Quality of life regarding eating and drinking of person with cervical spinal cord injury

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Abstract:
Background: In cervical level of spinal cord injury the swallowing, voice production and respiratory systems are often affected that may cause different types of Dysphagia, dysphonia besides physical problems. The problem may appear in mild to severe state which can be vary person to person. Speech & Language Therapists’ are those who work closely to solve the swallowing difficulties so they need concrete data about the challenges related to swallowing.

Aim: To explore the quality of life regarding eating and drinking of patient with cervical spinal cord injury.

Methodology: This cross sectional prospective survey study revealed eating and drinking related quality of life of 45 cervical spinal cord injury admitted patients through dysphagia handicap index (DHI) from Centre for the Rehabilitation of the Paralysed (CRP).

Result: Result showed 49% respondent reported had little to sever swallowing problem where as 13% reported extreme swallowing difficulties. The swallowing difficulty symptoms were coughing while eating-drinking (31.1%), needs of fluid to wash out the food (8.9%), multiple swallow (11.1%), chock in medicine (2.2%), strangling sensation in throat and couth up the food (4.4%) and liquid (6.7%). Besides that the functional status of swallowing affected by taking longer time to finish the meal than usual time (18.6%) which was the major complain. On the other hand the emotional swallowing status defined by ‘Afraid of chocking that may stops breathing because of swallowing problem (11.6%). There was highly significant correlation found between overall severities of swallowing difficulty and feeling handicapped because of swallowing problem p=.039.

Conclusion: The findings suggested that the CSCI patient have problem with physical, emotional and functional aspect of swallowing which need to be considered to rehab the swallowing.

Keywords - Quality of life, eating and drinking, cervical spinal cord injury.

Introduction:

Human body is a complex structure that has operated through nervous system. Spinal cord is one of the main parts of these systems that could be injured due to trauma or disease known as spinal cord injury (MacBean et al. 2006). According to World health Organization (WHO) report (2011), worldwide 20-40 people per million of populations acquire spinal injury every year. It is estimate that in the United States (US), each year there are about 11,000 new cases of SCI and there are currently about 250,000 persons alive with SCI, because of lack of improvements in medical care and survival (WHO, 2011). There is no recent study conducted about the prevalence of SCI patient in Bangladesh but in India, 236 people per million of the population has experienced traumatic SCI in every year (Furlan, Krassioukov, Miller, & Trenaman 2014). As per annual report of Center for the Rehabilitation of the Paralysed, (2015) claimed that from 2013-2014 there got admitted 388 patients
with SCI of whom 88.4% were male and 21.6% were female. Different levels of injury in spinal cord cause the impairment and disability to different systems within the body such as musculoskeletal system, digestive, respiratory systems (Abel, Ruf, & Spahn, 2004). In case of cervical level of spinal cord injury the swallowing, voice production and respiratory systems are often affected that may cause different types of Dysphagia, dysphonia besides physical problems (Yue Brodner & Thomas, 2005). Swallowing dysfunction might have effect on the quality of life (Abel, Ruf, & Spahn, 2004). The swallowing problems may trigger some other aspect of a person such as emotional changes, anxiety, depression, risk of aspiration, pneumonia, and in broader sense the restricted social participation (Dahlberg et al. 1997).

The study is aimed to explore the eating and drinking related quality of life first ever in Bangladesh. In order to improving the quality of life is the ultimate goal of speech & language therapist. The study revealed the emotional, physical and functional quality of life related to swallowing difficulties of SCI patients would give us a real impact scenario. It would be used as a view point prior to the treatment plan for person with cervical spinal cord injury patients. These study findings would guide the treatment by considering the multi factors related to the swallowing.

