The eye opening response health and social care essay

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\n[/toc]\n \nTopic: Effectiveness of Glasgow Coma Scale classification on Traumatic Brain Injury. And type of injury according to Marshall Classification in Nicaragua. Research question: Should patients with Traumatic Brain Injury who present a score of 13 (according to the Glasgow Coma scale) be included in moderate TBI or stay in mild TBI category in Nicaragua? (Based on patients at the Hospital Antonio Lenin Fonseca Martinez from 1st of July to 31st of December 2008). AbstractThe objective of this investigation was to state whether or not Traumatic Brain Injury with a score of 13 according to the Glasgow Coma Scale be included as moderate TBI in Nicaragua (This research refers to the whole country since hospital Antonio Lenin Fonseca is the only public hospital in the whole country that is specialized in neurology). To see if this would be appropriate or not an observational research was done based on the patients that accessed the hospital because of Traumatic Brain Injury from 1st of July to 31st of December that fulfilled the inclusion criteria. Traumatic Brain Injury was classified and statistics of death from each group of TBI (mild, moderate or severe) based on the clinical reports and from the results it could be seen that people who had a score of 13 according to Glasgow Coma Scale had a large lethality rate for almost the half of them perished. With that result it can be concluded that patients with

a score of 13 in the Glasgow coma scale should be included in the category of mild TBI so that practitioners check them out at regular intervals and order a CT scan. The recommendations following this paper would be that even though patients with a score of 13 that are classified as mild TBI should be checked periodically and doctors should order a computed tomography so that they can prevent any complication. IntroductionTraumatic Brain Injury (TBI) occurs when an external force injures your head. In the United States the annual incidence has been estimated from 180 to 220 cases per 100, 000 inhabitants and approximately 10% of those lesions are fatal[1]. In the majority of the cases the patients with moderate and severe TBI end up with permanent disability and will not be able to gain their pre-morbid function. In Nicaragua the most common causes for TBI are motor vehicle accidents, underpass falls, sports-related injuries, and penetrating trauma (according to the statistics of the Hospital " Antonio Lenin Fonseca"). Being the motor vehicle accidents responsible for almost half of head injuries. Glasgow Coma Scale (GCS) introduced by Jennet and Teasdale allows us to classify the patients with TBI in accordance to the punctuation system allowing the practitioners to divide the TBI into mild, moderate or severe[2]. According to this scale the patient with a score of 13 in the GCS belongs to the category of mild TBI but in the last years there have been multiple studies which demonstrate a potential risk of neurologic impairment associated with relevant lesions in the Computed Tomography (CT) which justifies that these patients should be excluded from the mild TBI group and be included as moderate TBI[3]. In Nicaragua the only specialized public hospital in neurology is " Antonio Lenin Fonseca Martinez" (HEALFM). According to the department of statistics of HEALFM in the year 2004 the lethality of TBI was

of 12% and the raw mortality rate of 13%. 738 patients were admitted and 97 die because of TBI, during that year it was the second cause of death between the people who were in the hospital for this cause. During 2008 TBI was the third cause of death and 367 patients accessed the hospital for head injury, from which 47 died and the lethality rate was of 15% (from July 1st to December 31st, 2008). Given that TBI is so common in Nicaragua and that HEALFM is the only public hospital specialized in neurology every case from TBI is transferred to this hospital the practitioners have to act fast and in an efficient way. From there the importance of this research, so that the doctors take into consideration the patients with a score of 13 in the Glasgow Coma Scale and give them follow up and treat them as moderate TBI to prevent omission of any injury. The research question : " Should patients with Traumatic Brain Injury who after the diagnosis present a score of 13 (according to the Glasgow Coma scale) be included in moderate TBI or stay in mild TBI category? (Based on patients at the Hospital Antonio Lenin Fonseca Martinez from 1st of July to 31st of December 2008)". Will help us determine whether mild TBI with a score of 13 should be included as moderate TBI and by this make doctors pay extra attention to patients with the score before mentioned so that a mild TBI does not develops in either severe or moderate. But the main reason of why this study is important (even though it lies in a non-biological answer) is that here in Nicaragua the only public hospital specialized in Neurology is HEALFM and because of that all of the patients who suffer TBI whether it is mild, moderate or severe are transferred to this hospital. And as it is backed up on research done by expert the patients who present a score of 13 in the GCS tend to have a greater potential for neurological impairment and clinically relevant lesions

