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ON TRAUMAS AT SKULL AND/OR FACIAL BONES CAUSED BY TRAFFIC ACCIDENTS

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Abstract: When an unwanted traffic accident occurred**,** a great attention is paid to lessen the bad consequences, especially, to treat the injuries. Traumas at skull and/or facial bones (skull traumas for short) often impact seriously to the health of patients. Among all kinds of injuries caused by traffic accidents in Vietnam, the percentage of this sickness type is not small. To contribute to reduce dramatic consequences, this study concentrates on estimation of danger level of various aspects which can lead to the skull traumas. A survey using questionnaire was carried out by interviewing the patients and/or their accompanied persons at Viet-Duc University Hospital, one top medical emergency center in Hanoi. After that, the paper discuss on the so-called t-value t_i that presents the degree of skull traumas in the special aspect i. By analyzing the received data, the study shares conclusions skull traumas level after 12 various aspects relating to traffic accidents: sex, road user group, residence, age, education level, profession of patients, workday and day off, accident time, causes of accidents, vehicle kind of patient and of that leads to accident, features of site.

Key Words: traffic accident, skull traumas, danger level of aspects, t-value, treatment of injured

1. INTRODUCTION

In spite of great efforts to keep the traffic safe, the road accidents remain one of great problem in Vietnam. In 2003, statistically, 20,690 transport accidents were recorded, among them, 19,852 road traffic accidents with 11,319 fatalities and 20,400 injuries as showed in The National Traffic Safety Committee (2003). In the first 10 months of 2004, there were 14,727 transport accidents with 10,095 fatalities and 13,193 injuries. In these months, on road transport only, there were 14,145 accidents with 9,682 fatalities and 12,969 injuries; that mean 10.2 accidents with 6.9 fatalities and 9.4 injuries for each 10,000 vehicles as indicated in The National Traffic Safety Committee (2004).

It is a great concern of the Vietnamese public medium that in spite of numerous activities of Government, the traffic accidents, especially, road accidents are still in a very large number. That is why, various studies were carried out, see Project Management Unit 1 (2000). These studies concentrate on the scale and nature of the road safety problem in Vietnam to find out urgent improvements. One of remarkable conclusions is that, between various kinds of vehicle, about 72%-75% of road accidents have causes relating to motorcycle.

Traffic accidents lead always to loss of precious resources: materials, time and especially the health of people. To diminish these losses, the first thing is to reduce these accidents. But in the case of any occurred unwanted misfortunes, a great attention is paid to lessen the bad consequences, especially, to treat the injuries. Among various injuries, the traumas at skull and/or facial bone (skull traumas for short) are most dangerous for they could lead to very dramatic outcome: death or very bad impact on the life after recovery of health.

Up to now, numerous research results were published on skull traumas, but they concentrate on the medical aspects of the injuries: the treatment of various kinds of skull traumas. It is noticeable that there is very little effort to study the skull traumas caused by road accidents in Vietnam. The seminar on "Safety helmet – to prevent skull traumas for motorbike users" held on July 27, 2004 in Ho Chi Minh City paid attention on the effectiveness of this helmet and published some statistical data of skull traumas patients only. In Cho Ray Hospital (2001), one rare effort was made by this medical center in the city on this topic for the case of southern part of the country. The authors collected a large data on skull traumas patients registered in this hospital from August 1999 up to March 2001 and analyzed various aspects that lead to this kind of traumas. It concentrated on the causes of skull traumas by traffic accidents in particular and neglected all comparative analysis with the causes of road accidents in general. These causes are same in both cases, so that this comparative analysis is necessary to clarify the special aspects in the particular case of skull traumas.

This paper has the aim to evaluate the danger level of various aspects leading to skull traumas caused by traffic accidents. The results of this study could be useful to contribute to reduce the bad consequences of road traffic in northern part of the country.

2. STUDY SCOPE AND METHODOLOGY

The study area includes Hanoi and the other neighborhood provinces in the Red river delta. Most of traffic injuries in this area are treated medically by the Viet-Duc University Hospital, a very important surgical emergency center. In the medical existing system of Vietnam, the first medical aid can be received at every medical establishment. But after that, the patient can be transferred to another establishment at higher level if needed. The Viet-Duc hospital is one of some top centers in surgery of the country. Skull traumas are mostly serious so that numerous patients of this kind are treated in this hospital. Daily the Viet-Duc hospital receives averagely about 200 emergency patients, between them; 50%-70% are from traffic accidents. In 2003, it was registered that this hospital has treated medically 34,450 patients of traffic accidents, among them there were 5,420 (15.73 %) skull traumas ones. Besides that a remarkable proportion from 8,587 (24.92 %) of multi-traumas patients had traumas at skull and/or facial bones too. So, in this hospital, the contacts with personals who can give needed information are favorable.