Speech-language therapists (SLPs) play an integral and active role on an inpatient rehabilitation spinal cord injury (SCI) unit. They provide assessment and treatment in the areas of swallowing, motor speech, voice, and communication functioning. (Frempong-Boadu; 2002; Logemann, 1998; Martin, Neary & Diamant, 1997; Dahlberg et al. 1997). The cervical spinal cord injury (CSCI) can result in swallowing difficulties especially oro-pharyngeal dysphasia (MacBean et al. 2006; Hoit et al. 1990). Patient with injury in Cervical-1 & 2 region may have no sensory awareness of their swallowing difficulties. Patient with injury in Cervical- 5 or above region tendency for poor tongue based motion, poor laryngeal movement, consequent reduced crico-pharyngeal opening and air way closure and uni/bilateral pharyngeal wall dysfunction during swallow attempt affects about one-third of all persons with CSCI in either the oral or the pharyngeal phase of swallowing or a combination of both (Yue, Brodner, & Thomas, 2005).Logemann, 1998;). Depending on the associated medical disorders, the population studied, and the diagnostic instrument used, the prevalence of dysphagia varies (Wilkins , Gillies, Thomas & Wagner, 2007; Shin, Yoo, Lee, Goo & Kim, 2011) reported that in their study, 42 of 187 people with cervical spinal cord injury showed signs of swallowing difficulties on bedside swallow evaluation and dysphagia was confirmed in 31 patients after videofluoroscopic swallowing evaluation. A cross sectional study conducted in Germany on swallowing difficulties in people with acute cervical spinal cord injury revealed five levels of dysphagia, where at levels 1 and 2, a severe impairment of swallowing was presented by patients, in level 3 a powerful coughing reflex indicated aspiration, level 4 comprised a laryngeal edema and/or a mild aspiration of fluids only and at level 5 function of larynx was not compromised (Wolf &Meiners, 2003). Dysphagia in CSCI can be associated with prolonged need for respiratory support (Abel, Ruf, &Spahn, 2004). Wolf and Meiners (2003) in reported that among 51 cervical spinal cord injury patients admitted in the intensive care unit because of respiratory insufficiency, 21 patients showed characteristics of severe dysphagia. Another study in Germany conducted by Abel, Ruf, &Spahn (2004) reported that dysphagia was diagnosed in 26 of the 73 patients with cervical spinal cord injury and tracheostomy and orotracheal intubation are associated with dysphagia. A prospective study on patients with quadriplegia conducted by Shem, Castillo, Wong, Chang & Hayner (2012) in USA reported that nearly 40% of individuals with quadriplegia suffer with dysphagia. One of the most common pulmonary complications of dysphagia is aspiration pneumonia (Chaw, Shem, Castillo, Wong & Chan, 2012). A study in South Korea reported that among 121 cervical spinal cord injury patients (106 male and 16 female patients), ten patients showed evidence of aspiration on videofluoroscopic swallow evaluation (Shin,Yoo, Lee, Goo & Kim, 2011). Cervical spine surgery is another cause of dysphagia in CSCI patients. Previous reports have identified dysphagia as a potential complication of anterior cervical spine surgery (ACSs) and that dysphagia occurs in as many as 80% of ACSs patients (Martin, Neary& Diamant, 1997).

Methodology

A descriptive cross sectional study was conducted purposively assigned 45 cervical spinal cord injury admitted patients from Centre for the Rehabilitation of the Paralysed (CRP), Savar, Dhaka. The study conducted for 6 months from May 2017 on both male and female with Cervical Spinal Cord Injured patient those who can communicate independently and currently taking the rehabilitation service from CRP of any age group. The data were collected by
through dysphagia handicap index (DHI) According to Silbergleit, et al, (2012) that is valid and standardized to collect the data regarding eating and drinking related quality of life. The questioner contains 25 questions which was translated accordingly and did piloting prior to the real admistration.

Result

The table 1 shows that the participants demographic information in frequency and percentage. The age range of the participant was 1 years to 80 years and the most of the participants 36% (16 respondents) are aged between above 20 to 35 years. Here 1 to 12 years 2% (1), 12 to 20 years 24% (11), 35 to 50 20% (9), years and 50 to 80 years 18%(8). The gender ration was higher in male 89% (40) and female was11% (5). The living status of the participant represents rural was half of the total participant 51% (23) , semi rural was 33% (15) and the lowest number of the participant was 16% (7). Besides that in case of occupation, number of student was higher 22% (10) and service holder 20%. Along 15% (7) was agriculture, 11% was day labor 9% business, 7% transport staff, 7% carpenter. Surprisingly 9% of the participant had no distinct occupation was 9% (4). 62% (28) was married and 38% (17) was unmarried there were no divorce or widowed participant.