on brain scans that may go unnoticed without the neuroradiological study. And in this particular hospital sometimes when they classify as mild a TBI with a score of 13 in the GCS the most they do is getting x-rays to see if there is skull fracture, for this reason I think this study is important. So that doctors know that when they get a score of 13 in the GCS even though it is classified as mild TBI it is important to order a CT (Computed Tomography) scan and to be constantly checking the patient to prevent any complications. In a given case if there is internal bleeding or the intracranial pressure is too high they would be able to act immediately and perform surgery to repair the damage. For which I think that patients with a score of 13 should be included in moderate TBI to prevent death. 3. 0 Background3. 1 Brain AnatomyHuman brain anatomyPicture[1]The brain is divided in three main parts which are: The cerebrumThe cerebellumThe Spinal cordAccording to Brian A. Curtis the cerebrum is the largest part of the brain and it occupies the upper portion of the cranium and it is divided into left and right hemisphere. Each hemisphere of the cerebrum controls the actions of the opposite part of the body. The left Hemisphere is in charge of Sequential Analysis: systematic, logical interpretation of information; language, mathematics, abstraction and reasoning. Memory stored in a language format and the right hemisphere is in charge of processing multi-sensory input simultaneously to provide " holistic" picture of one's environment it provides us with visual spatial skills and it also coordinates activities such as dancing and swimming.[1]. The cerebrum is composed of layers; the outer layer consists of gray matter (a tissue made of a dense collection of nerve cells), it is 1cm thick and is called cerebral cortex. A lateral fissure (deepest sulci) defines the Temporal lobe and the Frontal lobe. The temporal lobe

receives auditory impulses from auditory receptors in the inner ear. The temporal lobe is also responsible for expressed behavior, receptive speech and information retrieval[2]. The hippocampus is part of the cerebrum and it is the one in charge of your memory, and it divides it into long term or short term memory. The hypothalamus is in charge of controlling your body temperature and of sending messages to the neurons when we do not have the right body temperature so that we either sweat or shiver in order to maintain the temperature in about 37 °c (in order for our body to function properly). The frontal lobe divides into pre-frontal area, motor cortex and pre-motor cortex. The pre-frontal area is the one in charge of concentration and the process of thinking. The motor cortex is the one that provides us with voluntary motor activity (voluntary movements). And finally the pre-motor cortex is the one responsible of the storage of motor patterns and voluntary activitiesThe Occipital love contains the primary visual cortex and its main function is interpreting visual sensations and linking that information with memories[1]. The corpus callosum is on the medial surface of the cerebrum (composed of nerve fibers) an it connects the two cerebral hemispheres allowing information to be transferred between them[2]. And the cingulate gyrus which is above the corpus callosum is involved in emotional responses. The cerebellum is at the back of the brain and it controls balance, movement and coordination. The brain stem is the one that controls all the functions for your body to stay alive; such as food digestion, respiration, blood circulation[3]. 3. 2 Traumatic Brain InjuryAccording to the National Institute of Neurological Disorders and Strokes of the United States (NINDS) a Traumatic Brain Injury (TBI) occurs when an external force causes a trauma in the head and the brain suffers damage. TBI is divided into mild,

