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BURDEN OF DISEASE, COSTING AND DISABILITY AMONG INJURY VICTIMS IN KERALA.

Orthopaedics

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ABSTRACT

INTRODUCTION: Knowledge and understanding of the epidemiological profile is an essential pre-requisite for analysing the public health needs in the country and to enable efficient programme planning and management. Developments in knowledge and medical technology leads to increased demand for health services and it places increasing pressure on health budgets. In many countries including India there is a trend of increasing focus on making choices, while seeking both optimum health gain for health expenditure as well as fair and equitable access to health interventions. There is increasing public and policy concern to ensure that non-fatal conditions are appropriately reflected in health planning and priority setting. Paucity of adequate, accurate and appropriate statistical data has often led to over-estimations in some instances and under-estimations in others. The lack of uniformity in assessments had led to considerable difficulties in Global comparisons of health needs, Burden of diseases estimation, efficient health promotion, disease control & prevention etc. There was an urgent need to identify a single, acceptable and appropriate yardstick of measurement.

MATERIALS AND METHODS : We had conducted a Community Prospective Study, during 2003-2010 yrs period in Thiruvananthapuram District to know the Burden of Disease due to injury, the costing of injury and the disability of injury victims. The unit of the study was the households in the selected areas of Thiruvananthapuram District.

RESULTS : 9513 households were included; 3503 in urban and 6010 rural. The total numbers of population in the study were 39567.Costing: Injured from Urban spent an average amount of ₹ 28,058/- . 75% people spent below 058/- . 75% people spent below ₹ 16,900/-. Rural spend an average amount of 16,971/- 75% of persons spent less than ₹ 14000.

CONCLUSION: The incidence of injury in Thiruvananthapuram District was 8.74/1000 population. In the rural areas of the District it was 7.98 and in the urban area 9.91 in one year period (2007 to 2008). The total number of population participated in the study were 39567 from 9513 households. From 335 households (urban 145 and rural 190) 346(urban 154 and rural 192) had sustained injury. The Burden of Injury was contributed by 3.6 % of the households (4.1% in urban and 3.2% in rural). Incidence of trauma was comparatively more in urban than rural. There was significant difference between the cost encountered to treat mild and severe cases in rural population, where as no difference is seen in urban area. An average of ₹ 1300/- spend for transportation in urban area and ₹ 1600/- in rural area. The cost to accommodate a bystander in urban was found significantly higher₹ 3500/- than rural ₹ 1500/- .

KEYWORDS:

Burden of Disease , Costing, Disability, Relative Risk, Study Variables.

INTRODUCTION:

Knowledge and understanding of the epidemiological profile is an essential pre-requisite for analysing the public health needs in the country and to enable efficient programme planning and management. Developments in knowledge and medical technology leads to increased demand for health services and it places increasing pressure on health budgets. In many countries including India there is a trend of increasing focus on making choices, while seeking both optimum health gain for health expenditure as well as fair and equitable access to health interventions. There is increasing public and policy concern to ensure that non-fatal conditions are appropriately reflected in health planning and priority setting.[2]

In order to improve health and reduce inequalities evidence based evaluation of policies are required [8]. For this four basic types of informations are required:

1. Information on assessment of the magnitude and impact of health problems in the population. This includes the causes of loss of health and its determinants.
2. In day-to-day life we want to answer these important questions "What can be done to improve health? What are the best availabilities for the health in Rupees?" for that we should know the information on health expenditure and health infrastructure; a national system of health accounts, detailing the availability of resources currently used for health improvement.
3. Information on the cost-effectiveness of available technologies and strategies for improving health.
4. Information on inequalities in health status, health determinants, and access to & use of health services both in terms of prevention and treatment. The service providers may be from public sector, private or both; or it may be from modern medicine, indigenous medicine, and Indian systems of medicines or combined.

Conventionally, *The Global Burden of Disease (B O D):* has been measured by summary measures, which combine informations on mortality, morbidity and disability. The lack of uniformity in assessments had led to considerable difficulties in Global comparisons of health needs, Burden of diseases estimation, efficient health promotion, disease control & prevention etc. The "World Develop ment Report 1993" brought a lot of informations regarding the reforms in the health sector, planning and development. This report was based on the BOD study which was a sponsored by The World Bank in collaboration with WHO lead by Christopher Murray and his team. It had certain special features [1]. The general willingness to embark on estimation despite enormous deficiencies in data. [2]. The tenacity to provide methodological solutions to indirectly estimate epide miological parameters.[3].The use of internal consistency tools to seek more plausible estimates and to lay emphasis on the overall picture rather than on single disease entity or solitary interventions. [4]. It provides a lot of scope for health policy analysis.[1,2,14]

The principle guiding the burden of disease approach is that the best estimates of incidence, prevalence, and mortality can be generated by carefully analyzing all available sources of information in a country or region, and correcting for bias. The study of disease prevalence helps in decoupling epidemiological assessment from advocacy and a single measure of the health outcomes enables comparison of cost effecti veness of all interventions within the health sector.

Cost is defined as the amount paid or required in payment for a purchase; it may be a price, or the expenditure for something; such as time or labour, necessary for the attainment of a goal or the charges fixed for litigation, often paid by the loser or the consumption of a resource that otherwise could have been used for another purpose. Estimating the cost of society to any injury is important because of several reasons. They are [1]. It improves awareness among people regarding the seriousness of injuries as a social problem. [2]. Making proper comparisons between different causes of death and injury. [3]. Prioritising between different interventions to be made, using cost–benefits methods; since the social cost of road traffic accidents is a reflection of the social benefits of reducing accidents through safety interventions and scientific assessments of the costs.[5]

The patterns of disease and disability and their risk factors, the paying capacity and attitudes of people have changed dramatically in the present scenario. These factors are to be studied and reassessed in a newly comprehensive manner. A new structured study will take

advantage of the opportunity to bring global researchers together to communicate and work collaboratively in an environment that is strongly seeking new burden statistics. Many studies are necessary to identify and help the people by finding out the factors required for injury control so that the mortality, morbidity and disability can be reduced or rather prevented. [12] This is the relevance of this structured community based prospective study to the present world.

MATERIALS AND METHOD

Objectives of the Study:

Primary objectives:

1. To estimate the burden of injury in the rural and urban community of Thiruvananthapuram district in Kerala during the one year (2007-2008) period.
2. To follow the subjects for injury related Morbidity, Mortality and Disability.

Secondary objectives.

