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Swallowing difficulties among traumatic brain injury patients in Bangladesh

Md. Monir Hossain, Nahid Parvez, Ershad Ali

ABSTRACT

Aim: To determine the number of people having swallowing difficulties among traumatic brain injury patient.

Methods: This is a quantitative type of cross-sectional survey study where 117 samples were assigned purposively from Dhaka Medical College Hospital (DMCH). The Swallowing Disturbance Questionnaire (SDQ) was used for the study. Data were analyzed by using descriptive statistical analysis (SPSS = Statistics package for social science) method.

Results: On an average, most of the participants 90.60% (106) were males and other participants 9.40% (11) were females. The maximum numbers of participants 25.6% (30) were in the age range 18–27 years. The majority numbers of participants 33.30% (39) were at secondary level education. The maximum numbers of respondents 22.20% (26) found were day laborer (driver, rickshaw puller, and masons). Most of the participants 63.20% (74) had injuries in 0–2 months earlier. Among 117 participants, 76 (64.95%) participants had no swallowing difficulties (dysphagia) and 41 (35.05%) participants had swallowing difficulties (dysphagia).

Conclusions: Swallowing difficulty (dysphagia) is a common problem in patients with traumatic brain injury (TBI). Researchers explored the prevalence of swallowing difficulty among TBI patients. In this study, among 117 participants most of the participants 90.60% (106) were males and 9.40% (11) participants were females. So, swallowing difficulty is common in TBI patients who are associated with other condition of swallowing. According to SDQ score among 117 participants, (35.05%) participants had swallowing difficulties. So, TBI patients are vulnerable for presence of swallowing difficulties.

Keywords: Swallowing difficulties, Swallowing Disturbance Questionnaire, Traumatic brain injury

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INTRODUCTION

Traumatic brain injuries (TBI) are considered as one of the primary reasons for morbidity, mortality, disability, and socioeconomic loss worldwide [1]. They play a significant role in the deaths of patients under 25 years old and are responsible for one-third of total deaths caused by trauma [2].

Traumatic brain injury is an increasing health problem globally and especially in South-East Asia and

the outcome largely depends on promptness and quality of management [2]. The incident of TBI in the United States was found to be between 180 and 250 per 100,000 of the population per year [3]. Severe and moderate head injuries account for 12–14 per 100,000 and 15–20 per 100,000 population, respectively. The incidence of mild TBI has been reported as 64–131 per 100,000 [4]. Traumatic brain injury causes around 52,000 deaths and 80,000 permanent neurological disabilities all over the globe [4]. Every year around 1.5–2 million people suffer injury and 1 million people die due to TBI in India [1]. This current situation is the leading cause of road traffic injuries that appear (60%) of TBIs followed by falls (20–25%) and violence (10%). Alcohol involvement is known to be present among (15–20%) of TBIs at the time of injury [1]. Swallowing disorders are a common condition after brain injury, and it is estimated that 37–78% of patients have swallowing disorders in the acute phase of the stroke [5]. The rehabilitation needs of brain-injured persons are significantly high and increasing from year to year and TBI presents major health and socioeconomic problem [6]. Swallowing food is a complex activity that involves several stages, including chewing of the food, preparing it to swallow, initiating for the swallow, propelling the food through the pharynx, and passing the food through esophagus [7]. Swallowing difficulty is a common cause of morbidity and mortality following TBI [1]. Despite this, there is a paucity of evidence demonstrating the efficacy of swallowing difficulties management strategies and treatments in this population [8]. These are probably underestimated of the incidence of TBI because they do not include people with TBI who were treated and released from the hospital, those who wanted care from other healthcare settings, and who did not search for treatment [9]. Traumatic brain injury is a condition which is harmful for a person in many ways. It affects many essential domains of life and hampers the quality of life of a person [10]. It is the leading cause of death and disability among people aged between 1 and 44 years. The injury can be mild to severe including permanent brain damage [11]. Traumatic brain injured patients have so many swallowing difficulties and communication problems [12].

Speech and language therapy still now is a new profession in Bangladesh. Traumatic brain injury is the area where the speech and language therapist can work. There is no study that has been conducted on swallowing difficulties in TBI patient; as a result, there are lack of data in this area. By this study, healthcare professionals and other people can know about the swallowing difficulties of TBI patients. And patients' family members also aware of this problem and take proper treatment. Besides, speech and language therapist also identify their working area.

