Clinical Neurology and Neurosurgery 156 (2017) 41–47

Contents lists available at ScienceDirect

Clinical Neurology and Neurosurgery

journal homepage: www.elsevier.com/locate/clineuro

Interactive eBooks in educating patients and their families about head injury regardless of age☆

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ARTICLE INFO

Article history:
Received 9 February 2017
Received in revised form 3 March 2017
Accepted 4 March 2017
Available online 8 March 2017

Keywords:
Concussion
TBI
Traumatic brain injury
iBook
Education
Neurosurgery
Age
Elderly

ABSTRACT

Objectives: Traumatic Brain Injury (TBI) is a common and debilitating injury that is particularly prevalent in patients over 60. Given the influence of head injury on dementia (and vice versa), and the increased likelihood of ground-level falls, elderly patients are vulnerable to TBI. Educational interventions can increase knowledge and influence preventative activity to decrease the likelihood of further TBI. We sought to determine the efficacy of interactive tablet-based educational interventions in elderly patients on self-reported knowledge.
Patients and methods: Patients and family members, ages 20–90, presenting to a NeuroTrauma clinic completed a pre-survey to assess baseline TBI or concussion knowledge, depending on their diagnosis. Participants then received an interactive electronic book (eBook), or a text-based pamphlet with identical information, and completed a post-survey to test interim knowledge improvement.
Results: All participants (n = 180), regardless of age, had significantly higher post-survey scores ($p < 0.01$, 95% CI). Elderly participants who received the eBook (n = 39) scored lower than their younger counterparts despite higher pre-survey scores ($p < 0.01$, 95% CI). All participants who received the eBook (n = 20, 90) significantly improved on the post-survey ($p < 0.01$, 95% CI) when compared to participants who received the paper pamphlets (n = 10, 31). All participants significantly preferred the eBook ($p < 0.01$, 95% CI).
Conclusions: We demonstrated that interactive educational interventions are effective in the elderly TBI population. Enhanced educational awareness in the elderly population, especially patients at risk or with prior TBI, may prevent further head injury by educating patients on the importance of avoiding further head injury and taking precautionary measures to decrease the likelihood of further injury.

1. Introduction

Traumatic Brain Injury (TBI) is one of the leading causes of death and the leading cause of disability in the United States, costing $9.2 billion in lifetime medical bills and $51.2 billion in annual productivity loss [1]. Multiple head injuries, such as concussions, may result in cumulative neuropsychological deficits. Specifically, military veterans, football players, boxers, and other athletes who have suffered repeated head trauma, even asymptomatic subconcussive hits, have been found to develop a form of progressive tauopathy called chronic traumatic encephalopathy (CTE) [2]. CTE and other forms of trauma induced neurodegeneration manifest in later adult life as alterations in higher cognitive abilities, learning, psychological disorders, and even dementia or Alzheimer's disease (AD) [3–6]. Furthermore, individuals over the age of 75 have the highest rates of TBI-related hospitalization and death.

One of the most effective methods to reduce the prevalence of TBI and concussion is taking precautionary measures to reduce the likelihood of head injury, in particular, through improved public education and awareness [7]. Injury prevention is particularly important in those who have already suffered some form of head trauma, for any head injury increases sensitivity and the risk of receiving future TBIs [8]. As mentioned, individuals also bear a higher risk of suffering another TBI or concussion once they have had their first injury [9,10].

☆ This study was self-funded by the authors.
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http://dx.doi.org/10.1016/j.clineuro.2017.03.003
0303-8467/