The study time interval consists of December of 2003 and January and February of 2004, in total 61 days. There are two reasons to choose this time. Firstly, every year, in these months, the people are happy with most holidays, especially on the occasions of New Year, not only after Solar- but also and even more important for Vietnamese, after Lunar-calendar (in 2004, the first day of Lunar-calendar was January, 22nd). They often buy a lot and travel a lot so that the transport on road system is fully active and the traffic accidents percentage seems higher accordingly. There are 35 weekend- and holidays and only 60 workdays in these three months. Secondly, the weather in this time seems usually not favorable. It is normally cold and rainy so that the road safety becomes more important.

To receive necessary data, the study group has prepared a questionnaire that consists on several parts containing questions with various answer options:

- About the patient (sex, age, address etc.)
- Data on accident (place, time, cause of accidents after the observers etc.)
- The health state and the medical treatment, especially on the injured level.

To receive the answer, when it was favorable, the interviewer contacted directly to the patient after emergency treatment. But in the case of fatalities or if it was not allowed for the medical treatment requirements, the interviewers contacted the patient and/or relatives of the patients during their preparation to leave the Hospital to go home. The study group tried to receive the answer by direct interview or distributed the questionnaire sheet to them and received the answered sheet by mail. In both cases 10,176 sheets were used and the study group has received 6,383 answered sheets (62.73 %).

3. ON ASPECTS LEADING TO SKULL TRAUMAS IN TRAFFIC ACCIDENTS

3.1 Rate of Skull Traumas: Definition of t-value

While the questionnaire sheets were same for all surveyed cases; in the analysis of received information, it is necessary to divide them into two groups: group A for patients with skull traumas (including multi-traumas having skull injuries) and the group B without this trauma. We denote by S_A, S_B as the total number of group A and B accordingly. Among 6,383 answered sheets, there are S_A = 1,712 sheets (26.82 %) in group A while the rest S_B =4,671 (73.18 %) belongs to group B. The ratio between two groups is worth to be considered as the *value mark*, which shows *in the whole view the level of occurred skull traumas in comparison with other injuries.* We denote it by S:

$$S = S_A / S_B \qquad (1)$$
$$S = 36.65\ \%.$$

The magnitude of S shows us the average value of occurred skull traumas in all registered traffic accident.

In the following analysis, we consider various aspects relating to the accident and try to explore in each aspect, how high is the skull trauma proportion. So, denote in aspect i, the number of patients of groups A, by s_{ai} and that of group B, by s_{bi}. The ratio s_{ai} / s_{bi} can be used to describe the level of occurred skull traumas in comparison with other injuries in regard of the relative aspect. It is necessary to have a magnitude that can be used to evaluate

this ratio. The S can play this role so that we divide this ratio to the value-mark S, and have the so-called *t-value*:

$$t_i = (s_{ai} / s_{bi}) / S. \qquad (2)$$

The t-value t_i presents the degree of skull traumas in traffic accidents on the special aspect i. The case of $t_i > 1$ means that the ratio of skull traumas with other injuries in this special aspect is higher than the average level; and the case of $t < 1$, is vice versa.

3.2 Analysis of Various Aspects Leading to Traffic Accidents

In the following paragraphs, the received data was analyzed according to 12 aspects relating to traffic accidents.

a. Sex (see table 1 and figure 1)

Table 1. Patient Allocation after Sex

No.	Sex of patient	***t-value***	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Male	***1.04***	1,058	61.81	2,782	59.56	3,840	60.16
2	Female	***0.94***	654	38.19	1,889	40.44	2,543	39.84
3	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

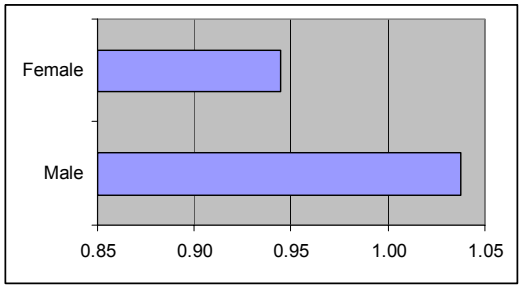

Figure 1. The t-value after Sex of Patient

From the Table 1, it is remarkable that the ratio between two sexes (161.85 % and 147.28 %) is almost equal between both groups while the t-value of male patients is higher than that of female. It can be explained by the fact that both sexes take part in road traffic with a same level, but the male road users have usually drive with higher speed, and unfortunately, they use alcohol and stimulant more than the weak sex. The late is easy to give way for other vehicle than the first.

b. Road user group (see table 2 and figure 2)

It is remarkable that the group of pedestrian has a low t-value for they move with a low speed and have pavement that separates them with running vehicles. The numbers of patients in both last groups seem equal, but the accompanied person group has a higher t-value. It can be explained by the fact that, in any vehicle, the driver has condition to be active while the other on vehicle in a passive condition. The driver often recognizes the accident before the other.

