“ASSOCIATION OF SOCIOECONOMIC STATUS WITH INCIDENCE AND SEVERITY OF MUSCULOSKELETAL TRAUMA”

THESIS

Submitted to

All India Institute of Medical Sciences, Jodhpur

In partial fulfilment of the requirement for the degree of

MASTER OF SURGERY (MS) ORTHOPAEDICS

JULY, 2020 **DR VIMAL PRAKASH**

AIIMS, JODHPUR

All India Institute of Medical Sciences, Jodhpur

DECLARATION

I hereby declare that the thesis titled "**ASSOCIATION OF SOCIOECONOMIC STATUS WITH INCIDENCE AND SEVERITY OF MUSCULOSKELETAL TRAUMA"** embodies the original work carried out by the undersigned in All India Institute of Medical Sciences, Jodhpur.

Dr. Vimal Prakash

Department of Orthopedics

All India Institute of Medical Sciences Jodhpur

All India Institute of Medical Sciences, Jodhpur

CERTIFICATE

This is to certify that the thesis titled **"ASSOCIATION OF SOCIOECONOMIC STATUS WITH INCIDENCE AND SEVERITY OF MUSCULOSKELETAL TRAUMA"** is the bonafide work of Dr. Vimal Prakash carried out under our guidance and supervision in the Department of Orthopaedics, All India Institute of Medical Sciences, Jodhpur.

GUIDE

Dr. Sumit Banerjee
Additional Professor
Department Of Orthopaedics
AIIMS, Jodhpur

CO-GUIDE

Dr. Abhay Elhence
Professor
Department Of Orthopaedics
AIIMS, Jodhpur, Rajasthan

CO-GUIDE

Dr. Prabodh Kantiwal
Assistant Professor
Department of Orthopaedics
AIIMS, Jodhpur, Rajasthan

CO-GUIDE

Dr. Mahaveer Singh Rodha
Additional Professor
Department Of General Surgery
AIIMS, Jodhpur, Rajasthan

ACKNOWLEDGEMENT

As I am near the completion of one of the most difficult academic pursuits, the MS thesis, I'd be negligent if I didn't convey my gratitude to everyone who helped me to get there. This massive project could not have been finished without the blessings of God, the unbelievable support of my family, the guidance and help of professors, seniors and friends.

First and foremost, I would like to express my gratitude to God Almighty for providing me the strength, knowledge, and ability to undertake this research study, endure, and successfully complete it.

My sincerest thanks are extended to my guide Dr. Sumit Banerjee sir, my thesis Guide and Additional Professor, Department of Orthopaedics, All India Institute of Medical Sciences, Jodhpur. Right from its conception to its culmination, she was the project's architect and this thesis would not have been possible without his vision and mentoring. Whenever I had a problem or had a question regarding this endeavour, the door to his room was always open. I consider myself extremely fortunate to have her tutelage and am eternally grateful for his wise advice.

I express my sincere gratitude to the Head of the department Dr Abhay Elhence sir, Professor and HOD, Department of Orthopaedics, AIIMS, Jodhpur, for providing the infrastructure and resources that allowed me to complete my research.

My sincere thanks to my first guide, Dr Nilesh barwar sir, Former Associate Professor, Department of Orthopaedics, All India Institute of Medical Sciences, Jodhpur

I am thankful to my co-guide Dr Prabodh Kantiwal sir, Assistant Professor, Department of Orthopaedics, All India Institute of Medical Sciences, Jodhpur for his invaluable contributions and assistance, which were vital in the thesis' completion.

My sincere thanks to my co-guide, Dr Mahaveer Rodha sir, Additional Professor, Department of General surgery, All India Institute of Medical Sciences, Jodhpur,

I am thankful to other faculty members of the department Nitesh Gahlot sir, Dr Sandeep Yadav sir, Dr Saurabh Gupta sir and Dr Rajesh Kumar Rajnish sir who were there for me in every step of the way for encouraging and guiding me.

I also thank my seniors Dr.Jeshwant, Dr. Sanchit, Dr Kishor, Dr Kunal, Dr Ashraf, Dr. Binod, Dr. Meghal, Dr.Azar, Dr. Lakshmi, Dr. Akhil, Dr. Abbas, Dr. Devdutha and juniors Dr. Ronnie, Dr. Sammarjanki, Dr. Akash, Dr. Amandeep, Dr. Adnan, Dr. Kiran, Dr. Naman, Dr. Amir, Dr. Raj, and Dr. Manveer for their valuable help in this study.

I thank all my colleagues Dr. Akshant Chandel, Dr. Sushil Kumar, Dr. Likhit Ram for their incredible ideas and cooperation during my entire journey as a postgraduate student. They have always kept me motivated when things seemed hopeless.

I would also like to thank my dear friends Dr. Akhil V George, Dr. Athul V, Dr. Manish Mohan , Dr. Ramanand, Dr. Sanjay Santhyavu, Dr. Sreevidya for their immense support to finish my thesis.

Sustenance has come in the form of affection from my family during this journey. I have no words to express gratitude for my father, Prakash and my mother, Laiju, my sister Vrinda, who support me in any kind of situation in my life and I am here just because of their unconditional love and immense blessings.

My heartfelt gratitude goes out to all of the Orthopaedics staff who worked with me and always encouraged me.

At last, words are short to express my deep sense of gratitude to all the participants who willingly and selflessly participated in my thesis during my research endeavour.

Dr. Vimal Prakash

CONTENTS

S No	Sections	Page No
1	LIST OF ABBREVIATIONS	i
2	LIST OF TABLES	ii
3	LIST OF FIGURES	iii
4	SUMMARY	iv-v
5	INTRODUCTION	1
6	AIMS AND OBJECTIVES	2
7	REVIEW OF LITERATURE	3-12
8	MATERIAL AND METHODS	13-15
9	RESULTS	16-33
10	DISCUSSION	34-39
11	STRENGTHS OF THENSTUDY	40
12	LIMITATIONS OF THE STUDY	40
13	CONCLUSION	41

14	**REFERENCES**	**42-44**
15	**Annexures (i-vii)**	**45-56**
	i. IEC certificate **ii. Modified kuppuswamy scale** **iii. Injury severity score** **iv. Consent form (English and Hindi)** **v. Patient Information sheet (English and Hindi)** **vi. Patient proforma**	**45** **46-47** **48** **49-52** **53-54** **55-56**

LIST OF ABREVIATIONS

ABBREVIATION	EXPANSION
SES	Socioeconomic status
RTA	Road traffic accident
ISS	Injury severity score
TA	Traffic accidents
MOI	Mechanism of injury
DALY	Disability adjusted life years

LIST OF TABLES

Table No.	Table Description	Page No.
Table 1	Review of similar articles	8
Table 2	Injury severity score grading	14
Table 3	Socioeconomic class distribution	17
Table 4	Mechanism of RTA	20
Table 5	Non-RTA Injuries	21
Figure 6	Injury severity score	22
Table 7	Socioeconomic status vs Injury severity	23
Table 8	Socioeconomic status VS mean and SD of ISS	23
Table 9	SES vs open fracture grading	25
Table 10	Education vs ISS	27
Table 11	Occupation vs Injury severity	28
Table 12	Age vs Mechanism of injury	28
Table 13	Gender vs mechanism of injury	29
Table 14	SES vs Mechanism of injury	30
Table 15	SES vs Workplace injuries	31
Table 16	SES category vs workplace injuries	31
Table 17	SES vs mechanism of RTA	32
Table 18	SES vs blunt/penetrating injury	33
Table 19	SES vs one month mortality rate	33
Table 20	Gender vs one month mortality rate	33

LIST OF GRAPHS/FIGURES

Table No.	Figure Description	Page No.
Figure 1	Gender distribution of trauma	16
Figure 2	Age distribution of trauma	17
Figure 3	Socioeconomic class distribution	18
Figure 4	Occupation of participants Out of 1000 patients, majority were shop and market sales workers (23.7 %) followed by agricultural workers (19.6%) and factory workers (11.8)	18
Figure 5	Education	19
Figure 6	Income	19
Figure 7	Mechanism of injury RTA vs Non-RTA	20
Figure 8	Blunt vs Penetrating injuries	21
Figure 9	Injury severity categories	22
Figure 10	Error bar plot of ISS vs SES	24
Figure 11	Scatter diagram showing ISS vs Income	26
Figure 12	Error bar showing Income vs ISS category	26
Figure 13	Education vs ISS	27
Figure 14	Occurrence of RTA and non-RTA were almost similar among males and female. Statistically no significant association was found between gender and cause of injuries	29
Figure 15	SES vs Mechanism of injury	30
Figure 16	SES vs workplace injuries	32

SUMMARY

Background: Traumatic injuries continue to be an important cause of mortality and morbidity. The trends vary widely by age, gender, location and cause. Traumatic injuries account to major part of healthcare burden and economic burden nowadays and it keeps on increasing year by year in developing countries like India. This study was designed to find out the relation between socioeconomic status of patients and incidence and severity of musculoskeletal trauma.

Objectives: To find out the association of socioeconomic status with incidence and severity of musculoskeletal trauma.

Methods: Patients with musculoskeletal injury who presented to AIIMS Jodhpur emergency during the period January 2021 to august 2022 were included in this study. Socioeconomic details of patients were collected with the help of a questionnaire. Socioeconomic status was calculated with Modified Kuppuswamy scale and injury severity was calculated with Injury severity score and Gustilo Anderson grading. Mechanism of injury, type of injury and post 1 month mortality status data were also collected.

Results: A total of 1000 trauma patients participated in this study. Primary data regarding injury and socioeconomic status was collected from all 1000 patients and for 1 month post injury follow up was done for 916 patients. Majority of patients were from 'upper lower' (43.4 %) and from 'lower middle' socioeconomic class (38.7%)

There was a significant negative correlation between socioeconomic status and injury severity score. Significant difference was found in ISS across various categories of SES [F=32.04, p<0.001].Significant negative correlation was observed between SES and Modified Gustilo Anderson grade of open fractures. [Spearman's rho=-0.243, p=0.003] i.e., as the SES increases, the Open fracture grade decreases. Significant negative correlation was observed between Income and Injury severity score. [Spearman's rho =-0.344, p<0.001] I.e., as the income increases, the injury severity score decreases. Significant association was found between education and severity of injury. Severe and profound injuries were found more in illiterate patients followed by school level educated patients and least in graduated patients. Graduates and above graduates presented mostly with mild injury. It was found that severe and profound injures were more common in unemployed and unskilled patients. Professionals, semi-professional, and arithmetic skilled patients presented mostly with mild grade injury. It was found that Lower socioeconomic class patients were more prone to workplace injuries and penetrating injuries compared to above lower socioeconomic class.

One month post trauma mortality rate was significantly higher in Lower socioeconomic class compared to above lower socioeconomic class patients.

Conclusion:

Majority of patients included in this study belong to ‘upper-lower’ socioeconomic class. There was a negative correlation between socioeconomic status and injury severity. As the income increases, injury severity decreases. Socioeconomic status and grade of open fractures were inversely related. It was found that 1 month mortality rate was high among lower socioeconomic class. Penetrating injuries and workplace injuries were significantly higher in Lower socioeconomic class. Severe injuries were more common in less educated patients.

INTRODUCTION

Traumatic injuries continue to be an important cause of mortality and morbidity. The trends vary widely by age, gender, location and cause. Traumatic injuries account for a major part of healthcare burden and economic burden nowadays and it keeps on increasing year by year in developing countries like India. Traumatic injuries raise major health concern as they affect the most productive age group i.e. (15-60 years) and increase disability adjusted life years (DALYs) .(1,2)

Socioeconomic status is the social position or social class of an individual or a group. Socioeconomic status is one of the most essential indicators to evaluate the health status and nutritional status of a family and is composed of Occupation, education, and income. Socioeconomic status is defined as "a position attained by any individual within a system of hierarchical social structure." SES plays role in accessibility , affordability, acceptance and overall usage of health services by the population(3). Clinical experience and previous studies indicate that low socioeconomic positions are represented more in trauma populations(4).

As per the census of Emergency dept. AIIMS Jodhpur, of the month of November 2020, approx. 32% of the total reported cases were different kind of trauma cases. This necessitates to study about the sociodemographic trends among injured population.

More recently, research efforts have focused on the epidemiological factors regarding most of the health care issues.(2) Few studies have been done regarding the relation of socioeconomic status and injury mortality. Some of the studies have shown that there is inverse relation between socioeconomic status and trauma mortality but only very few studies have been done related to socioeconomic status and severity of injury(5). To the best of our knowledge, no Indian study has been done so far regarding the relation of socioeconomic status and incidence and severity of musculoskeletal trauma. But there is high probability that the socioeconomic status of the patient affects the incidence and pattern of musculoskeletal trauma.

This study was designed to investigate an association between socioeconomic status and incidence and severity of musculoskeletal trauma.

AIMS AND OBJECTIVES

Aims:

- To find association between Incidence and severity of musculoskeletal trauma.

Primary objective:

- To determine the association between socioeconomic status and incidence of musculoskeletal trauma.

Secondary objectives:

- To determine the association between socioeconomic status and severity of musculoskeletal trauma.

Research question:

- Is there any association between incidence of musculoskeletal trauma and socioeconomic status.
- Is there any association between severity of trauma and socioeconomic status

Research hypothesis:

- **Null hypothesis**: There is no association between incidence and severity of musculoskeletal trauma and socioeconomic status.
- **Alternative hypothesis**: There is an association between incidence and severity of musculoskeletal trauma and socioeconomic status.

REVIEW OF LITERATURE

SOCIOECONOMIC STATUS

Occupation, education and income are usually considered as components of socioeconomic status. Wealth of the family can also be taken for determining socioeconomic status. Socioeconomic status of a family decides the ability of family to lead good quality of life, accessibility to better healthcare and protection from health hazards.(6)

Socioeconomic status is "a position attained by any individual within a system of hierarchical social structure".(3)

There are multiple international and Indian scales for the quantification of socioeconomic status

International scales

- Hollingshead scale
- Nakao and Treas scale
- Moore scale
- Chapin's Social Status Scale
- Warner's Index of Status Characteristics
- Nam-Powers Socioeconomic Status Scores
- Hollingshead Index

Indian scales

- Modified Kuppuswamy scale for 2022
- Modified B G Prasad classification for 2016
- Uday Pareek scale
- S.C Tiwari et al scale
- O.P Aggarwal scale (2005)
- Rahudkar scale
- Jalota scale
- Amrish Kumar and Agarwal scale

Modified kuppuswamy scale is widely accepted and easy to measure(6), hence used in this study

1) Modified kuppuswamy scale 2022(3)

The modified kuppuswamy scale is composed of 3 factors

- Education
- Occupation (head of family)
- Income per month (family)

It has total scores from 3 to 29 and which divides population into 5 socioeconomic categories.

2) B.G Prasad Classification (1961)(7)

This classification in based on

a) Per capita income per month

b) All India Average Consumer Price Index (AICPI)

This scale should be frequently updated as AICPI value changes at frequent intervals.