3. To estimate the costing (both direct and indirect) among those injury victims.

Methods:

Population Prospective study for injury epidemiology and costing.
Using a Sampling frame of urban and rural Thiruvananthapuram district and all individuals in the household from 2 selected blocks in the rural and 7 urban wards. Data's were collected based on socio-demographic variables such as income, housing, education and occupation. Also severity of injury were assessed after categorising into major and minor; all fractures and dislocations of joints were classified as major and were assessed among those who sustained traffic injuries , fall from height , fall from construction works and others which includes homicide, falling at home , violence and occupation related. Outcome status was death, total recovery or with some disability (bed ridden; not doing routine work; can do routine work and returned to original work). Economic evaluation was done for direct and indirect costs. All subjects were followed up for one year from inception. Data were analysed for description of variables, univariate and logistic regression model as well as costing. Level of significance, p value was set as 0.05.

Sample Size:

	Households	Population
Total	9524	39567
Urban	3504	15532
Rural	6010	24035

Study Variables: Socio-demographic variables such as income, housing, education and occupation, type of injury as major and minor.

Age recorded as Years and stratified as less than 15, 16-30, 31-60 and more than 60.

Education recorded as years of schooling and stratified; Illiterate (No Years of Schooling, 1-7, 8-10, 11+.

Mode of Injury were Classified into:

1. Fall from tree, 2. Fall from construction work, 3. Pedestrian, 4. Vehicle accident, 5. Others.

Fracture Sites classified as:

1. Arm , 2. Forearm ,3. Thigh , 4. Leg 5. Spine , 6. Head, 7. Chest, 8. Others.

Status of the persons after injury were classified into three categories:

1. Died 2. Recovered fully 3. Disability.

Disability was classified into four categories:

1. Bed ridden 2. Not doing routine work 3. Can do routine work 4. Returned to original work.

Costing: Economic evaluation carried out for direct and indirect costs. Direct means all costs related to treatment, hospitalisation, and wage lost. Direct costs are those changes in resource use directly attributable to the injury and may be both medical and non-medical in nature. Direct medical costs: They include the value of all goods, services and other resources arising from the utilisation of health services such as hospitalisation, pharmaceuticals, and medical and allied health treatments received outside of the hospital setting. Direct Non Medical **Costs:** include the cost of supporting the injured person's activities of daily living, for example through modification of living spaces, and the broader derivative costs associated with the occurrence of the event rather than the injury, such as property damage. Expenditure for food, lodging, family care, home aids and clothing are results of an illness but do not involve purchasing medical services.

Indirect Cost: Travel and wage of accompanying persons (The value of lost productivity from time off work due to illness). Intangible Costs: These are the costs of pain, suffering, grief, and the other non financial outcomes of disease and medical care. In this study this cost factor is not calculated.

Outcome Variables:

1. Death
2. Recovery with no sequel
3. Recovery with sequel
4. Costing as indicated
5. Disability as evaluated by inability to execute.

RESULTS

The burden of disease -incidence of injury among households, during one year period (2007-2008) in urban and rural areas are shown in Table 1.

Table 1: Burden of Injury in Urban and Rural population by Household.

	Urban		Rural		Total	
	N	%	N	%	N	%
Injury	145	4.1	190	3.2	335	3.52
No injury	3358	95.9	5820	96.8	9178	96.47
Total	**3503**	**100.0**	**6010**	**100.0**	**9513**	**100.0**

χ^2=6.229 df= 1 p=0.012

Table 2: Socio Demographic Variables of ***Study Population*** and the Domicile.

Sl no	Characteristic		Injury						χ^2	p	RR	95% CI	
			Present		Absent		**Total**						
			N	%	N	%	N	%				Lower	Upper
1	Place	Urban	154	44.5	15454	39.0	15608	39.0	4.414	0.036	1.256	1.015	1.554
		Rural	192	55.5	24197	61.0	24389	61.0					
2	Gender	Male	246	71.1	18496	47.2	18742	47.4	78.844	<0.001	2.756	2.183	3.481
		Female	100	28.9	20725	52.8	20825	52.6					
3	Age(Yrs)	>30	245	70.8	18147	46.3	18392	46.5	83.033	<0.001	2.817	2.232	3.555
		≤30	101	29.2	21074	53.7	21175	53.5					
4	Alcoholism	Yes	99	28.6	2865	7.3	2964	7.5	224.376	<0.001	5.081	4.012	6.435
		No	247	71.4	36320	92.7	36567	92.5					
5	Chewing	Yes	42	12.1	1963	5.0	2005	5.0	37.220	<0.001	2.653	1.915	3.674
		No	304	87.9	37688	95.0	37992	95.0					
6	Smoking	Yes	85	24.6	3628	9.1	3713	9.3	96.805	<0.001	3.234	2.526	4.140
		No	261	75.4	36023	90.9	36284	90.7					

Table 3: Socio Demographic Variables and the injury status in the ***Urban.***

Sl no	Characteristic		Injury						χ^2	p	RR	95% CI	
			Preseant		Absent		Total						
			N	%	N	%	N	%				Lower	Upper
1	Gender	Male	113	73.4	7595	49.4	7708	49.6	35.106	<0.001	2.825	1.973	4.044

		Female	41	26.6	7784	50.6	7825	50.4					
2	Age(Yrs)	>30	113	73.4	7424	48.3	7537	48.5	38.457	<0.001	2.953	2.063	4.227
		≤30	41	26.6	7954	51.7	7995	51.5					
3	Alcohol	Yes	53	34.4	1812	11.8	1865	12.0	73.856	<0.001	3.927	2.806	5.495
		No	101	65.6	13559	88.2	13660	88.0					
4	Chewing	Yes	16	10.4	916	5.9	932	6.0	5.408	<0.020	1.840	1.092	3.101
		No	138	89.6	14538	94.1	14676	94.0					
5	Smoking	Yes	35	22.7	1767	11.4	1802	11.5	19.043	<0.001	2.278	1.558	3.332
		No	119	77.3	13687	88.6	13806	88.5					

Table 4: Socio Demographic Variables and the injury status in the ***Rural.***

Sl no	Charestersitic		Injury						χ2	p	RR	95% CI	
			Present		Absent		Total						
			N	%	N	%	N	%				Lower	Upper
1	Gender	Male	113	73.4	7595	49.4	7708	49.6	35.106	<0.001	2.825	1.973	4.044
		Female	41	26.6	7784	50.6	7825	50.4					
2	Age(Yrs)	>30	113	73.4	7424	48.3	7537	48.5	38.457	<0.001	2.953	2.063	4.227
		≤30	41	26.6	7954	51.7	7995	51.5					
3	Alcohol	Yes	53	34.4	1812	11.8	1865	12.0	73.856	<0.001	3.927	2.806	5.495
		No	101	65.6	13559	88.2	13660	88.0					
4	Chewing	Yes	16	10.4	916	5.9	932	6.0	5.408	<0.020	1.840	1.092	3.101
		No	138	89.6	14538	94.1	14676	94.0					
5	Smoking	Yes	35	22.7	1767	11.4	1802	11.5	19.043	<0.001	2.278	1.558	3.332
		No	119	77.3	13687	88.6	13806	88.5					

The statistical significance of income of a person in the occurrence of injury is analysed in Table 5 along with the age pattern & its effect on injury among total population.