Table 2. Patient Allocation after Road User Groups

No.	Road user	*t-value*	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Pedestrian	***0.51***	175	10.25	943	20.19	1,118	17.52
2	Driver	***1.05***	732	42.77	1,894	40.55	2,626	41.14
3	Accompanied person	***1.20***	805	46.98	1,834	39.26	2,639	41.34
4	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

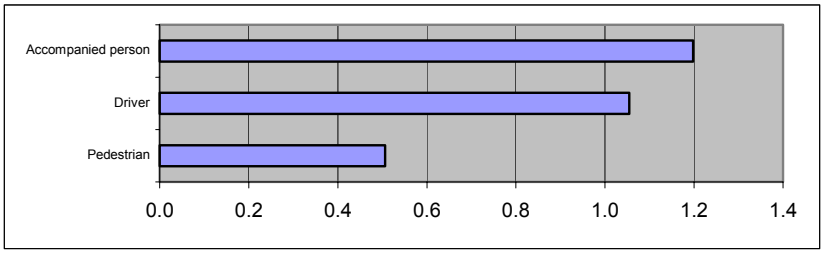

Figure 2. The t-value after Road User Groups

c. Residence (see table 3 and figure 3)

Table 3. Patient Allocation after Residence

No.	Residence	*t-value*	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Hanoi	***0.74***	632	36.89	2,315	49.56	2,947	46.17
2	Red river delta	***1.17***	875	51.09	2,049	43.87	2,924	45.81
3	Other provinces	***1.82***	205	12.02	307	6.57	512	8.02
4	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

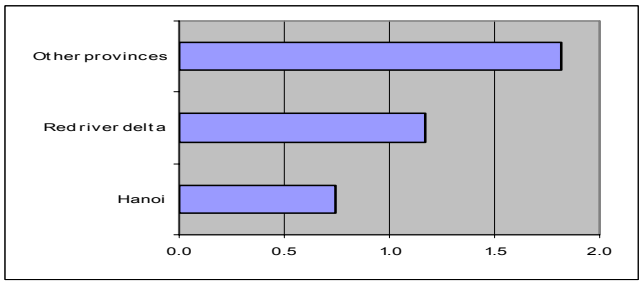

Figure 3. The t-value after Residence

The Viet-Duc hospital is situated in Hanoi. This capital locates in center of Red river delta. That is why the numbers of patient in Hanoi is greatest and that of various provinces of Red river delta is higher than that of other province. These provinces are in larger distances to Hanoi in comparison to the Red river delta. It does not mean that in these provinces the number of traffic accidents is small, but simply that a lot of patients have been treated in other local medical establishments. Only serious patients can be transferred to Hanoi. That is why the larger distance to Hanoi, the greater is t-value. One more reason that in Hanoi, the traffic regulations are propagated widely at a higher level and there are more traffic polices there than in other provinces.

d. Age (see table 4 and figure 4)

Table 4. Patient Allocation after Various Age Groups

No.	Age *(from - up to)*	***t-value***	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	0-5	***1.15***	21	1.25	50	1.06	51	0.80
2	5-10	***1.10***	40	2.36	99	2.12	100	1.57
3	10-15	***1.02***	56	3.25	150	3.22	151	2.37
4	15-20	***1.25***	278	16.24	607	13.00	608	9.53
5	20-25	***1.24***	392	22.91	860	18.41	861	13.49
6	25-30	***1.21***	295	17.21	667	14.28	668	10.47
7	30-35	***1.09***	212	12.39	530	11.34	531	8.32
8	35-40	***1.05***	136	7.93	355	7.60	356	5.58
9	40-45	***0.85***	106	6.17	339	7.26	340	5.32
10	45-50	***0.70***	70	4.09	273	5.85	274	4.29
11	50-55	***0.47***	35	2.06	203	4.35	203	3.19
12	55-60	***0.39***	24	1.39	167	3.58	167	2.62
13	60-65	***0.40***	29	1.68	199	4.25	199	3.12
14	> 65	***0.29***	18	1.07	172	3.68	172	2.70
15	TOTAL		1,712	100.00	4,671	100.00	4,683	100.00