3) Udai pareek scale (8)

Pareek's classification of rural areas gained popularity as simple interviews can be used to gather the data needed to check the scale Based on nine factors, including caste, occupation of the family head, education of the family head, level of social engagement of the family head, landholding, housing, agricultural power, material goods, and family type.

a) Caste

b) Occupation

c) Education

d) Social Participation

e) Land

f) House

g) Farm power

h) Material Possession

i) Family Type

Population is divided into 5 socioeconomic categories based on these details

4) S.C TIWARI ET AL SCALE(9)

This scale is composed of 7 factors.

a) House profit
b) Material possession
c) Educational status
d) Occupation
e) Per capita income per family
f) Possessed land/House cost profile
g) Social status

5) O.P AGARWAL ET AL SCALE

It is composed of 22 parameters

1. Income (Per capita income)
2. Occupation
3. House type
4. Number of members in family with income
5. Water and electricity supply
6. Affordability of servant at home
7. Caste
8. Land for agriculture
9. Possession of cattle
10. Owns house or not
11. Inherited properties
12. Education
13. Type of family
14. Vehicle in family
15. Number of offsprings
16. Location of residence
17. International travels in last 3 years
18. Ownership of non-cultivating land

19. Pets
20. Positions held by family members
21. Tax paid per year
22. Education of children

Population is divided into 6 categories based on these 22 factors Among all these Indian socioeconomic status parameters, Kuppuswamy scale has been reported to be a better predictor of socioeconomic status and its convenient to collect data in emergency department and for these reasons had been chosen for this study.(6)

MUSCULOSKELETAL TRAUMA

Traumatic injuries are becoming major healthcare burden in the world. Trauma is leading among top causes of mortality and morbidity in productive age group.(10,11)

Only 58% of people who were employed before suffering an orthopaedic injury from a moderate to high-energy impact had returned to their jobs after a year. By contributing to the improvement of people with extremities injuries, Orthopedic surgeons have the chance to significantly reduce this burden. Trauma is the leading cause of death in the developed world for people under the age of 44, and road traffic accidents are the main culprit. Although the orthopaedic surgeon may not have participated in the initial evaluation of the seriously injured patient, their immediate management of a number of conditions can significantly impact the patient's final prognosis(12,13). There are numerous grading schemes for traumatic injury classification. More than 30 years ago, trauma scores were developed to give numerical numbers to physiological and anatomical changes following an injury. Physiological scores explain how a trauma causes changes that are reflected in the body's vital signs and level of consciousness(13,14).

Anatomical Scoring Systems

- Abbreviated injury scale (AIS)
- Injury severity score (ISS)
- New injury severity score (NISS)
- Organ injury scale (OIS)

- International Classification of Diseases (ICD-9)
- Injury Severity Score (ISS)

Physiological Scoring Systems

- Revised trauma score
- Glasgow coma score
- APACHE scoring

Combined Anatomic and physiologic scoring

- Trauma and injury severity scores (TRISS)
- A severity characterization of trauma (ASCOT)

1)Injury severity score(15)

This is an anatomical scoring system and in which body is divided into 6 anatomical regions and injury to each part is scored AIS (abbreviated injury scale) from 0 to 6.then take sum of square of most injured 3 regions and values come from 0 to 75.if in any of the region AIS come as 6 (unsurvivable), total value will automatically go to 75

Trauma is considered as major if ISS in more than 15. Bolorunduro et al., categorized ISS as follows

- <9 = Mild
- 9-15 = Moderate
- 16-24 = Severe
- >24 = Profound

The ISS's main flaw is that it only takes into account one injury per body region. This causes injuries to be missed and causes calculations to prioritize less serious injuries that occur in other body regions over more significant ones that occur in the same body location.

2)New Injury Severity Score (NISS)(13)

New injury severity score (NISS), was designed by Osler et al. in 1997. The NISS is the sum of squares of the three most severe injuries, regardless of body region injured. NISS will be equal to or higher than the ISS.

3) Revised Trauma Score (RTS)(13)

The revised trauma score is a physiological scoring system. It This consists of Glasgow coma scale, systolic blood pressure and respiratory rate

4)Trauma and Injury Severity Scores (TRISS)(13)

TRISS is combination of anatomic and physiological scoring system TRISS determines the probability of survival from the ISS, RTS and patient's age. TRISS is more accurate compared to other grading systems.(14)

Table 1 Review of similar articles

Sl no	Author	Year/ Location	Title of study (sample size)	Conclusion
1	Masoumeh Abedzadeh-Kalahroudi et-al(16)	2018 Iran	the relationship between socioeconomic status and trauma outcomes (600)	• Lower socioeconomic class patient receives low level of health care.
2	Judy N Mikhail et al(17)	2016 Georgia	The Association of Race, Socioeconomic Status, and Insurance on Trauma Mortality (4007)	• Insurance type is associated with trauma mortality and varies with age
3	Xiangming Fang et al(18)	2014 China	Socioeconomic status and the	• the incidence of injury increasing from richest to

			incidence of child injuries in China (Population based study on 43 million population)	poorest. • children from poor economic background are more likely to be affected severe injuries.
4	L Laflamme et al(19)	2001 Sweden	Injury risks and socioeconomic groups in different settings (community registry based study 256510 population)	• Male manual laborer's have extra risk compared to salaried exposure employees in all context except sports.
5	Mojtaba Sehat 1, Kourosh Holakouie Naieni et al(20)	2008 Iran	Socioeconomic Status and Incidence of Traffic Accidents in Metropolitan Tehran (64200)	• Traffic accidents incidence, fatality rates, severity and death more among Lower socioeconomic status
6	Susan B Sorenson et al((21)	2007 USA	Gender disparities in injury mortality (study based on data from web based injury query system from 1981 to 2007)	• Male mortality was higher than it should have been across all racial and age groups, regardless of cause of death
7	Fatemeh Shahbazi et al(22)	2016 Iran	Socioeconomic inequality in Mortality from Road Traffic Accident in Iran (50755)	• people with low socioeconomic class were more prone to fatal accidents and injuries.
8	Kelly Simpson et al(23)	2002 Canada	Associations between socioeconomic	• higher risk of hospitalisation and injury was frequently associated

			status and injury among adolescents (7235)	with lower SES. • Higher SES increase the risk of injury in sports and recreational activities
9	Mays T Ali et al(24)	2009 Baltimore	Socioeconomic disparity in inpatient mortality after traumatic injury (267621)	• mortality was considerably higher for patients in Lower SES • Mean household income still accurately predicts hospital mortality following adult trauma.
10	Philip McHale et al(11)	2015 England	Socioeconomic status and 30-day mortality after minor and major trauma (48652)	• Older patients and patients with low SES have a higher risk of 30-day mortality
11	EQJuanita A Haagsma et al(1)	2000	The global burden of injury: incidence, mortality, disability-adjusted life years and time trends (Data based on WHO health report database 1999	• injuries are a major factor in morbidity and death. patterns differ greatly by cause, age, sex, place, and time.
12	A Pearce et al	2012 UK	Does the home environment influence inequalities in unintentional injury in early childhood (14378)	• Factors related to the home environment did not seem to account for socioeconomic disparities in injuries
13	Alasdair R Corfield et al(4)	2016 Scotland	Association between trauma and	• low-income communities are more likely to

			socioeconomic deprivation (Retrospective cohort study of 9238 patients)	experience trauma, particularly penetrating trauma.
14	Olof Brattström et al	2014	Socio-economic status and co-morbidity as risk factors for trauma (7382)	• Low levels of education and poverty are risk factors for trauma
15	Zar Popal et al	2019 Amsterdam	The effect of socioeconomic status on severe traumatic injury (967)	• Patients with lower SES who had sustained serious injuries stayed in the ICU for a longer period
16	Thomas Snell et al	2019 UK	whether Socioeconomic status is associated with mechanism and intent of injury (7666)	• High-intensity and violent mechanisms have a role in mediating the elevated risk of trauma associated with lower SES
17	Seema Kacker et al	2009 Cameroon	Socioeconomic correlates of trauma: An analysis of emergency ward patients presenting to the largest trauma hospital in Yaoundé, Cameroon (2855)	• Patients who presented to this trauma centre where the study was conducted were wealthier than the general population, raising the likelihood of access to care restrictions. • Poorer patients were less likely to seek prompt treatment at a major trauma centre

18	Christian Madsen et al	2022 Norwey	Injury severity and increased socioeconomic differences: A population-based cohort study (177663)	• They observed inverse relation between socioeconomic status and severity of injuty
19	Ifeanyi Charles Nwagbara et al	2021 Nigeris	Epidemiology of open fractures	• Open fractures are most commonly caused by motor vehicle accidents

MATERIAL AND METHODS

Study setting

The study was conducted after taking approval from the Institutional Ethics Committee (vide letter no. AIIMS/IEC/2021/3378 dated March 3, 2021).

This observational study was carried out in the Emergency department (Orthopaedics), AIIMS Jodhpur.

Study design:

Cross sectional study

Inclusion criteria:

All patients presented to AIIMS Emergency with any musculoskeletal trauma during the period of January 2021 through August 2022 and willing to participate in study.

Exclusion criteria (for cases):

- Unidentified patients (patients whose sociodemographic details not known)
- Patients with non-traumatic injuries (burn, frostbite)

Sampling .

Out of 1500 patients who visited AIIMS Jodhpur emergency during the month of November 2020,the number of trauma cases were 480.Aproximately 32%.considering p=32% and z=1.96 for getting 95% confidence,

$Z^2pq/d^2 = (1.96^2 \text{ x } 32 \text{ x } 68)/5^2 = 335$

Considering 10% Non-responders for 1 month post trauma mortality assessment

Sample size was calculated to be 372 at 95 % Confidence level.

Study procedure and data collection methods:

Study population was defined as per inclusion criteria.

Data was collected in emergency department with help of printed questionnaire.

Socioeconomic status of all patients were assessed as per **modified Kuppuswamy scale (2022)** and severity of overall injury was measured by **injury severity score**, open fracture severity assessed by **Modified Gustillo Anderson grading**. mode of trauma and whether it was blunt or penetrating and mortality status after 1 month was also taken.

Type of study: Cross sectional study

Socioeconomic status Scores of Education occupation and income were assessed as per Modified Kuppuswamy scale and summated to get total and it was used for categorization

Scoring of Education

Education of head of family was taken into account. Education is scored from 1 to 7

Scoring of Occupation

Occupation of head of the family, and was scored from 1 to 10.

Total Monthly Income of the Family was scored from 1 to 12

Tables of Education, Occupation, and income is given in appendix.

Assessment of overal severity of the injury was done by injury severity score (15)

A detailed calculation of ISS has been attached in the Appendix

Bolorunduro et al. categorized and validated ISS as follows(25)

Table 2 Injury severity score grading

<9	Mild
9-15	Moderate
16-24	Severe
>/= 25	profound

Grading of open fractures was done by Gustillo Anderson classificaton(26)

- **Type 1**

Fracture with wound of less than 1 cm over it, and the wound is clean

- **Type 2**

Open fracture with a wound of size more than 1 cm long without extensive soft tissue damage, flaps, or avulsions

- **Type 3**

either an open segmental fracture, an open fracture with extensive soft tissue damage, or a traumatic amputation

- **Type 3A**

open fractures with sufficient soft tissue coverage of a fractured bone despite extensive soft tissue laceration or flaps, or high-energy trauma regardless of the size of the wound.

- **Type 3B**

open fractures with extensive soft tissue injury loss with periosteal stripping and bone exposure. This usually is associated with massive contamination.

- **Type 3C** Type 3 injuries with vascular lesion requiring repair to preserve limb viability.

Statistical analysis

All data collected was tabulated and entered on Microsoft excel.SPSS software. (IBM® SPSS® statistics data editor, version 25) was utilized to perform all statistical analysis. Statistical analysis was done using chi square tests and correlation analysis and Bonferroni's Post-hoc analysis.

RESULTS

A total of 1000 trauma patients who presented to AIIMS Jodhpur emergency department were participated in the study. Primary data regarding injury and socioeconomic status was collected from all 1000 patients. One month follow up was attempted for all patients telephonically and out of which,916 patients responded and 84 patients could not be contacted either because of wrong number given in hospital panel or because they did not attend the phone calls.

Gender distribution

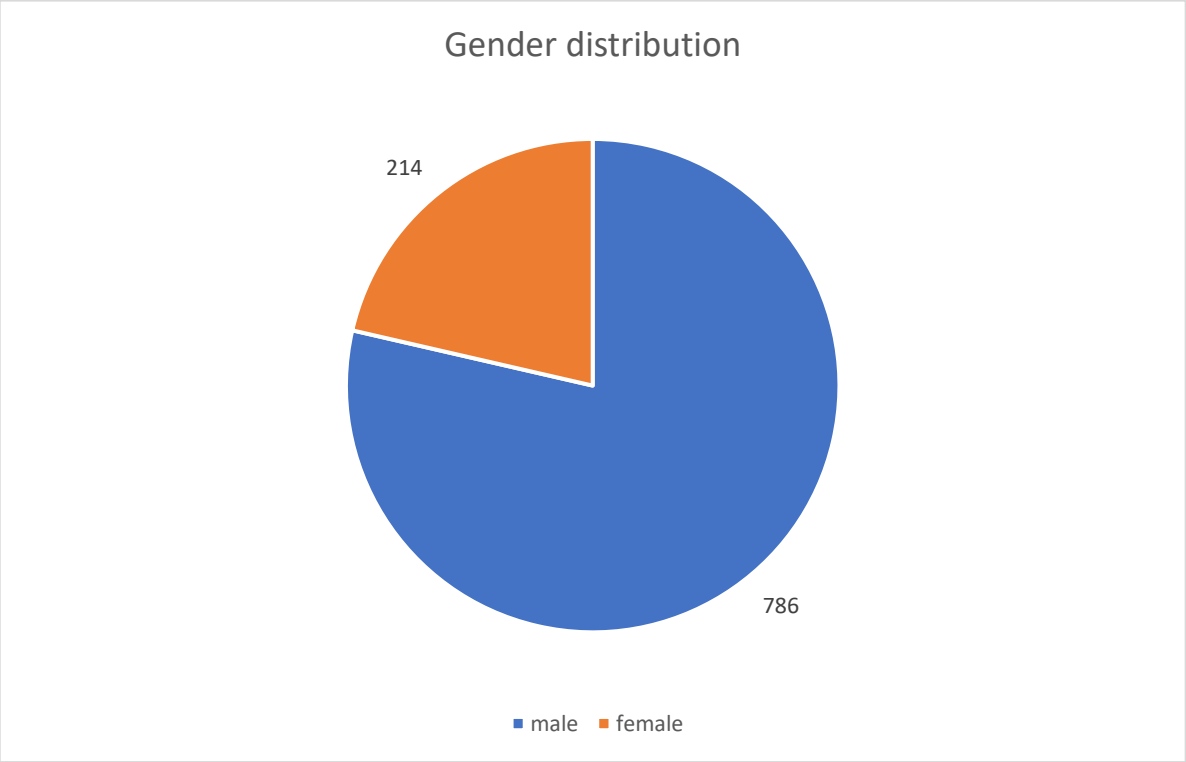

Figure 1 Gender distribution of trauma

Out of total 1000 patients,786 (78.6 %) were male patients and 214(21.4 %) were female patients.