MATERIALS AND METHODS

The investigators conducted this study to identify the number of people having swallowing difficulties in TBI. They used quantitative cross-sectional prospective survey design [13]. Quantitative research is used to establish facts and cross-sectional studies examine a phenomenon at one point of time [14]. The study conducted in Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh. All the people with TBI admitted in Dhaka Medical College Hospital (DMCH). The investigators used purposive sampling from the population who meet the inclusion and exclusion criteria [15]. A structured questionnaire was [swallowing disturbance questionnaire (SDQ)] used as a data collection instrument. There were 15 types of questions on SDQ where Questions 1–5 were related to oral phase and Questions 6–14 were related with pharyngeal phase. Question 15 was related to respiratory infection happened last year [16]. This SDQ was translated into Bengali by the investigators. The English questions were converted into Bengali to ask the participants during the interview [17]. Data were collected from participants by using SDQ. Administration of the SDQ took average 5–10 minutes. If the SDQ score was 12 or higher, the person might have problems in swallowing efficiently and safely. The investigators collected data from the participants through face-to-face interview [16]. The investigators used descriptive statistics for data analysis because descriptive statistics is commonly used to survey data and it requires large quantities of data [15]. Descriptive analysis allows the investigators to describe large number of information with few words. Data were analyzed through the software named Statistical Package for Social Science (SPSS) [18]. Descriptive statistics is commonly used to describe, organize, and summarize data and also used for describing survey data [14, 19]. At first, the investigators took permission from Speech and Language Therapy Department of Bangladesh Health Professions Institute and then the authority of DMCH for data collection. Then the investigators went to the study place with consent form and SDQ. They explained the participants about the purpose of the study and also ensured them that any personal information would not be published anywhere. The investigators used descriptive statistics for data analysis. Data were analyzed through the Statistical Package for Social Science (SPSS) software. The study was approved by the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) (CRP/BHPI/IRB/12/2020/421), the academic Institute of Centre for the Rehabilitation of the Paralysed. Voluntary participation of the participants was considered. Participants were provided with a written consent form. The investigators collected the written permission to conduct the research from the participants. The participants were informed verbally about the aims and objectives of the study and the investigators' role as well. The investigators also assured that the study

would have no harm to the participants physically or mentally because it was a survey and was not involved any experiments. Confidentiality was maintained by the investigators by keeping the name, address, and personal information of the participants and the data were not shared with others except the supervisor of the investigators. The participants were also being informed that they had full rights to withdraw themselves or refuse to answer any question any time during the study.

RESULT

In this study, the investigators' aim was to determine the number of people with TBI who had difficulty in swallowing. So the investigators had collected 117 respondents and also collected data from them. The data were analyzed by descriptive statistics and calculated as percentages and presented by using pie charts, columns, and tables.

Gender of the participants shown in Figure 1.

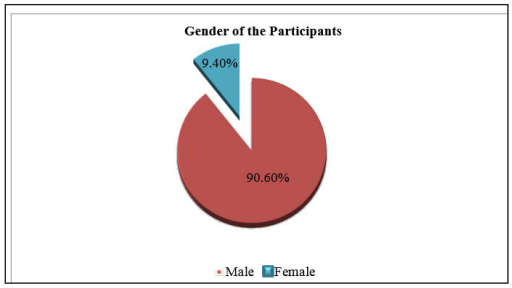

Figure 1: Gender of participants.

The chart shows that most of the participants 90.60% (106) were males and other participants 9.40% (11) were females.

Presence of swallowing difficulties according to SDQ score is shown in Figure 2.

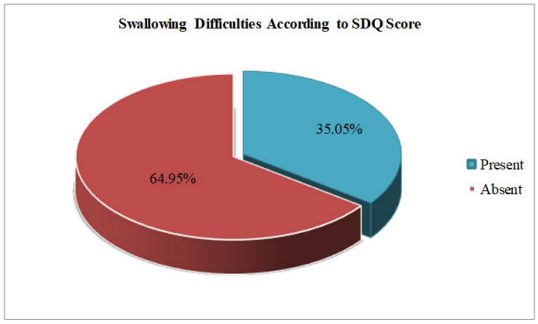

Figure 2: Presence of swallowing difficulties according to SDQ score.

According to SDQ score, this chart shows that among 117 participants, 76 (64.95%) participants had no swallowing difficulties (dysphagia) and 41 (35.05%) participants had swallowing difficulties (dysphagia).

SDQ responses of the participants (Questions 1–14) are shown in Figures 3 and 4.