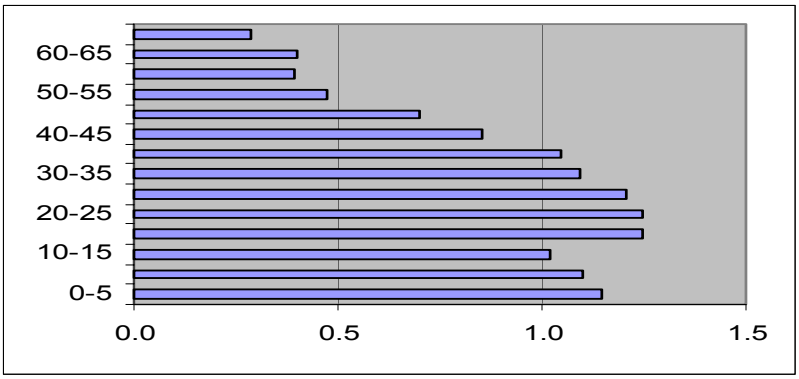

Figure 4. The t-value after Various Age Groups

It is remarkable that the proportion of pupil of 0 up to 15 years old in all accidents is small. At these ages, they use road less than other people and mostly play the passive role in vehicle. But unfortunately, they are too small so that they are easier to be injured seriously as the high value of t-value shows.

For groups of 15 up to 30 years old, they are active road users but their driving experiences and especially, their self-control are at a smaller level in comparison with the older people. That is why these groups have a very high proportion of accidents and a high t-value.

For people of 30-35 or 35-40, they have better driving experiences in general, but they remain active road users, and the self-control seems unsatisfied so that their accident proportion and t-value is still relatively high.

The older people have numerous experiences and high self-control, especially the retired people usually use road less than people in working age. This explains the fact that the number of accidents and t-value of relative groups are comparatively low.

e. Education level (see table 5 and figure 5)

Table 5. Patient Allocation after Education Levels

No.	Education level	***t-value***	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Post-graduate	***0.39***	2	0.12	14	0.29	16	0.25
2	University	***0.54***	79	4.59	401	8.59	480	7.52
3	College	***0.98***	325	18.96	902	19.32	1,227	19.22
4	High school	***1.09***	604	35.29	1,508	32.29	2,112	33.08
5	Primary school	***1.05***	527	30.76	1,367	29.26	1,894	29.67
6	Rest	***1.00***	176	10.28	479	10.25	655	10.26
7	TOTAL		1,713	100.00	4,671	100.00	6,384	100.00

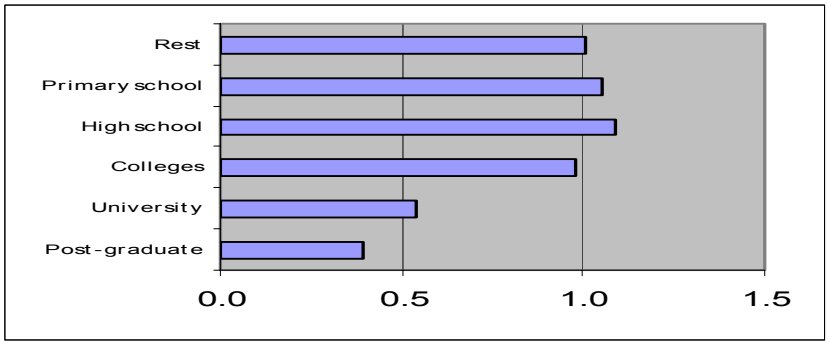

Figure 5. The t-value after Education Levels

Under an education level group we understand the highest learning level of each people at the survey date. So, for example, not only pupil but also numerous older people can belong to the "Primary school" group if they did not attend any High school.

The table 5 and figure 5 show us a relatively high number of accidents and a high t-value of four last groups. It can be explained by the fact that most of people in these groups are active road users and comparatively young. The people of two other groups are anyway older and most of them, especially the post-graduated, have a stationary job: in school, research institution etc.

f. Profession (see table 6 and figure 6)

The profession group "Agriculture" has a small number of accidents. They probably work mainly in fields and use road not so much as other people. But this group has the highest t-value. It can be explained by the fact that they are frequently poor and besides that they lack of experiences on traffic rule.