Age distribution

Majority of patients were young adults(46.1%) , followed by middle aged adults (25.6 %),elderly (13.7 %) adolescents (9.1 %) and children (5.5%)

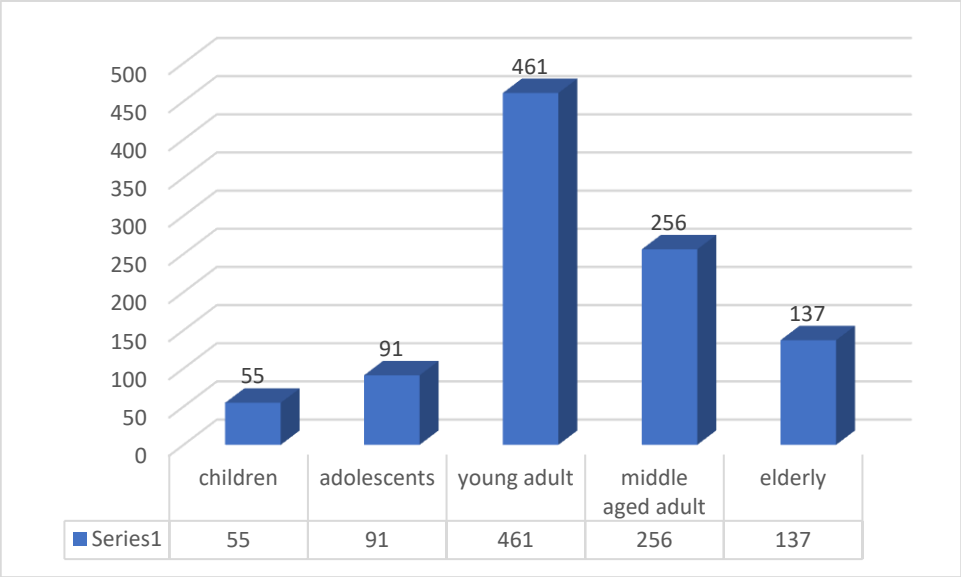

Figure 2 Age distribution of trauma

Socioeconomic status of participants

Table 3 Socioeconomic class distribution

Class	Frequency	Percentage
lower	79	7.9
upper lower	434	43.4
lower middle	387	38.7
upper middle	90	9
upper	10	1

Most of the patients were from upper lower (43.4 %) and from lower middle class (38.7%) followed by upper middle (9 %) ,lower (7.9 %) and upper class being the least (1 %)

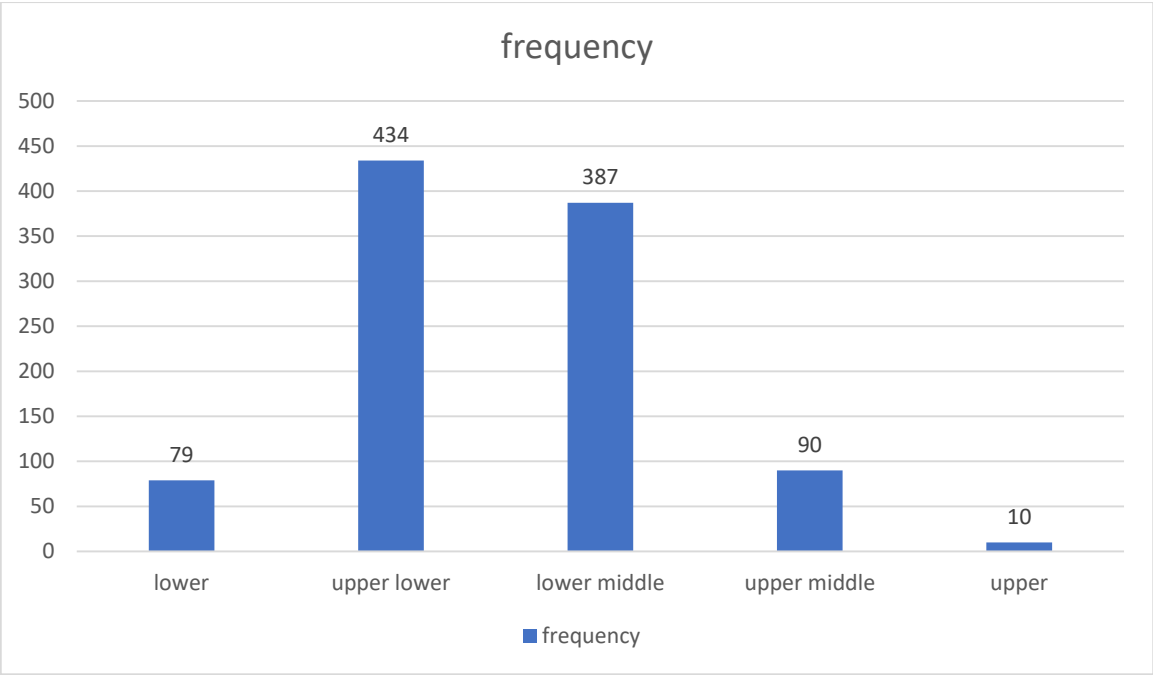

Figure 3 Socioeconomic class distribution

Occupation

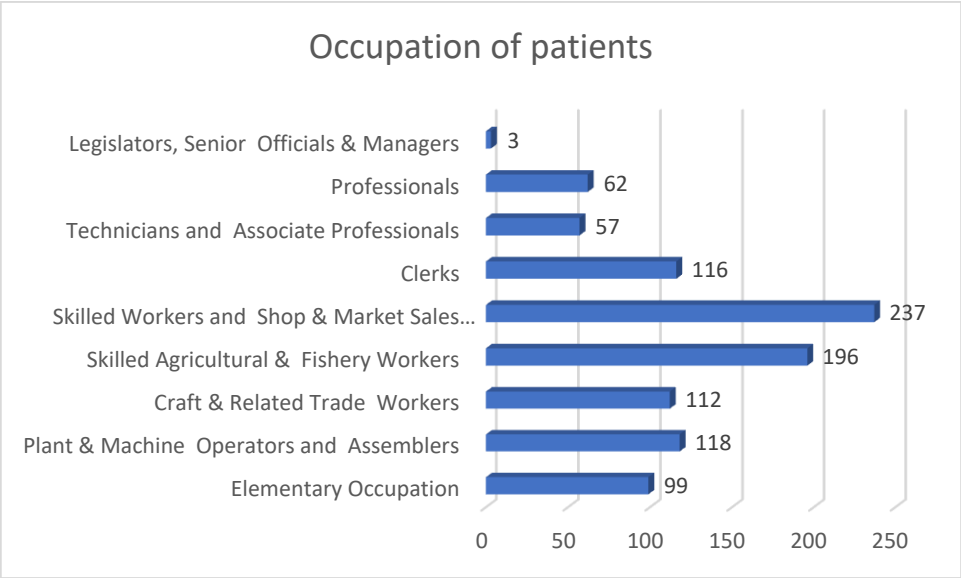

Figure 4 Occupation of participants

Out of 1000 patients, majority were shop and market sales workers (23.7 %) followed by agricultural workers (19.6%) and factory workers (11.8%). A minority of the participants were Associate professionals (5.7%) and Professionals (6.2%); with Legislators, senior officials (0.3 %) being the least common occupation.

Education

Out of total, 21% of patients were graduated,18.6% were illiterate,followed by 16.3% with high school certificate,15.9% and 15.2% respectively with miidle school and primary school education.

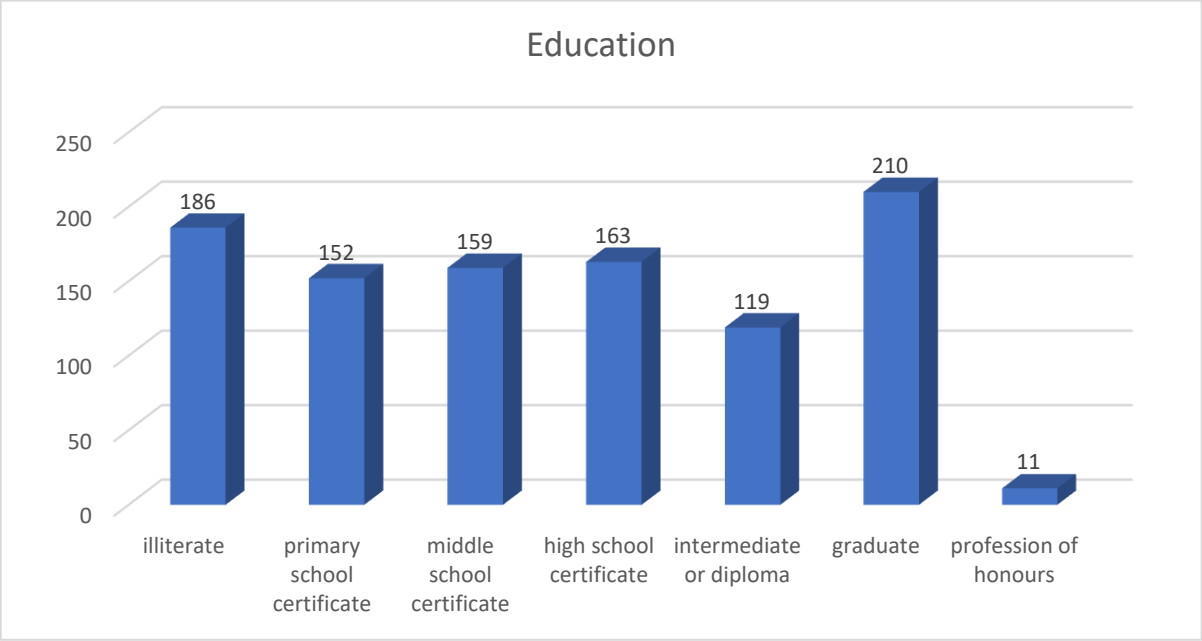

Figure 5 Education

Income

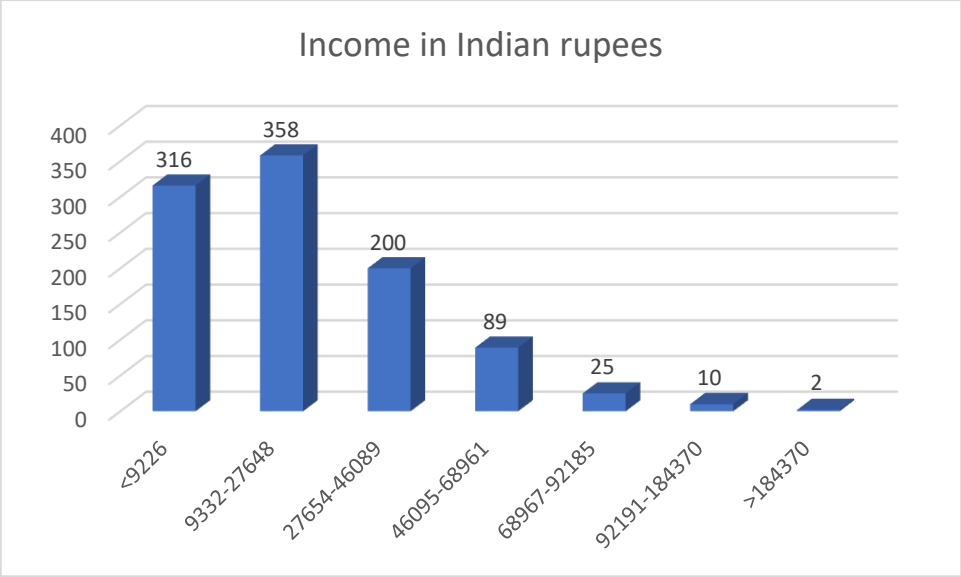

Figure 6 Income

31.6 % of population had an income less than Rs. 9226 per month.67% of population had income less than Rs.27648 per month which indicates that a majority of injured population had low income. Less than 5 % of population had an income of more than Rs.68967.

Mechanism of injury

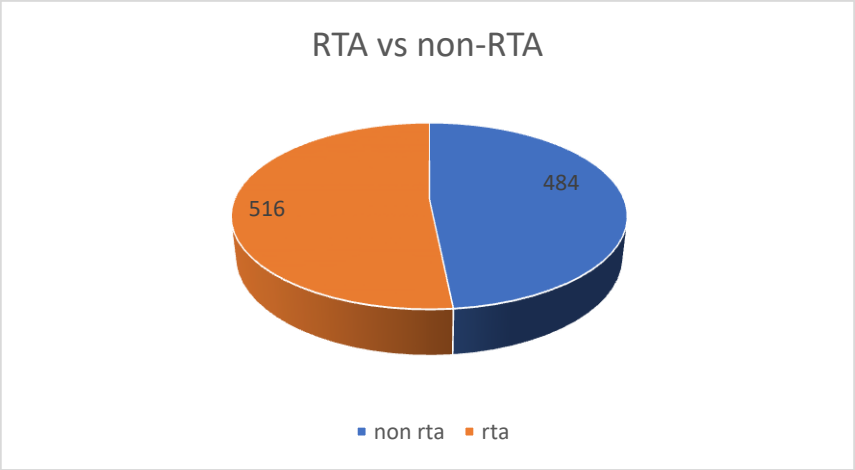

Figure 7 Mechanism of injury RTA vs Non-RTA

Almost half of the patients were injured in road traffic accidents and half of them were injured by other means. Which indicates that the burden created by road traffic injuries to the community is huge.

Table 4 Mechanism of RTA

	Frequency	Percent
MOTOR CYCLE	402	78
BICYCLE	9	1.7
PEDESTRIAN	34	6.6
CAR	34	6.6
BUS	21	4
OTHER RTA	15	2.9

Out of 516 patients who were injured by road traffic accidents, majority 78% were motorcycle accidents. Pedestrian injuries and car accident injuries comprised of 6.6 % each.

4% were injured in bus accidents and 2.9 % injured by other road traffic injuries which include 3 wheelers, tractors, trucks and railway injuries.

Non RTA injuries

Table 5 Non-RTA Injuries

Household accidents	253	52.3
Workplace injuries	185	38
assault	21	4.3
Sports injuries	11	2.2
Others	10	2
Suicidal injuries	0	0

Among non RTA injuries, the leading cause was household accidents which included slip and fall mainly and comprised of 52 % of non RTA injuries, followed by workplace injuries (38%).

Blunt vs Penetrating injuries

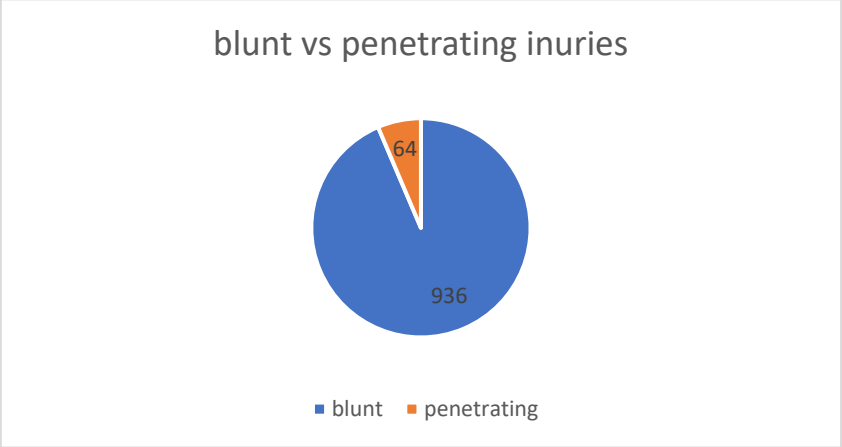

Figure 8 Blunt vs Penetrating injuries

Among all the patients,93.6% were blunt injuries and 6.4% was penetrating injuries

Severity of injury based on Injury severity score

Table 6 Injury severity score

	Frequency	Percent
minor	437	43.7
Moderate	240	24
severe	222	22.2
profound	101	10.1

Majority of the patients presented with minor injuries (43.7%), followed by Moderate injuries (24%),Severe injuries (22.2%) and Profound injuries (10.1%)