moderate and severe[4]. It is classified by a routine pupil study and it is given a score by the Glasgow coma scale; 8 or less the patient is said to be in coma, 9-12 is moderate and 13-15 is said to be mild (meaning that it might just be a concussion). A person with a mild TBI may remain conscious or may experience a loss of consciousness for a few seconds or minutes. Other symptoms of mild TBI include headache, confusion, lightheadedness, dizziness, blurred vision or tired eyes, ringing in the ears, bad taste in the mouth, fatigue or lethargy, a change in sleep patterns, behavioral or mood changes, and trouble with memory, concentration, attention, or thinking. A person with a moderate or severe TBI may show these same symptoms, but may also have a headache that gets worse or does not go away, repeated vomiting or nausea, convulsions or seizures, an inability to awaken from sleep, dilation of one or both pupils of the eyes, slurred speech, weakness or numbness in the extremities, loss of coordination, and increased confusion, restlessness, or agitation (according to NINDS)Mild TBI is associated with loss of consciousness for less than 30 minutes, (if a person is unconscious for more than 30 minutes it is considered al severe TBI) The person might present cognitive problems such as headache, difficulty thinking, memory problems, attention deficits, mood swings and frustration but these are commonly overlooked[1]. Moderate TBI is related to loss of consciousness from 20 minutes to 6 hours and severe TBI involves loss of consciousness for 6 hours or more[2]. In severe TBI the injuries might either be closed or penetrating. Closed injury occurs when a sudden impact causes the brain to bump into the skull which might increase Intra-cranial pressure. Penetrating injuries in when an object causes damage to the brain by perforating the skull (skull fracture). 3. 3 Glasgow Coma ScaleThe Glasgow Coma Scale

(GCS) tells us the level of consciousness of a patient and helps us categorize head injuries[3].

Table 1. Glasgow Coma Scale

Eye Opening Response

Spontaneous--open with blinking at baseline4 pointsOpens to verbal command, speech, or shout3 pointsOpens to pain, not applied to face2 pointsNone1 point

Verbal Response

Oriented5 pointsConfused conversation, but able to answer questions4 pointsInappropriate responses, words discernible3 pointsIncomprehensible speech2 pointsNone1 point

Motor Response

Obeys commands for movement6 pointsPurposeful movement to painful stimulus5 pointsWithdraws from pain4 pointsAbnormal (spastic) flexion, decorticate posture3 pointsExtensor (rigid) response, decerebrate posture2 pointsNone1 pointPrevious(taken from unc. edu)Patients with TBI might present cloudy consciousness, lethargy, obtundation, stupor and coma. Cloudy consciousness is a deficit in the information this state is defined as a mild deficit in the speed of information processing speed by the brain (results from cell to cell disruption, the cells are not able to pass information because the connectivity was affected). Cloudy consciousness may be noted after mild-to-moderate head trauma and may persist for several months. Memory of recent events may be affected but memory of long term events remains intact. Lethargy is a decrease in awareness which results in a

reduction of skills which makes harder for the individual to execute activities that would usually be effortless performed; the person would respond to the stimuli but afterwards would go back to inactivity. Patients rouse briefly in response to stimuli and then settle back to stillness. Obtundation is pretty much the same as lethargy except that the patients respond to commands but they are unaware of their immediate environment[1]. Stupor is when the patients are unaware of everything and they respond solely to continued pain stimulus. When the patient is said to be in coma is when the person does not respond to any stimulus. And it is referred as brain death when the damage done to the brain is irreversible causing the lost of brain functions and there is no brain activity (determined by the electrical activity)[2]. The initial neurological examination is vital for it must be recorded in the clinical record and should be performed at regular intervals. It should always include the examination of the pupils and the assessment of the level of consciousness. The pupil status is a critical part of the review of patient suffering TBI, mainly in those with severe TBI. A normal pupil examination, is reactive pupils, bilateral consensual and respond to direct stimulationWhen assessing status and pupil function should quantify the size (in mm), symmetry and reactivity of light. During resuscitation procedures used drugs that may induce alterations pupils, which must be taken into account assessing the patient in a neurological aspect. The diameter and pupil light reflex is an early indicator of patient prognosis, as demonstrated by Marshall in his 1991 study. After the level of TBI (mild, moderate or severe) is classified by the Glasgow Coma Scale moderate and severe TBI require Computed Tomography (CT) scan, in order for the doctor to determine the pathology of the injury. Despite the classification, studies suggest that