Table 6. Patient Allocation after Profession Groups

No.	Profession	*t-value*	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Blue-collar	***1.09***	674	39.36	1,693	36.25	2,367	37.08
2	Professional	***0.70***	68	3.97	266	5.69	334	5.23
3	Student, School pupil	***1.18***	249	14.56	575	12.30	824	12.91
4	Agriculture	***1.75***	97	5.69	152	3.25	249	3.90
5	Merchant	***1.20***	212	12.36	479	10.26	691	10.83
6	Employee	***1.64***	263	15.36	437	9.35	700	10.97
7	Self-employee	***0.73***	90	5.26	338	7.24	428	6.71
8	Others	***0.22***	59	3.44	731	15.66	790	12.38
9	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

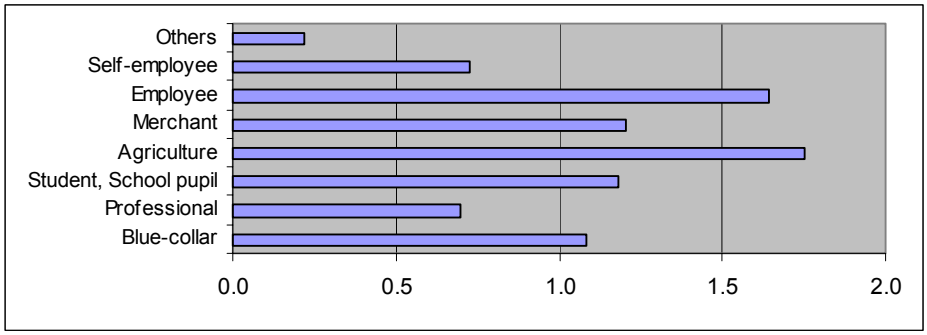

Figure 6. The t-value after Profession Groups

The number of accidents of group of "Employee" is not high, but t-value reaches to 1.64. The reason is probably that they move relatively often and most of them use motorcycle, a vehicle kind with high frequency of accidents (see later). By a similar reason but at lower level is "Merchant" group.

The "Blue-collar" group has a very high number of all accidents, but the t-value is not the highest. Most of the people of this group have low income so that their motorcycle has usually a low quality while they must move a lot for a relative large distance from their home to the working place.

The "Student, School pupil" group has a high number of accidents for they are still young (see sub-section d above).

<u>g. Workday and day off</u> (see table 7 and figure 7)

It is very special that the number of accident and the proportion of serious injuries as skull traumas (as t-value shows) in a day-off are higher than that in a workday. Usually the people move a lot in day off, especially in the occasion of many successive days off as at the chance of Lunar New Year. The road became crowed while as mentioned above, it is not favorably for moving on way under the cold and rainy weather of this time.

Table 7. Patient Allocation in a Workday and in a Day-off

No.	One Day (data averaged)	***t-value***	Group A	Group B	All
1	Workday	***0.88***	15.64	48.64	64.28
2	Week-end, Holiday	***1.20***	24.95	56.54	81.49

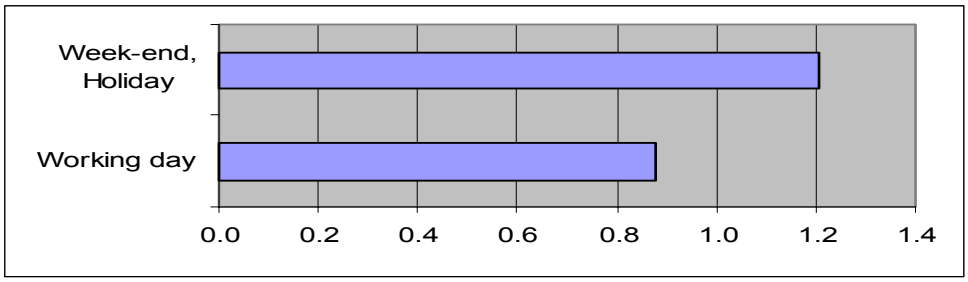

Figure 7. The t-value in a Workday and in a Day-off

h. Accident time (see table 8 and figure 8)

Table 8. Patient Allocation after the Occurred Accident Time

No.	Time: *(from - up to)*	***t-value***	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	00h00 - 01h00	***0.87***	19	1.11	60	1.28	79	1.24
2	01h00 - 02h00	***0.86***	17	1.02	55	1.18	72	1.13
3	02h00 - 03h00	***0.93***	17	1.01	51	1.09	68	1.07
4	03h00 - 04h00	***0.77***	11	0.67	41	0.87	52	0.81
5	04h00 - 05h00	***0.91***	15	0.89	46	0.98	61	0.96
6	05h00 - 06h00	***0.83***	20	1.19	67	1.43	87	1.36
7	06h00 - 07h00	***0.94***	36	2.09	104	2.23	140	2.19
8	07h00 - 08h00	***0.96***	65	3.78	184	3.94	249	3.90
9	08h00 - 09h00	***0.99***	67	3.93	186	3.98	253	3.96
10	09h00 - 10h00	***0.90***	62	3.61	188	4.03	250	3.92
11	10h00 - 11h00	***0.98***	80	4.67	223	4.77	303	4.75
12	11h00 - 12h00	***1.09***	90	5.26	226	4.84	316	4.95
13	12h00 - 13h00	***1.06***	89	5.18	229	4.90	318	4.98
14	13h00 - 14h00	***0.84***	86	5.03	279	5.98	365	5.72
15	14h00 - 15h00	***0.94***	84	4.89	243	5.21	327	5.12
16	15h00 - 16h00	***0.81***	74	4.31	249	5.34	323	5.06
17	16h00 - 17h00	***0.97***	97	5.64	271	5.81	368	5.77
18	17h00 - 18h00	***1.05***	118	6.87	306	6.55	424	6.64
19	18h00 - 19h00	***1.04***	131	7.66	343	7.34	474	7.43
20	19h00 - 20h00	***1.16***	130	7.57	304	6.50	434	6.80
21	20h00 - 21h00	***1.43***	135	7.88	257	5.50	392	6.14
22	21h00 - 22h00	***1.70***	153	8.96	246	5.26	399	6.25
23	22h00 - 23h00	***0.86***	99	5.79	316	6.77	415	6.50
24	23h00 - 24h00	***0.23***	17	0.99	197	4.22	214	3.35
25	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