Table 5: Socio-demographic variables: Income and Age

Variable	Domicile	No injury		Injury		t	P
		Mean	sd	Mean	sd		
Income in INR	Urban	4344.43	4445.12	6137.86	5404.32	-4.846	0.000
	Rural	2101.02	6947.20	3117.45	1956.11	-2.025	0.043
Age(Years)	Urban	48.42	14.61	41.20	17.89	5.931	0.000
	Rural	50.30	14.18	39.41	18.20	10.358	0.000

Combined Age Distribution.

Sl. No	Variable		All (N=39567)		urban (N=15532)		rural (N=24035)		χ^2	p
			N	%	N	%	N	%	74.422 (df=3)	.001
1	Age in years	<15	9872	25.0	3542	22.8	6330	26.3		
		16-30	11303	28.6	4453	28.7	6850	28.5		
		31-60	14841	37.5	6043	38.9	8798	36.6		
		>60	3551	9.0	1494	9.6	2057	8.6		

Age Distribution (Urban)

Sl No.	Variable		Total (N=15532)		No injury (N=15378)		Injury (N=154)		χ^2	p
			N	%	N	%	N	%	39.366 (df=3)	.001
1	Age	<15	3542	22.8	3528	22.9	14	9.1		
		16-30	4453	28.7	4426	28.8	27	17.5		
		31-60	6043	38.9	5952	38.7	91	59.1		
		>60	1494	9.6	1472	9.6	22	14.3		

Age Distribution (Rural)

Sl No	Variable		Composite (N=24035)		No injury (N=23843)		Injury (N=192)		χ2	p
			N	%	N	%	N	%	44.445 (df=3)	.001.
1	Age	<15	6330	26.3	6306	26.4	24	12.5		
		16-30	6850	28.5	6814	28.6	36	18.75		
		31-60	8798	36.6	8690	36.4	108	56.25		
		>60	2057	8.6	2033	8.5	24	12.5		

Those variables found statistically significant in uni -variate analysis were analysed by logistic regression among the total and separately in the urban and rural population in Table 6,7 and 8.

Table 6: Logistic Regression: Combined.

Variables:	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender	.786	.132	35.606	1	.000	2.194	1.695	2.839
Place	.003	.112	.001	1	.982	1.003	.805	1.249
Age	.852	.126	45.853	1	.000	2.345	1.832	3.001
Chewing	.263	.177	2.208	1	.137	1.301	.919	1.841
Smoking	-.205	.168	1.484	1	.223	.815	.586	1.133
Alcoholism	1.038	.169	37.603	1	.000	2.824	2.026	3.935
Constant	1.472	.300	24.099	1	.000	4.359		

Table 7: Urban Domicile: Logistic Regression.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender	.834	.204	16.677	1	.000	2.303	1.543	3.437
Age	.941	.192	23.991	1	.000	2.564	1.759	3.737
Alcohol	.917	.228	16.193	1	.000	2.502	1.601	3.912
Chewing	.061	.278	.049	1	.825	1.063	.617	1.833
Smoking	-.430	.240	3.225	1	.073	.650	.407	1.040
Constant	1.724	.406	18.011	1	.000	5.607		

Table 8: Rural Domicile: Logistic Regression.

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender	.740	.173	18.256	1	.000	2.095	1.492	2.941
Age	.750	.169	19.617	1	.000	2.116	1.519	2.949
Alcohol	1.177	.251	21.990	1	.000	3.244	1.984	5.305
Chewing	.400	.234	2.936	1	.087	1.492	.944	2.359
Smoking	-.020	.243	.006	1	.936	.981	.609	1.580
Constant	1.301	.325	16.057	1	.000	3.673		

Table 9: Demography and Patterns of Injury in the Injury Population.

Sl.	Variable		Total		Urban (N=154)		Rural (N=192)		χ2	p
			N	%	N	%	N	%	1.299 (df=3)	.729
1	Age	<15	38	11.0	14	9.1	24	12.5		
		16-30	63	18.2	27	17.5	36	18.8		
		31-60	199	57.5	91	59.1	108	56.3		
		>60	46	13.3	22	14.3	24	12.5		
2	Gender	Male	246	71.1	113	73.4	133	69.3	0.701 (df=1)	.402
		Female	100	28.9	41	26.6	59	30.7		
3	Education (years of schooling)	Illiterate	21	6	9	6	12	6	11.895 (df=3) *7.806	0.007 *0.005
		1-7	135	39	51	33	84	44		
		8-10	127	37	54	35	73	38		
		11+	63	18	40	26	23	12		
4	Injury pattern	Mild	117	33.8	44	28.6	73	38.0	3.409 (df=1)	0.065
		Severe	229	66.2	110	71.4	119	62.0		

5	Hospitalized	Yes	255	73.7	119	77.3	136	70.8	1.828 (df=1)	.176
		No	91	26.3	35	22.7	56	29.2		
6	Mode of injury	Fall from tree	25	7.2	19	12.3	6	3.1	27.561 (df=4) *6.195	.000 *0.012
		Fall from construction work	25	7.2	14	9.1	11	5.7		
		Pedestrian	65	18.8	17	11.0	48	25.0		
		Vehicle Accident	124	35.8	66	42.9	58	30.2		
		Others	107	30.9	38	24.7	69	35.9		
7	Injury site	Upper limb	107	30.9	41	26.6	66	34.4	34.186 (df=5)	.001
		Lower limb	132	38.1	56	36.4	76	39.6		
		Spine	21	6.1	2	1.3	19	9.9		
		Head	46	13.3	23	14.9	23	12		
		Chest	5	1.4	3	1.9	2	1		
		Multiple	35	10.3	29	18.5	6	3		
8	Service	Indigenous medicine	5	1.4	1	.6	4	2.1	4.975 (df=3)	0.174
		Private	154	44.5	76	49.4	78	40.6		
		Public	160	46.2	63	40.9	97	50.5		
		Both	27	7.8	14	9.1	13	6.8		
9 Outcome		Died	15	4.3	3	1.9	12	6.3	3.895 (df=2)	.143
		Recovered	155	44.8	72	46.8	83	43.2		
		Disability	176	50.9	79	51.3	97	50.5		
10	Disability	Died	15	4.3	3	1.9	12	6.3	27.148 (df=4)	.001
		Bed ridden	32	9.2	10	6.5	22	11.5		
		Not doing routine	81	23.4	31	20.1	50	26.0		
		Can do routine	66	19.1	20	13.0	46	24.0		
		Return to original work	152	43.9	90	58.4	62	32.3		

* Trend analysis for chi square

Table 10: ***Costing*** of Injuries in the Urban and Rural Population.