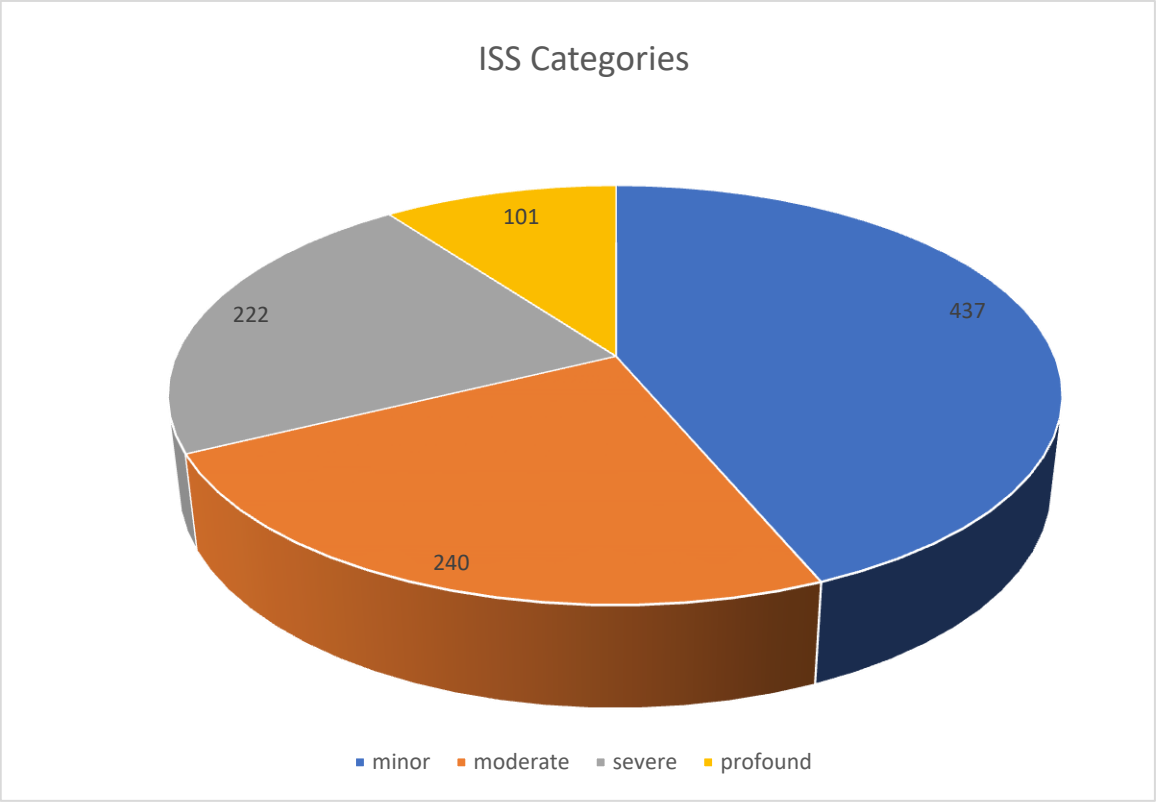

Figure 9 Injury severity categories

Analysis

1)Association of Socioeconomic status (Modified kuppuswamy scale) with severity of trauma (Injury severity score)

Number of patients in each socioeconomic status and each injury severity category

Table 7 Socioeconomic status vs Injury severity

SES	mild	moderate	severe	profound
lower	5(6.30%)	12(15.20%)	51(64.60%)	11(13.90%)
upper lower	115(26.50%)	148(34.10%)	104(24.00%)	67(15.40%)
lower middle	229(59.20%)	76(19.60%)	61(15.80%)	21(5.40%)
upper middle	78(86.70%)	4(4.40%)	6(6.70%)	2(2.20%)
upper	10(100%)	0	0	0

There was a significant negative correlation between socioeconomic status and injury severity score. Significant difference was found in ISS across various categories of SES [F=32.04, p<0.001]. On Bonferroni's Post-hoc analysis, there was a significant difference across all SES categories except between Upper Middle and Upper SES Class

Table 8 Socioeconomic status VS mean and SD of ISS

Socioeconomic status	N	Injury Severity Score	Std. Deviation
		Mean	
lower	79	19.70	9.66
upper lower	434	15.20	13.67
lower middle	387	9.39	10.22
upper middle	90	4.88	5.96
upper	10	3.40	2.50
Total	1000	12.26	12.20

Progressive increase in the mean of injury severity score was observed with decrease in the socioeconomic class of patients.

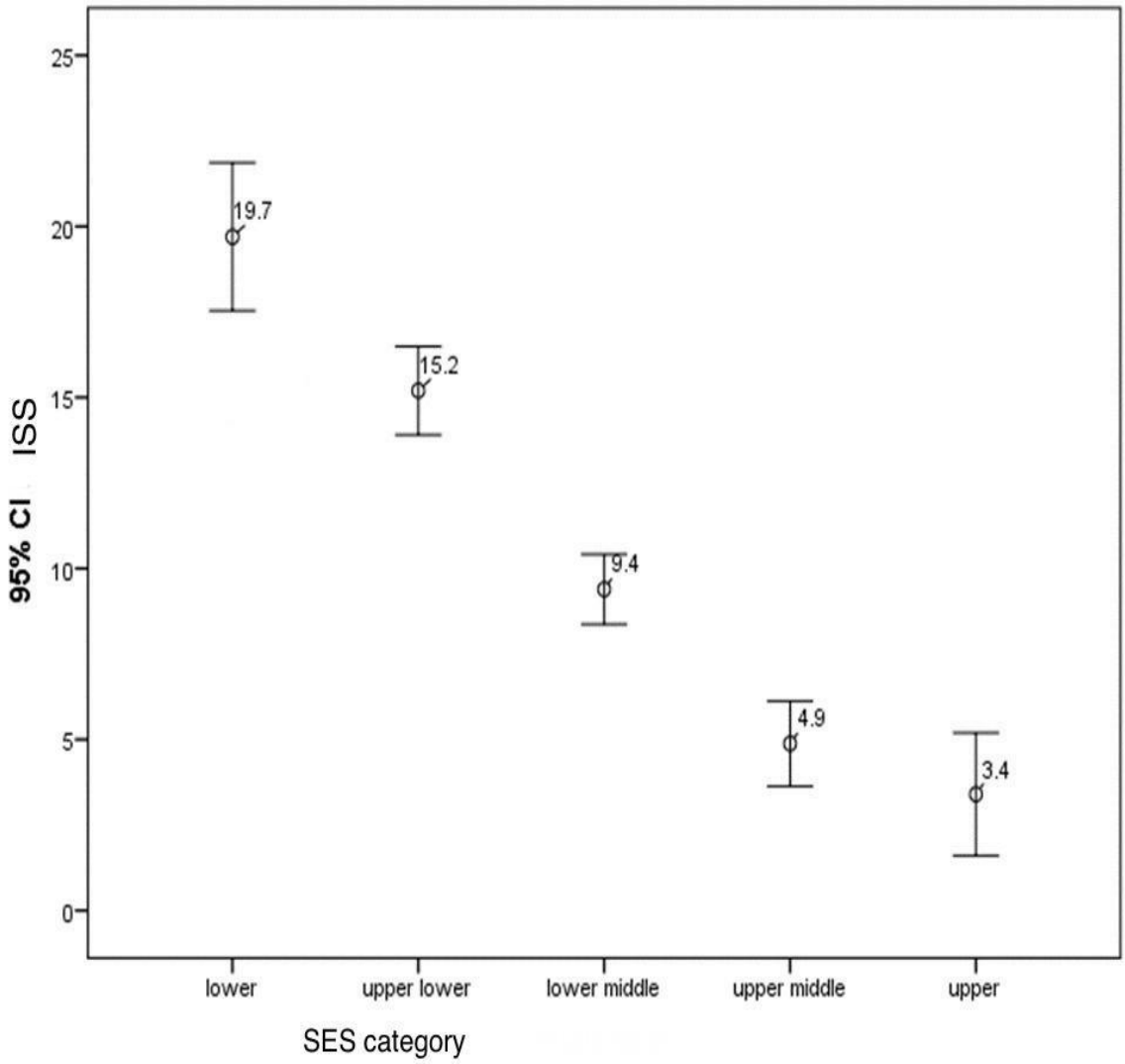

Figure 10 Error bar plot of ISS vs SES

2) Correlation between Socioeconomic status (Modified kuppuswamy scale) and Open fracture grading (Modified Gustilo Anderson classification)

There was a significant **negative correlation** between SES and Modified Gustilo Anderson grade. [Spearman's rho=-0.243, p=0.003] i.e., as the SES increases, the Open fracture grade decreases.

Table 9 SES vs open fracture grading

SES	Closed injuries	Open fracture grading Gustilo Anderson				
		1	2	3A	3B	3C
lower	42(53.2%)	5(6.30%)	8(10.1%)	8(10.1%)	9(11.4%)	7(8.9%)
upper lower	342(78.8%)	19(4.4%)	19(4.4%)	18(4.1%)	25(5.8%)	11(2.5%)
lower middle	369(95.3%)	6(1.6%)	8(2.1%)	2(0.5%)	2(0.5%)	0
upper middle	88(97.80%)	2(2.2%)	0(0%)	0(0%)	0(0%)	0(0%)
upper	10(100%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)

3)Correlation of income and Injury severity score

Significant negative correlation was found between Income and Injury severity score. [Spearman's rho =-0.344, p<0.001] i.e., as the income increases, the injury severity score decreases.

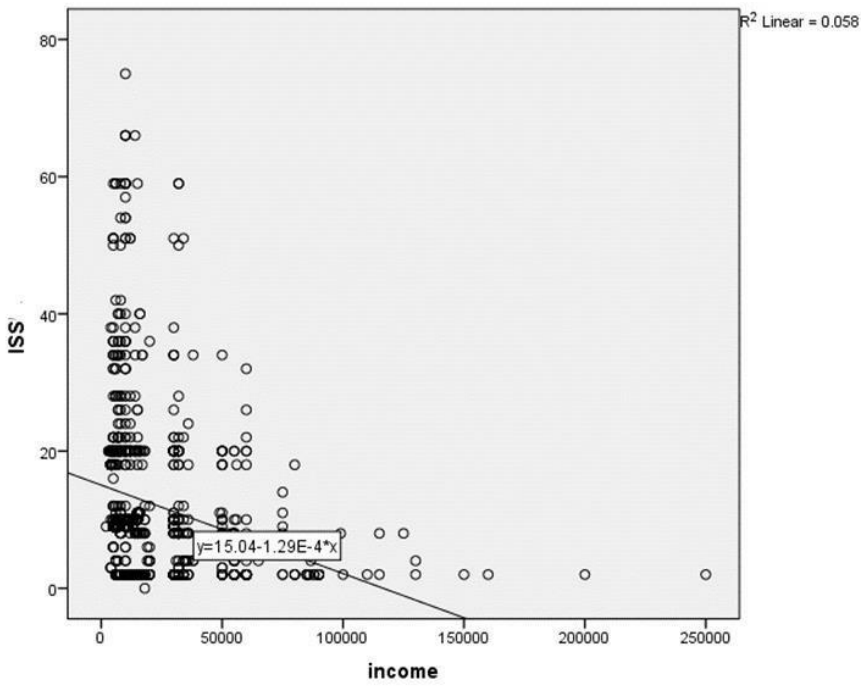

Figure 11 Scatter diagram showing ISS vs Income

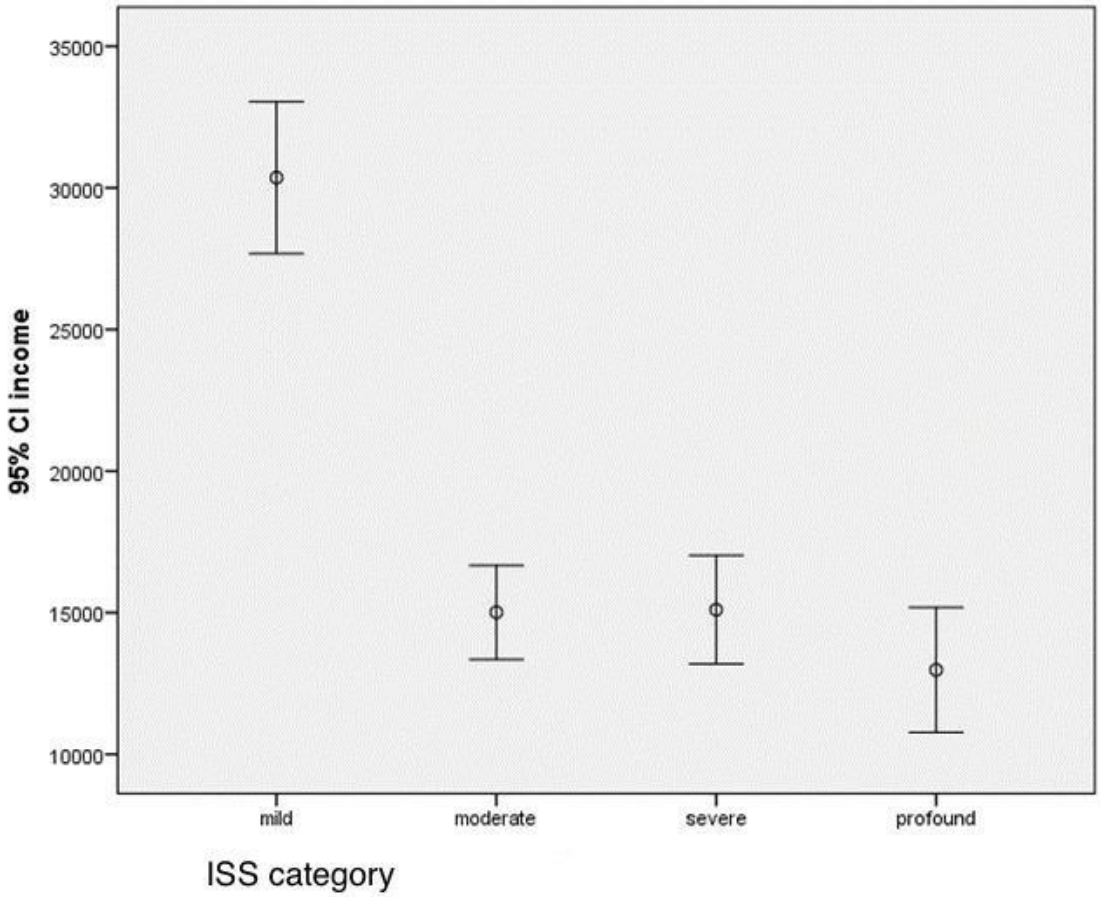

Figure 12 Error bar showing Income vs ISS category

4) Association of Education and Injury severity

Table 10 Education vs ISS

Educational status	mild	moderate	Severe	profound	P value
illiterate	34(18.3%)	43(23.1%)	76(40.9%)	33(17.7%)	<0.001
school level	156(32.9%)	160(33.8%)	103(21.7%)	55(11.6%)	
intermediate	66(55.5%)	25(21%)	22(18.5%)	6(5%)	
graduate and above	181(81.9%)	12(5.4%)	21(9.5%)	7(3.2%)	

Significant association was found between education and injury severity(P = <0.001). Severe and profound injuries were more among illiterate patients followed by school level educated patients and least in graduated and above graduated patients. Graduated and above graduate patients were observed to have more mild injury and less severe injury.