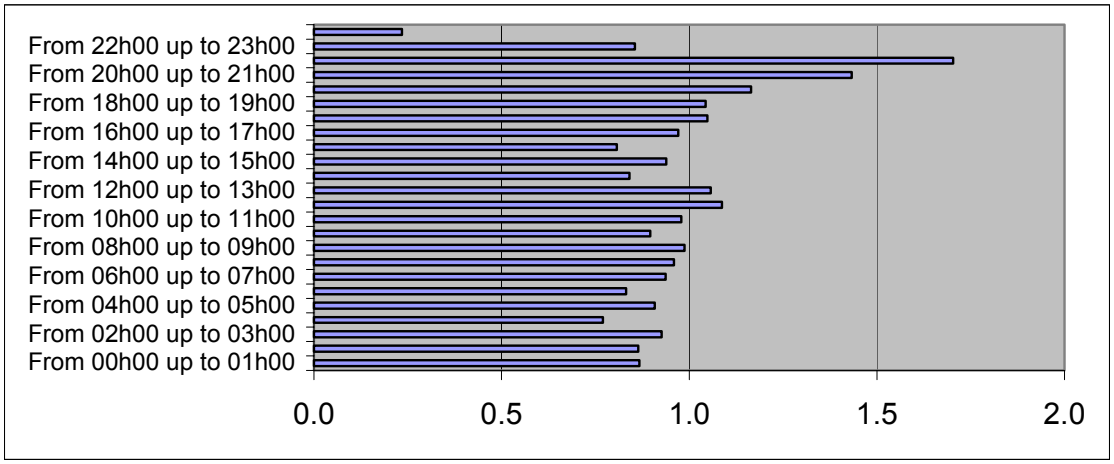

Figure 8. The t-value after the Occurred Accident Time

Regarding the total number of accidents, the table shows that in the time from 17h00 up to 23h00, it increases specially. The t-value increases twice a day. At the noontime, from 11h00 up to 13h00, it reaches the lower peak. This is the time of rest and a lot of people go to have lunch and use time to have some shopping. The t-value increases from 17h00-18h00 and reaches the highest peak at 21h00-22h00. It is the time after work and the time that the hospital is full of serious patients. It can be explained that the people use road a lot in this free time for various reasons: shopping, amusement, learning etc. and the road is crowed.

i. Causes of accidents (see table 9 and figure 9)

Table 9. Patient Allocation after Causes of Accidents

No.	Causes of accidents	***t-value***	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Faults of drivers	***1.08***	638	37.28	1,612	34.52	2,250	35.25
2	Faults of people on vehicle (not driver)	***1.46***	91	5.32	170	3.65	261	4.09
3	Faults of other road user	***1.09***	452	26.41	1,136	24.31	1,588	24.88
4	Technical faults of road	***0.56***	109	6.38	527	11.28	636	9.96
5	Technical faults of vehicles	***1.21***	212	12.39	479	10.25	691	10.83
6	Bad weather	***0.63***	91	5.29	393	8.41	484	7.58
7	Mixed of above mentioned	***0.92***	119	6.93	354	7.58	473	7.41
8	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

It is remarkable that while the faults of drivers and faults of other road users lead to a very high accident patients, the faults of the accompanied on vehicle can causes a fewer accidents but it is serious ones: the t-value in this case reaches 1.46. This is because in numerous cases, the people use motorcycle and on this vehicle, the driver has great difficulty to control the other people sitting on vehicle. Technical faults of vehicle form a great problem for there are various motorcycles with low technical quality running on road.