	Wage lost		DRUGS		SURGERY		Appliances		Laboratory		Consultation	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Mean	20965	14096	9674	2976	15416.5	11772	1245	2147	860.3	1691	3400	770.8
95% CI LB	93	8405	5637	1545	3358.1	3904	585.3	1107	432.2	450.4	-1379	499.7
UB	41838	19786	13711	4407	27474.9	19640	1905	3187	1288	2931	8178	1042
5% Trimmed Mean	7074	8937	5614	1639	12393.4	9001	1004	1415	614.7	668.4	609.4	616.4
Median	4000	6000	2000	725	5000.0	5000	750	425	300	200	200	500
Std. Deviation	104653	30942	22524	9281	23453.0	18194	1598	4733	1458	6655	17335	983.3
Minimum	18	60	40	30	250.0	150	20	20	40	25	2	50
Maximum	1005000	2680600	150000	107540	85000.0	79000	7500	35370	8000	60545	125000	5000
Range	1004982	2680000	149960	107510	84750.0	78850	7480	35350	7960	60520	124998	4950
Interquartile Range	8000	11500	5500	1700	30500.0	14500	1750	1250	300	630	762.5	800
Skewness	9	6	4	9	2.0	2.62	2.85	4.877	3.376	7.45	6.924	2.784
Kurtosis	82	42	16	100	3.9	8.103	9.727	30.37	13.13	60.47	49.12	8.286

The central tendency and the dispersion of cost encountered for transportation during injury as well as for the services of a bystander in order to help victim/victims are described in Table 11.

Table 11: Indirect Cost of injuries

Expense in INR	Transport		Bystander	
	Urban	Rural	Urban	Rural
Mean	1304	1570	3458	1463
95% CI LB	846.7	809.3	2114	821.3
UB	1761	2330	4801	2104
5% Trimmed Mean	846.8	851.4	2753	1027
Median	500	500	1650	500
Std. Deviation	2594	5083	5015	2864
Minimum	10	10	70	50
Maximum	15000	56110	30000	22450
Range	14990	56100	29930	22400
Interquartile Range	800	750	4500	1250
Skewness	3.652	8.405	3.188	5.539
Kurtosis	14.58	81.75	13.8	37.73

Table 12: ***Total C***ost in Indian Rupees.

	Total cost in INR	
	Urban	Rural
Mean	28058	16971
95% CI LB	12051	9418
UB	44066	24524
5% Trimmed Mean	13324	9538
Median	6000	4365
Std. Deviation	98201	52498
Minimum	72	100
Maximum	1040000	632550
Range	1039928	632450
Interquartile Range	16900	14000
Skewness	8.377	9.265
Kurtosis	80.51	103.2

Table 13: ***Components of Cost*** by Urban and Rural

Expense in INR	Direct cost		Indirect cost	
	Urban	Rural	Urban	Rural
Mean	25623.4	15145.2	2753	2196
95% CI LB	9710.9	8313.7	1868	1195
UB	41535.9	21976.7	3639	3197
5% Trimmed Mean	11258.0	8323.4	1908	1265
Median	5000.0	3500.0	500	700
Std. Deviation	97618.8	47096.5	5104	6747
Minimum	52.0	100.0	10	10
Maximum	1040000.0	553990.0	30000	78560
Range	1039948.0	553890.0	29990	78550
Interquartile Range	12950.0	12730.0	2238	1250
Skewness	8.6	8.9	3.04	8.997
Kurtosis	83.4	95.6	10.22	95.93

Table 14: ***Costing*** of injuries by Type of Injury

	Type of injury	N	Total costing		T	p
			mean	sd		
Urban	Mild	39	5252.7	7365.8	1.703	0.091
	Severe	108	36293.6	113494.7		
Rural	Mild	73	5204.7	6977.8	2.482	0.014
	Severe	115	24440.4	65917.6		

Table 15: Costing of injuries by type of injury (Stratified Data) ***A.Urban B. Rural***

INJURY TYPE	Total cost	Mild	Severe	Total
A.Urban	<5000	28	39	67
	5001-10000	6	17	23
	10001-20000	2	20	22
	20001-30000	2	8	10
	30001-40000	1	3	4
	40001-50000	0	6	6
	50001-100000	0	9	9
	>100000	0	6	6
	Total	***39***	***108***	***147***
B. Rural	<5000	49	51	100
	5001-10000	13	13	26
	10001-20000	7	25	32

	20001-30000	3	7	10
	30001-40000	1	2	3
	40001-50000	0	2	2
	50001-100000	0	10	10
	>100000	0	5	5
	Total	***73***	***115***	***188***

Table 16: Comparison of ***Work Days Lost*** in Urban and Rural

Sl no	Variable	Domicile	Mean	sd	t	p
1	Work Days lost (in days)	Urban(N=127)	76	290	0.744	0.457
		Rural (N=180)	59.1	76.2		

The statistical significance of components of costing heads like direct & direct along with the various costs encountered for drugs, surgery, appliances, laboratory, consultation, transportation and for a bystander are shown in Table 17. For cross checking of wage lost and work days lost are also analysed in Table 16.

Table 17: *Comparison of Costing* in Urban and Rural.

			Cost in INR			
			Mean	sd		
1	Wage lost	Urban(N=98)	21149	105175	0.688	0.492
		Rural (N=116)	14095.6	30942.4		
2	Expense for Drugs	Urban(N=122)	9674	22524	3.438	0.001
		Rural (N=164)	2975.9	9280.8		
3	Expense for Surgery	Urban(N=17)	15417	23453	0.554	0.583
		Rural (N=23)	11771.7	18194.4		
4	Expense for Appliances	Urban(N=25)	1245	1598	0.934	0.352
		Rural (N=82)	2147.0	4732.7		
5	Expense for Laboratory	Urban(N=47)	860	1458	0.846	0.399
		Rural (N=113)	1690.9	6655.3		
6	Expense for Consultation	Urban(N=53)	3400	17335	1.102	0.273
		Rural (N=53)	770.8	983.3		
7	Expense for Transportation	Urban(N=126)	1304	2594	0.538	0.591
		Rural (N=74)	1569.9	5082.8		
8	Expense for Bystander	Urban(N=56)	3458	5015	2.928	0.004
		Rural (N=79)	1462.8	2863.8		
9	Total expenditure	Urban(N=147)	28058.0	98201	1.325	0.186
		Rural (N=188)	16971.2	52497.6		
10	Direct cost	Urban(N=147)	25623	97619	1.284	0.200
		Rural (N=185)	15145.2	47096.5		
11	Indirect cost	Urban(N=130)	2753	5104	0.790	0.430
		Rural (N=177)	2196.2	6747.2		

DISCUSSION

World Health Organisation works with governmental and non governmental agencies to make the profile of injuries around the world, which says that 3400 people die on the roads every day including children, pedestrians, cyclists and elderly people. Worldwide nearly 1.2 million deaths occur due to RTA every year and 50 million gets injured. Three-quarter of all RTAs occur in individuals aged between 15–45 years and were predominantly men. Additionally, for every death, nearly 20–30 people were likely to be hospitalized also.