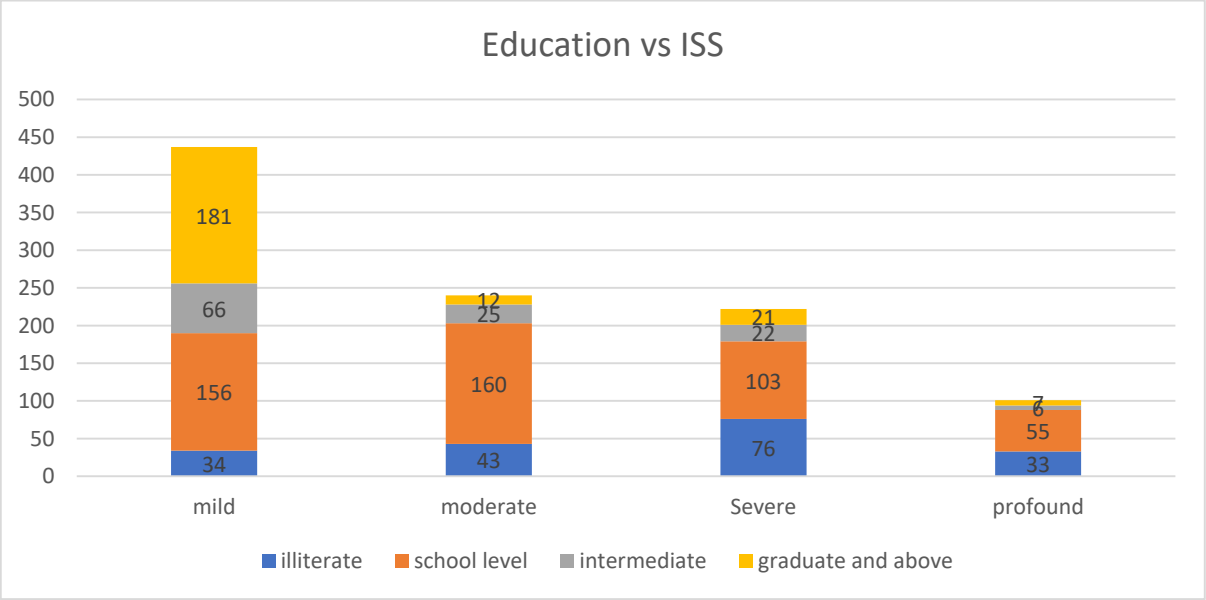

Figure 13 Education vs ISS

5)Occupation and Injury severity

Table 11 Occupation vs Injury severity

OCCUPATION	mild	Moderate	severe	Profound
unemployed	0(0%)	1(3.4%)	23(79.3%)	5(17.2%)
unskilled	11(15.7%)	19(27.1%)	32(45.7%)	8(11.4%)
semiskilled	20(16.9%)	35(29.7%)	34(28.8%)	29(24.6%)
skilled	29(25.9%)	40(35.7%)	29(25.9%)	14(12.5%)
arithmetic skilled	271(49.4%)	140(25.5%)	95(17.3%)	43(7.8%)
semi-professional	47(82.5%)	4(7.0%)	6(10.5%)	0(0%)
Professionals	59(90.8%)	1(1.5%)	3(4.6%)	2(3.1%)

It was observed that severe and profound injures were more found in unemployed and unskilled population. Professionals, semi-professional and arithmetic skilled population presented mostly with mild grade injury. But there could not find any statistical significance.

6)Association of Sociodemographic background and mechanism of injury

- Association of Age with mechanism of injury(RTA/Non-RTA)

Table 12 Age vs Mechanism of injury

Age group	RTA	NON-RTA	P value
			<0.01
children	19(34.5%)	36(65.5 %)	
adolescents	47(51.6%)	44(48.4%)	
young adult	262(56.6%)	199(43.4%)	
middle aged adult	143(55.9%)	113(44.1%)	
elderly	45(32.8%)	92(67.2%)	

Age was categorised into 5 groups. It was found that 2/3rd injuries in children and elderly were non-RTA type. More than half of injuries in adolescents, young adult and middle aged

adult were caused by RTA . Majority of young adults(56.6%) and middle aged adult (55.9%) were injured in RTA making it the most common cause of trauma in these age groups.. Chi square test was applied and P value of <0.001 indicates that a significant association was there between age and mechanism of injury.

- Gender and Mechanism of injury

Table 13 Gender vs mechanism of injury

Gender	RTA	Non-RTA	P value
Male	413(52.5%)	373(47.5%)	0.205
Female	102(47.7%)	112(52.3%)	

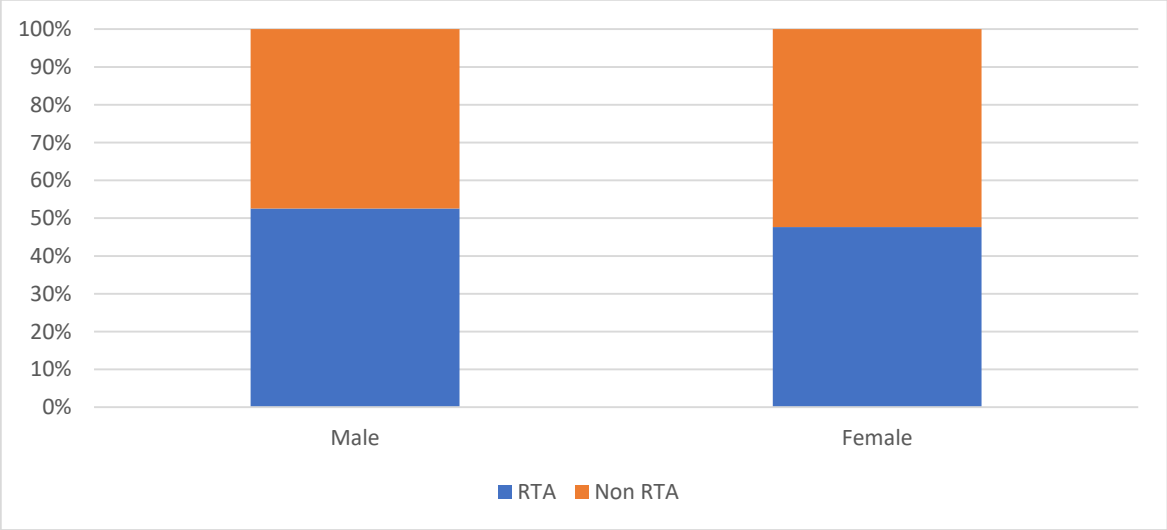

Figure 14 Occurrence of RTA and non-RTA among male and female.

Occurrence of RTA and non-RTA were almost similar among males and female. Statistically no significant association was found between gender and cause of injuries

- Socioeconomic status and mechanism of injuries

Table 14 SES vs Mechanism of injury

Socioeconomic status	RTA	Non RTA	P Value
Lower(L)	18(22.8%)	61(77.2%)	>0.05
upper lower(UL)	223(51.4%)	211(48.6%)	
lower middle(LM)	231(59.7%)	156(40.3%)	
upper middle(UM)	42(46.7%)	48(53.3%)	
Upper(U)	1(10%)	9(90.0%)	

It was observed that in L and UL socioeconomic status, non-RTA injuries were high and in UL and LM class RTA injuries were more. But no statistically significant association was found

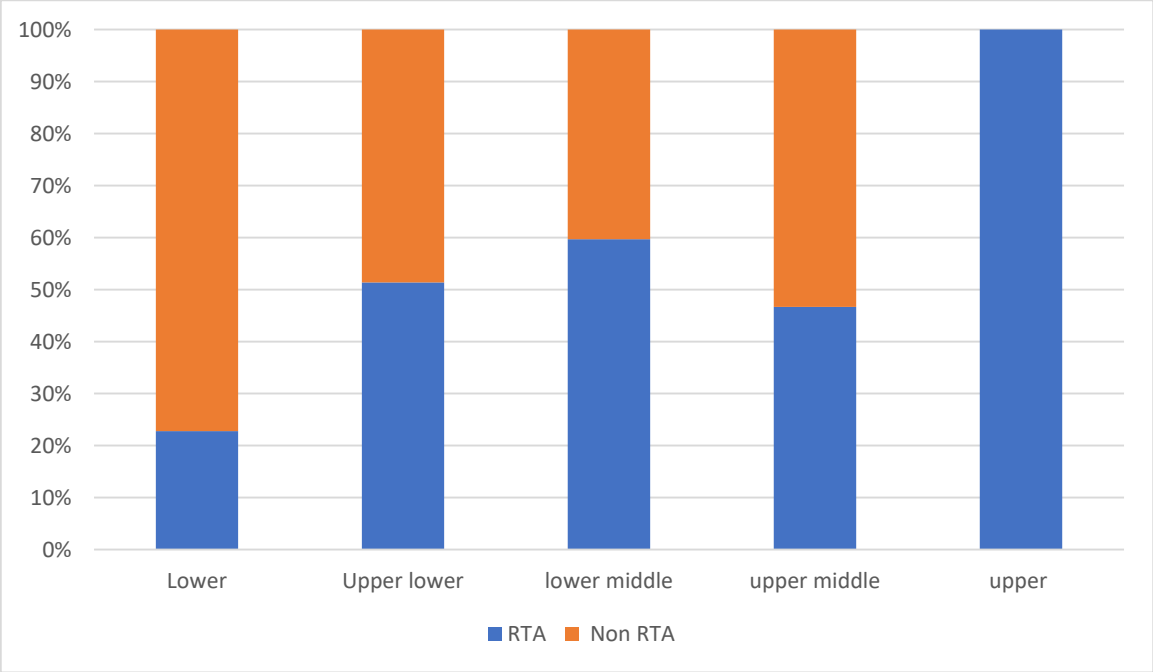

Figure 15 SES vs Mechanism of injury

- Association of workplace injuries with socioeconomic status

Table 15 SES vs Workplace injuries

	NON-WORKPLACE	WORKPLACE
lower	32(40.50%)	47(59.50%)
upper lower	319(73.50%)	115(26.50%)
lower middle	369(95.30%)	18(4.70%)
upper middle	87(96.70%)	3(3.30%)
upper	10(100%)	0(0%)

It was observed that workplace injuries were high in Lower SES followed by UL socioeconomic status. incidence of workplace injury reduces as socioeconomic status increases and there were very few workplace injuries in UM class and no workplace injuries were found in upper SES . Out of total 183 workplace injuries,88.5% were from lower and UL socioeconomic background.

Socioeconomic class was combined into Lower and Above Lower socioeconomic status due to low sample size in some of the categories and to get more clinically valid statistical association.

Table 16 SES category vs workplace injuries

	Workplace injuries	Non workplace injuries	P value
Lower class	162(31.6%)	351(68.4%)	<0.001
Above lower class	21(4.3%)	566(95.7%)	

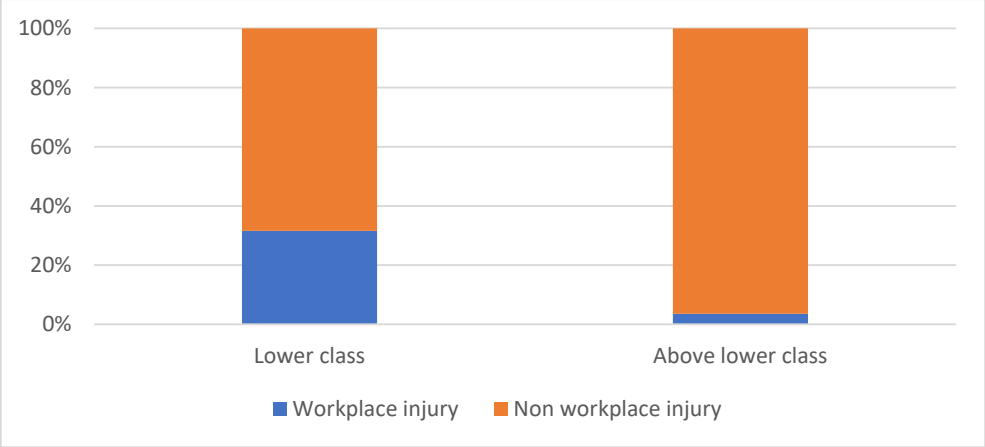

Figure 16 SES vs workplace injuries

Association between socioeconomic status in 2 categories with Workplace and non-workplace injuries were done with chi square test. It was found that there was significant association (P value <0.001)and Lower socioeconomic status population was more prone for workplace injuries.

- Association of Socioeconomic status with Mechanisms of RTA

Table 17 SES vs mechanism of RTA

	MOTOR CYCLE	**BICYCLE**	**PEDESTRIAN**	**CAR**	**BUS**	**OTHER RTA**
lower	11(61.1%)	1(5.6%)	3(16.7%)	0(0.0%)	3(16.7%)	0(0%)
upper lower	171(76.7%)	2(0.9%)	15(6.7%)	6(2.7%)	16(7.2%)	13(5.8%)
lower middle	183(79.2%)	5(2.2%)	14(6.71%)	26(11.3%)	1(0.4%)	2(0.9%)
upper middle	36(86.7%)	1(2.4%)	2(4.8%)	2(4.8%)	1(2.4%)	0(0.0%)
upper	1(100%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)

We couldn't find any statistically significant relation between socioeconomic status and mechanism of RTA

- Association of Socioeconomic status and type of injury.

Table 18 SES vs blunt/penetrating injury

	Penetrating injury	Blunt injury	P Value
Lower	60(11.7%)	453(88.3%)	<0.001
Above Lower	4(0.8%)	336(99.2%)	

Significant association (P value < 0.001) was there between socioeconomic status and occurrence of penetrating injury. Lower Socioeconomic class was more prone for penetrating trauma compared to above lower socioeconomic class.

7) Association of Socioeconomic status and 1 month post trauma mortality rate

Patients were contacted telephonically after 1 month and 916 patients responded. 84 patients could not be contacted either because they had given wrong number in hospital panel or they didn't attend phone calls.

Table 19 SES vs 1 month mortality rate

Socioeconomic class	Dead	Alive	P value
Lower	17(3.30%)	496(96.7 %)	0.042
Above Lower	5(1.2 %)	398(98.8%)	

One month post trauma mortality rate was significantly high in Lower socioeconomic status compared to above lower socioeconomic status.

8)Association of gender and 1 month mortality rate

Table 20 Gender vs 1 month mortality rate

	Died	Alive	P value
Male	21(2.9%)	711(97.1%)	0.066
Female	1(0.5)	183(99.5%)	

Mortality rate was more among males but was not statistically significant.

DISCUSSION

Injuries are a major public health concern, affect the most productive age group i.e. (15–60 years), increase disability adjusted life years (DALYs) and result in a huge financial burden on the household and community(2). Few studies have been done so far in different countries regarding relation between socioeconomic status and mortality of traumatic injuries but there are only very few studies conducted regarding relation of socioeconomic status and severity of injury. To the best of our knowledge, there are no such studies reported in Indian population.

In this study with 1000 patients with musculoskeletal injuries, overall it was found that there is a negative correlation between socioeconomic status and Injury severity. A higher severity of injury was observed as the SES of patients decrease. There is negative correlation between income and severity of trauma, i.e., injury severity reduces as total family income increases and there is negative correlation between socioeconomic status and grade of open fractures.

It was observed that most of the patients were of upper lower (43.4%) and lower middle socioeconomic status (38.7%). Upper socioeconomic population represented the least (1%) . This is consistent with findings of Brattström et al., (2014) who conducted study on Socio-economic status and co-morbidity as risk factors for trauma. In case-control research with 7,382 trauma patients from a level 1 trauma centre, they looked at the effect of socioeconomic characteristics and co-morbidity on the chance of becoming a trauma victim. They came to the conclusion that low levels of education and poverty were risk factors for trauma. Kelly Simpson et al(23) (2002) conducted a study on Multilevel analysis of associations between socioeconomic status and injury in Canada. A higher risk of hospitalisation and injury was frequently associated with lower SES. Mojtaba Sehat et al.,(2008) conducted study on Socioeconomic Status and Incidence of Traffic Accidents in Iran. According to their study also, there is increased incidence of traffic accident related injuries in lower socioeconomic population and they found correlation between SES and accidents incidence and severity.(20)

Majority of lower socioeconomic class patients presented with severe injury (64.60%) followed by moderate (15.2%) and profound injuries (13.9%) and only very few of them presented with mild grade injuries (6.3%). A possible reason for this may be that they are unable to seek medical care for mild injuries because of socioeconomic constraints. In

contrast to the upper lower class, majority presented with moderate grade of injury (34%) followed by mild (26.5%). As the socioeconomic increased, fraction of mild injuries progressively increased and 86.7% of upper middle and 100 % of upper class patients presented with mild injuries.. It was observed that fraction of mild injury increases and fraction of severe injury reduced as socioeconomic status increases

According to Seema Kacker et al.,(2003)(27) who conducted study on socioeconomic correlates of trauma among patients presenting to one of the largest trauma hospital in Cameroon. Sociodemographic details collected from 2855 patients presented to trauma centre in Cameroon. Using logistic regression, they assessed the effect of socioeconomic status on care seeking and injury severity. They concluded that the patient presented to that specific trauma centre were wealthier than general population, raising the likelihood of restrictions in the access of care. Poor people are less likely to seek treatment from major trauma centre and they suggested in future researches, there should have community bases sampling methods due to significant variations in socioeconomic status of general population and sample visiting the hospital. In our study conducted in AIIMS Jodhpur, which is a tertiary care centre which provide high quality free of cost treatment for emergency patients so it seems plausible that that sample presenting to emergency department is representative of the general population but still it is likely that the poorest patients hesitate to seek treatment for mild grade injuries unless it impedes their normal activities or working capacity.

