**ASSOCIATION BETWEEN PERSONAL CHARACTERISTICS AND SELECTED DISEASE OUTCOMES AMONG PATIENTS WITH HEAD INJURY, ADMITTED TO THE NEURO-TRAUMA UNIT AT NATIONAL HOSPITAL OF SRI LANKA**

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**Introduction**

Traumatic brain injury is a leading cause of death and disability. It can be categorized mild to severe stages. The head injury is a broad term. Commonly damaged areas are scalp, skull, brain, and underlying tissue and blood vessels in the head. Head injuries are also commonly referred as brain injury, or traumatic brain injury (TBI). It depends on the severity of injury and site of the injury.

Nowadays head injuries are dramatically increased, and it is reported as a 1.7million per each year .

According to Colombia neurological department in 2015, they said that the “Millions of Americans are alive today who have had a head injury and now need help with the activities of daily living, costing the country more than $56 billion per year” (Colombia university,2015).

Age is regarded as the most important factor to determine the prognosis of head injury. There are several studies conducted to assess the poor prognosis of the age group was reported patients ≥65 years is poorly prognosis (Patel, H.C.,2010).

Radio-logical findings prove the nature and location of the lesion site and most common method to diagnose the head injury was computed tomography (Prashanth, G.,2011). It was more effective method for identify better surgical procedure to recover the patient.

Most essential factors for outcome studies are type of head injury, age group and the severity level. One of the researcher explained guidelines are more reliable for the before giving treatment of the head injury patients. Guidelines were sharply explained how to handle the patients and how to give proper treatments (Carney,N.(2016).

Best surgical intervention is Decompressive Craniectomy. But its efficacy depends when performed

< 5 hours after injury in younger patients with Glasgow Coma Scale decrease to 5. So, another research study showed decreased mortality and increased Glasgow coma scale represent the patients aged less than 50 years (Barthélemy, E. J.,2015).

Treatment of these patients requires an experienced clinical and neuro surgical team. There can be some complications occur during and after surgery such as hemorrhage, increased intra- cranial pressure, seizures and infection. So, these are need careful evaluation and monitoring.

Most traumatic brain injury studies related to the complication and treatments. There is little a evidence in the assessment of association between personal characteristics and head injury. So, aim of this study is to assess the association between the disease outcomes and personal characteristics among patients with head injury admitted to NHSL.

 **Methodology and methods.**

In order to accomplish our goal, we designed a descriptive cross-sectional study covering the period between June 01st and September 01st 2018. This is a none-internationale (observational) study in which we as the researchers just observed and analyzed re-searchable objects or situations but does not intervene. Glasgow coma scale we used to observe the patient. It was better scale for observe the head injured patient (Jennett, 2015).

This analytic research study was carried out in the Neuro-trauma center (NTC) of National Hospital of Sri Lanka, which provide a care for a large number of patients with traumatic head injury.

There are two Intensive care units (NTC ICU 1and ICU 2) , two wards (WD79 and WD 81) , Emergency treatment unit (ETU) And High dependency unit (HDU). We have planned to collect the data for three months of period and the data was collected through the bed head tickets and admission books of the each units. Initially we collected data from the resuscitation room because the place where trauma patients are admitted first and undergone the basic investigations such as brain Computed Tomography (CT).

 All the data gathered from data extraction sheet (checklist) (Appendix A). In here we wish to measure, observe, and record data by using this check list. This check list consisted of the information of the patient from admission to the discharge from the hospital including BHT No, age, sex, type of injury, diagnosis CT, Magnetic Resonance Imaging (MRI), Glasgow Coma Scale (GCS) level and other injuries etc. There content validity assessed by the expert panel consisted members affiliated to the Faculty of Nursing, Kattsu International University. All the data were collected by in our research team members.

For statistical analysis, odd ratio and its corresponding confidence interval (95%) were used. Descriptive data were summarized as a percentage. A statistical significant level of *p<0.05* was used. Further analysis used descriptive statistics such as frequencies, means and standard deviations and associations between variables analyzed via performing “Pearson Chi-Square”test. Microsoft Excel 2010 and SPSS (version 23.0) used as statistical tools.

