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Physical disability of musculoskeletal affection- Retrospective analysis of data in a teaching institute

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ABSTRACT

Introduction: There is little internationally comparable statistical data on incidence, trends and distribution of disability. Musculoskeletal diseases are one of major causes of disability. Aim of this study is to retrospectively analyze data of physically disabled population of musculoskeletal affection.

Materials and Methods: Permanent disability of more than 40% of musculoskeletal affection in all ages and both sexes of single district of our state who voluntarily attended Disability Assessment and Certification Camp at Department of Orthopaedics at our teaching institute on first and third Friday of every month from 2012 to 2017 were included. Temporary disability, disability of hearing, visual, mental retardation etc., disability of less than 40% and disabled evaluated and certified at camps outside our Institution were excluded. Disability percentage was calculated as per standard method prescribed by Guidelines and Gazette by Government of India. Diagnosis was clinical in majority but whenever needed, appropriate investigations were done. Educational and occupational status was evaluated on using Kuppuswamy's method. Authors realized that monthly income in each category of Kuppuswamy's method was quite low considering today's context and therefore was modified and used to evaluate income status.

Results: 367 persons fulfilled our criteria and included. Mean age was 29.67 years (1-69 years). Majority (20.99%) in 30-40 years age and least (6.82%) in 60-70 age. Males (73.30%) and rural population (75.75%) were thrice more common than their counterparts. Highest percentage of disability was 95%, average being 60.85% and majority (42.78%) had 40-50% disability. Acquired conditions (63.76%) were almost double to congenital condition (36.24%). Cerebral palsy (45.12%) was most common congenital cause and amputation (17.95%) was most common acquired cause. Illiterate, primary school certificate and middle school certificate constituted majority (71.38%). Clerical job, Shop owner and Farm owner was most common (39.84%) followed by un-skilled worker (20.71%) and unemployed (13.90%). 23.83 % had monthly income of Rs 1000 or less and 22.26 % had between Rs 1001 to Rs 2999.

Conclusion: This study provides an epidemiological data of musculoskeletal disabled population which can be utilized for policy making and implementation for prevention, treatment and rehabilitation programs.

1. Introduction

World Health Organization (WHO) defines disability as any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being.[1] This includes persons with visual, hearing, speech, loco-motor and mental disabilities. It can be temporary or permanent and progressive or regressive.[2] Disability is a relative term, measurement is a problem and most existing instruments are poorly standardized and they produce non-comparable estimates.[3] There is little internationally comparable statistical data on the incidence, trends and distribution of disability.[4] The data on disability in low-income countries in general is abysmal and few existing overview articles suffer from poor quality, lack of comparability and limited applicability.[5]

While WHO for many years has estimated 10% of world population to be suffering from some form of disability, it is

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suggested that the proportion is more likely to be around 4% in low- income countries and 7% in high-income countries.[6] Although WHO estimates 1/6th of disabled population to be residing in India, yet Indian surveys like National Sample Survey Organization (NSSO), Census data of 2001 and 2011 reported its prevalence as low as around 2%.[7]

Musculoskeletal diseases are one of the major causes of disability around the world, in both developed and developing countries.[8] There is a report that of all persons receiving disability pension or taking long-term sick leave, 60% had a diagnosis related to the musculoskeletal system.[9] The aim of this study is to conduct a retrospective analysis of six years data of physically disabled persons of musculoskeletal affection who voluntarily attended disability assessment and certification camp at our tertiary care teaching institute.

2. Materials and Methods

Permanently physical disabled persons of musculoskeletal affection with more than 40% disability of all ages and both sexes of only single district of our state who voluntarily attended Disability Assessment and Certification Camp at Department of Orthopaedics of our Institute in collaboration with Department of Social Welfare and Justice of our state Government on the first and third Friday of every month (except holidays) for 6 years from April 2012 to September 2017 were included in our study. The study excluded those with temporary disability, disability of other causes such as hearing, visual, mental retardation etc., disability of less than 40%, inhabitants outside this district of the state and disabled who were evaluated and certified at camps held outside our Institution. Disability percentage was calculated as per standard method prescribed by Guidelines and Gazette Notification Regd. No. DL33004/99 (extraordinary) part II, Sec1, June 13, 2001 issued by Ministry of Social Justice and Empowerment, Government of India.[10] A minimum of 40% disability was needed for issuing disability certificate & therefore only those more than equal to 40% disability were considered in the study. Although diagnosis was clinical in majority of patients but whenever needed, investigations like radiograph, Computerized Tomography (CT) scan, Magnetic Resonance Imaging(MRI), Muscle biopsy, blood parameters etc. were done. The collected data was analyzed for distribution of age, sex, residential location and percentage, duration & cause of disability of musculoskeletal affection.