Significant negative correlation was found between socioeconomic status and injury severity score. There was a significant difference of the ISS across various categories of SES As the socioeconomic status increases, the injury severity score reduced. According to Christian Madsen et al., (2022) who conducted study on Injury severity and increased socioeconomic differences. It was a population-based cohort study in Norway. Study was conducted on 25 lakh population and around 1.7 lakh individuals analysed. Injury severity was measured by ICISS. Analysis was done with Robust Poisson regression models. They found inverse gradient between socioeconomic status and severity of injury and which was more steep in more severe injuries(5).

Considering socioeconomic status and 1 month post injury mortality rate, In this study, out of total 916 patients (excluding 84 patients lost follow up),22 patients died within 1 month of injury. For the purpose of analysis, SES data was clubbed into 2 categories due to low sample size in some of the categories which would have precluded more clinically valid statistical

association. Lower and upper lower socioeconomic classes were clubbed into Lower class, Lower middle, upper middle and upper socioeconomic classes were clubbed into Above lower category. One month mortality rate was 3.3% in Lower category and only 1.2% in above lower category. It was observed that 1 month mortality rate is significantly high in lower socioeconomic class(P = 0.042). This is comparable to studies by Philip McHale et al and Mayas T Ali et al., Philip McHale et al., (2015)(28) conducted a study on Socioeconomic status and 30-day mortality after minor and major trauma in England,2015. It was done using multivariate logistic regression. Age, injury severity, comorbidities, and SES calculated from area-level deprivation are covariates. Their findings showed that older patients and patients with low SES have a higher risk of 30-day mortality for less severe trauma. Mays T Ali et al., conducted study on Socioeconomic disparity in inpatient mortality after traumatic injury in adults. Nationwide Inpatient Sample was used to identify trauma patients between the ages of 18 and 65 with Injury Severity Scores (ISS) of more than 9. To calculate the socioeconomic score, median household income (MHI) by zip code, available in quartiles, was used. Multiple logistic regression models were carried out, adjusted for ISS, the kind of injury, comorbidities, and patient demographics. They found that post trauma mortality is higher for patients with lower socioeconomic quartiles compared to richest people.

Considering the occurrence of open fractures, this study had total of 149 open fractures and remaining were closed injuries, graded as per modified Gustilo Anderson classification.46.8% of lower socioeconomic patients presented with open fracture which is significantly high. Fraction of open fractures decreases while going from lower to higher socioeconomic status. All of open grade 3C fractures (18) were Lower and Upper lower socioeconomic background. There was a significant inverse correlation between SES and Modified Gustilo Anderson grade. i.e., as the SES increases, the Open fracture grade decreases. On relation to mechanism of injury, out of total 149 open fractures,77 (51.6%) were workplace injuries followed by 65 from road traffic accidents (43.9%).

Considering each mechanism of injury of open fractures,42% of all workplace injuries were open fractures, followed by 12.6% of RTAs in this study. We found a significant association (P value < 0.001) between mechanism of injury and occurrence of open fractures. In contrast to this, a study conducted by Ifeanyi Charles Nwagbara et al., (2021) on epidemiology of Open fractures in Nigeria, which showed most of the open fractures were as result of road traffic accidents (82.9%) followed by gunshot injuries (8.6%) and assault (4.3%). The

contrast in results of this study could be because gunshot injuries are relatively less frequent in the region and a majority of our patients were from the industrial area in the vicinity , so workplace injuries were more common.

There was a significant negative correlation between Income and Injury severity score in this study. i.e., as the income increases, the injury severity score decreases. It is comparable to study on association between trauma and socioeconomic deprivation by Alasdair R Corfield et al. The national trauma registry's secondary data were used to conduct a retrospective cohort analysis. The Scottish Index of Multiple Deprivation was used to produce deciles based on a resident's postcode. To compare the incidence of trauma among SIMD deciles, the incidence rate ratio (IRR) was determined. In order to calculate mortality ratios, the Trauma and Injury Severity Score (TRISS) method's likelihood of survival was used to combine observed mortality from the cohort with projected deaths. They concluded that people who live in low-income communities are more likely to experience trauma, particularly penetrating trauma, which necessitates hospitalisation. More severe and penetrating injuries are linked to case fatality, but not socioeconomic disadvantage. Xiangming Fang et al. (18)(2014)conducted a study on Socioeconomic status and the incidence of child injuries in China. They concluded that the incidence of injury increasing from richest to poorest. children from poor or low SES families (in either developed or developing countries) are more likely to be affected by fatal and severe injuries.

In this study, it was found that there is significant association between education and severity of injury. Severe and profound injuries were more observed among illiterate patients followed by school level educated patients and least in graduated and above graduated patients. Graduated and above graduated patients were observed to have more mild injuries and very less severe injuries. This signifies the importance of education on public health. Well educated population has better quality of life and access to better safety measures. They are less likely to get exposed to hazardous working environments. Educated people are better aware of traffic rules and road traffic injuries were observed to be less among them.

Considering the occupation, it was observed that severe and profound injures were more likely in unemployed and unskilled patients. Professionals, semi-professional, and arithmetic skilled people presented mostly with mild grade injury. In a study conducted by L Laflamme et al.,((19)(2001)on Injury risks and socioeconomic groups in different setting, it was found that male manual labourers have extra risk compared to salaried population. These findings

signify the lack of safety measures for low profile occupation and which necessitates safety improvements in working environments.

It was observed that workplace injuries were high in lower socioeconomic status followed by upper lower socioeconomic status. Incidence of workplace injury reduces as socioeconomic status increases and there were very few workplace injuries in upper middle class and no workplace injuries were found among upper class patients. Out of total 183 workplace injuries,88.5% were from lower and upper lower socioeconomic background. Socioeconomic class combined into Lower and Above Lower socioeconomic status to get statistically valid association. Association between socioeconomic status in 2 categories with Workplace and non-workplace injuries done with chi square test. It was found that there was a significant association and Lower socioeconomic status population was more prone to workplace injuries.

Out of 1000 patients, majority (46.1%) were young adults. It was found that 2/3rd injuries in children and elderly were non-RTA type. It was observed that RTA is more common in young adult and middle aged adult age groups. There was a significant association between age and mechanism of injury (P value <0.001). RTA was more common among young adult, and middle aged group probably because they are more likely to be driving to workplaces and for leisure.

Out of total 1000 patients,786 (78.6 %) were male patients and 214(21.4 %) were female patients. This indicate that male population is more prone to trauma. Occurrence of RTA and Non RTA were almost similar among males and female. Statistically no significant association was found between gender and RTA vs non-RTA type of injuries. In post 1 month mortality rate, there were 21 deaths among male patients (2.9%) and only 1 female death (0.5%). But it is not statistically significant. There is a study conducted by Susan B Sorenson et al((21) (2007)in USA on gender disparities in injury mortality. This study aimed to improve understanding of gender disparities in injury mortality. The Web-based Injury Query System, which has US injury fatality data from 1981 to 2007, was used to gather the data. Comparisons between age groups and ethnic groups were done, and male-to-female rate ratios in injury mortality were determined for important variables. Injury-related deaths were more likely to affect boys and men than women and girls. The male-to-female age-adjusted rate ratio for accidental injuries fell by 20% to 2.15 between 1981 and 2007, but the rate ratio for injuries resulting from violence rose by 11% to 3.91. they concluded that Male mortality

was higher than it should have been across all racial and age groups, regardless of cause of death.

Significant association was found between socioeconomic status and occurrence of penetrating injury (P value < 0.001). Lower Socioeconomic class was more prone for penetrating trauma compared to above lower socioeconomic class.11.7% of Lower class presented with penetrating injury but only 0.8% of above lower class presented with penetrating injuries. This was statistically significant with P value <0.001. There is a similar study on Association between trauma and socioeconomic deprivation by Alasdair R Corfield et al. (24)(2016). 9238 individuals who visited emergency rooms in Scotland after experiencing trauma were included in the research. The national trauma registry's secondary data were used to conduct a retrospective cohort analysis. The Scottish Index of Multiple Deprivation was used to produce deciles based on a resident's postcode. To compare the incidence of trauma among SIMD deciles, the incidence rate ratio (IRR) was determined. In order to calculate mortality ratios, the Trauma, and Injury Severity Score (TRISS) method's likelihood of survival was used to combine observed mortality from the cohort with projected deaths. They concluded that People who live in low-income communities are more likely to experience trauma, particularly penetrating trauma(4).

STRENGHTHS OF THE STUDY

- This study is adequately powered with a large sample size . So the statistical inferences are robust.
- AIIMS Jodhpur Emergency, where this study was conducted, provides universal free health care ensuring affordability and availability of healthcare to all level of population. So study population was more likely to represent general population.
- Socioeconomic status, demographic details and injury severity measured by objective widely accepted scales. This helped in minimising Observation bias.

LIMITATIONS OF STUDY

- Patients were likely to underreport socioeconomic status expecting economic benefits.
- This study was a hospital based study and it is not a true representation of general population. Population based cohort study will yield more valid results and actionable inferences.

CONCLUSIONS

- Majority of patients in this study belonged to upper lower socioeconomic class.
- There was a negative correlation between socioeconomic status and injury severity. As the socioeconomic status reduces, injury severity increases.
- Socioeconomic status and grade of open fractures were inversely related.
- 1 month mortality rate was more among lower socioeconomic class.
- Penetrating injury and Workplace injuries were significantly higher in lower socioeconomic class
- Severe injuries were more common in less educated population compared to well-educated population.
- Both injury severity and incidence of musculoskeletal trauma were higher in patients from lower socioeconomic status, hence preventive strategies should preferentially target this section of the population to reduce the injury burden.

REFERENCES

1. Haagsma JA, Graetz N, Bolliger I, Naghavi M, Higashi H, Mullany EC, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. Inj Prev. 2016 Feb;22(1):3–18.

2. Yadav J, Menon G, Agarwal A, John D. Burden of injuries and its associated hospitalization expenditure in India. Int J Inj Contr Saf Promot. 2021 Apr 3;28(2):153–61.

3. Gunjan Kumar, Dash P, Jayeshmit Patnaik, Gitanjali Pany. SOCIOECONOMIC STATUS SCALE-MODIFIED KUPPUSWAMY SCALE FOR THE YEAR 2022. Int J Community Dent. 2022 Jun 10;10(1):1–6.

4. Corfield AR, MacKay DF, Pell JP. Association between trauma and socioeconomic deprivation: a registry-based, Scotland-wide retrospective cohort study of 9,238 patients. Scand J Trauma Resusc Emerg Med. 2016 Dec;24(1):90.

5. Madsen C, Gabbe BJ, Holvik K, Alver K, Grøholt EK, Lund J, et al. Injury severity and increased socioeconomic differences: A population-based cohort study. Injury. 2022 Jun;53(6):1904–10.

6. Gunjan Kumar, Dash P, Jayeshmit Patnaik, Gitanjali Pany. SOCIOECONOMIC STATUS SCALE-MODIFIED KUPPUSWAMY SCALE FOR THE YEAR 2022. Int J Community Dent. 2022 Jun 10;10(1):1–6.

7. Bashar MdA. Modified BG Prasad Socioeconomic Status Scale: Updated for the Year 2022. Indian Pediatr. 2022 Oct;59(10):816–816.

8. Wani R. Socioeconomic status scales-modified Kuppuswamy and Udai Pareekh’s scale updated for 2019. J Fam Med Prim Care. 2019;8(6):1846.

9. Tiwari SC, Kumar A, Kumar A. Development & standardization of a scale to measure socio-economic status in urban & rural communities in India. Indian J Med Res. 2005 Oct;122(4):309–14.

10. Stinner DJ, Edwards D. Surgical Management of Musculoskeletal Trauma. Surg Clin North Am. 2017 Oct;97(5):1119–31.

11. McHale P, Hungerford D, Taylor-Robinson D, Lawrence T, Astles T, Morton B. Socioeconomic status and 30-day mortality after minor and major trauma: A retrospective analysis of the Trauma Audit and Research Network (TARN) dataset for England. Ramagopalan SV, editor. PLOS ONE. 2018 Dec 31;13(12):e0210226.

12. O'Hara NN, Isaac M, Slobogean GP, Klazinga NS. The socioeconomic impact of orthopaedic trauma: A systematic review and meta-analysis. Farouk O, editor. PLOS ONE. 2020 Jan 15;15(1):e0227907.

13. Javali RH, Krishnamoorthy null, Patil A, Srinivasarangan M, Suraj null, Sriharsha null. Comparison of Injury Severity Score, New Injury Severity Score, Revised Trauma Score and Trauma and Injury Severity Score for Mortality Prediction in Elderly Trauma Patients. Indian J Crit Care Med Peer-Rev Off Publ Indian Soc Crit Care Med. 2019 Feb;23(2):73–7.

14. Höke MH, Usul E, Özkan S. Comparison of Trauma Severity Scores (ISS, NISS, RTS, BIG Score, and TRISS) in Multiple Trauma Patients. J Trauma Nurs. 2021 Mar;28(2):100–6.

15. Baker SP, O'Neill B, Haddon W, Long WB. The injury severity score: a method for describing patients with multiple injuries and evaluating emergency care. J Trauma. 1974 Mar;14(3):187–96.

16. Abedzadeh-Kalahroudi M, Razi E, Sehat M. The relationship between socioeconomic status and trauma outcomes. J Public Health. 2018 Dec 1;40(4):e431–9.

17. Mikhail JN, Nemeth LS, Mueller M, Pope C, NeSmith EG, Wilson KL, et al. The Association of Race, Socioeconomic Status, and Insurance on Trauma Mortality. J Trauma Nurs. 2016 Nov;23(6):347–56.

18. Fang X, Jing R, Zeng G, Linnan HW, Zhu X, Linnan M. Socioeconomic status and the incidence of child injuries in China. Soc Sci Med. 2014 Feb;102:33–40.

19. Laflamme L. Injury risks and socioeconomic groups in different settings. Differences in morbidity between men and between women at working ages. Eur J Public Health. 2001 Sep 1;11(3):309–13.

20. Sehat M, Naieni KH, Asadi-Lari M, Foroushani AR, Malek-Afzali H. Socioeconomic Status and Incidence of Traffic Accidents in Metropolitan Tehran: A Population-based Study. Int J Prev Med. 2012 Mar;3(3):181–90.

21. Sorenson SB. Gender Disparities in Injury Mortality: Consistent, Persistent, and Larger Than You'd Think. Am J Public Health. 2011 Dec;101(S1):S353–8.

22. Shahbazi F, Hashemi Nazari SS, Soori H, Khodakarim S. Socioeconomic Inequality in Mortality from Road Traffic Accident in Iran. J Res Health Sci. 2019 Jan 9;19(1):e00437.

23. Simpson K. Multilevel analysis of associations between socioeconomic status and injury among Canadian adolescents. J Epidemiol Community Health. 2005 Dec 1;59(12):1072–7.

24. Ali MT, Hui X, Hashmi ZG, Dhiman N, Scott VK, Efron DT, et al. Socioeconomic disparity in inpatient mortality after traumatic injury in adults. Surgery. 2013 Sep;154(3):461–7.

25. Bolorunduro OB, Villegas C, Oyetunji TA, Haut ER, Stevens KA, Chang DC, et al. Validating the Injury Severity Score (ISS) in Different Populations: ISS Predicts Mortality Better Among Hispanics and Females. J Surg Res. 2011 Mar;166(1):40–4.

26. Yim GH, Hardwicke JT. The Evolution and Interpretation of the Gustilo and Anderson Classification. J Bone Joint Surg Am. 2018 Dec 19;100(24):e152.

