

Paramedic student performance on the Paramedic Readiness Exam 4 (PRE4) improves with exposure to higher acuity patients.

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Introduction

Paramedic program directors struggle with balancing the limited time available to paramedic students in clinical and field learning experiences with accomplishing required objectives and allowing for broad exposure to differing patient types. Previous research efforts have examined student performance (1-3), however, there is a paucity of research that specifically used Fisdap™ data to explore the relationship between student performance and exposure to high acuity patients (2).

While studies have explored student performance, there is a gap in the literature demonstrating a need to examine the influence of patient acuity reported and students' cognitive performance. Loken et al. analyzed prior Fisdap™ data and stated that "paramedic students exposed to 10% of all calls with high acuity patients have an 8.7% increased likelihood of passing the summative exam compared to students exposed to less than 5% high acuity calls" (4). This is supported by another Fisdap™ study that identified ALS Case attendance with student performance (2), however that study did not specifically identify a correlation between ALS cases and patient acuity.

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Aim

The purpose of this study was to examine how the student's exposure to perceived high-acuity patients relates to cognitive performance.

The null hypothesis is: there is no significant relationship between paramedic student cognitive performance and exposure to student perceived higher patient acuity. The alternative hypothesis is: there is a significant relationship between paramedic student cognitive performance and exposure to self-identified higher patient acuity

Method

A retrospective review of 554,546 student records from Fisdap™ (Minneapolis, MN 55402) an online repository of Emergency Medical Services (EMS) student tracking was completed from 2014 to 2018. Participants were included in this analysis if they completed a first attempt at the PRE4 and had completed clinical and field patient contacts prior to their exam attempt. The outcome variable was pass/fail on the PRE4. The dichotomized pass/fail was determined by Angoff standard setting. The cut score for the PRE4 is 73% with a 97% positive predictive value for passing the NREMT Paramedic examination.

The primary independent variables were exposure to patients by perceived criticality as a proxy for patient acuity.

Patient acuity was defined as red, yellow, green, or black and determined by student perception of patient condition with the following criteria as defined by the Fisdap (™) database in Table 1.

Table 1. Fisdap™ patient criticality criteria

Patient Criticality	Definition
Green	Not critical, ambulatory
Yellow	Illness/Injury not yet life-threatening
Red	Critical, life-threatening illness/injury
Black	Dead on arrival

Results

A logistic regression model estimates the likelihood of passing the PRE4 was 1.07 (95% CI 1.02-1.12, p=0.003) for perceived Red criticality when compared to all other levels of criticality. Further analysis explored the differences observed between this association in the clinical and field settings. The likelihood of passing the PRE4 was 1.18 (95% CI 1.17-1.19, p=0.000) for perceived Red criticality patients in the field setting and the likelihood of passing the PRE4 was 0.84 (95% CI 0.83-0.85, p=0.000) for perceived Red criticality patients in the clinical setting.

Table 2. Perceived Criticality

PASS4	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interva
criticality_green	1.003498	.023535	0.15	0.882	-.9584141 1.0507
criticality_yellow	.9936054	.0233103	-0.27	0.785	-.9489525 1.0403
criticality_red	1.072923	.0257683	2.93	0.003*	1.023588 1.1246

Table 3. Red Criticality in Field Settings

PASS4	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interva
shift_field	1.181747	.0047084	41.91	0.000*	1.172554 1.1910

Table 4. Red Criticality in Clinical Settings

PASS4	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interva
shift_clinical	.8462051	.0033715	-41.91	0.000*	.8396228 .8528

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Discussion

This study investigated retrospective data from the Fisdap™ repository regarding student experience and how that experience correlates to cognitive performance on the PRE4. The study provides insight into educational opportunities, however is limited in its retrospective nature. Further limitations include the lack of detail in this study on what role the student performed in the clinical team, team member or team leader; as well as the lack of data on acute patient frequency. These limitations provide future research directions both retrospectively using Fisdap™ data as well as through prospective observational studies.

Conclusion

This study suggests that there is a positive correlation between exposure to high acuity patients in field placements and performance on the PRE4. Conversely this study suggests a negative correlation between exposure to high acuity patients in clinical placements and performance on the PRE4. These findings suggest a need for further research while highlighting that paramedic programs should consider placing greater emphasis on field placements with reduced emphasis on clinical placements for paramedic students.