Education status of all persons was documented. As patients above 18 years of age are only lawfully employable, the occupational status and economic status of only those patients above the age of 18 years were documented for analysis. All persons submitted educational certificate issued by last institution/board/university he/she was attending or had attended as proof of their educational qualification. Patients above 18 years of age produced employment certificate issued by concerned authority he/she was working under. In case patient was unemployed or self-employed, a certificate issued by District Commissioner or Sub Divisional Officer or Block Developmental officer was accepted. All patients above 18years of age also produced an income certificate on basis of annual income tax return or issued by District Commissioner or Sub Divisional Officer or Block Developmental officer.

The educational and occupational status was evaluated on the basis of Kuppuswamy's method.[11] However, authors felt that the monthly income in each scoring category in Kuppuswamy's method was too low in present day context. Therefore authors modified the original Kuppuswamy's economic categorization by multiplying the smaller denominator by 10 and increasing larger denominator to 1 less than next higher category.

3. Result

568 persons filled up prescribed application form along with enclosure of necessary documents. Only 367 persons fulfilled our criteria and included in this study. The youngest patient in our study was 1 year old and eldest patient was 69years old. The mean age affected was 29.67 years. The most common age group affected was between 30-40 years (N=77, 20.99%) followed by 10-20 years (N=68, 18.52%). These two age groups constituted 145 cases out of 367 (39.50%). The least common age group was 60-70 years (N=25, 6.82%) [Figure 1].

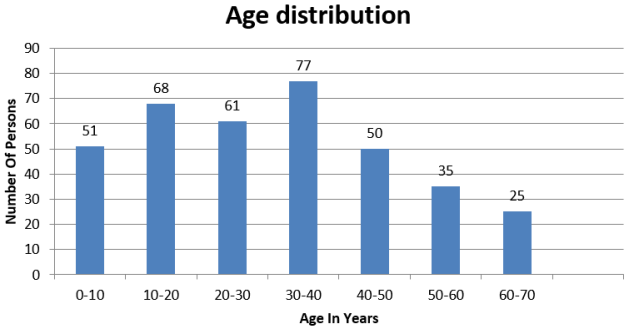

Fig. 1: Age distribution of study sample. Age in years at 10 years interval on X-Axis and number of persons in Y-Axis

Males affected in the study was 269 cases (73.30%) as compared to 98 females (26.70%) with male : female ratio of about 2.7:1. The most of the study population resided in rural areas (N=278, 75.75%) as against only 89 cases (24.25%) in urban areas. The ratio of rural to urban residents in study population was 3.12: 1.

Persons with disability of more than 40% were only included in the study. Maximum percentage of disability was 95% and average percentage of disability was 60.85%. Majority (N=157, 42.78%) belonged to 40-50% of disability

Table 1: Kuppuswamy's Method of Socioeconomic Classification of an individual

	Item		Score
A	**Education**		
1	Professional degree, Honors degree, Postgraduate degree		07
2	Graduation		06
3	Intermediate, post high school diploma		05
4	High school certificate		04
5	Middle school certificate		03
6	Primary school certificate or literate		02
7	Illiterate		01
B	**Occupation**		
1	Professional		10
2	Semiprofessional		06
3	Clerical, Shop owner, Farm owner		05
4	Skilled worker		04
5	Semiskilled worker		03
6	Unskilled worker		02
7	Unemployed		01
C	**Income Per Month(Rs)**		
	Kuppuswami's original classification	**Authors' modification**	
1	2000 or more	X10=20,000 or more	12
2	1000 -1999	X10=10,000 -19,999	10
3	750-999	X10=7,500-9,999	06
4	500-749	X10=5,000-7,499	04
5	300-499	X10=3000-4,999	03
6	101- 299	X10=1,001-2999	02
7	100 or below	X10=1,000 or below	01

& least (N=2) fell in 90-100% of disability category [Figure 2].

