospectively" at a tertiary referral heath care center in North Eastern India** was conducted encompassing the period of six years from January'2012-December'2017 in the Orthopaedics department at North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences (NEIGRIHMS), Shillong, India. Patients who underwent various Orthopaedic surgeries in the age group upto 18 years were evaluated. Patients who underwent surgeries multiple times due to some complication related to the previous intervention or the disease itself were excluded while numbering them in collecting the data.

Conclusion: Our study has highlighted various paediatric orthopaedic disorders based on etiology and their gender as may be found in a setting of a tertiary health care facility for which surgical interventions are required. This revelation may go a long way in designing the pediatric surgery training curriculum for the medical students undergoing training in the subspecialty of paediatric orthopaedics and also to formulate preventive strategies for problems wherever applicable. However, more detailed prevalence of various childhood bone and joint as reflected through data of our patients and to plan out pediatric orthopaedic health care facility in a region. dirsorders may help in formulating training modules for the medical students

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Introduction:-

A child's musculoskeletal problems are different from those of an adult. The peculiarity of the child's skeleton lies in the fact that it has the presence of growth plates at the end of the growing long bones. These growth plates contribute to the longitudinal bone growth. Various disorders falling in the categories of infections, metabolic disorders, tumors, fractures and congenital problems etc. Have the potential to effect the growth and cause skeletal deformities. Orthopaedic problems in children may require a combination of a conservative-surgical team approach. Operative procedures are the most definitive mode of treatment in severe paediatric orthopaedic problems as and when required (Staheli, 2006). [1]

It is quite desirable then to know the extent of problem and the category in which it falls, which can lead us to frame a preventive strategy in relation to a particular problem affecting the population in the given area and even to establish a paediatric health care facility in the region so affected. With this idea in mind, a retrospective study from our hospital data was planned, which evaluated the gender and aetitlogies with regard to orthopaedic problems in paediatric age group, who were subjected to some surgical intervention during their visit to this tertiary referral health care center in northeast India.

Aims:-

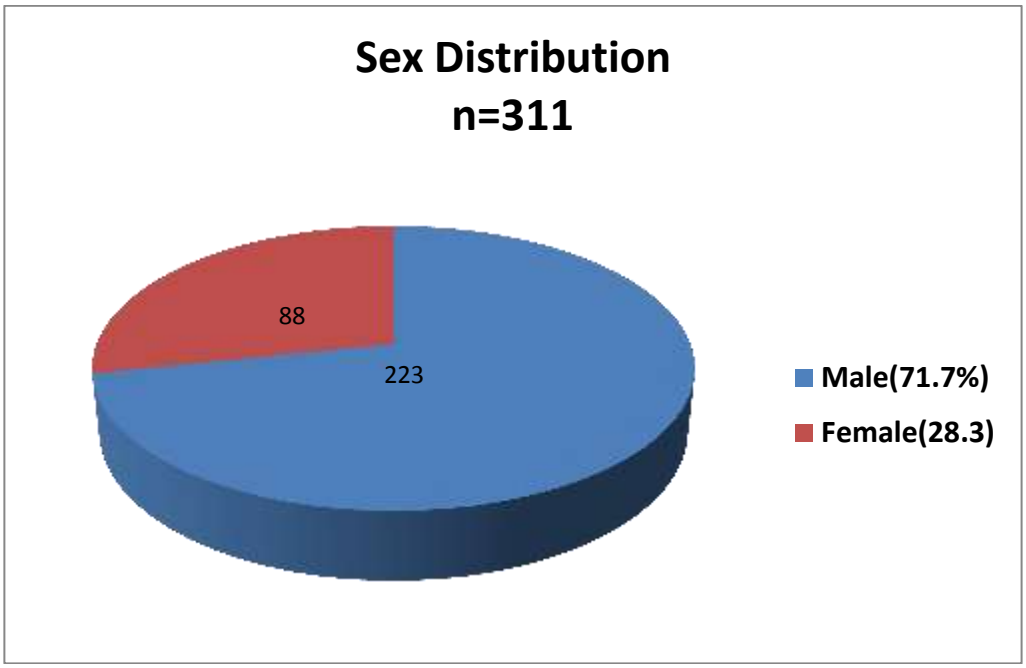
1. To find out any significant gender based difference in paediatric orthopaedic cases presenting to the hospital.
2. To study the aetiology i.e. congenital, infective or traumatic in children between the age group of 0-18 years.
3. To correlate the most common aetiology in different age groups of 0-6 years, 7-12 years and 13-18 years.