Prior to the study approval was taken by Ethical Review Committee (ERC) at KIU and NHSL. Patients who met the research inclusion criteria were included in the study. All patients were enrolled from different ICU s and wards. The aims and methods of the study was explained for the patients who are with good conscious level (GCS<12/15) or for the guardian or close relation who stay with the patient at that time of enrollment.

**Results.**

During the period of analyses there were total of 480 patients admitted with a traumatic brain injury. But 180 patients were excluded for not related for inclusion criteria of the study and 300 patients finally selected.

The demographics characteristics of the sample and hospital admission types are provided in table ( 1).

Table 1: Demography characteristics and type of hospital admission of the study population (n= 300).

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristic |  | Frequency | Percentage (%) |
| Patient’s age | 0yrs – 30yrs | 58 | 19.3 |
| (years) | 31yrs – 60yrs | 110 | 36.7 |
| >61yrs | 132 | 44.0 |
| 300 | 100 |
| Marital status | married | 222 | 74 |
| unmarried | 78 | 26 |
| Gender | Male | 265 | 88.3 |
| Female | 35 | 11.3 |
| 300 | 100 |
| Admission type | Direct | 77 | 25.7 |
| Transferred from other | 223 | 74.3 |
| hospital |

Most of participants belonged to the age category of above 61yrs (44%). In 19.3% and 36.7% patients respectively belongs to age group 0-30 years and 31- 60years. A total of 74% patients were married and most of the participants were males (89.3%). Majority of participants have transferred from other hospitals (74.3%).

A history of head injury of the sample is outlined in figure (1).



This figure describes the prevalence cause ( history) of head injury. More than 50% of patients who participated in this study had Road traffic accident. Second highest percentage showed fallen on the floor it was 20%.

The main objective of this study is to assess association between the disease outcomes and personal characteristics among patients with head injury. So more than 25% of patients had complication of weakness in whole part of the body 18.7% of patients were no any complication (figure 2).

 Figure (2).

Complication of head injury.



Table ( 2).

The relationship of Patients’ age, gender, admission type and on admission mean arterial pressure with head injury complications.

|  |  |  |
| --- | --- | --- |
| Factors | Complication – frequency (%) | p Value |
| Bed sore | pneumonia | septic | DVT | Death | Confusion  | Nocomplication | weakness | convulsion |
| Age | 2 | 6 | 3 | 2 | 1 | 7 | 8 | 21 | 8 | 0.033\* |
| 0-30yrs |
| 30-60yrs | 10 | 5 | 7 | 4 | 22 | 2 | 33 | 28 | 9 |
| >60yrs | 4 | 8 | 10 | 3 | 24 | 3 | 2 | 4 | 5 |
| Gender | 15 | 18 | 18 | 8 | 42 | 2 | 46 | 69 | 23 | 0.587 |
| Male |
| Female | 1 | 1 | 2 | 1 | 4 | 6 | 10 | 6 | 4 |
| Admission type | 4 | 7 | 6 | 3 | 10 | 8 | 12 | 23 | 4 | 0.033\* |
| Direct |
| Transferred | 12 | 12 | 14 | 6 | 37 | 2 | 44 | 51 | 23 |
| from other hospital |
| On admission mean | 3 | 1 | 3 | 1 | 9 | 3 | 7 | 12 | 1 | 0.001\* |
| arterial pressure |
| 51-65mmHg |
| 66-80mmHg | 7 | 10 | 9 | 2 | 8 | 1 | 34 | 39 | 13 |
| 81-95mmHg | 2 | 2 | 5 | 2 | 16 | 8 | 10 | 17 | 9 |
| 96-110mmHg | 3 | 4 | 2 | 3 | 1 | 7 | 1 | 3 | 2 |
| >110mmHg | 1 | 2 | 1 | 1 | 13 | 1 | 4 | 3 | 2 |

According to Person chi-square test there were statistically significant relationship present between complication with age of the patient (p=0. 033), admission type (p=0. 033), and on admission mean arterial pressure (P=0.001) (Table 2). But gender and complication indicate p=0.587 it was >0.05 so there is no statistically significant association.

Table (3).