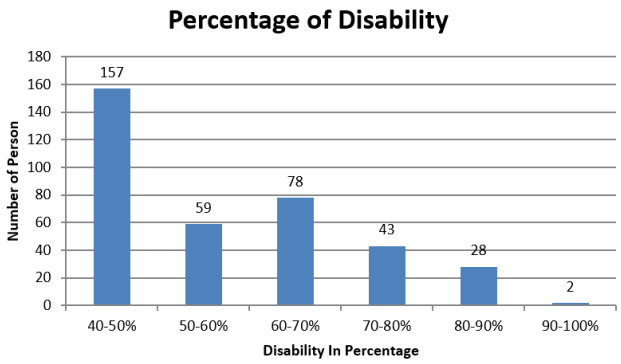

Fig. 2: Distribution of study sample in terms of disability percentage. X-Axis showing disability percentage at 10% increment starting from 40%. Y-Axis showing number of persons

The shortest duration of disability in the study was for 1 year and the longest was 65 years. The most number of persons were disabled for 15-20 years (N=52, 14.17%) followed by 0-5 years (N=45, 12.26%) [Figure 3].

The acquired causes of disability (N=234, 63.76%) were almost twice more common than congenital & developmental causes (N=133,36.24%). The most common cause amongst congenital/developmental causes of disability was cerebral palsy constituting(N=60, 45.12%) followed by CTEV(N= 24,18.05%) [Table 2]. The acquired causes of disability were numerous and varied in the study population. The most common acquired causes in our study was amputation (N= 42, 17.95%) [Table 3].

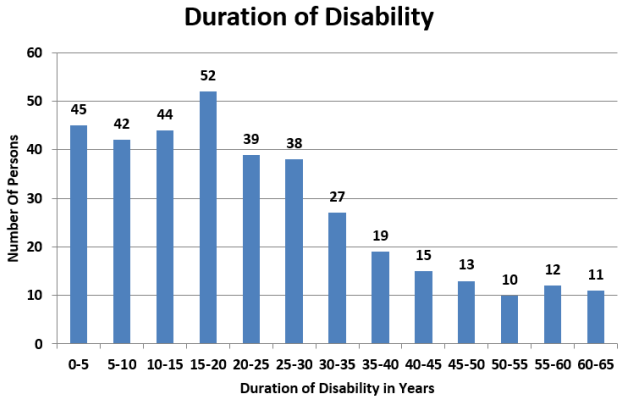

Fig. 3: Duration of disability in study sample.X-Axis showing duration of disability in years & Y-Axis showing number of persons

Table 2: Distribution of congenital/developmental causes of disability

Causes	No. of Patients
Cerebral palsy	60
Untreated/ failed treated/ uncorrected CTEV (into adulthood) -Unilateral	16
Untreated/ failed treated/ uncorrected CTEV (into adulthood) - Bilateral	8
Congenital agenesis of Upper limb	12
Congenital agenesis of Lower limb	2
Congenital agenesis of Both upper & lower limb	1
Muscular Dystrophy	9
Congenital Syndactylism of bilateral hands & feet	1
Congenital Shortening of Upper limb	1
Congenital Shortening of Lower limb	2
Congenital Synostosis of Bilateral forearm	1
Untreated bilateral congenital Calcaneovalgus foot(into adulthood)	1
Short Stature	4
Klippel Feil Syndrome	3
Pseudoarthrosis of tibia with failed multiple surgeries	3
Klippel Trenaunay Syndrome	1
Down Syndrome	1
Congenital Weakness Of Right Wrist and Hand Grip Strength with Functional deficit	1
Mandibular Dysgenesis	1
Mandibular Hypoplasia with shortened Lower Limb with Genu Varum	1
Myelomeningocele	1
Arnold Chiari Malformation	1
Anterior Horn Cell disorder	1
Untreated bilateral Rocker Bottom foot (into adulthood)	1

3.1. Education based on Kuppuswamy's score

Kuppuswamy's highest score of 7 signifying Professional degree, Honor's degree, Post-graduate degree was attained by only 7 patients (1.91%) and score of 6 signifying Graduation was attained by only 23 patients (6.27%). The illiterate (N=73), primary school pass out (N=99) and middle school certificate (N=90) constituted majority (N=262, 71.38%).