patients with a score of 13 in the GCS should be excluded from the group of mild head injury, but should be included within the moderate category, with all therapeutic and prognostic considerations this entails, as it is clearly shown that these have a higher potential for neurological impairment and clinically relevant lesions on CT brain that may go unnoticed without the radiological study, which is supported by guides of the Italian Society of Neurosurgery, widely spread in Europe and with a external validation study conducted by Stille, for Canadian and American guidelines (New Orleans) in patients with a score of 13, 14 and 15 in GCS. 4. 0 HypothesisIf patients with a score of 13 in the Glasgow Coma Scale are classified as mild TBI then the doctors will at most order X-rays (at least here in Nicaragua, according to doctor Arostegui[1]due to resource factors as economical factors between others that are not taken into consideration since they are not biological) to test for skull fractures which would prevent the doctors from seeing any internal injuries and the person could either die or have some kind of irreversible damage in the brain because they would not be able to determine any internal injury such as hematomas or a contusion might develop into Diffuse Axonal Injury (DAI) and cause cell impairment which would turn the mild TBI into moderate TBI but since it was classified as mild TBI the doctors would not pay enough attention to the patient (for they would have severe TBI emergencies) and the patient might die or experience brain damage. 5. 0 Method and PlanningType of study: Descriptive and observationalIn order to prove the hypothesis a period of time was chosen which was from July 1st to December 31st from the year 2008. During this period of time 317 patients were admitted at the HEALFM because of TBI (according to the department of statistics of the hospital). The admitted

patients were evaluated by the neurology team from a clinical point of view making use of the GCS (based on Jennet and Teasdale criteria) which allowed them to classify the TBI between mild, moderate and severe. 317 clinical records were revised and only the patients with a score of 13 in the GSC, the ones with moderate and severe TBI were selected; leaving us with a total of 126 patients for the study. From which 48 had severe TBI, 50 with moderate and 28 patients with a score or 13 on the GSC (this was done by the doctor Maria Isabel Rivera Zamora). The criteria for the inclusion of patients was: Patients who entered Neurology are for moderate and severe TBI who got a CT scan. Patients with moderate and severe TBI who had less than 72 hours of evolution of the trauma. Patients who had TBI level I and III with CT scan (previous to craniotomy)TBI patients with a score of 13 in GCS that enters neurosurgery and has a CT scan. Table 2 http://1. bp. blogspot. com/-jh5-kmx1o50/TkHgNB9RNLI/AAAAAAAAAzs/jQz-xZABfco/s1600/1. pngAfter the level of TBI was classified according to the GCS the type of injury was classified according to the Marshall CT method of classification. It could be diffuse type I, type II, type III, type IV, type V, evacuated mass lesion or non-evacuated mass lesion; it was classified depending on the CT scan characteristics (This was done by the doctor Maria Isabel Rivera Zamora specialist on radiology since it needed to be done by a professional in order for the study to be valid). After the classification was done the number of deaths was determined and separated into 3 groups which werenumber of patients who died because of TBI with a score of 13 according to the Glasgow Coma Scale. Number of patients who died because of moderate TBINumber of people who died because severe TBI. The results of death were given accordingly to statistics and then analyzed. The conclusion was