Table1: Distribution of respondents demographics

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
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<tbody>
<tr>
<td>1 day upto 12 Years</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12 Years up to 20 Years</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>20 years up to 35 Years</td>
<td>16</td>
<td>36</td>
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<tr>
<td>35 Years up to 50 Years</td>
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<td>20</td>
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<tr>
<td>50 Years up to 80 Years</td>
<td>8</td>
<td>18</td>
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</tbody>
</table>

<table>
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<tr>
<th>Gender</th>
<th>%</th>
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<tbody>
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<td>Female</td>
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</tr>
<tr>
<td>Male</td>
<td>40</td>
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<th>Living Status</th>
<th>%</th>
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<tbody>
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<td>Urban</td>
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<tr>
<td>Rural</td>
<td>23</td>
</tr>
<tr>
<td>Semi-rural</td>
<td>15</td>
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<tr>
<th>Marital Status</th>
<th>%</th>
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<tbody>
<tr>
<td>Married</td>
<td>28</td>
</tr>
<tr>
<td>Unmarried</td>
<td>17</td>
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</table>

The figure1 has been shown that most of the participant has injured due to road traffic injury 38% and the second most cause was fall from height is 36%. Fall while carry heavy object is 13% which is the third most cause of spinal cord injury. Other causes are fall of heavy object over head is 7% (3), fall while carry heavy object 13% (6), diving in to shallow water 4% (2), Physical assault 2% (1).

Figure-1: Causes of spinal cord injury of the participant.

According to American Spinal Injury Association (ASIA) classification, the participants were classified as complete and in-complete spinal cord injury. The pie chart represents the 69% were complete SCI and 31% were incomplete SCI. The completeness of SCI is marked by bowel bladder control

Figure-2: Participants ASIA impairment level (Complete vs incomplete)

The figure3, the line graph represents the skeletal and neurological level (Complete vs incomplete) of spinal cord injury among all respondents of the study. The neurological level is much higher than the skeletal level in case of all respective points of cervical and dorsal point. 24% have no skeletal level injury and 9% have no evidence of neurological level injury. In case of cervical 2 the skeletal level was 2% and neurological have 9%. In case of cervical 3, the skeletal level was 0% where as the 9% found in case of neurological level. On the other hand the Cervical 4, the skeletal level found 11% where the height number of neurological level found as 60%. The highest number of the skeletal level 29% found in cervical 5, where only 2% neurological level found. In cervical 6 the skeletal level found 25% where as only 4% found in neurological level. After that the cervical & the skeletal level was 7% along with 5% neurological level. In case of dorsal 3, the 2% of the participants had both skeletal level and neurological level injury.
In case of dorsal 7, no skeletal level injury found but only 2% found in neurological level.

In the figure 4, The bar graph shows level of problem faced during feeding of the respondent. Here half of the respondent 51% (23) had no problem faced during feeding and 13% (6) of the respondent had extremely severe problem that is known as profound swallowing difficulty.

Figure 3: Skeletal and Neurological Level (Complete vs incomplete) of spinal cord injury.

Among all the respondent 20% (9) of the respondent was suffering from moderate swallowing problem. Besides that 11% (5) have experienced with very little problem where as only 4% (2) have faced mild problem. There were no moderately severe problem and severe problem found.

Figure - 4: Self perceived overall severity of swallowing difficulty of the respondent.

In the figure 5 the bar graph shows physical swallowing status of the participants according to the dysphagia handicap index where the data illustrates in 3 major category of response these are no problem, sometimes problem and always problem. As per the response the most of the participant complained about dryness of mouth 28.9% always and 26.7% reported sometimes that was the higher percentage in physical problem. Second highest 11.1% of respondent complained always the weight loss and 17.8% sometimes loss the weight. The 11.1% of the respondent both always and sometimes required to swallow again before the food go down. Among all respondent 8.9% always and 17.8% respondents required sometimes the water to wash the food down. Besides that 6.7% respondent experienced always and 24.4% sometimes with couth when drink liquid.