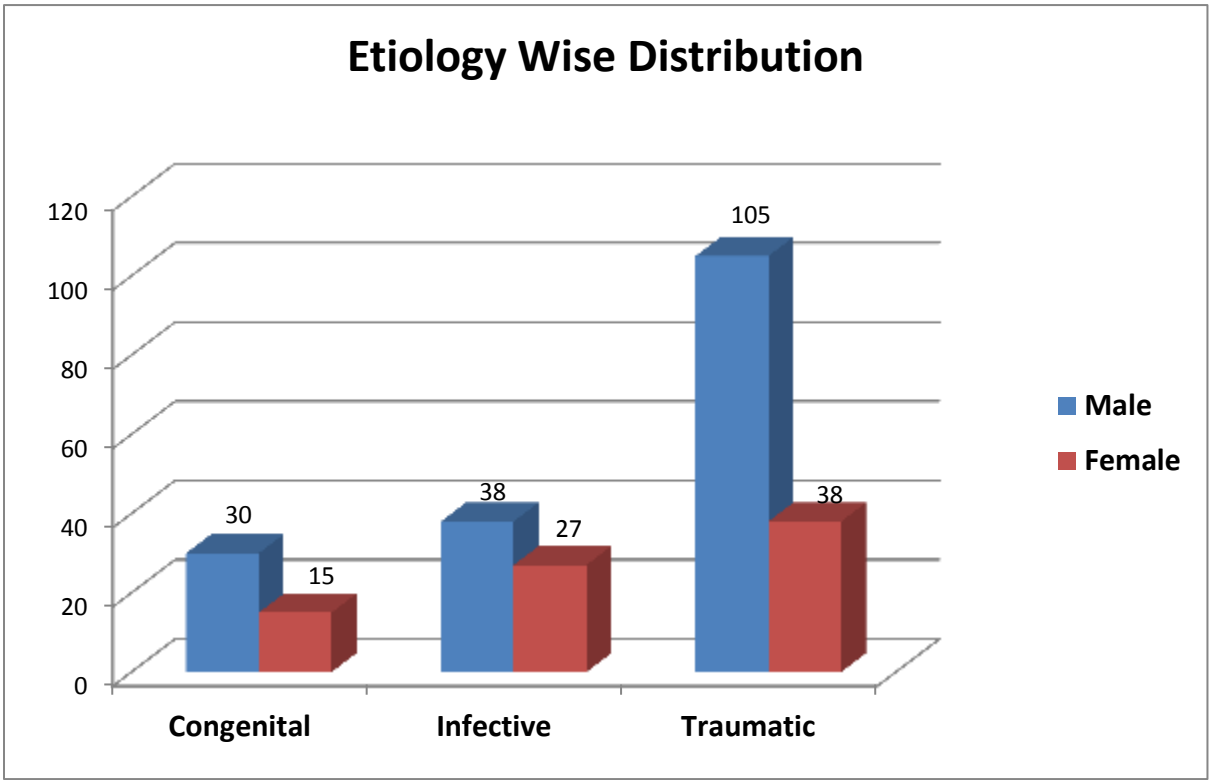
Material & Methods:-

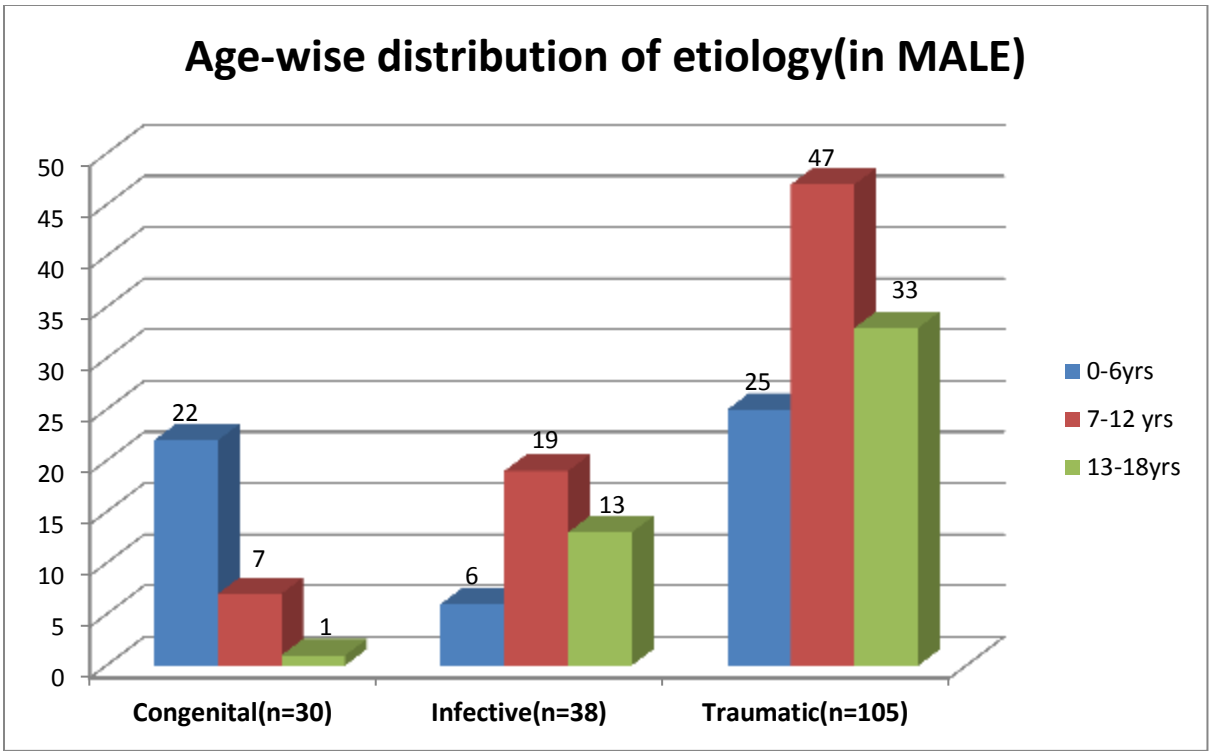
It was a retrospective study. Hospital data of patients in the age group of 0-18 years presenting to the department of Orthopaedics from 2012-2017 (5 years) was analyzed. Only those patients in whom the disease/injury was severe enough to require operative intervention were studied, there by excluding the cases which underwent conservative approach of management for the disorder.

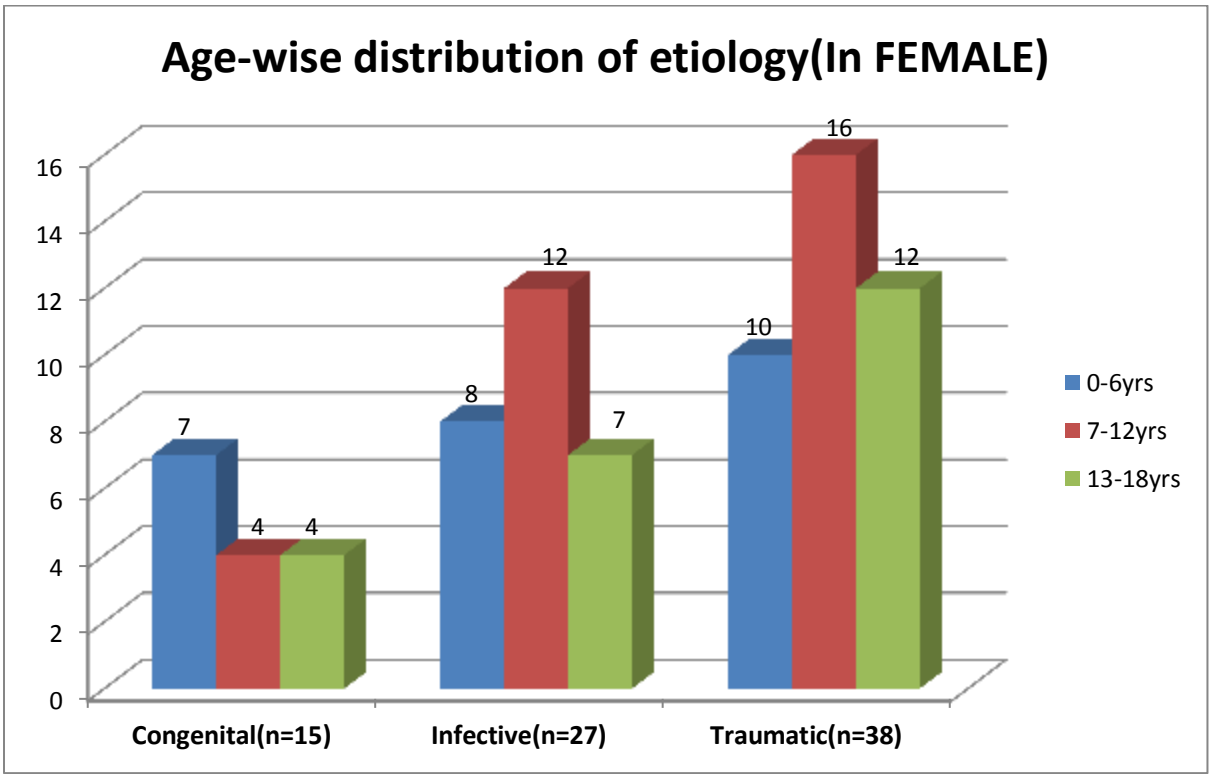
Demographic and other data were extracted from the database and stored in a spreadsheet for analysis of the case characteristics. The case records of all these patients who were within 18 years of age and who underwent treatment for various orthopaedic disorders here at this hospital were studied and the data thus obtained was recorded & analyzed based on age, sex, presentation and surgical intervention undertaken. Based on the nature of injury/disease and investigations, the aetiology was diagnosed and classified into Congenital, Infective and Traumatic categories.

