

Using the Health Belief Model to Predict Concussion Reporting Intentions and Behavior

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Introduction

- Historically, the Theory of Planned Behavior has been used to examine concussion reporting behavior.^{1,2,3}
- However, the theory does not account for factors such as an individual's perceived susceptibility, or barriers to reporting their injury, which are included in the Health Belief Model (HBM).⁴
- Therefore, the HBM may be more appropriate in understanding and gaining insight into why individuals report or conceal a concussion.
- The purpose of this study was to determine whether constructs of the HBM predict:
 - Concussion reporting intentions (symptom and concussion reporting) and,
 - Behavior (symptom and concussion reporting)

Methods

- We recruited student-athletes from three universities in the Southeast.
- The HBM survey includes the following sections:
 - Knowledge
 - Perceived susceptibility
 - Perceived severity
 - Perceived benefits of taking action
 - Barriers to taking action
 - Cues to action
- We also asked participants to complete surveys regarding:
 - Concussion reporting intentions (symptom and concussion reporting)
 - Behavior (symptom and concussion reporting)
- The HBM sections and intentions were averaged.
- Responses to both symptom and concussion reporting behavior were used to categorize participants as "reporters" or "non-reporters".
- We conducted four separate multivariate regression analyses for HBM sections to predict:
 - Concussion reporting intentions
 - Two linear-symptom and concussion reporting
 - Concussion reporting behavior
 - Two logistic-symptom and concussion reporting

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Results

- We had a survey completion rate of 27.9%
 - n=330/1183
 - Age=19.9±1.54 years
 - Males: 34.8%, n=115/330
 - Females: 65.2%, n=215/330
- We found the HBM predicted both symptom ($F_{7,318}=4.44, p<0.001, R^2=0.089$) and concussion reporting intentions ($F_{7,318}=11.34, p<0.001, R^2=0.200$) (Table 1).
- A one-point increase in cues to action increased symptom reporting intentions by 0.25 ($\beta=0.25, p=0.016$).
- Additionally, a one-point increase in perceived benefits ($\beta=0.12, p=0.018$), perceived barriers ($\beta=-0.11, p=0.034$), and cues to action ($\beta=0.29, p<0.001$) resulted in a 0.12 increase, 0.11 decrease, and 0.29 increase in concussion reporting intentions, respectively.
- The HBM did not predict symptom ($X^2=5.51, p=0.138, Nagelkerke R^2=0.096$) or concussion reporting behavior ($X^2=5.20, p=0.157, Nagelkerke R^2=0.159$) (Table 2).

Table 1. Health Belief Model multivariable enter linear regression analysis for symptom and concussion reporting intentions.

Criterion Variables	Predictor Variables	Estimates	Standard Error	P-Value
Symptom Reporting Intentions ($F_{7,318}=4.44, p<0.001, R^2=0.089$)				
	Constant	3.50	0.94	0.000
	Survey Administration Mode, Educational Module	-0.20	0.15	0.183
	Knowledge	-0.06	0.13	0.625
	Perceived Susceptibility	0.07	0.06	0.271
	Perceived Severity	0.07	0.07	0.337
	Perceived Benefits	0.11	0.08	0.143
	Perceived Barriers	-0.11	0.08	0.151
	Cues to Action	0.25	0.10	0.016*
Concussion Reporting Intentions ($F_{7,318}=11.34, p<0.001, R^2=0.200$)				
	Constant	3.81	0.62	0.000
	Survey Administration Mode, Education Module	-0.12	0.10	0.219
	Knowledge	0.00	0.08	0.991
	Perceived Susceptibility	0.03	0.04	0.396
	Perceived Severity	0.03	0.05	0.612
	Perceived Benefits	0.12	0.05	0.018*
	Perceived Barriers	-0.11	0.05	0.034*
	Cues to Action	0.29	0.07	0.000*

*Indicates significance at $\alpha<0.05$ level. Note: The reference category for survey administration mode was short message service.

Table 2. Health Belief Model multivariable enter logistic regression analysis results for symptom and concussion reporting behavior.

Criterion Variables	Predictor Variables	Unstandardized Beta	Standard Error	Exp(B)	P-Value
Symptom Reporting Behavior ($X^2=5.51, p=0.138, Nagelkerke R^2=0.096$)					
	Constant	-2.74	2.80	0.07	0.328
	Perceived Benefits	-0.15	0.26	0.86	0.564
	Perceived Barriers	0.56	0.27	1.76	0.035*
	Cues to Action	0.23	0.38	1.26	0.542
Concussion Reporting Behavior ($X^2=5.20, p=0.157, Nagelkerke R^2=0.159$)					
	Constant	-10.70	5.20	0.00	0.040
	Perceived Benefits	-0.16	0.39	0.85	0.676
	Perceived Barriers	0.44	0.38	1.55	0.253
	Cues to Action	1.55	0.75	4.71	0.038*

*Indicates significance at $\alpha<0.05$ level. *Indicates individual predictor significance, however overall model was not significant. Note: Only significant predictors variables of reporting intentions were included in the models to prioritize variables.

Conclusions

- Cues to action, or a "trigger" to perform action was a predictor of concussion reporting intentions and behavior.
- To increase concussion reporting, clinicians should:
 - limit perceived barriers such as dispelling that reporting a concussion would let the student-athlete's teammates down
 - increase perceived benefits such as positive view towards long-term health, but most importantly
 - encourage stakeholders to cue student-athletes to act (i.e., discuss with a health care professional) if faced with a suspected concussion.
- Future research should examine if the HBM predicts concussion reporting behavior in other populations such as pediatric or professional athletes.

References

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