27. Kacker S, Bishai D, Mballa GAE, Monono ME, Schneider EB, Ngamby MK, et al. Socioeconomic correlates of trauma: An analysis of emergency ward patients in Yaoundé, Cameroon. Injury. 2016 Mar;47(3):658–64.

28. McHale P, Hungerford D, Taylor-Robinson D, Lawrence T, Astles T, Morton B. Socioeconomic status and 30-day mortality after minor and major trauma: A retrospective analysis of the Trauma Audit and Research Network (TARN) dataset for England. Ramagopalan SV, editor. PLOS ONE. 2018 Dec 31;13(12):e0210226.

ANNEXURES

I IEC certificate

अखिल भारतीय आयुर्विज्ञान संस्थान, जोधपुर

All India Institute of Medical Sciences, Jodhpur

संस्थागत नैतिकता समिति

Institutional Ethics Committee

No. AIIMS/IEC/2021/3543 **Date: 12/03/2021**

ETHICAL CLEARANCE CERTIFICATE

Certificate Reference Number: **AIIMS/IEC/2021/3378**

Project title: **"Association of socioeconomic status with incidence and severity of musculoskeletal trauma"**

Nature of Project:	**Research Project Submitted for Expedited Review**
Submitted as:	**M.S. Dissertation**
Student Name:	**Dr. Vimal Prakash**
Guide:	**Dr. Nilesh Barwar**
Co-Guide:	**Dr. Abhay Elhence & Dr. Mahaveer Rodha**

Institutional Ethics Committee after thorough consideration accorded its approval on above project.

The investigator may therefore commence the research from the date of this certificate, using the reference number indicated above.

Please note that the AIIMS IEC must be informed immediately of:

- Any material change in the conditions or undertakings mentioned in the document.
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research.

The Principal Investigator must report to the AIIMS IEC in the prescribed format, where applicable, bi-annually, and at the end of the project, in respect of ethical compliance.

AIIMS IEC retains the right to withdraw or amend this if:

- Any unethical principle or practices are revealed or suspected
- Relevant information has been withheld or misrepresented

AIIMS IEC shall have an access to any information or data at any time during the course or after completion of the project.

Please Note that this approval will be rectified whenever it is possible to hold a meeting in person of the Institutional Ethics Committee. It is possible that the PI may be asked to give more clarifications or the Institutional Ethics Committee may withhold the project. The Institutional Ethics Committee is adopting this procedure due to COVID-19 (Corona Virus) situation.

If the Institutional Ethics Committee does not get back to you, this means your project has been cleared by the IEC.

On behalf of Ethics Committee, I wish you success in your research.

Dr. Praveen Sharma
Member Secretary

Member secretary
Institutional Ethics Committee
AIIMS,Jodhpur

Basni Phase-2, Jodhpur, Rajasthan-342005; **Website:** www.aiimsjodhpur.edu.in; **Phone:** 0291-2740741 Extn. 3109
E-mail : ethicscommittee@aiimsjodhpur.edu.in; ethicscommitteeaiimsjdh@gmail.com

II Kuppuswami Modified scale for the year 2022(6)

Sl. No.	**Occupation of the Head of family**	
1	Legislators, Senior Officials & Managers	10
2	Professionals	9
3	Technicians and Associate Professionals	8
4	Clerks	7
5	Skilled Workers and Shop & Market Sales Workers	6
6	Skilled Agricultural & Fishery Workers	5
7	Craft & Related Trade Workers	4
8	Plant & Machine Operators and Assemblers	3
9	Elementary Occupation	2
10	Unemployed	1

	Education of the Head of family	
1	Profession or Honours	7
2	Graduate	6
3	Intermediate or diploma	5
4	High school certificate	4
5	Middle school certificate	3
6	Primary school certificate	2
7	Illiterate	1

	Updated Monthly Family Income in Rupees (2020)	score
1	≥184376	12
2	92191-184370	10
3	68967-92185	6
4	46095-68961	4
5	27654-46089	3
6	9232-27648	2
7	≤9226	1

	Score	**Socioeconomic class**
1	26-29	Upper
2	16-25	Upper middle
3	11-15	Lower middle
4	5-10	Upper lower
5	<5	lower

III Injury severity score calculation(15)

To calculate an ISS, take the highest AIS severity code in each of the three most severely injured ISS body regions, square each AIS code and add the three squared numbers for an ISS (ISS = A2 + B2 + C2 where A, B, C are the AIS scores of the three most injured ISS body regions). The ISS scores ranges from 3 to 75 (i.e. AIS scores of 5 for each category). If any of the three scores is a 6, the score is automatically set at 75. Since a score of 6 ("unsurvivable") indicates the futility of further medical care in preserving life, this may mean a cessation of further care in triage for a patient with a score of 6 in any category

- Head or neck – including cervical spine
- face
- Chest – thoracic spine and diaphragm
- Abdomen or pelvic contents – abdominal organs and lumbar spine
- Extremities or pelvic girdle –

And the grading on basis of severity

1. Minor;
2. Moderate
3. Serious (non life threatening)
4. Severe (life threatening)
5. Critical (survival uncertain)
6. Maximal (currently untreatable)

IV Consent Form

DOCUMENTATION OF INFORMED CONSENT:

I, ……, have read the information in this form (or it has been read to me). I was free to participate in the study. I am over 18 years of age and, exercising my free power of choice, hereby give my consent to be include as a participant in **"STUDY ON THE RELATION OF SOCIOECONOMIC STATUS WITH INCIDENCE AND SEVERITY OF MUSCULOSKELETAL TRAUMA."**

(1) I have read and understood this consent form and the information provided to me.

(2) I have had the consent document explained to me.

(3) I have been explained about the nature of the study.

(4) My rights and responsibilities have been explained to me by the investigator.

(5) I have been advised about the risks associated with my participation in the study.

(6) I have informed the investigator of all the treatments I am taking or have taken in the past …..months including any *desi* (alternative) treatments.

(7) I agree to cooperate with the investigator and I will inform him/her immediately if I suffer unusual symptoms.

(8) I have not participated in any research study within the past ….. month(s).

(9) I am aware of the fact that I can opt out of the study at any time without having to give any
reason and this will not affect my future treatment in the hospital.

(10) I am also aware that the investigators may terminate my participation in the study at any time,
for any reason, without my consent.

(11) I hereby give permission to the investigators to release the information obtained from me as
result of participation in this study to the sponsors, regulatory authorities, Government agencies,
and ethics committee. I understand that they may inspect my original records.

(14) My identity will be kept confidential if my data are publicly presented.

(15) If, despite following the instructions, I am physically harmed because of any substance or any procedure as stipulated in the study plan, [my treatment will be carried out free at the investigational site / the sponsor will bear all the expenses], if they are not covered by my insurance

agency or by a Government program or any third party.

(16) I have had my questions answered to my satisfaction.

(17) I have decided to be in the research study.

I am aware, that if I have any questions during this study, I should contact at one of the addresses

listed above. By signing this consent from, I attest that the information given in this document

I will be given a copy of this consent document.

Date: Participant's initials

Place:

Name of the participant:

Complete postal Address:

Signature of principal investigator:

Date: Place:

This is to certify that above consent has been obtained in my presence.

Witness Signature

Name:

Address:

Name of the investigator: Name of the Guide:

Dr Vimal Prakash Dr Sumit Banerjee

+91-6282605437

V सू चत सहमति का दस्तावेज:

मैं... ... ... ने इस फॉर्म में जानकारी पढ़ली है (या यह मुझे पढ़ी गई है) मैं अध्ययन में भाग लेने के लए स्वतंत्र । हूं 18 वर्ष से अ धक आयु का हूं और अपनी स्वतंत्र शक्ति का प्रयोग कर रहा/रही हूं व इस अध्ययन में भाग लेने की सहमति देता/ देती हूँ ।

"STUDY ON THE RELATION OF SOCIOECONOMIC STATUS WITH INCIDENCE AND SEVERITY OF MUSCULOSKELETAL TRAUMA."

(1) मैंने इस सहमति फॉर्म को पढ़ा और समझ लया है ।

(2) मुझे सहमति दस्तावेज अच्छे से समझा दिया गया है ।

(3) मुझे अध्ययन के ववरण समझाया गया है।

(4) मैं जांचकर्ता से सहयोग करने के लए सहमत हूं और मैं निय मत अंतरालों पर क्लिनिकों में उपस्थित रहूंगा जैसा क जांचकर्ता ने बताया है।

(5) मुझे इस अध्ययन की प्रकृति के बारे में सू चत कया गया है, जहां पर प्रतिभा गता को कोई नुकसान नहीं होगा क्यों क अध्ययन गैर-आक्रामक और वशुद्ध उद्देश्य है।

(6) मुझे उन लाभों के बारे में बताया गया है जो क प्रतिभागी या समुदाय या दूसरों के लए अनुसंधान के परिणाम के रूप में उ चत उम्मीद कये जा सकते हैं ।

(7) अन्वेषक द्वारा मुझे मेरे अ धकार और जिम्मेदारियों को समझाया गया है।

(8) मुझे मेरे उपचार के बारे में सभी रूपरेखाओं के अन्वेषक द्वारा सू चत कया गया है।

(9) मैंने पछले ... .. महीने/ साल के भीतर कसी भी शोध अध्ययन में हिस्सा नहीं लया है।

(10) मैं इस तथ्य से अवगत हूं क मैं कसी भी समय बिना कसी कारण के अध्ययन से बाहर निकल सकता है और यह इस अस्पताल में मेरे भ वष्य के उपचार को प्रभा वत नहीं करेगा।

(11) मैं यह भी जानता हूं क जांचकर्ता मेरी सहमति के बिना, कसी भी कारण, कसी भी समय अध्ययन में मेरे वार्ड की भागीदारी को समाप्त कर सकते हैं।

(12) प्रायोजकों, वनियामक प्रा धकारियों, सरकारी एजें सयों और नैतिकता स मति को इस अध्ययन में भाग लेने के परिणामस्वरूप, मैंने इनके द्वारा प्राप्त जानकारी को जारी करने के लए जांचकर्ताओं को अनुमति दी है। मैं समझता हूं क वे मेरे मूल अ भलेखों का निरीक्षण कर सकते हैं।

(13) अगर मेरे डेटा को सार्वजनिक रूप से प्रस्तुत कया गया है तो मेरी पहचान को गोपनीय रखा जाएगा।

(14) यदि निर्देशों का पालन करने के बावजूद, मुझे शारीरिक रूप से नुकसान पहुंचाया जाता है क्यों क अध्ययन योजना में निर्धारित कसी भी प्र क्रया के कारण, [मेरा इलाज जांच स्थल पर मुफ्त में कया जाएगा / प्रायोजक सभी खर्चों को सहन करेंगे], यदि वे मेरी बीमा एजेंसी या कसी सरकारी कार्यक्रम या कसी तीसरे पक्ष द्वारा कवर नहीं कया जाता है

(15) अनुसंधान टीमों और पते और फोन नंबर वाले संपर्क व्यक्तियों की पहचान मुझे अनुसंधान से संबं धत प्रश्नों के लए या नैतिक सद्धांतों और मानवा धकारों के उल्लंघन के खलाफ अपील करने के लए दी गई है।

(16) मेरे सवालों के मेरी संतुष्टि के अनुसार उत्तर दिए गए हैं।

(17) मैंने शोध अध्ययन में शा मल होने का निर्णय लया है।

दिनांक: प्रतिभागी के हस्ताक्षर:

जगह:

प्रतिभागी का नाम:

पूरा डाक पता:

प्रमुख अन्वेषक के हस्ताक्षर:

ति थ: जगह:

यह प्रमा णत करना है क उपरोक्त सहमति मेरी उपस्थिति में प्राप्त की गई है।

गवाह के हस्ताक्षर

नाम:

पता:

VI PATIENT INFORMATION SHEET

Department of Orthopaedics

All India Institute of Medical Sciences, Jodhpur

STUDY ON THE RELATION OF SOCIOECONOMIC STATUS WITH INCIDENCE AND SEVERITY OF MUSCULOSKELETAL TRAUMA."

This study requires assessment of socioeconomic status with a questionnaire and severity of injury by injury severity scale which will not cause any harm to your health.

The expected duration of your stay for this study in emergency is 5 minutes. There are no obvious, expected or known adverse effects on the patient due to this study.

You have been invited to take part in a study, which will help us in better understanding the relation between socioeconomic status and incidence of musculoskeletal trauma and relation of severity of trauma with socioeconomic status. You are free to withdraw from the study at any time and this will not have any negative implication on your future treatment in the hospital.

Contact Person for further queries.

Dr,Vimal Prakash

+91-6282605437

VII सूचना पत्र

आर्थोपे डक्स वभाग

ऑल इं डया इंस्टिट्यूट ऑफ मै डकल साईं सस, जोधपुर

TITLE: **"STUDY ON THE RELATION OF SOCIOECONOMIC STATUS WITH INCIDENCE AND SEVERITY OF MUSCULOSKELETAL TRAUMA"**

इस अध्ययन के लए आपके स्वास्थ्य लाभ के शुद्ध इरादों के साथ शारीरिक परीक्षा और CT-scan द्वारा घुटने और टांगो की वस्तृत मांसपे शयों की परीक्षा के साथ-साथ परीक्षा की आवश्यकता है। ओ.पी.डी में आपके ठहरने की उम्मीद की अव ध, ऑर्थोपे डक्स वभाग, एम्स, जोधपुर में 1 घंटा होगा । इस अध्ययन के कारण रोगी पर कोई स्पष्ट, अपे क्षत या ज्ञात प्रतिकूल प्रभाव नहीं हैं।

आपको इस अध्ययन में भाग लेने के लए आमंत्रित कया गया है। आप कसी भी समय अध्ययन को छोड़ने के लए स्वतंत्र हैं और अस्पताल में आपके भ वष्य के उपचार पर इसका कोई नकारात्मक प्रभाव नहीं होगा।

अ धक प्रश्नों के लए व्यक्ति से संपर्क करें

Dr Vimal Prakash
+91 6282605437

VIII PROFORMA

1. NAME:

2. AGE:

3. SEX:

4. ADDRESS:

5. IP NO / REG NO:

6.MODE OF INJURY

RTA					FALL			ASSAULT	OTHERS
MOTORCYCLE	BICYCLE	PEDESTRIAN	CAR/ BUS	RAILWAY	ACCIDENTAL	SUICIDE	HOMICIDE		

7. TYPE OF INJURY

BLUNT	PENETRATING

6.INJURY SEVERITY SCORE CALCULATION

	1 (MINOR)	2 (MODERATE)	3 (SERIOUS)	4 (SEVERE)	6 (CRITICAL)	6 (UNSURVIVABLE)
HEAD/NECK						
FACE						
CHEST						
ABDOMEN/PELVIC CONTENTS						
EXTREMITIES/ PELVIC GIRDLE						

7.SEVERITY OF OPEN FRACTURE GRADING BY MODIFIED GUSTILLO ANDERSON CLASSIFICATION

	GRADE 1 (CLEAN OPEN WOUND < 1 CM)	GRADE 2 (WOUND 1-10 CM)	GRADE 3(LACERATION MORE THAN 10CM)		
			3A(INTACT PERIOSTIAL COVERAGE)	3B (PERIOSTEAL STRIPPING)	3C (ASSOCIATED ARTERIAL INJURY)

8.SOCIOECONOMIC SCALE CALCULATION WITH KUPPUSWAMI SCALE

Signature& Name of Patient

Sl. No.	Occupation of the Head of family	
1	Legislators, Senior Officials & Managers	10
2	Professionals	9
3	Technicians and Associate Professionals	8
4	Clerks	7
5	Skilled Workers and Shop & Market Sales Workers	6
6	Skilled Agricultural & Fishery Workers	5
7	Craft & Related Trade Workers	4
8	Plant & Machine Operators and Assemblers	3
9	Elementary Occupation	2
10	Unemployed	1