As per World Road Statistics 2009 (published by International Road Federation, Geneva), The number of road accident related deaths were 10.5 per lakh inhabitants per year which was much lower compared with 12.72 per lakh in Korea and 13.68 per lakh in USA. The highest number of deaths was reported for Anguilla 31.25 per lakh and lowest in Australia 6.98 in 2007. In 2009 the incidence went up to 11.7 in India. Hospital Data from Govt. Medical College, Trivandrum in 2008 shows death of 866 persons among 13646 injuries (6.34%) Mortality when all types of injuries were clubbed together.

We had conducted a Community Prospective Study, during 2003-2010 yrs period in Thiruvananthapuram District to know the Burden of Disease due to injury, the costing of injury and the disability of injury victims. The unit of the study was the households in the selected areas of Thiruvananthapuram District. 9513 households were included; 3503 in urban and 6010 rural. The total numbers of population in the study were 39567; it is described gender wise and age wise below.

Table 18: POPULATION DESCRIPTION: AGE AND GENDER.

Total Population=39567	**Male**	**18743**	**47.4%**	**Urban 7708 (49.6%)**	**Rural 11035 (45.9%)**	**Total Injury Victims=346 Urban=154**
	Female	20824	52.6%	7824 (50.4%)	13000 (54.1%)	Rural=192

Age (Yrs)	All (N=39567)	Urban(N=15532)	Rural(N=24035)	
	N	%		
<15	9872	25	3542(22.8%)	6330(26.3%)
16-30	11303	28.6	4453(28.7%)	6850(28.5%)
31-60	14841	37.5	6043(38.9%)	8798(36.6%)
>60	3551	9	1494(9.6%)	2057(8.6%)

The incidence of injury in Thiruvananthapuram District was 8.74/1000 population. In the rural area it was 7.98 and in the urban area 9.91 in 2007 to 2008. Total households having injury victims were 335; urban 145 and rural 190. Persons from 3.6 % of households had sustained injury (4.1% in urban and 3.2% in rural). Incidence of trauma was comparatively more in urban than rural. The urban population had more risk for getting injury ($p<0.05$) than rural.

The Male to Female ratio in the community was 900:1000 (980:1000 in urban and 850:1000 in rural). There was significant difference between the population pattern of urban and rural area with respect to age distribution , male female ratio and the behavioral pattern especially tobacco chewing, smoking habits and alcohol abuse. The child population was more in rural areas-26.3% than in urban-22.8%. The female population was more in rural -54.1% than urban-50.4%; may be because of migration of males from rural to urban area for occupational purpose. The tobacco chewing, smoking and alcohol abuse were more in urban population, may be an aftermath of modernization. In the urban area 6% had the bad habit of tobacco chewing to 4.5% in rural; 22.9% and 16.9% had smoking habit and 23.7% to 9.7% had alcoholic abuse in urban and rural areas respectively.

Health differences due to variations in socio-economical status (SES) are a major matter of concern in today's public health research. In spite of marked health improvement in the overall population and the efforts to overcome health inequalities, higher morbidity and mortality rates are still found among the socioeconomically backward groups. Explanations for these inequalities in health are often analyzed in detail but quiet unclear. The causes are multiple and complex. These include 1. Living conditions 2. Education 3. Un-equal distribution of risk factors and 4. In equalities in the accessibility to health care. We can examine the households' pattern.

Description of Households: Even though Kerala as whole can be considered as a big town, with respect to other states in the country in reality it was different. The demography of the rural population and urban population were entirely different. Only 10% of rural population had a good toilet against 52.06% of urban. 11.53% had cooking gas in their home in rural compared to 55.32% in urban. Less than 1 percent (0.23) of rural community had safe water compared to 70% of urban population. 55.58% urban population had concrete houses against 28.16% in rural areas. Other than concrete houses in urban area there were 25.5% tiled pucca, 5.6% sheet roof, and 0.6% each of thatched hut and pucca and 0.1% of tiled hut houses and in rural area 47.13% tiled pucca, 8.9% thatched pucca, 6.6% tiled hut, 5.5% sheet roof and 3.5% thatched hut as their shelter. On comparing to the urban, the rural had more tiled & thatched pucca and tiled & thatched hut. This clearly explains the socio economic background of the population and even in urban area at least one third of the population were lacking the basic health needs especially safe water and shelter.

The households of injury victims analyzed separately showed, in the urban area 62% of households of injury victims possessed a car or a two wheeler against 44.3% with-out injury. In rural areas this was 10% and 5.5% respectively. 57.2% of households of injury victims have concrete houses in urban against 55% of households with-out injury, no much difference. 33.2% of household of injury victims had concrete houses in rural areas against 28% of households without injury. Besides concrete houses 42.8% of urban population with injury had other types of shelter(26.9% tiled pucca, 6.9% thatched pucca, 6.2% sheet roof, 2.1% thatched hut and 0.7% tiled hut) and 66.8% of the injured rural population had other types of shelter(51.6% had tiled pucca, 6.3% thatched pucca, 4.7% sheet roof, 2.6% tiled hut and 1.6%

thatched hut houses). When household processing bicycles were considered 28.2% of no injury group and 17.9% with injury owns it in urban and 1% and 6.3% in rural areas respectively. 54.4% of urban households' with-out injury had cooking gas against 77.2% of the households with injury. In rural households it was 11.1 % among no injury group and 25.8% among injured. 14.6% of no injury group and 22.8% of injury victims households in urban possesses a washing machine, against 0.6 and 1.6% respectively in rural. 42.4% in urban and 8.6% in rural households without an injury possessed a fridge and when the injury victims households considered separately it was 63.4% in urban and 18.4% in rural area. Similarly 84.3% in urban and 75.7% in rural no injury households processed a TV. Injury victim's households considered separately it was 95.2 % and 81.6% respectively.

House hold possessions are a good indicator of socio-economic index. Theoretically there is a definite positive association exists between income and household possessions in the community. This data clearly shows that injuries were more frequent among high socioeconomic groups and the households of urban were better than rural in these aspects. The only thing frequently present more or less equally in rural and urban was television.