The relationship of patients age, gender, admission type, Past medical history with patients’ total days of hospitalization.

|  |  |  |
| --- | --- | --- |
| Factors | Days of hospitalization | p value |
| < 1 Week | 1 Week 1- Month | 1Month – 3 Month |
| **Age(years)** | 16 | 33 | 9 | 0.019 |
| 0-30yrs |
| 31-60yrs | 35 | 63 | 12 |
|  |  |  |  |
| >61yrs | 113 | 159 | 28 |
| **Gender** | 101 | 137 | 27 | 0.269 |
| Male |
| Female | 12 | 22 | 1 |
| **Admission type** | 28 | 44 | 5 | 0.528 |
| Direct |
| Transferred | 85 | 115 | 23 |
| from other hospital |
| **Past medical history** | 8 | 32 | 3 | 0.011 |
| Diabetics |
| Hypertension | 15 | 16 | 1 |
| Renal disease | 3 | 5 | 1 |
| Asthma | 4 | 7 | 1 |
| Arthritis | 1 | 2 | 1 |
| Heart disease | 9 | 5 | 1 |
| Others | 7 | 5 | 1 |
| None | 44 | 77 | 22 |
| Multiple | 19 | 8 | 2 |
| medical disease |

Finally Person Chi-square test was conducted to check significant association between age, gender, admission type, past medical history with no of days of hospitalization. There were statistically significant relationship between age of patient (p=0. 019), past medical history with days of hospitalization (p=0. 011).

The results indicated there is a significant association having between personal characteristic and disease outcome.

**Discussion.**

The research study implemented was supported and encouraged by the staff members in the relevant area. The result of this study shown there was a positive statistically significant association between personal characteristics and disease outcome. And also we found there was a significant association between age and number of days of hospitalization, age and complications after injury, complications after injury and vital signs such as mean arterial pressure, number of days of hospitalization and complication, number of days of hospitalization and nutrition status, number of days of hospitalization and investigation results such as cultures.

When observing the data from our sample was found most of the participants (44%). belonged to the age category of above 61years. A total of 74% patients were married. Most of the them (89.3%) were males. This is in accordance with the literature reported, that high estrogen blood level in males and females early recover after injury is associated with adverse outcomes (Sethuraman ,et al (2014). Tan and his group were described high estradiol levels is ≥42.6 pg/ml and they also mentioned estradiol was measured using electro-chemiluminescence immunoassay (Tan, R. S., Cook, K. R., & Reilly, W. G. (2015). Farzaneh,E., et al. (2017) has reported most of the head injured patients were male (71.6%) and the most numbers of injuries according to mechanism were traffic accidents (41.7%) those are similar to our findings.

Hukkelhoven and group developed and validate prognostic models that use information available at admission to estimate 6-month outcome after severe or moderate traumatic brain injury they have used several characteristics to validate the model such as age, motor score, pupillary reactivity, hypoxia, hypotension, computed tomography classification, and traumatic subarachnoid hemorrhage (Hukkelhoven, C. W. P. M.,et al (2005). However finally they were explained, old age is continuously associated with worsening outcome after head injury. So in our study also reported nearly same result above that study. In our study also identified most hospitalized patients and more complicated patient in above 61 year age group. And we also analyzed that there is a significant relationship between the age and outcomes. Indeed, the young age patients shown higher survival rate when comparing to aged patients. But it could not find relationship between gender and prognosis /outcome of the disease because, total no of female admissions is less than the male admission during data collection periods.

 Shi,J.,et al (2016) stated that hyperglycemia after severe traumatic brain injury occurs frequently and is associated with poor clinical outcome and increased mortality. These investigators mainly focused on examining the relationship between brain cell metabolism and hyperglycemia after severe TBI. Then the final result of this study they identified hyperglycemia is one of the most common and serious secondary complications of severe TBI. In our study we also assessed the past medical history and outcome of the injury. Result of that there is a significant association having between past medical history and brain injury outcome.

However some limitation noticed. First, we decided to selected Patients, who diagnosed as traumatic brain injury in more than 2 weeks. Because We conducted in our study only three months periods. So, we need to enough time period to assess patients’ conditions who admitted to neuro -trauma center in National Hospital of Sri Lanka. Second, we selected the patients who undergone surgical intervention or manage as conservatively of traumatic brain injury because in our study was outcome observing study . However final result of the study indicated must need to identify the association factors before giving the treatment of the traumatic brain injury. Because those are directly affected to the outcome of the head injury.