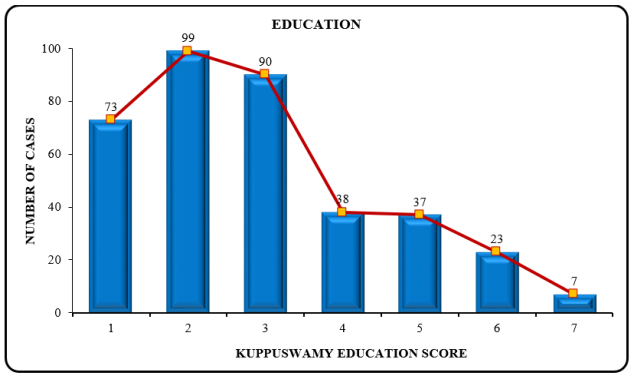

Fig. 4:

3.2. Distribution of occupation based on Kuppuswamy's score

Only 256 persons in our study population were above the age of 18 years and therefore as per our methodology were documented and classified for their occupational category. Kuppuswamy's occupational score of 5 (Clerical job, Shop owner and Farm owner) was most common (n=102, 39.84%) followed by score of 02 (un-skilled worker, n=53, 20.71%) and score of 01 (unemployed, N= 51). Kuppuswamy's score of 10 (n=2, 0.788%) and 06 (n=4, 1.56%) which included professional and semiprofessional respectively were least represented.

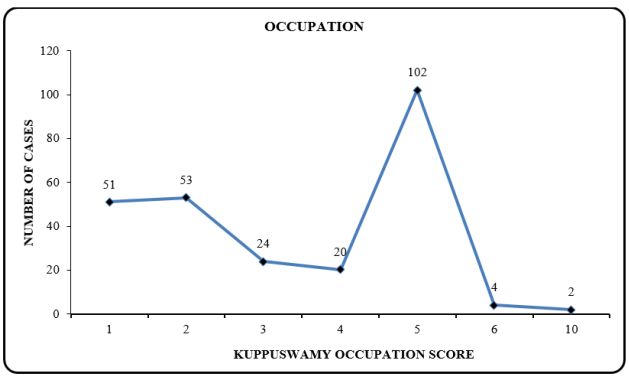

Fig. 5:

Table 3: Distribution of acquired causes

Causes	No. of Patients
Below Elbow Amputation	5
Elbow disarticulation	4
Above Elbow Amputation	7
Wrist Disarticulation	4
Above Knee Amputation	8
Knee disarticulation	2
Below Knee amputation	9
Syme's amputation	3
Post Polio Residual Paralysis	21
Fixed Flexion Deformity of Upper Limb	3
Fixed Flexion Deformity of Lower Limb	4
Brachial Plexus Injury	10
Erbs Palsy	3
Myositis ossificans following surgery for posterior dislocation of hip with acetabular #	1
POC of left parietal astrocytoma with urine & stool incontinence	1
Quadriparesis	1
Hemiparesis	3
Hemiplegia	28
Paraparesis	7
Monoparesis	6
Arthrodesis	8
Sequelae of Ankylosing Spondylosis with uncorrectable spine and hip deformity	3
Sequelae of Seronegative Arthropathy	4
Sequelae of Rheumatoid Arthritis with multiple joint deformity	5
Sequelae of Pyogenic maningitis	5
Sequelae of Leprosy with mutilated hands and feet	1
Sequelae of Encephalitis	3
Sequelae of cervical Myelopathy	1
Sequelae of Brain Injury	2
Haemophilic Knee joints	1
Post TB Spine with severe Kyphotic deformity	2
Post TB Spine with severe Kyphoscoliotic deformity	3
Post TB hip with fixed deformities	5
Post TB knee ankylosis	3
Post TB Wrist deformity and stiffness	3
Post Burn contracture with limb joint involvement	2
Scoliotic Deformity	5
Spasticity	8
Post infective Anklestifness	2
Post septic arthitisbony ankylosis of knee	3
Post septic arthritis hip sequelae	4
Infected nonunion of fracture Both bone Leg with failed multiple surgeries	2
Post surgical permanent shoulder stiffness	2
Post surgical permanent elbow stiffness	4
Post injury residual Radial Nerve Palsy	4
Bilateral Knee Dystrophy	1
Crush Injury foot	3
Sequelae of bullet injury to right wrist & hand	1
Myopathy (of various etiology) Upper limb	5
Myopathy (of various etiology) Lower limb	9