Motorization pattern in urban and rural household: In urban population 5.4% of the vehicle owners suffered injuries where as 3.3 %of those without vehicles had suffered injuries (p= 0.002). Similarly in rural population it was 5.3% and 3% respectively (p=0.023). Anyone known to have a vehicle showed significant association in getting an injury, so safety measures like Seat belt, Helmet, Proper Signal System, Vision testing, Enforcement of traffic rules, even more obeying traffic rules , education among public particularly youths regarding traffic rules etc, have to be undertaken to escape from the possible injuries.

The mean income of an injury victim in urban was 6138/- and rural 3117/- where as no injury group had 4344/- and 2101/- respectively ($p< 0.05$). Injured were more in high income group, so the days lost due to injury cause more economic loss both for the person concerned and to the society. The economic loss happened to him/her partially compensated by the social security schemes of the government and non governmental agencies but the lost happened to the society remains as such. The compensation to the injured is usually given by court and welfare boards. For RTA victims the compensation by the court is based on the cost of treatment, work days lost and disability of the victim. Similarly the welfare boards consider the compensation based on the work days lost, their income per day and the number of days the injured victims had plaster immobilisation etc. The high income group shows a duality with respect to the incidence of injuries, the treatment, the prognosis and the loss of economy. High income group can go to any health provider without considering the cost of treatment, thus they undergo treatment in more scientific way than the low income group. But the government hospitals with adequate facility and the provision of insurance like RSBY partly overcomes this hurdle.

Relative Risk: The most important advantage of a cohort study is, we can find out the relative risk. As the RR increases the strength of the association also increases and above 5 considered to be the strongest association. Tobacco chewing was 5.1 % among the total population, more in urban population (6%) compared to rural (4.5%). Smoking was 19.4% among the total population (23% in urban 17% in rural), even though smoking in public places is banned by high court. Alcohol abuse was 16% in the total population more in urban population 23.7% and 9.7% in rural. Alcohol abuse was a major risk factor for getting injury. In urban area injury victims with alcoholism amounts to 35.4% of individuals compared to 23.5% of non injury individuals (p=0.001). In rural areas it was 27.8% and 9.5% respectively (p=0.001). Among injury victims 10.4% of urban and 13.5% of rural had chewing habits; similarly 23% and 29.3% had smoking habits.

The incidence of injury during the one year study period was 1.25 times more in urban area than in rural but when confounding factors considered through regression there was no much difference in the risk among urban and rural individuals. Similarly the incidence of injury was 2.75 times more in males to females , p=0.001(95% CI: 2.183-3.481), 2.8 times more in people aged more than 30 yrs p=0.001(95% CI: 2.232-3.555) to less than 30 yrs . When the modifiable factors were considered the strongest association found among alcoholics, the injury was 5 times more in them, p=0.001(95% CI: 4.012-6.435), it is 2.6 times more in people having chewing habits and 3.2 times more in people who smokes. When the confounding effects of chewing and smoking were considered the alcohol becomes the most important modifiable risk factor. Age, gender and alcohol abuse found association with occurrence of injury both in rural and urban areas.

Age Distribution: The mean age of injury victims in urban area was 41 yrs and rural 39 yrs where as in population with-out injury the mean age was 48 yrs in urban and 50 yrs in rural. That means younger people contract injury more. 37.5% of the target population were in the 31 to 60 yrs age group (urban 38.9% and rural 36.6%). 57.5% of injured victims were in 31-60 yrs age group, urban being 59.1% and rural 56.3%. 31-60 yrs old were at major risk to get an injury (p=0.001). 13.3% of injury victims were senior citizens (urban 14.3% and rural 12.5%). The analysis clearly shows younger productive population were under high risk of getting injury (p=0.000). Among the normal population 25% were under 15 yrs (urban 22.8% and rural 26.3%). 11% of the total injured was from this category (urban 9.1 and rural 12.5%).

Gender Distribution: The Male female ratio of the injured was 2.5:1(urban 2.7:1 and rural 2.3:1; but they showed no statistical significant difference between urban and rural areas). But when the community was studied the female population exceeds the male (0.9:1) both in urban (0.98:1) and in rural (0.84:1). The gender ratio significantly varies between urban and rural areas, the female population were more in rural.

The Kerala Aging Survey (KAS) conducted among more than 5000 elderly (2271 men and 2722 women) in 14 districts of Kerala showed that the age of participants ranged from 60 to over 100 years of age with 54% being women and that study emphasised that falls and fractures are a significant issue among older adults. In our study 9% were above 60 yrs (urban 9.6% and rural 8.6%).The current world literature says, in India, 76.6 million people (7.7%) are at or over 60 years of age group. Falls are one of the major problems in the elderly and are considered one of the " Geriatric Giants". Recurrent falls are an important cause of morbidity and mortality in the elderly and are a marker of poor physical and neurological status. More over the people in the urban area have to travel and do more work than their rural counter parts for their livelihood particularly in house maid job and also other manual works. In rural areas older individuals remain in the house itself doing their household duties; hence the chances of getting injuries were less.

Years of Schooling: The illiteracy rate (that percentage of people not gone to school) was 6% in the injured group. Primary education status among the injury victims in urban and rural groups were more or less the same but the higher education status were significantly more in urban population. So also the incidences of injuries were gradually increasing from the less studied group to the higher studied group. The educational status of injured in urban and rural areas significantly differ (p=0.007). Trend analysis also found significance when injured from urban and rural were considered (p=0.005). Highly educated were more in urban i.e. 26% compared to the 12% in rural.

Injury Patterns: The injury patterns were classified into minor and major according to the criteria in the study. Severe injuries (66.2%) were nearly double to the mild (33.8%) in the study group. The injured with mild to severe ratio was 1:1.95. In the urban area 71.4% suffered severe injuries but in rural population it was 62%. There was no statistical difference between the rural and urban areas in the pattern of injury even-though mild injuries were more in rural 38% (mild to severe ratio was 1:1.63). The severe injuries were more in urban than in rural the ratio being 1.15:1. This may be due to the high velocity injuries especially following RTA were more in urban areas.

Hospitalization Pattern: All the victims in this study underwent hospital treatment following their injury irrespective of the pattern whether minor or severe. For each person treated as outpatient, nearly 3 were treated as in patient for the same purpose. This may be because the severe injuries were more frequent in this study population. 73.7% undergone IP (In Patient) treatment and 26.3% undergone OP (Out Patient) treatment following injury. No statistical difference exists among urban and rural when the hospitalisation pattern was considered. An average of 7 days of in-patient care was needed in urban victims compared to 6.5 in rural; more or less the same to treat an injury victim. Injured from Urban area had Median 3 days and

maximum 150 days of hospital stay, similarly people from rural area had a median of 1 day to a maximum of 210 days to treat their respective injuries they suffered, this may be because mild injuries were frequent in rural areas than in urban.