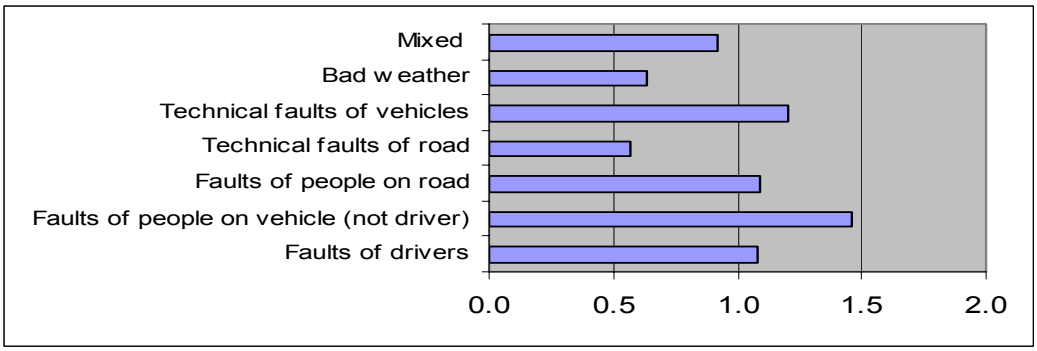

Figure 9. The t-value after Causes of Accidents

j. Kind of patient's vehicle (see table 10 and figure 10)

Table10. Patient Allocation after Kind of Patient's Vehicle

No.	Kind of patient's vehicle	*t-value*	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	Patient	%
1	No vehicle	***0.58***	53	3.09	247	5.29	300	4.70
2	Non-motorized vehicles	***0.92***	73	4.28	218	4.67	291	4.56
3	Motorcycle (capacity <100 cm^3)	***1.22***	758	44.27	1,695	36.28	2,453	38.43
4	Motorcycle (capacity >100 cm^3)	***1.10***	560	32.69	1,385	29.66	1,945	30.47
5	Car	***0.71***	93	5.42	358	7.67	451	7.07
6	Truck	***0.81***	130	7.62	437	9.35	567	8.88
7	Other	***0.37***	45	2.63	331	7.08	376	5.89
8	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

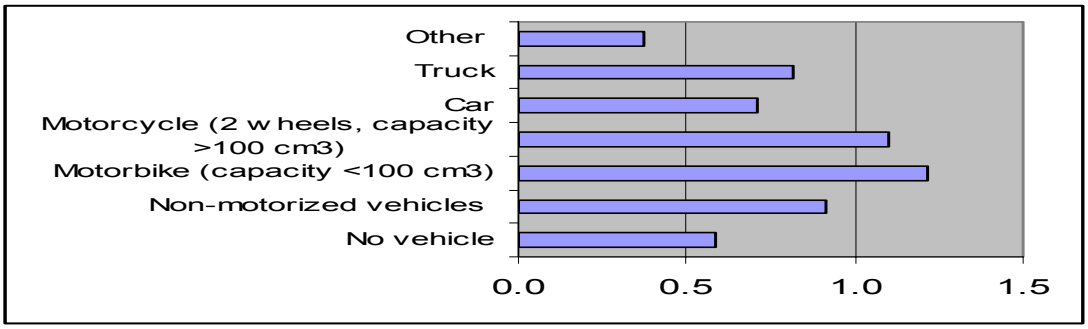

Figure 10. The t-value after Kind of Patient's Vehicle

The table shows clearly that the part of accidents with patient on motorcycle (both capacities) is very great. The motorcycle with lower capacity even leads to a higher t-value and the total patient number. It can be explained by the fact that this kind of vehicle is relatively cheap and many people can buy them. Besides that, the procedure to get driving license of motorcycle in general and of motorcycle with lower capacity in particular is very simple in comparison with that of car. The car drivers understand the traffic regulations in many cases better than the motorcycle users.

k. Kind of vehicle leading to accident (see table 11 and figure 11)

Table 11. Patient Allocation after Kind of Vehicle Leading to Accident

No.	Vehicle leading to accident	*t-value*	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Bicycle	***0.62***	38	2.21	166	3.55	204	3.20
2	Non-motorized (except bicycle)	***0.93***	56	3.26	164	3.51	220	3.45
3	Motorbike (capacity <100 cm^3)	***1.04***	708	41.34	1,858	39.78	2,566	40.20
4	Motorcycle (capacity >100 cm^3)	***1.07***	678	39.61	1,724	36.91	2,402	37.63
5	Car	***0.76***	93	5.42	333	7.13	426	6.67
6	Truck	***0.90***	130	7.62	393	8.41	523	8.19
7	Other	***0.74***	9	0.54	33	0.71	42	0.66
8	TOTAL		1,712	100.00	4,671	100.00	6,383	100.00