Figure 5: Physical swallowing status of the participant according to Dysphagia Handicap Index.

Similarly incase of solid food 4.4% always and 11.1% sometimes experienced with cough. Always cough up the foods was experienced by 4.4% respondent where as 2.2% had always cough while taking medicine. The 11.1% respondent sometimes and 2.2 always had experienced with strangling sensation when swallow.

In the figure 6 the bar graph shows that functional swallowing status of the participants according to the dysphagia handicap index where the data illustrates in 3 major category of response these are no problem, sometimes problem and always problem. The 18.6% always and 27.9% reported respondents reported sometimes it took longer time to eat a meal than usual time. The 32.6% respondent reported sometimes and 4.7% respondent always took smaller meals than usual due to swallowing problem. The 4.7% respondent always and 20.9% sometimes don’t socialize as much due to swallowing problem. The 27.9% of the respondent sometimes and 2.3% always avoids...
some foods due to swallowing problem.

The respondent always felt depressed and don’t enjoy eating as much as usual due to swallowing problem where as 25.6% did not always enjoy and 14% sometimes felt depressed. The 4.7% respondents always felt embarrassed to eat in public where as only 2.3% felt it sometimes. Among all the participants 18.6% respondents sometimes felt nervous because of swallowing problem.

The Table-2, represents the cross tabulation between overall severities of swallowing difficulty and feeling handicapped because of swallowing problem. Total 21 participant have did not feel handicapped problem where as 24 participants have felt handicapped due to swallowing problem that extends from very little to extreme problem. Chi-Square test which is the statistically significant as Chi value is 16.22 with degree of freedom 8 and the level of significance is .039. It indicates there is strong relationship between overall severities of swallowing difficulty and feeling handicapped because of swallowing problem.

**Discussion**

The total participant was 45 with cervical spinal cord injury those who admitted in Centre for the Rehabilitation of the Paralysed (CRP) indoor spinal cord injury unit. All the participant those who meet the crieteria was selected as participant. Hospital data and personal interview provides several information rather than the assessment. The age of the participant had wide range starts from 18 months to 80 years. Most of the participant is aged between 20 to 30 years of age that was 16 participants out of 45 participants. Mostly the participants were from the middle age. Usually...
spinal cord injury is related to injury and hazardous work. Similar study also found that cervical SCI where the adult age is more prevalent in middle age. The gender of the male participant was higher in than the female. Its may be due to the nature of work. Most the Bangladeshi female are not working outside of home and though they work the always advised to keep safe from heavy physical work. So this could contribute in less number of female SCI. In rural area the female are not usually moves by road traffic and not use to work in high risk activity. The most of the respondent was from rural area (51%) where as 33% from semi rural as it’s similar to other studies conducted in Centre for the Rehabilitation of the Paralysed. Spinal cord injury is mostly prevalent to farmer, day labor and other physical work.

The respondents occupation was mostly student 22% and 20% have job and surprisingly the number of farmer was less 15%. The number of student is higher as the young aged people was participated more. Besides that the marital status of the participant are higher in case of married. This is due to the age of the participant. Most of the participants are aged between 20- 50 years. This age is quite common for marriage.

The causes of injury is higher in case of road traffic accident. Second most prevalent cause also fall from height. As there are several farmers and day labors were in the study. Usually the farmer is higher in other research but here the number of farmers was in second level.

According to the American Spinal Injury Association (ASIA) the respondent was categorized as complete SCI and incomplete SCI. It depends on the bowel bladder control. If the bowel bladder is under control, then the it known as incomplete and complete if no control. As the participants were cervical SCI so the number of Complete SCI is higher that was 69%. Complete SCI is more complicated than the incomplete SCI. As per the study of Wolf & Mainers (2003) the number of the participant was complete SCI was higher than the incomplete SCI.