Mode of Injury: There was significant difference between the urban and rural population in the mode they sustained the injury (P<0.05). The mode of getting injury was 1. RTA (vehicle accidents) 35.8%, in urban it was 43% and in rural 30%. Pedestrians come around 18.8% among the injured, more in rural 25% than in urban 11%. It very well explains the living pattern of people in the rural community .2. Fall from height; i.e from tree and construction work, contributed 14.4% of total injury. Fall from tree was 7.2% which was more in urban 12.3% compared to 3.1% in rural, this was little different from our concept that fall from trees usually more in rural areas; may be because of lack of training or experience they had undergone for tree climbing in urban community. They were compelled to do the unaccustomed work of climbing trees especially coconut trees since now-a- days it is very difficult to get people for tree climbing. 3. Fall from construction work 7.2%, more in urban areas 9.1% compared to 5.7% in rural; may be because construction works were more in urban areas at that time. 4. Other modes of injury contributed 30.9%. In rural it was 35.9% and in urban 24.7%, definitely more in rural community. This group included fall at home, bites of unknown animals, drowning, suicides, violence etc. So this group constituted a noticeable share of burden and needs further long term study needed to explore the epidemiology of it.

Injury Site (Body Part): There was significant difference between the site of injuries in rural and urban areas (p=0.001). Injuries sustained to the extremities were the common type, similar to many studies across the world. 69% of injuries occurred to extremities, 63% in urban and 74% in rural. Spine injuries were more in rural population 9.9% compared to 1.3%. The main causes that lead to spine injury were fall from height, fall from tree or construction work. Even-though fall from height were more in urban area the fall may be from a lesser height than that had occurred in rural areas. Tree climbing is a profession in rural area especially for climbing the coconut trees and areca-nut trees that are very high. Hence even-though the incidence of fall was less in rural the severity was often high. Multiple injuries were more common in urban areas (18% in urban against 3% in rural). Multiple injuries including head and chest injuries were common in urban areas since high velocity injuries particularly RTAs were suffered more among injury victims of urban population.

Health Service Providers: All injured were undergone treatment. Among the whole injury victims 5(1.4%) took indigenous treatment. 46.2% approached public sector, and 44.5% private sector for various treatment purposes. The injured who utilised indigenous treatment were 2.1% in rural compared to 0.6% in urban explain the indigenous ways more frequent in rural areas. Those utilised public health services were 50.5% among rural compared to 40.6% in urban, clearly shows more utilisation of government facilities had been done by the rural community. Those utilised private services were more among the urban group 49.4% compared to 40.6% in rural, clearly showed more utilisation of private services by urban group , so also both facilities together were utilised more by urban 9.1% compared to 6.6% in rural. Many factors especially the low income of rural population (p<0.05) or the lack of private service facilities in rural areas or more government and private institutions in the urban areas may contribute to these. Even considering all these findings there was no statistical significant difference among the service users between urban and rural population (p=0.174) in this study since a major shift of utilisation to private facilities occurred from time to time in rural community also i.e 40.6% sought private providers to 50.5% government.

Sequelae of Injury (Mortality and Morbidity): Mortality rate among the injured victims were 4.3%. It was more in rural population 6.3% compared to 1.9% in urban even though the more severe injuries were occurred among the urban individuals. It might be due to the timey treatment given to the urban injured from a good facility hospital. Rural population suffers from delay in reaching hospitals and lack of hospital facilities. People recovered from injury and those left with some amount of disability were more or less equal in rural and urban population. No statistical difference noted among urban and rural when the outcome of injury was considered (p=0.143).

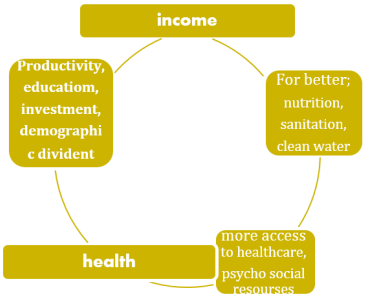
Sequelae of Injury- Morbidity (Disability): The morbidity assessment is equally important to the mortality assessment when the burden of injury study is concerned. 44% of injured victims returned to their own work after treatment, 58.4% from the urban and 32.3% from the rural. Those become bed ridden after injury were 9.2%, 11.5% in rural compared to 6.5% in urban. It is clear that those become bed ridden were more in rural group. This might be due to more spinal injury cases in rural areas (p=0.001). The morbidity after spinal injuries is well known with respect of their bad outcome. In both ways the morbidity pattern was high in rural area. This may be due to the lack of proper transportation of injury victims to a good facility hospital, or due to the severity of injury.

Days of Absenteeism from Work: The days of absenteeism from work are a good indicator of the severity of injury. Usually more severely injured take more days leave even though certain exceptions are there. Certain people may take more days of absenteeism for more compensation. Certain less severe injuries, depending on the character of job e.g. climbing trees, may need more days to become healthy/ normal. Injured from urban were absent from work for an average of 50 days; 75% were absent from their work for less than 61 days. Injured from rural were absent for 58 days; 75% less than 81 days of absenteeism with a median of 30 days. To increase the validity there was a provision in the questionnaire, to include days of work lost and wage lost (days of work lost × wage per day). Days of absenteeism were included a qualitative element in nature than days of work lost and wage lost, which reflects its economic point of view. An average of 76 days of work lost in urban compared to 59 days in rural. This may be due to the severity of injuries were more in urban areas, but no statistical difference noted between urban and rural (p=0.45.) in the economic point of view since the days of work lost reflected directly to the wages lost.

Costing:

A Country's economy is in strict adherence with its health, so demographic factors, cost analysis, health determinants are all important in day to day existence. There is a triangular relationship between income, health and capital. From income to health and health to income there are many steps. The figure below shows the different steps.

Fig 1: STEPS IN INCOME-HEALTH RELATIONSHIP



Urban population spend an average of ₹ 28,058/- for treatment. 75% people spent below ₹16900/-. Rural spend an average amount of ₹16,971/-. 75% of persons spent less than ₹14,000 for treatment of injury in rural area.

There was significant difference between the cost encountered to treat mild and severe cases in rural population, where as no difference was seen in urban area. This may be because in urban area majority utilised private treatment providers for their help. The mean cost to treat a mild injury was ₹ 5252/- and a major case was ₹ 36,293/- in urban area. In rural area 5204 was needed to treat a mild case and ₹ 24,440/- for a severe case. Among the injured 6 severe cases from urban area and 5 from rural spent more than 1 lakh for their treatment purpose, due to the degree of severity they had suffered. The costing includes direct, indirect and intangible costs, among which intangible was not calculated here.