	Education of the Head of family	
1	Profession or Honours	7
2	Graduate	6
3	Intermediate or diploma	5
4	High school certificate	4
5	Middle school certificate	3
6	Primary school certificate	2
7	Illiterate	1

	Updated Monthly Family Income in Rupees (2020)	score
1	>2 lakh	12
2	1-2 lakh	10
3	75000-1 lakh	6
4	50000-75000	4
5	30000-50000	3
6	10000-30000	2
7	<10000	1

	Score	Socioeconomic class
1	26-29	Upper
2	16-25	Upper middle
3	11-15	Lower middle
4	5-10	Upper lower
5	<5	lower

9. MORTALITY STATUS AFTER 1 MONTH

Signature & Name of Patient

Sl no	Name	Age	Gender	IP number	Mechanism of injury																Blunt/Penetrating injury		Open=1 closed=0	Gus-And grading	Socioeconomic Status					ISS	Mortality status after 1 month
					RTA						non-RTA																				
					Motor cycle	Bicycle	Pedestrian	Car	Bus	Others	Household accidents	Fall from height workplace	fall from height non workplace	suicide	homicide	machienecut injury	other workplace injury	assault	others	Sports	Blunt	Penetrating			Occupation	education	income	total SES	SES caregory		
1	Ramnivas	18	M	2022/06/013681							Y										Y	N	0		4	2	75000	12	3	14	0
2	SAWAR LAL	20	M	2022/03/012976							Y										Y	N	0		4	1	10000	7	2	6	0
3	VISHAL	21	M	2022/03/013031	Y																Y	N	0		5	5	30000	13	3	10	0
4	NIRMALA	50	F	2022/03/012934	Y																Y	N	0		6	2	30000	11	3	2	0
5	LICSHA RAM	32	M	2022/03/013224								Y									Y	N	0		5	3	12000	10	2	20	0
6	NITHIN	18	M	2022/03/013139														Y			Y	N	0		1	1	3900	3	1	20	0
7	VISHNU DUTT	24	M	2022/03/013290	Y																Y	N	0		5	5	16000	12	3	20	0
8	AMBA RAM	47	M	2022/02/013459					Y												Y	N	0		5	3	10000	10	2	10	0
9	HANUMAN RAM	27	M	2022/02/013746	Y																Y	N	0		5	3	10000	10	2	20	0
10	SAHTU RAM	35	M	2022/02/013560	Y																Y	N	0		5	1	6000	7	2	2	0
11	BALVEER	40	M	2022/02/013553	Y																Y	N	0		4	4	10000	10	2	20	0
12	PAPPU DEVI	52	F	2022/02/013460					Y												Y	N	0		4	3	10000	9	2	20	0
13	AMBA RAM	47	M	2022/02/013459					Y												Y	N	0		4	4	7000	9	2	20	0
14	EHSAAN	18	M	2022/02/013317												1						Y	1	3B	3	2	5000	6	2	9	0
15	WASIM	25	M	2022/02/013304	Y																Y	N	0		5	3	10000	10	2	20	0
16	BALRAM	18	M	2022/02/011894												1						Y	1	3B	1	1	5000	3	1	20	0
17	DILDAR	13	M	2022/02/010406					Y												Y	N	0		5	4	13000	11	3	10	0
18	MANJOOR KNAN	12	M	2022/02/010481						Y											Y	N	0		3	1	5000	5	2	10	0
19	GANI	14	M	2022/02/010483					Y												Y	N	0		5	3	7000	9	2	4	0
20	MABU	5	M	2022/02/010327					Y												Y	N	0		1	2	4000	4	1	18	0
21	SIKENDRA	9	M	2022/02/010434					Y												Y	N	0		1	1	4000	3	1	20	0
22	AAVESH	8	M	2022/02/010326					Y												Y	N	0		3	2	5000	6	2	9	0
23	BARAKT	7	M	2022/02/010485					Y												Y	N	0		5	3	10000	10	2	4	0
24	NABAB KHA	7	M	2022/02/010486					Y												Y	N	0		5	3	7000	9	2	20	0
25	BARKAT	7	M	2022/02/010487					Y												Y	N	0		3	2	5000	6	2	9	0
26	YASIN	9	M	2022/02/010335					Y												Y	N	0		5	2	7000	8	2	9	0
27	YASHIR	16	M	2022/02/010489					Y												Y	N	0		5	3	7000	9	2	20	0
28	YASIN	7	M	2022/02/010331					Y												Y	N	0		5	1	6000	7	2	4	0
29	RAMZAN	10	M	2022/02/010491					Y												Y	N	0		5	3	7000	9	2	20	0
30	INSAF	9	M	2022/02/010492					Y												Y	N	0		5	3	7000	9	2	10	0
31	SATAR	10	M	2022/02/010382					Y												Y	N	0		5	3	7000	9	2	22	0
32	SADAM KHAN	10	M	2022/02/010336					Y												Y	N	0		5	4	7000	10	2	10	0
33	HUSAIN	8	M	2022/02/010386					Y												Y	N	0		1	1	4000	3	1	18	0
34	NASOO	6	M	2022/02/010490					Y												Y	N	0		5	1	6000	7	2	11	0
35	GARVIT PANWAR	18	M	2022/03/015598	Y																Y	N	0		5	4	10000	11	3	2	0
36	SARLA	67	F	2022/03/003694							Y										Y	N	0		6	6	80000	18	4	2	0
37	DR VIJAY	68	M	2022/03/003689							Y										Y	N	0		10	7	110000	27	5	2	0
38	NISHA KALLA	58	F	2022/06/005742																Y	Y	N	0		10	6	115000	26	5	8	0
39	GAJE SINGH	20	M	2022/06/006051													Y				Y	N	0		5	5	14000	12	3	2	0
40	MANISH	8	M	2022/02/002559							Y										Y	N	0		5	3	10000	10	2	2	0
41	SHRAWAN	19	M	2022/02/002031												1						Y	1	3C	1	1	6000	3	1	32	0
42	AMARLAL	51	M	2022/02/002814								Y									Y	N	0		3	2	10000	7	2	20	0
43	VIRONICA	62	F	2022/02/002704							Y										Y	N	0		5	6	16000	13	3	2	0
44	VATISHN YADAV	26	M	2022/02/002781												1						Y	1	1	3	2	10000	7	2	20	0
45	NARPAT	20	M	2022/02/002914	Y																Y	N	0		3	1	10000	6	2	18	0
46	JYOTSNA MEGHWAL	32	F	2022/04/010502							Y										Y	N	0		10	6	55000	20	4	2	0
47	RAM	42	M	2022/02/002017	Y																Y	N	0		5	4	13000	11	3	2	0
48	SHIKHA JAIN	35	M	2022/01/035318	Y																Y	N	0		10	7	90000	23	4	2	0
49	HARSH TAK	40	M	2022/02/001831	Y																Y	N	0		10	6	55000	20	4	2	0
50	KIRAN	62	M	2022/02/002036								Y									Y	N	0		1	1	4000	3	1	20	0
51	BALVEER	27	M	2022/02/001464														Y				Y	1	3A	5	1	6000	7	2	9	0
52	AYAN PANDEY	4	M	2022/02/001408							Y										Y	N	0		5	4	12000	11	3	2	0
53	SALHI RAM	46	M	2022/02/002514									Y								Y	N	0		5	1	10000	8	2	2	0
54	SURESH NATH	24	M	2017/08/005979	Y																Y	N	0		10	6	86000	22	4	2	0
55	MANISH	8	M	2022/02/002553							Y										Y	N	0		5	4	12000	11	3	2	0
56	AVINASH K BHARTI	25	M	2022/02/002388							Y										Y	N	0		5	4	12000	11	3	2	0
57	NARPAT	20	M	2020/02/002914	Y																Y	N	0		3	1	10000	6	2	57	0
58	MEGHA RAM	25	M	2022/02/005639	Y																Y	N	0		5	6	32000	14	3	20	0
59	BHAWNA	21	F	2022/02/005705	Y																Y	N	0		10	6	32000	19	4	2	0
60	KUSHAN BAHDUR	55	M	2022/02/005836								Y									Y	N	1	3A	1	1	3500	3	1	20	0
61	DEEPARAM	21	M	2022/02/005807							Y										Y	N	0		4	1	5000	6	2	6	0
62	SUDARSHAN CHAUDHARY	30	M	2022/02/006046													Y				Y	N	0		3	1	4000	5	2	18	0
63	MAHENDRA SUKHDEV	67	M	2022/02/006046	Y																Y	N	0		5	5	30000	13	3	2	0
64	PRAKASH	35	M	2022/02/006069	Y																Y	N	0		5	2	10000	9	2	2	0
65	SURAJ	18	M	2022/02/006006								Y									Y	N	0		3	1	5000	5	2	22	0
66	SAWAI	23	M	2022/02/006136	Y																Y	N	0		5	6	30000	14	3	2	0
67	MUKESH	38	M	2022/02/006126							Y										Y	N	0		5	4	10000	11	3	2	0
68	NARU RAM	60	M	2022/02/006653				Y													Y	N	0		4	1	5000	6	2	9	0
69	SURENDRA	58	M	2022/02/011906	Y																Y	N	1	1	6	6	55000	16	4	20	0
70	TATU	22	M	2022/02/011101													Y				Y	N	1	3A	1	1	5000	3	1	20	0
71	PARKASH	26	M	2022/02/010572	Y																	N	1	3B	3	1	5000	5	2	22	0
72	MAHAVEER	10	M	2022/02/010895																Y	Y	N	0		6	6	200000	24	4	2	0
73	AASHA	18	F	2022/02/007356							Y										Y	N	0		4	4	30000	11	3	20	0
74	NADEEM	22	M	2022/02/011037							Y										Y	N	0		6	4	30000	13	3	20	0
75	RONI SINGH	22	M	2022/02/011012												1						Y	1	3B	3	1	4000	5	2	18	0
76	BALRAM	18	M	2022/02/011894												1						Y	1	3B	1	1	5000	3	1	20	0
77	JAGDISH	50	M	2022/02/011725	Y																Y	N	0		5	5	10000	12	3	20	0
78	RAMNIVAS	25	M	2022/02/010455												1						Y	1	3B	5	1	30000	9	2	18	0
79	PINKY PRAJAPAT	32	M	2022/02/010477							Y										Y	N	0		6	5	32000	14	3	8	0
80	BHUTA RAM	68	M	2022/07/008567	Y																Y	N	0		5	3	10000	10	2	34	0
81	DINESH	29	M	2022/02/010000	Y																Y	N	0		6	6	99000	22	4	8	0
82	PRIYANKA KUMARI	18	F	2022/02/010541	Y																Y	N	0		5	3	7000	9	2	22	0
83	PRACHI CHARAN	14	F	2022/02/006395	Y																Y	N	1	2	5	6	32000	14	3	8	0
84	NILESH KUMAR	3	M	2022/01/027189							Y											Y	1	2	5	5	30000	13	3	11	0
85	ASHITA GADWAL	26	F	2021/02/009138							Y										Y	N	0		10	6	80000	22	4	2	0
86	RAM CHANDRA	65	M	2021/07/014504							Y										Y	N	0		5	6	30000	14	3	2	0
87	KALU SINGH	62	M	2022/01/026895												1						Y	1	3B	3	2	5000	6	2	12	0
88	NAZIM	22	M	2022/01/027042							Y										Y	N	0		5	4	14000	11	3	8	0
89	AKSHAY	52	M	2022/01/026277							Y										Y	N	0		5	5	14000	12	3	2	0
90	CHOTIDEVI	64	M	2021/04/007278							Y										Y	N	0		5	5	80000	16	4	18	0
91	KUTUL SINGH	30	M	2022/01/022672															Y			Y	1	3C	4	2	6000	7	2	59	0
92	SUKHI DEVI	70	F	2022/01/022646							Y										Y	N	0		5	3	30000	11	3	51	0
93	SANG SINGH	22	M	2022/01/021118		Y															Y	N	1	3B	4	4	10000	10	2	22	0
94	ANISH	26	M	2022/01/021064								Y									Y	N	0		4	3	10000	9	2	2	0
95	JAGDISH BISHNOI	30	M	2022/01/020724						Y											Y	N	0		5	4	30000	12	3	9	0
96	HARISH	42	M	2022/01/021957							Y										Y	N	0		5	4	14000	11	3	20	0
97	LUNA RAM	35	M	2022/01/022067						Y											Y	N	0		3	2	10000	7	2	59	1
98	AMIT SINGH	23	M	2022/01/021838				Y													Y	N	0		5	3	12000	10	2	28	0
99	HARI DUTT	75	M	2022/01/021902							Y										Y	N	0		5	6	50000	15	3	8	0
100	NEMA RAM	30	M	2022/01/012923							Y										Y	N	0		5	6	32000	14	3	8	0
101	GOLDI	48	F	2021/10/004352	Y																Y	N	0		5	4	14000	11	3	8	0
102	PANCHA RAM	45	M	2022/01/022886												1						Y	1	3B	4	3	10000	9	2	32	0
103	DILIP SINGH	28	M	2021/11/008159	Y																Y	N	0		4	3	10000	9	2	32	0
104	ASHOK	19	M	2021/10/013048													Y				Y	N	0		3	2	5000	6	2	20	0
105	BABULAL	45	M	2021/10/013039	Y																Y	N	0		3	2	10000	7	2	38	0
106	SHRAWN RAM	26	M	2021/10/013221	Y																Y	N	0		3	2	10000	7	2	36	0
107	MAHENDRA SINGH	30	M	2021/10/013246	Y																Y	N	1	2	5	3	10000	10	2	51	1
108	SYARMA RAM	31	M	2021/10/013782	Y																Y	N	0		5	4	14000	11	3	8	0
109	NARPAT SINGH	23	M	2021/10/013262	Y																Y	N	1	2	3	2	5000	6	2	34	0
110	PARDEEP TEJI	25	M	2022/01/025805	Y																Y	N	0		5	2	10000	9	2	9	0
111	KRISHNA DAS	24	M	2022/01/034965													Y				Y	N	0		4	2	10000	8	2	9	0
112	CHAMPALAL	53	M	2022/01/035053	Y																Y	N	0		1	1	5000	3	1	51	0
113	VIMLA DEVI	76	F	2022/01/035057							Y										Y	N	0		5	4	30000	12	3	10	0
114	NARESH BISHNOI	23	M	2022/01/034489	Y																Y	N	0		5	5	30000	13	3	2	0
115	SONA RAM	60	M	2022/01/034421								Y									Y	N	0		1	1	4000	3	1	20	0
116	VISHNU RAM	30	M	2022/01/033317												1						Y	1	3A	3	1	4000	5	2	18	0
117	RAKESH	21	M	2022/01/033222									Y								Y	N	0		5	2	6000	8	2	9	0
118	BHANWAR KANWAR	42	F	2022/01/033128							Y										Y	N	0		5	6	32000	14	3	8	0
119	BHAGWATI DEVI	42	F	2022/01/031900	Y																Y	N	0		5	3	12000	10	2	51	0
120	BHAVESH	5	M	2022/01/036211							Y										Y	N	0		5	2	10000	9	2	2	0
121	BHAWANA DEVI	28	F	2021/02/011365							Y										Y	N	0		10	6	80000	22	4	2	0
122	SOORAJ	30	M	2022/01/036250								Y									Y	N	0		3	1	4000	5	2	18	0
123	YASHPAL	77	M	2022/01/036445							Y										Y	N	0		6	6	55000	16	4	20	0
124	KUSHAL	20	M	2022/01/036478	Y																Y	N	0		6	6	75000	18	4	8	0
125	SURAJ	3	M	2022/01/036450								Y									Y	N	0		5	2	10000	9	2	9	0