3.3. Distribution of income per month based on Authors' modification Kuppuswamy's score

Only 256 persons in our study population were above the age of 18 years and therefore as per our methodology were documented and classified for their income category on basis of author's modified kuppuswamy's score. The highest score of 12 and second highest score of 10 was attained by only 07 (2.73%) and 11(4.31%) persons respectively. Kuppuswamy's income score of 6(monthly income of Rs 7500-9999) was most common (N=71, 27.73%) followed by score of 01 (monthly income of Rs 1000 or below, N=61, 23.83%) and score of 02 (monthly income of Rs 1001-2999, N=57, 22.26%)

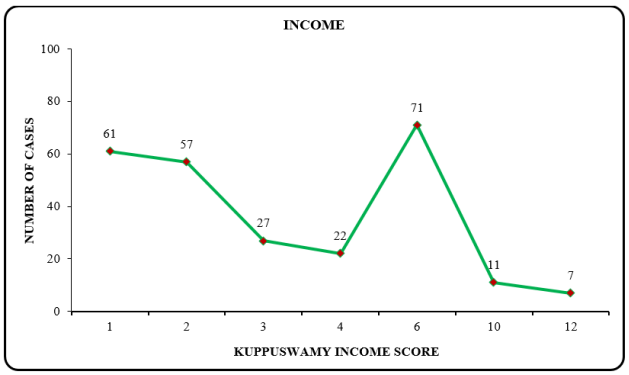

Fig. 6:

4. Discussion

There are great differences from country to country in the criteria used for defining disability in the descriptive and diagnostic labels used. Even within one country, the assignment to particular groups according to the kinds of difficulty or defect from which they suffer varies more or less arbitrarily according to the views of those making the classification and according to the purpose for which the classification is made. This makes attempts at comparable assessments of prevalence in different countries and different parts of the world hazardous. There are also real differences between countries in the prevalence of disability related to great differences in the provision of health, educational and social services. The real and substantial difference exists between the developed and the developing world.[12]

Even in such countries whose primary preventive services are comparatively highly developed and have social and educational services designed to provide for the disabled, there have been only a few fully adequate and comprehensive epidemiological studies. Even these studies are not based upon very clearly defined criteria. They provide a sobering snapshot of a state of affairs which is far from ideal.[12]

Current disability statistics is far from robust or comparable globally.[5] There is little information about the prevalence, incidence or epidemiology of disabling diseases in low-income countries and relies heavily on anecdotal evidence and case studies.[3] Most low-income countries carry out population censuses at regular intervals. Some of these censuses have also included questions to map number of individuals with different types of disability. The information is often based on outdated screening therefore its value is limited. This situation will improve following agreement on global standard questions for censuses.[5] Therefore it is often claimed that the published estimates of national, regional and global disabled populations are little more than speculation and educated guesswork.[13]

The estimated disability rates tend to be higher in developed (high-income) countries, possibly due to variations in definition of disability and in the way information is collected, demographic differences and greater capacity to diagnose some conditions.[3]

Based on 2010 population estimates, globally around 785-795 million persons aged 15 years and older are disabled.[7] The prevalence of musculoskeletal disability in a population varies very considerably from time to time according to a wide variety of factors.[10] The global prevalence of loco-motor disability was estimated at 23 per 1,000 but some populations at higher risk of disability were not included (nomads, soldiers and the residents of a few mined villages).[14] Around 4-5 children per 1,000 of school age in developed countries have marked musculoskeletal anomalies. The figure may well be higher in developing countries.[12]

In India, the National Sample Survey Organization (NSSO) has been collecting information on socio-economic conditions of persons with disabilities on regular basis once in ten years since 1981. The Census has also started collection of information on persons with disabilities from the Census-2001.[2]

According to the Census 2001, there are 2.19 crore persons with disabilities in India who constitute 2.13 percent of the total population. This includes persons with visual, hearing, speech, locomotor and mental disabilities. There were 93.01 lakh women with disabilities, which constitute 42.46 percent of total disabled population Seventy five per cent of them live in rural areas, 49 per cent were literate and only 34 per cent are employed.[2] The musculoskeletal disability population in India was estimated at 4.2 million, this figure being ever growing and not static.[11]