Comparison of costing in Urban and Rural: When wage lost occurred to victims, expenses of drugs, surgery, appliances, laboratory, consultation, transportation and expenses for bystanders were considered, only expenses for drugs and for bystanders were shown a statistically significant difference between urban and rural victims where urban injured spent more than that of a rural injured.

Direct Costing: Wage lost: persons from urban area lose an average of

₹21,000/- and rural area ₹ 14,000/- because of the injury. Persons from urban area spend an average of ₹ 9674/- for drugs and ₹ 2976/- by rural. This might be because in urban areas people depend more on private providers than in rural areas where the governmental agencies were the major health provider covering nearly 50%. The difference was statistically significant (p=0.001) also. For surgical purpose, the injured from urban area spent an average of ₹ 15,417/- and from rural ₹11,772/-. The amount spent for orthopaedic appliances in rural was more with an average of ₹2147/- than in urban ₹ 1245/-.This might be because, spinal injuries were common in rural and spinal braces are more costlier than other appliances. On an average rural people spent more money for laboratory investigations also. This was not really true since it was a skewed distribution when median was taken urban spent more money even though no statistical significance in the difference found. For consultation to doctors urban injured spent more money, an average of ₹ 3400/- than rural ₹ 771/-. In urban there were no statistical difference between the costing of injuries whether it was mild or severe (p=0.091) in nature. But in rural there was significant difference in the costing (p=0.014) of injuries between mild and severe. Severely injured people spent more money for treatment purpose as well as rehabilitation, since they need more days of hospitalisation, surgery etc. Among injured from urban 67 spent less than 5000/- for their treatment purpose, 28 suffered mild injuries and 39 were with severe injuries. 100 persons from rural area spent less than ₹ 5000/- ; 49 were with mild injuries and 51 with severe injuries. Even though generally severe injuries need more money for treatment purpose, certain severely injured group including those with fractures and dislocations, needed only one time hospitalization since they can also be managed on OP basis. Hence they were less expensive in nature. This explains why certain severely injured spent less money. Example; A dislocation of shoulder may be treated in medical college, Trivandrum with a total expenditure of ₹ 500/- only.

In-direct cost: An average of ₹ 1300/- was spent for transportation in urban area and ₹ 1600/- in rural area. To accommodate a bystander in urban area was costlier (p=0.004) than rural .An average of ₹ 3458/- spent for it and in rural area it was ₹ 1463/-. It is in par with the present situation that the human resources are costlier. The 'Transportation cost difference' was not found statistically significant when the urban was compared with the rural.

CONCLUSION

1. The incidence of injury in Thiruvananthapuram District was 8.74/1000 population. In the rural areas of the District it was 7.98 and in the urban area 9.91 in one year period (2007 to 2008). The total number of population participated in the study were 39567 from 9513 households. From 335 households (urban 145 and rural 190) 346(urban 154 and rural 192) had sustained injury. The Burden of Injury was contributed by 3.6 % of the households (4.1% in urban and 3.2% in rural). Incidence of trauma was comparatively more in urban than rural.

2. The most vulnerable group was males between 30 to 60 yrs. There was no difference in the risk among urban and rural individuals. The incidence of injury was 2.75 times more in males and 2.8 times more in people between 30 to 60 yrs. The strongest association was found among alcoholics, the injury rate was 5 times more in them.

3. In the community 66.1% of people belong to the age group 16 to 60 yrs. The number of Children were more in rural and the older generation more in urban. The people in the age group of 31-60 years were more vulnerable to incur an injury both in urban and rural (p=0.001) population. The mean age of injured in the urban area was 41 yrs and rural 39 yrs.

4. In the community; The Male: female ratio was 900:1000(980:1000 in urban and 850:1000 in rural areas.) Females were more in rural. The Male female ratio of the injured population was 2.5:1. (Urban 2.7:1 and Rural 2.3:1). Males in urban had a high risk to get an injury.

5. Urban population had a better Socio economic status than rural both income wise (p<0.05) and Household Possessions-wise. The illiteracy rate (not gone to school) was 6% in the injured group. The incidence of injury was high in individuals having higher education (p=0.005).

6. Habits in the community: 5.1% had chewing habits, 19.4% smoking and 15.5% alcoholics who were significantly more in urban community coming to 23.7% and in rural 9.7%. Among the injured 35.4% in urban and 27.8% in rural areas were alcoholic abusers. Similarly smoking habits were 23% & 29.3%; respectively. Chewing habits were 10.4% & 13.5% in urban and rural respectively.

7. Mild to severe injury ratio was 1: 1.95, similar in urban and rural areas.

8. Injured who saught 'In-Patient and Out –Patient' treatment were similar in both urban and rural areas in number.

9. The Mode of injury was: -

1. RTA: 73.4% (including pedestrians 18.8%) ; Urban-53.9% including pedestrians 11%; Rural- 55.2% including 25% pedestrians.
2. Fall from Height-14.4 Percentage (Fall from tree 7.2% & Fall from construction work 7.2%- more in urban areas.)
3. Other injuries 12.2% which includes fall at home, suicide, bites of unknown animals, drowning were more in rural (P<0.05).

10. Site of injury: Injury to extremities was common and it comes around 69% of all injuries. Spine injuries were more in rural population (9.9% compared to 1.3%). Multiple injuries were more common in urban areas (18% in urban against 3% in rural.).

11. All undergone one or other type of treatment following injury. Those seeking Indigenous treatment constituted 1.4%, Private hospitals 44.5% Government Hospitals 46.2% and utilising both private and public 7.8%. No difference was seen between urban and rural population in this respect.

12. Outcome of injury: Mortality Rate was 4.3 percentage (Rural- 6.3% and Urban- 1.9%).

13. Disability Pattern: The morbidity pattern showed Bed Ridden following trauma was -9.2% (more in rural -11.5% compared to urban 6.5%); those not doing routine work were 23.4% (more in rural 26% than in urban 20.1%); those can do routine work-19.1% (more in rural 24% than in urban 13%); those returned to original work-43.9% (more in urban 58.4 than rural 32.3%). Average loss of work days in urban was 76 days and 59 days in rural.

14. Costing: Injured from Urban spent an average amount of₹ 28,058/- . 75% people spent below ₹16,900/-. Rural spend an average amount of ₹ 16,971/- 75% of persons spent less than ₹ 14000. There was significant difference between the cost encountered to treat mild and severe cases in rural population, where as no difference is seen in urban area. An average of ₹ 1300/- spend for transportation in urban area and ₹ 1600/- in rural area. The cost to accommodate a bystander in urban was found significantly higher ₹ 3500/- than rural ₹1500/- .

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