Results:-


Sex Distribution
n=311
88
223
Male(71.7%)
Female(28.3)


Etiology Wise Distribution
120
100
80
60
40
20
0
30
15
38
27
105
38
Congenital
Infective
Traumatic
Male
Female





In our study, 311 pediatric orthopaedic patients were analyzed in the total period of 5 year who underwent some form of surgical intervention. Out of these 223 (75%) were male and 88 (23.3%) were female. Male patients were considerably more than the female counterparts having bone disease/injury in younger age group. Though in older

age group, women as is well known, tend to have more prevalence of osteoporosis and probably increased number of fractures subsequently.

Table 1:-

Etiology	**Percentage distribution in sex**	
	Male	Female
Congenital	66.66	33.33
Infective	58.46	41.53
Traumatic	47.10	43.20

Etiology:-
When comparing the causes of bone diseases 66.66% male had congenital diseases as compared to 33.33% females and were subjected to operative intervention. Infective orthopaedic problems were found in 58.46% males vis a vis 41.53% females. Traumatic bone diseases accounted for 47.10% in males vis a vis 43.20% in females. Gender based difference found in our study was not statistically significant.

Table 2:-

Etiology in male	**Percentage in different age groups**		
	0—6 yrs.	7-12 yrs.	13-18 yrs.
Congenital	73.35	23.35	3.35
Infective	15.80	50.00	34.20
Traumatic	23.80	44.75	31.40

Etiology in males- On analysing the type of diseases among the males, congenital diseases were found to be more common between 0-6 years. The most common congenital disorder seen in our study was club foot. Both infective and traumatic bone diseases were most common in the age group of 7-12 years. Probably this is the time when the child is active, reckless, curious and is moving from protected home envoirnment to perils of external envoirnment thus being more exposed to infections and trauma.

Table 3:-

Etiology in female	**Percentage in different age groups**		
	0—6 yrs.	7-12 yrs.	13-18 yrs.
Congenital	46.65	26.65	26.65
Infective	29.60	44.45	25.95
Traumatic	26.30	42.10	32.00

Etiology in females:-
On analyzing the diseases leading to orthopaedic surgery in young females, it was found that congenital lesions are most common in 0-6 years age group. Infective and traumatic bone diseases are more common between 7-12 years.

χ^2 test was used for statistical analysis & All statistical tests were calculated at $P \leq 0.01$.P-value <0.01 considered significant.

	χ^2 value	**Degree of freedom**	**P-value**	**Significance (Yes/No)**
T1	5.016	2	0.081	No
T2	87.05	4	<2.2e-16	Yes
T3	12.7	4	0.012	Yes

1. No significant difference has been found with regard to operative interventions undertaken between female and male i.e. gender based aetiological difference.
2. But, within same sex of different age groups there are significant observations:

In case of male paediatric patients undergoing operative interventions, there is statistically significant association between different age groups and aetiology.

Whereas, female group shows no statistically significant difference between various age groups and aetiology.

Discussion:-

In our search of literature we could also not find the studies which analyzed the pattern and aetiology based distribution of pediatric disorders, encouraging us to undertake this study. This is in accordance to the observation of Burnette JB et al [2] in pediatric orthopaedic patients undergoing surgery. Hence this data was analyzed to evaluate severe cases of orthopaedic diseases requiring surgery especially to observe any association between the bone disease and injuries of patients in male and female gender and any relationship to particular age group thereof.

A study in sub-saharan Africa mentioned about the preponderance of injury, congenital musculoskeletal disorders and infection amongst the most frequently occuring surgical diseases in children[3].