**Conclusions.**

The findings of this study contribute to knowledge about the traumatic head injury and also identify the characteristics related to their poor outcomes. In general, findings from this study showed, majority of the patients were males, belongs to 30– 46 years of age. Types of head injury and number of days of hospitalization are affected to the patent out-come related to head injury. Most of them were transferred from other hospitals and most of them did not have previous medical history. And this study also identified, there is a significant association having between personal characteristic and disease outcome.

Finally findings are complication after head injury directly affected to the patient poor out - come among head injury patient. So this section helped to improve the knowledge and skills necessary to conduct a study in a scientific manner.

As a health care worker or individual who worked in this field. More important to known patient’s mortality and morbidity pattern of the head injured.

These findings indicate urgent need for nurses, to assess these patient’s problems and to develop interventions to improve patient positive outcomes, to improve their family and social supports by educating family members and counseling the patient about head injury out–come and rehabilitation programmed.

And also, nurses may need to help general populations become aware of the preventable methods of the head injury and how to use appropriate first aid techniques to prevent complication of the head injury. It was very important to patient’s early mobilization.

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Appendix (A) Check list

Check list from BHT.

Details of the patients with Traumatic Brain Injury who admitted to the Neuro Trauma Unit (NTC) at National Hospital of Sri Lanka from the month of June 2018 to August 2018. On admission to The Resuscitation Room at Accident Service OPD at NHSL.

|  |  |
| --- | --- |
| 01. BHT No :- |  |
| 02. Age:- |  |  |
| 03.Sex :- |  |  |
| 04.Marital Status:- |  |  |

05.Transferred from another hospital:-

06.Direct Admission:-

07.VITAL SIGNS

a .Blood pressure on admission

1. Heart Rate on admission

1. Respiratory rate on admission

d .Temperature on admission

e .Glasgow Coma Scale(GCS) on admission

f .Pupils reaction on admission.

g. Limb Power on admission.

 08.HISTORY OF THE INJURY.

a .RTA.

1. Fallen on the floor (slip and trip)

1. Fallen from height

1. fallen a weight or heavy object on the head

1. Assault.

1. Other

09.TYPE OF THE HEAD INJURY.

1. ICH

1. SAH

1. SDH

1. IVH

1. Cerebral Oedema.

1. Contusion.

1. Midline shift.

1. Hydrocephalus.

1. Pneumocephalus.

1. Base of skull Fracture.

1. Other.

10.PATIENT TRANSFER DETAILS.

To Operation Theatre “T”.

To ICU

To ICU 11.

To ETU.

To Ward 78/HDU.

To Ward 79.

To Ward 81.

To Other Unit

11.OTHER DETAILS RELATED TO THE INJURY.

Diagnosis CT.

Surgery.

Other injuries.

Past medical history :-

Diabetic mellitus

Hypertension

Renal disease

Asthma

Arthritis

Heart disease

Other disease

 POST OPERATIVE DETAIIS.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| VITAL SIGNS | OP DAY | DAY 01 | DAY 02 | DAY03 | AFTER 01 WEEK. |
| BLOOD PRESSURE(mmhg) |  |  |  |  |  |
| HEART RATE(bpm) |  |  |  |  |  |
| RESPIRATION(bpm) |  |  |  |  |  |
| TEMPERATURE(f) |  |  |  |  |  |
| GCS |  |  |  |  |  |
| PUPILS |  |  |  |  |  |
| LIMB POWER |  |  |  |  |  |

Complications after the injury:-

Transfer to Local Hospital. N0 YES

Total number of days hospitalization:

INVESTIGATIONS

|  |  |  |
| --- | --- | --- |
| TYPE OF THE INVESTIGATION | PRE OP | POST OP |
| FBC |  |  |
| SERUM SODIUM |  |  |

|  |  |  |
| --- | --- | --- |
| SERUM POTASSIUM |  |  |
| CRP |  |  |
| CPK |  |  |
| SERUM ALBUMIN |  |  |

|  |  |  |
| --- | --- | --- |
| Cultures.Blood Urine | Positive | Negative |
| Sputum |  |  |
| Other |  |  |
| NUTRITIONAL STATUS.Serum albumin level. |  |  |
| High Protein DietNormal Diet |  |  |