determined based on statistics. 6. 0 ResultsThe average age between the patients was of 30. 5 ± 14. 8 (ages from the clinical record were added and divided by the amount of patients), the majority of the patients were male and from urban areas (92%). In 45% of the patients was determined a history of alcohol intake. The average lapse from the time when the trauma occurred to the admission of the Hospital was of approximately 10 hrs The most common cause was car accidents (48%) and falls (21%). The 35% of the patients showed pupil alterations and most of the patients suffered of severe TBI in which most cases dominance was of unilateral lesion (affects a specific part of the brain)In table 3 appendix A it can be seen the frequency of the main lesions found for TBI. Epidural Hematoma, accumulation of blood between the skull and the dural membrane (EDH) were present in a 42% of the patients (it was greater than 10mm in the majority of the cases). Subdural hematoma was observed in 54% of the cases and in 78% of these cases it was level I. In 66% of the cases intraparenchymal concussions were observed. Hemorrhagic concussions were present in 76% of the patients and edematous bleeding was present in 16% of the cases. Subarachnoid hemorrhage was present in 53% of the cases, in which level 2 injury was the most common (29%) followed by level 3 with 14%. Diffuse axonal injury was found in 7% of the patients. Fracture was found in 86% of the patients in which 34% of them involved the cranial vault and 66% the base was involved. The aligned fracture was the most common with 67% followed by depressed fracture with 14%. According with Marshall classification the most common injuries were diffuseinjury type I with 43%, focal injury with 35%, cerebral hernia with 25%. From the patients 67% were discharged alive and dead 33%. From the ones who died 58% were from the ones with severe TBI

and 24% had moderate TBI. From those who were alive 31% had severe TBI and 76% had moderate TBI. The seven patients who were discharged with coma had severe TBI. According to Marshall classification diffuse injury type II was the most common (43%). In the patients with severe TBI the dominant injury was focal type VI with 40% followed by diffuse type III with 27%. In moderate TBI the frequent one was diffuse type II with 54%. The 62% of the patients that had diffuse type II and the 41% with injury type VI died . Discharged alive were 80% with injuries type II and 55% with type VI and in state of coma were 2 patients from the categories III, IV and V. In the radiological findings it was observed that 73% of the patients with severe TBI presented pupil alterations; 49% of the patients also presented cerebral hernia and in two cases it was associated with cerebral stroke. The lethality index of injuries type III was of 62%and the 40% and 41% was for injuries type IV and V. 20 of 48 cases of severe TBI needed surgery, 26 from the 50 cases with moderate TBI also needed surgery and 10 from the 28 cases with a score of 13 in the GCS (with mild TBI) needed surgery as well. One third of the patients with a score of 13 in the Glasgow Coma Scale presented focal injury type VI (non-evacuated mass) and because of that they had to be surgically intervened. In those patients pupil alterations were observed and aside from that one patient presented cerebral hernia and two patients died. 7. 0 AnalysisAs we see in the results 60. 5% of the patients were discharged alive, 32. 5% dead and 7% ended up in coma. From the 28 cases presented with a score of 13 in the Glasgow Coma Scale 10 died. This tells us that almost half of the cases classified as mild TBI ended up dead which means that this study proves the hypothesis right. If these patient had been included as moderate TBI the doctors would probably have ordered a CT

scan and realize of all the internal bleeding, the intracranial pressure or hematomas that the patient might have presented. 8. 0 ConclusionEven though the state of the pupils (properly interpreted) of the patient with TBI is an excellent indicator of short term prognosis and that the classification of TBI according to Marshall allows us to identify secondary lesions to intracranial hypertension that threatens the patient’s life the people with TBI that present a score of 13 in the Glasgow Coma Scale should be included in the moderate TBI category and excluded of the mild TBI category. For as seen in the cases, they tend to develop complications as the focal lesion type VI presented in one third of the patients with a score of 13 for which they had to be surgically intervened causing death in some of them. 9. 0 EvaluationThis research is inconclusive for the short period of time selected to do the research. More studies should be carried by professional for longer periods of time so that we can understand the seriousness /importance of classifying patients with a score of 13 in the GCS in Nicaragua. Non-biological factors should be taken into consideration and a solution should be proposed. Appendix AType of lesionNumber of patientsPercentageEpidural Hematoma4132%Subdural Hematoma6854%Intra-axial lesions8366%Sub-arachnoid hemorrhage6753%Cerebral hernias3125%Diffuse axonal lesion97%Pneumocephalus4737%Fractures9676%