NSSO 2002 report estimates that about 1.8% population of our country is having one or other kind of disability. More than 50% of them (1% of population) have orthopaedic disability and amongst them roughly half (50% or 0.5% of population) are of deformity. In other words, more than 4.5 million population of our country are having deformity. The male and female ratio is 3:1. Age ratio is that of child:

adult: geriatric is 1:3:1 and rural and urban ratio is 4:1. Post-traumatic deformity (29%) is the main cause followed by Post-Polio Residual Paralysis (PPRP, 27%), congenital including cerebral palsy (24%) and others (20%). It is also estimated that 45% of them had mild, 30% had moderate, 15% had severe and 10% had profound deformity.[7]

As per the Census 2011, out of 121 Cr population in India, 2.68 Cr persons are 'disabled' (including all types) which is 2.21% of the total population. This shows that there is increase of 0.08% disabled population in our country as compared to census 2001.56% (1.5 Cr) are males and 44% (1.18 Cr) are females. 1.86 Cr disabled persons reside in rural areas and 0.81 Cr in urban areas. The loco-motor disability affected 5,436,604 persons (20.3% of total disability population).Males are 3,370,374 (22.5% of all disabled persons) and females are 2,066,230(17.5% of all disabled persons). 21.7% loco-motor disability persons resided in rural areas as opposed to 17.1% in urban areas.[15]

There were 51 and 68 disabled persons in the age group of 0-10 years and 10-20 years respectively. Together they constituted 32.43% of our study population. This disabled age group of below 20 years usually pursue their educational or vocational career. Permanent physical disability may therefore have negative impact in their career pursuance. Our study had about 60.76% of disabled persons between 20 to 60 years who would have been otherwise functionally active and socio-economically productive. There was predominance of male sex and rural residents.

157 persons had 40-50% disability, 59 persons had 50-60% disability and 78 persons had 60-70% disability. Therefore it can be inferred that majority of our study population had between 40-70% of disability. The number of years our study population spent as disabled varied. The duration of disability each person lived with was also assessed in our study by categorizing at 5 years of increment (0-5years, 5-10 years, 10-15 years etc.). It was found number of disabled persons were almost equal in each category from 0-30 years of duration of disability (as can be seen in diagram 3).

Injuries are among the leading causes of death and disability in the world. They affect all populations, regardless of age, sex, income or geographic region. Injuries affect mostly young people, often causing long-term disability.[16] Non-life threatening injuries, in particular injuries to the hand and limb fractures, resulting from accidents in the workplace, the home and during sports make a significant contribution to the prevalence of permanent injury related disability in young adults.[17]

In our study the causes of disability were vast and varied origin of congenital/developmental or acquired nature. Cerebral palsy, amputation, sequelae of central or peripheral nerve system deficit, post-polio residual paralysis, untreated/failed treated CTEV patients attaining adulthood, congenital agenesis of limbs, sequelae of pyogenic or tubercular infections, various types of myopathy etc. were the predominant causes in our study population.

Majority of the disabled persons in our study were illiterate or primary school certificate holder or middle school certificate holder. The graduate, post-graduate or professional degree holders were very small in numbers. Our study population had only 2.34% of professionals and semi-professionals and 7.82% of skilled workers. About half of our study population were semi-skilled or un-skilled workers or unemployed. The modified kuppuswamy's score that we used in our methodology to calculate economic status showed that 23.83 % had monthly income of meager Rs 1000 or less and 22.26% had monthly income between Rs 1001 to Rs 2999. More than 50% of our study population lived with monthly income of less than Rs 5000. Therefore it can be inferred that the disabled population in our study were socio-economically backward and disadvantageous.

Our study is retrospectively designed and sample represents only voluntarily assessed residents of a single district of our state. These are the limitations of our study. On the other hand, six years long duration data of a considerably large sample size, being evaluated and certified for musculo-skeletal disability by a single team of evaluators in a tertiary care referral teaching institute are strong points of our study.

5. Conclusion

This study gives us an epidemiological data including education, occupation and income status of musculoskeletal disabled population which can be utilized for policy making and implementation for prevention (of the preventable causes), treatment (of treatable or curable causes) and rehabilitation (education, vocation, economic and social) programmes.

6. Source of Funding

None.

7. Conflict of Interest

None.

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