According to the international standards for neurological classification of spinal cord injury the neurological level was identified of the participant by the doctors and physiotherapist. As per Kirshblum et al. (2011) the higher skeletal level patients are more prone to die due to respiratory distress. Highest rate of survivors of cervical SCI is level 4 to 7. Below that the there are less chance to survive. In this study highest number of survivors in C-5 skeletal level where as the highest neurological level was C-4. According to Wolf & Mainers (2003) Dysphagia is more prevalent to the CSCI patient. The Overall severity of the swallowing difficulties were very interesting as 51% of the respondent reported no problem at all where as 13% reported extreme problem. In between 20% reported moderate problems. It fits with Abele, Ruf, & Spahn. (2004) & Wolf & Mainers (2003) found the same facts in their study. The number of the mild, moderate and severe problem depends on how the person feels. As it was a visual analogue scale so the patient may report their problem in very subjective manner. The surprising fact was 98% could manage normal liquid and 91% can manage normal food but only 51% reported that they have no problem to swallow as a whole with visual analogue scale (VAS). So it indicates the patient is facing the problem in different angel rather than the exact ability to swallow. Some patient may ignore mild or moderate problems while rating the specific liquid and solid food management.

According to Silbergleit, et al, (2012) Dysphagia handicap index (DHI) is specially designed to find out the quality of life of the patient with dysphagia. The DHI contains physical, functional and emotional segment of questioner. Here the respondent of the study complained the dryness of mouth kept always and some times. As per Wolf & Mainers (2003) the dryness of mouth is common to the dysphagia patient.

In this study the physical symptoms was reported as coughing while eating-drinking, needs of fluid to wash out the food, multiple swallow, chock in medicine, strangling sensation in throat and cough up the food. Abel, Ruf, & Spahn. (2004) also found most of the similar complaints from his study. So it would help to determine the treatment of the individual with CSCI patient by considering the physical aspect of swallowing.

Besides that the functional status of swallowing also have affected as characterized by taking longer time to finish the meal than usual time. It was one of the higher prevalent complain from the respondent. Besides that avoiding food, changing the way of swallowing, taking smaller meal, socialization problem, eating less, modify and change the diet chart due to swallowing problem. Abel, Ruf, & Spahn. (2004) have found similar types of problem in his participant. The functional problem is much irritating to the patient with dysphagia that prevents him to actively participate in the day to day life.

On the other hand the emotional swallowing problem defined by the most of the respondent was afraid of choking that may stops breathing because of swallowing problem. Besides that the patient...
also complained feeling embarrassed, depressed, nervous, feel handicapped, angry and didn’t enjoy eating. These are very vital side of the mental process. Wolf & Mainers (2003) found similar complain from his study. So due to the swallowing problem the patient emotionally have affected severely that can’t be measured unless the patient explain it. Over all, here it’s very clear that though the patient reported no problem to the regular food and liquid but the DHI explores quite opposite findings. So it indicates sometime by asking very structured question would not be enough to explore the real life problem that needs further more assessment like DHI. Another correlation between overall severities of swallowing difficulty and feeling handicapped because of swallowing problem was highly significant p=0.039, df=8. It indicates that the severity of swallowing problem is highly correlated with feeling handicapped in case of swallowing issue. So it will help us to reducing the handicapping factors by treating the severity of swallowing problem.

Conclusion

The patients with spinal cord injury have several problems regarding eating and drinking. The quality of life is a major concern of spinal cord injured survivors. The physical, emotional and functional status of swallowing is the ultimate representation of the quality of life. Severity of the swallowing affects wellbeing of a person. The symptoms are coughing, dryness of mouth, aspiration, in ability to manage the liquid and different types of solid foods. Difficulty of swallowing also influences the person as handicapped. Spinal cord injury is highly seen in the young aged person as they have work in risk and hazardous work place. Spinal cord injury is a lifelong condition that can be treated and rehabilitated by multi specialty professionals. Speech & language therapist are also in a major role for the rehabilitation swallowing problem and voice disorders. The study explores very important findings of cervical spinal cord injury patient. The findings would be very helpful for the further planning of treatment and rehabilitation. A complete rehabilitation would include all aspect of the patient’s life. The future study could be placed in community level in final stage of rehabilitation.

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Conflict of Interest

This study did not involve anything that may create any conflict of interest.

Reference