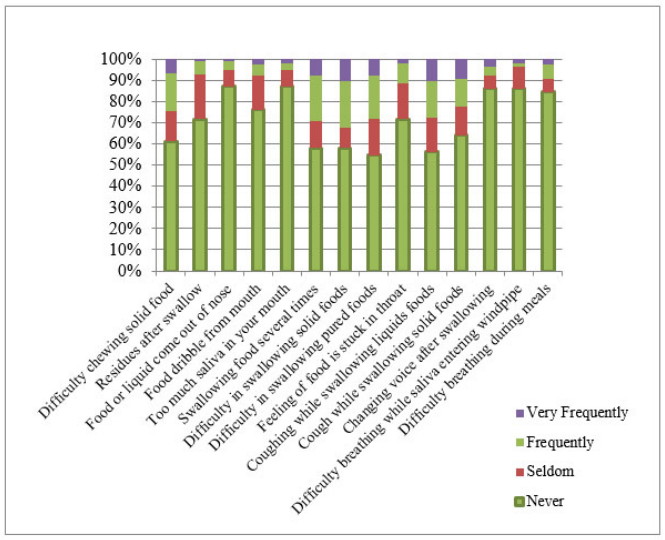

Figure 3: SDQ responses of the participants (Questions 1–14).

In response of Questions 1–5 (oral phase), 17 (14.50%) participants reported seldom difficulty in chewing solid foods, 21 (17.90%) participants reported frequent difficulties, and 8 (6.80%) participants reported that they had very frequent chewing difficulties. 25 (21.40%) participants reported seldom (once a month or less) presence of food residue, 7 (6.0%) reported participants frequent presence of residue, and 1 (0.90%) participants reported very frequent presence of food residue in mouth, cheek under the tongue and palate. 9 (7.70%) participants reported seldom (once a month or less), 5 (4.30%) participants reported frequent (more than 7 times a week), and 1 (0.90%) participant reported regurgitation. 19 (16.20%) participant reported seldom (once a month or less), 6 (5.10%) participants reported frequent (more than 7 times a week), and 3 participants (2.60%) reported dribbling of food. 9 (7.70%) participants reported seldom occurrences of feeling too much saliva in mouth, 4 (3.40%) participants reported frequent occurrence, and 2 (1.7%) participants reported very frequent occurrence of feeling too much saliva in mouth.

In terms of Questions 6–14 (pharyngeal phase), 15 (12.80%) participants reported seldom occurrence (once a month or less), 25 (21.40%) participants reported frequent and 2 (1.70%) participants reported very frequently occurrence of multiple swallowing. 11 (9.4%) participants reported seldom difficulty, 26 (22.20%) participants had frequent (1–7 times a week) difficulty, and 12 (10.30%) participants reported very frequent difficulty (more than 7 times a week) in swallowing solid foods. 20 (17.10%) participants reported seldom difficulty, 24 (20.50%) participants had frequent (1–7 times a week) difficulty, and 9 (7.70%) participants had very frequent (more than 7 times a week) difficulties in swallowing of pure foods.

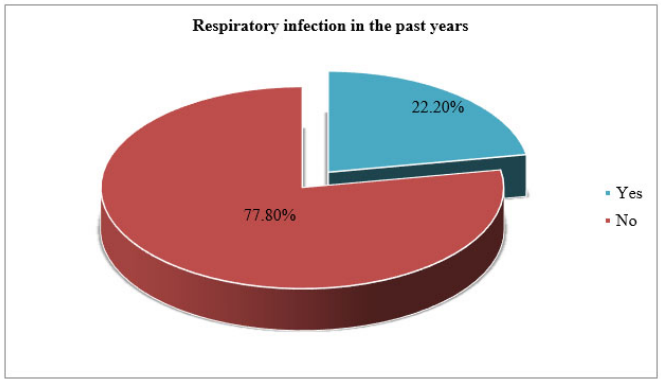

Figure 4: SDQ responses of the participants (Question 15). This chart shows that among 117 participants, maximum 91 (77.80%) participants had no respiratory infection of the past years and 26 (22.2%) participants had respiratory infection of the past years.

Association between age and presence of swallowing difficulties respondents is shown in Table 1.

In this study among 117 participants, swallowing difficulty occurrences were found highest in 12 participants in the age range of 28–37 years and also 10 participants were found swallowing difficulties in the age range of 48–57 years. Association between age and presence of swallowing difficulties was examined by chi-square test. The association was not significant (p>0.05).

Association between gender and presence of swallowing difficulty respondents is shown in Table 2.

Table 1: Association between age and presence of swallowing difficulties

Age versus presence of swallowing difficulties		Presence of swallowing difficulties according to SDQ score		Total
		Absent (<12.5)	Present (≥12.5)	
Age	18–27 years	22	8	30
	28–37 years	16	12	28
	38–47 years	16	3	19
	48–57 years	11	10	21
	58–67 years	7	6	13
	68–above	4	2	6
Total		76	41	117

In this study among 117 participants, swallowing difficulty occurrences were found highest in 37 participants who were males and 4 participants who were females. Association between gender and presence of swallowing difficulties was examined by chi-square test. The association was significant (p>0.05).