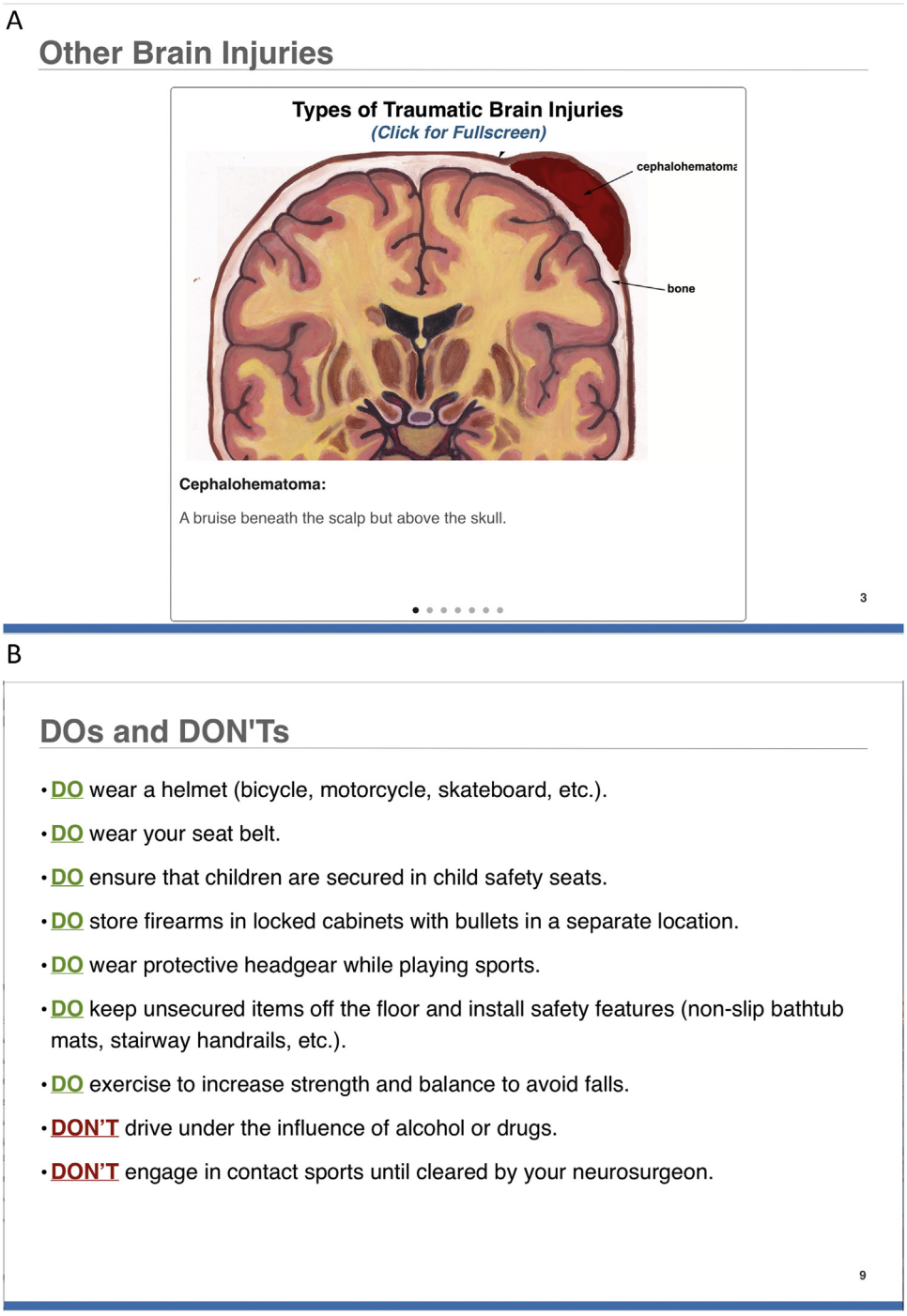

Fig. 1. Screenshots of the TBI eBook [23].

Despite the benefits of patient education in preventing and mitigating illness, patients, particularly those with brain injuries, may have difficulties comprehending their medical condition and any associated medical or surgical interventions. This can be exacerbated in individuals with Alzheimer's disease (AD) or cognitive alterations [11]. Furthermore, individuals with cognitive decline, as in AD, are at an increased risk of developing a TBI or concussion, and thus this patient population can uniquely benefit from enhanced educational interventions [18]. Interactive educational tools have been shown to be particularly useful in enhancing leaning, especially when compared to passive learning through static informational sources [12–14]. Based on previously reported literature supporting the benefits of interactive learning tools, we developed an interactive and user-friendly electronic book (eBook) to educate patients on neurotrauma, namely concussion and TBI (Fig. 1) [15]. In particular, we wanted to examine the effects of age on knowledge acquisition, in order to determine whether educational eBooks are effective in patients older than 60 years of age. Furthermore, we wanted to determine the impact, if any, of a patient's pathology on their knowledge acquisition.