

# The Efficacy of Interactive eBooks in Patient and Family Education on Traumatic Brain Injury and Concussion

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## Introduction

- Surgeons are tasked with educating patients on a variety of conditions & procedures under time constraints and at times, language barriers.
- Educational intervention is important in Traumatic Brain Injury (TBI) since repeat TBI is detrimental to the patient.
- We aimed to (1) assess the utility of interactive eBooks on inpatient education and (2) assess the cross-cultural validity of educational intervention in non-English speakers.
- We hypothesize that interactive educational interventions will improve subject understanding of their condition regardless of their cultural background.

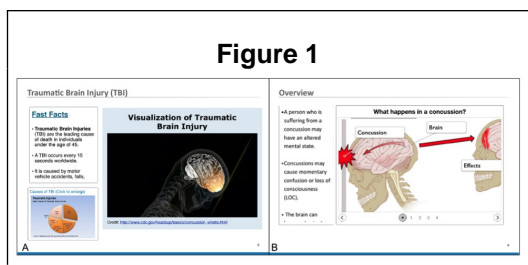
## Methods

- With IRB approval and consent, patients & families in a American College of Surgeons verified Level 1 Trauma Center, (1) completed a pre-survey (5-point Likert scale), (2) viewed an iPad-based eBook on TBI or concussion in their native language [Fig. 1], and (3) completed a post-survey.
- Randomly selected subjects (n = 81) completed supplementary validation questions for survey reliability testing and perceived eBook utility.
- Statistical analysis was performed with IBM SPSS & MATLAB R2016a.
- All T-tests and ANOVA tests were performed at 95% confidence interval.

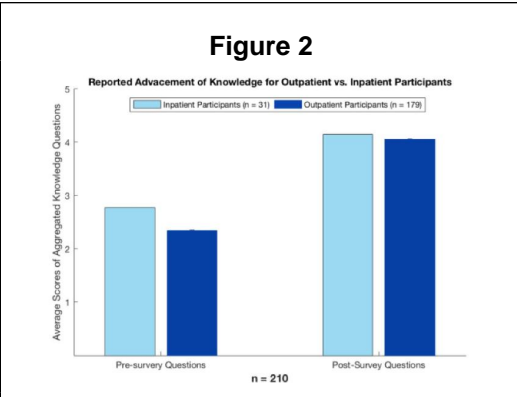
**Table 1**

## Results

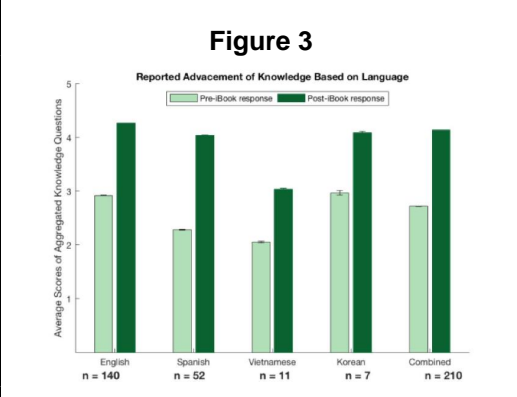
- Cronbach's alpha was .79, suggesting internal survey reliability.
- Post-survey results showed increased outpatient (n=179) post-survey scores (P<.01) [Fig. 2] (average pre- vs post-score: 2.78 vs. 4.15).
- Inpatient subjects (n=31) also improved (P<.01) [Fig. 2] in their post-survey scores (average pre-iBook score: 2.34 vs. average post-iBook score: 4.05).
- Pre-survey results indicate higher baseline knowledge in outpatients vs. inpatients (P<.01); post-survey scores in both groups were similar.
- Subjects improved in self-reported knowledge regardless of language, despite discrepancies between languages [Fig. 3] (P<.01).
- English speakers scored higher than Vietnamese & Spanish speakers on pre- and post-surveys, and higher than non-English speakers at baseline (P<.05).
- Korean speakers scored higher than Vietnamese and Spanish speakers at baseline (P <.05), and higher than Vietnamese speakers following eBook presentation (P<.01).
- Spanish speakers scored higher than Vietnamese speakers on the post-survey (P<.01).



**Figure 1**  
Screenshots of (A) TBI and (B) Concussion eBooks



Paired T-tests show in- and outpatients self-reported knowledge increased (P<0.01). Unpaired T-tests show outpatient pre-survey scores were higher than inpatient scores (P<0.01); while post-survey scores were similar.



Paired T-test analysis shows significant improvements within every language post-iBook presentation (P<0.01). One-way ANOVA shows discrepancies in pre- & post-survey scores between languages.

## Discussion

- Interactive educational interventions improved self-reported knowledge in inpatient and outpatient settings.
- This improvement is cross-culturally valid, indicating a beneficial effect of interactive interventions regardless of language or cultural background.

## Conclusions

- Interactive eBook-based educational interventions on concussion and TBI improved patient knowledge of their condition, and optimized patient-physician communication.
- The beneficial effects of interactive educational interventions are cross-culturally valid, and can help mitigate the language barriers physicians face when educating patients.
- These benefits outweigh costs to equip a neurotrauma center with iPads.

## Learning Objectives

- By the conclusion of this session, participants should be able to:
- Describe the importance of interactive educational interventions in patient education;
- Identify an effective approach to disseminating medical information to enhance patient knowledge.

## References

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