Table 2: Association between gender and presence of swallowing difficulties

Gender versus presence of swallowing difficulties		Presence of swallowing difficulties according to SDQ score		Total
		Absent (<12.5)	Present (≥12.5)	
Gender of the participants	Male	69	37	106
	Female	7	4	11
Total		76	41	117

DISCUSSION

This is a cross-sectional study to investigate the swallowing difficulties among TBI patients in Bangladesh. The participants were selected from a specialized hospital. The study identifies demographic characteristics, relationship between demographic characteristics and presence of swallowing problem.

From this study, among the 117 participants most of the participants 90.60% (106) were males and 9.40% (11) were females. Bremare et al. (2016) conducted a study, during the study they also found male participants were more than the female participants [5]. The association between gender and presence of swallowing difficulties was significant.

Most of the TBI patients were within the maximum number participants, 25.6% (30) participants were in the age range of 18–27 years. It was found that 23.90% (28) participants were in the age between 28 and 37 years. Also, 16.20% (19) participants found were in the age between 38 and 47 years. Also, it was found that 17.90% (21) participants were in the age between 48 and 57 years. Limited parentages of 11.10% (13) participants were in the age between 58 and 67 years. Only 5.10% (6) participants were in the age between 68 and 77 years. According to Bremare et al. (2016), people those who are middle-aged are more prevalent to brain injury [5]. The association between age and presence of swallowing difficulties is not significant. In this study most of the participants 63.20% (74) had injury in 0–2 months earlier. It also found that 21.40% (25) participants had injury in 3–5 months earlier. Also, 7.70% (9) had injury in 6–8 months earlier. Limited number of participants 6% (7) had injury more than 1 year ago. And only 1.70% (2) participants had injury in 9–11 months earlier. Bremare et al. (2016) state that the average diagnosis time of the severe brain injury patients is 1–3 months [5]. The association between onset of TBI and presence of swallowing difficulties is not significant.

According to SDQ score, this pie chart shows that among 117 participants, 76 (64.95%) participants had

no swallowing difficulties (dysphagia) and 41 (35.05%) participants had swallowing difficulties (dysphagia).

In SDQ, the response of Questions 1–5 (Oral phase), 17 (14.50%) participants reported seldom difficulty in chewing solid foods, 21 (17.90%) participants reported frequent difficulties, and 8 (6.80%) participants reported that they had very frequent chewing difficulties. 25 (21.40%) participants reported seldom (once a month or less) presence of food residue, 7 (6.0%) reported participants frequent presence of food residue, and 1 (0.90%) participants reported very frequent presence of food residue in mouth, cheek under the tongue, and palate. 9 (7.70%) participants reported seldom (once a month or less), 5 (4.30%) participant reported frequent (more than 7 times a week), and 1 participant (.90%) reported regurgitation. 19 (16.20%) participant reported seldom (once a month or less), 6 (5.10%) participants reported frequent (more than 7 times a week), and 3 participants (2.60%) reported dribbling of food. 9 (7.70%) participants reported seldom feeling too much saliva in mouth, 4 (3.40%) participants reported frequent occurrences, and 2 (1.7%) participants reported very frequent occurrences of feeling too much saliva in mouth.

In terms of Questions 6–14 (pharyngeal phase), 15 (12.80%) participants reported seldom occurrence (once a month or less), 1125 (21.40%) participants reported frequent, and 2 (1.70%) participants reported very frequently occurred once multiple swallowing. 11 (9.4%) participants reported seldom difficulty, 26 (22.20%) participants had frequent (1–7 times a week) difficulty, and 12 (10.30%) participants reported very frequent difficulty (more than 7 times a week) in swallowing solid foods. 20 (17.10%) participants reported seldom difficulty, 24 (20.50%) participants had frequent (1–7 times a week) difficulty, and 9 (7.70%) participants had very frequent (more than 7 times a week) difficulty swallowing pureed foods. 20 (17.10%) participants reported seldom difficulty, 11 (9.40%) participants had frequent (1–7 times a week), and 2 (1.70%) participants reported very frequent (more than 7 times a week) feeling of food stuck in throat. 19 (16.20%) participants had seldom (once a month or less) occurrence, 20 (17.10%) participants frequent (1–7 times a week) occurrences, and 12 (10.30%) participants had very frequent (more than 7 times a week) occurrences of coughing while swallowing liquid foods. 16 (13.70%) reported seldom (once a month or less) occurrence, 15 (12.80%) had frequent (1–7 times a week) occurrences, and 11 (9.40%) had very frequent (more than 7 times a week) occurrences of coughing while swallowing solid foods.