In a study conducted by Dorman SL et al [4], In reference to establishing a children's hospital for Malawi, it was found osteoarthritis (OA) of the hip secondary to disorders like Perthes disease (LCPD) [5-9], Slipped capital femoral epiphysis (SCFE) [10-12], dysplastic hip (DDH) [13-16], Idiopathic femoro-acetabular impingement (FAI) [17-22], as well as Juvenile polyarthritis [23-26], Septic arthritis [27-30], Primary and Secondary avascular necrosis [31-35]. The aim of their intervention was to relieve pain, restore function and overall quality of life [36, 37].To intervene in pediatric disorders is itself challenging and requires specialized training and such studies help us in delineating the plethora of problems one can encounter as an orthopaedist.

In a study conducted by Mukesh Sharma et al [34], it was found that over all trauma was most common in school going age group (6-12 years) with male children outnumbering females in the ratio of 1.9:1.

In our study also, we have found that trauma is most common in the age group of 7-12 years & males far outnumber females. However, here it should be highlighted that this trauma required some operative intervention and that the cases undergoing non operative management are not included. These observations corroborated with the study undertaken by Mukesh et al [34] where trauma was most prevalent in between 6-12 years with male preponderance. Fractures in children can be an important reason for affecting the life, activity of the child and his parents and in no way this problem can be underrated, even if the problem is not involving the productive adult component of the society directly.

Data on burden inflicted by injuries in India during childhood is virtually inadequate. The problem becomes more compounded when it comes to epidemiological findings on pediatric trauma in developing countries as a whole.

Our showed that traumatic bone diseases accounted for 47.10% in males vis a vis 43.20% in females, where operative intervention was undertaken. However, this difference was not significant. Perhaps more data needs to be evaluated to find out any difference in the nature of trauma and the surgery undertaken in different genders.

In our study infective etiology was seen maximally in the age group of 7-12 year old patiens. We also found that the kind of bone diseases, be it congenital, infective or traumatic were found to be more in males as compared to females.

The exact cause of such high incidence rates of bone and joint infections among our indigenous pediatric population is not definitely known. This can be a matter of subsequent studies in the light of the fact that ours is a referral center and is catering to the people from far flung areas in the north eastern part of the country in addition to the local population.

Acute Hematogenous Osteomyelitis is more commonly reported in males and in young children and it more frequently involves the lower limb and long bones. In our study, however females were found to have slightly more infection rate compared to males. More analysis is required by taking up community based longitudinal studies to establish this association and the reasons thereof [38]. Osteoarticular infections in children warrants prompt diagnosis and treatment with operative interventions many times to avoid poor outcomes [39].

In our study also club foot was the most common congenital pediatric orthopaedic disorder requiring surgery. Majority of the patients fall in the age group of 0-6 years This knowledge may be of benefit in taking up club foot awareness and management in the form of posteromedial soft tissue release and bony tarsal surgeries etc. [40] program on this group of children in the community for controlling long term disability in the form of neglected pattern of disability in adulthood.

These studies highlight the importance of studying the regional distribution of different paediatric orthopaedic problems in a given geographical area as it may be related to certain predisposing factors prevalent in that population.

Many unique qualities of paediatric surgical care pose a good challange foe developing a quality health care program. There is marked heterogenicity in outcomes of surgical procedures in children, some resulting from the physiological changes in function, which are a part of normal development & growth.[40] Also, a positive relationship between volume and outcomes has been reported for various orthopaedic procedures as well.

Our study had many limitations. It had relatively small numbers, and derived from a population unique in its climate, ethnicity and socioeconomic demography thus limiting the generalabity of our inferences. However, it may serve as an important tool for the health administrators while they plan a health care facility focussing on children in a region. Being a retrospective nature of study, some data was incomplete or missing and even follow-up outcome after an intervention and response to antibiotics in patients pertaining to osteoarticular infections. However, this omission related bias has been taken care of by not including the patients undergoing operative intervention again for the same disorder.

Conclusion:-

The general lack of data on health care, in particular on high-cost hospital admissions and trauma care, results in the burden of injury being underestimated in many countries. It also prevents a proper analysis being made of the groups receiving such expensive and scarce health care and of the nature of their injuries.

So, this study has shown the prevalence of various childhood orthopaedic disorders like fractures, congenital problems like club foot or infective diseases like osteomyelitis, septic arthritis etc. and also their gender based difference through this ppilot study project on “POSER”, taken up in the one of the neglected north eastern region of this country. It may form the basis of taking up the training program in pediatric orthopaedics & it may also serve as an important tool for the health administrators while they plan a health care facility catering to children in a region. This study may become a torch bearer for the future more cross sectional and multicentric studies to anlyse various modifiable and non modifiable factors in various disease aetiologies. Planning and formulation of strategies to target modifiable factors can then help to attain a healthy and economically sound society with healthy adults in future.

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