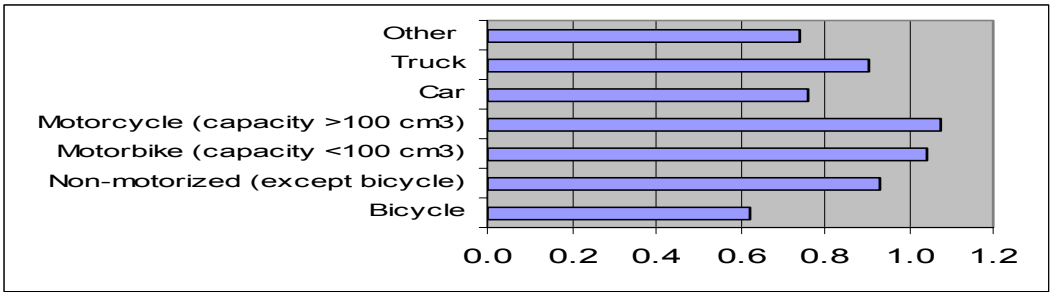

Figure 11. The t- value after Kind of Vehicle Leading to Accident

Once again we have similar conclusion and explanation about the high t-value and the high number of accident causes by motorcycle. The table shows also that car is one of safe vehicle. Of course, motorcycle has a lot of advantages in comparison with car. But in reference of the road safety, car is no doubly better.

k. Accident sites (see table 12 and figure 12)

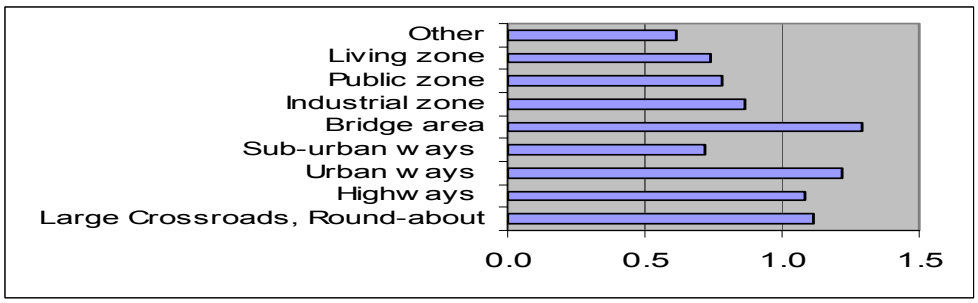

Figure 12. The t-value after Accident Sites

The urban ways group has a high number of accident patients and a high t-value. It shows that the ways system of Hanoi has various problems: for example, most of roads are narrow and short, there are a lot of intersections etc.

The bridge area has problems by the highly sloping and curved way connecting road and bridge. Besides that sometime young people gather on this area and it makes hazards for traffic.

Table 12. Patient Allocation after Accident Sites

No.	Special features of accidents sites	***t-value***	Group A		Group B		All	
			Patient	*%*	*Patient*	*%*	*Patient*	*%*
1	Large crossroad, Round-about	***1.12***	196	11.45	479	10.25	675	10.57
2	Highways (*)	***1.08***	451	26.34	1141	24.42	1,592	24.94
3	Urban ways (*)	***1.22***	297	17.33	665	14.24	962	15.07
4	Sub-urban ways (*)	***0.72***	106	6.22	404	8.65	510	7.99
5	Bridge area	***1.29***	250	14.62	529	11.32	779	12.20
6	Industrial zone (*)	***0.87***	159	9.26	499	10.68	658	10.31
7	Public zone (*)	***0.78***	107	6.24	376	8.06	483	7.57
8	Living zone (*)	***0.74***	90	5.27	330	7.06	420	6.58
9	Other	***0.62***	56	3.27	248	5.32	304	4.76
10	TOTAL		1,712	100.00	4671	100.00	6,383	100.00

(*) except large crossroad, round-about

4. CONCLUSIONS

The paper has proposed the so-called t-value, which can be used as a magnitude expressing the skull trauma level in comparison with other injuries. With this value, in reference of common 12 aspects relating of road traffic accidents, the analysis has shows in some cases, the numbers of accidents in general and the proportion of skull traumas has same behaviors. But in other cases, they can be different, for example, in case of residence or of age etc. The paper tried to give explanations in each special feature, too. The results of this study can contribute to lessen the bad consequence of accidents when this misfortune occurred.

The paper opens some research directions in the future. The value S, that shows us the average value of occurred skull traumas in all registered traffic accidents can be used in other study area and in other time intervals. It can lead us to some useful conclusions on the level of skull traumas there and on the effectiveness of measures to reduce these serious injuries. The transport time needed to transfer patients up to any first medical aid is very important in the case of skull traumas, and it is necessary to have some studies to evaluate it, too.

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