Among 117 participants, maximum 91 (77.80%) participants who had no respiratory infections (pneumonia, bronchitis) of the past years and 26 (22.2%) participants who had respiratory infections (pneumonia, bronchitis) of the past years.

CONCLUSIONS

Swallowing difficulty (dysphagia) is a common problem in people with TBI (TBI) patients. Researchers explored the prevalence of swallowing difficulty among TBI patients. In this study, among the 117 participants most of the participants 90.60% (106) were males and 9.40% (11) participants were females. Most of the participants were males. In this study more than half of the participants 63.20% had diagnosed with TBI in 0–2 months earlier. 17 (14.50%) participants reported seldom difficulty in chewing solid foods, 21 (17.90%) participants reported frequent difficulties, and 8 (6.80%) participants reported that they had very frequent chewing difficulties. 25 (21.40%) participants reported seldom (once a month or less) presence of food residue, 7 (6.0%) reported participants frequent presence of residue. 11 (9.4%) participants reported seldom difficulty, 26 (22.20%) participants had frequent (1–7 times a week) difficulty, and 12 (10.30%) participants reported very frequent difficulty (more than 7 times a week) in swallowing solid foods. 20 (17.10%) participants reported seldom difficulty, 24 (20.50%) participants had frequent (1–7 times a week) difficulty, and 9 (7.70%) participants had very frequent (more than 7 times a week) difficulty swallowing pureed foods. 20 (17.10%) participants reported seldom difficulty, 11 (9.40%) participants had frequent (1–7 times a week) difficulties. So, swallowing difficulty is common after TBI patients associated with other condition of swallowing. According to SDQ score among 117 participants, (35.05%) participants had swallowing difficulties. So, TBI patients are vulnerable for presence of swallowing difficulties.

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Author Contributions

Md. Monir Hossain – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Nahid Parvez – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Ershad Ali – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission
The corresponding author is the guarantor of submission.

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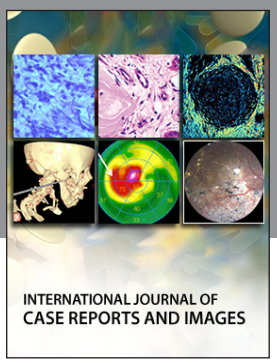
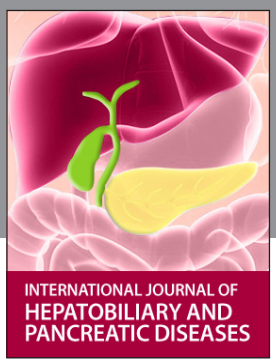
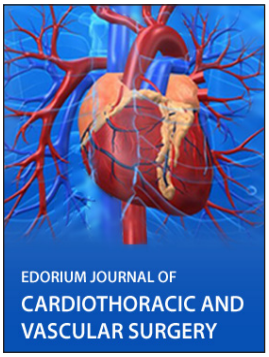
Consent Statement
Written informed consent was obtained from the patient for publication of this article.

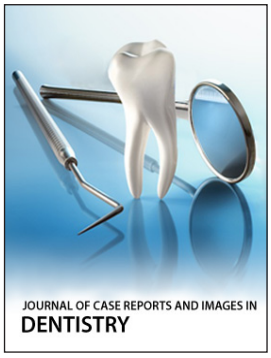
Conflict of Interest
Authors declare no conflict of interest.

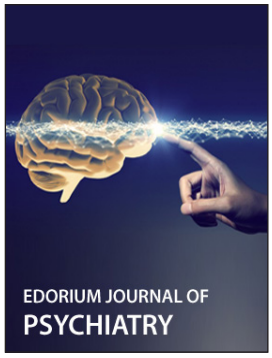
Data Availability
All relevant data are within the paper and its Supporting Information files.

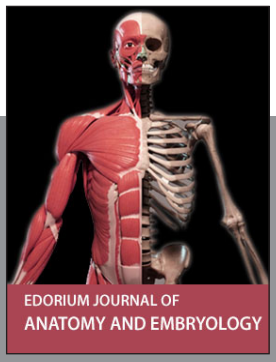


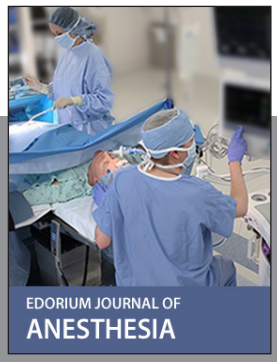












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