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Impact of a Mobile Device-Based Clinical Decision Support Tool on Guideline Adherence and Mental Workload Among Trainees and Attending Physicians

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Impact of a Mobile Device-Based Clinical Decision Support Tool on Guideline Adherence and Mental Workload Among Trainees and Attending Physicians

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IRB Number: 17030175

Describe role of Submitting/Presenting Trainee in this project (limit 150 words): The submitting trainee conceived of the idea for the research with the help of her mentors. She took the lead in writing the protocol, recruiting participants, designing the study, performing the simulations, and analyzing the data for the study. She has written a manuscript on data related to the study (previously presented) and is planning to work on a manuscript regarding the data submitted in this abstract.

Background, Objectives/Goal, Methods/Design, Results, Conclusions limited to 500 words

Background: Electronic clinical decision support (ECDS) tools provide a means to disseminate medical knowledge and evidence-based medical care recommendations. ECDS tools may be especially useful due to the rapidly expanding medical knowledge. They may also be useful for young or less experienced physicians. There has been little assessment of the impact of ECDS tools on mental workload and performance among physicians at various levels of training. PedsGuide is a mobile ECDS tool (app) that was utilized in a national practice standardization project focused on febrile infant management.

Objectives/Goal: The objective of this study was to evaluate the individual-level impact of PedsGuide on febrile infant clinical decision-making and cognitive workload among attending and resident physicians to determine if there is a difference. We hypothesized that improved adherence to febrile infant guidelines and decreased cognitive workload with use of ECDS tool vs. without use of ECDS tool would be observed in both trainee and attending physicians.

Methods/Design: A counterbalanced, prospective, cross-over simulation study was performed among attending physicians with at least three years of experience and trainee physicians. Participants performed simulated febrile infant cases with use of PedsGuide and with standard reference text. These cases were graded against evidence-based recommendations and scores were compared between conditions among trainee and attending physicians. Cognitive load was assessed using the NASA-Task Load Index (NASA-TLX), which assesses mental, physical, temporal

demand, effort, frustration, and performance. NASA-TLX scores were compared between conditions by physician level. All comparisons were conducted using t-tests with a Bonferroni-corrected alpha-level of 0.01.

Results: A total of 32 participants completed the study. Scores on febrile infant cases using PedsGuide were significantly higher compared to standard reference for trainee (92% vs. 67%, $p=0.002$), but not attending (83% vs. 78%, $p=0.155$) physicians (Figure 1). NASA-TLX scores were significantly lower (i.e. more optimal) with use of PedsGuide vs. standard reference for trainees but not for attending physicians (Figure 2).

Conclusions: Use of ECDS led to improvement in case scores and decrease in cognitive load amongst physicians; however, the impact was primarily observed amongst trainee physicians. This study demonstrates that use of an ECDS tool can be especially helpful to a trainee physician both in adherence to recommendations as well as in decreasing mental workload.

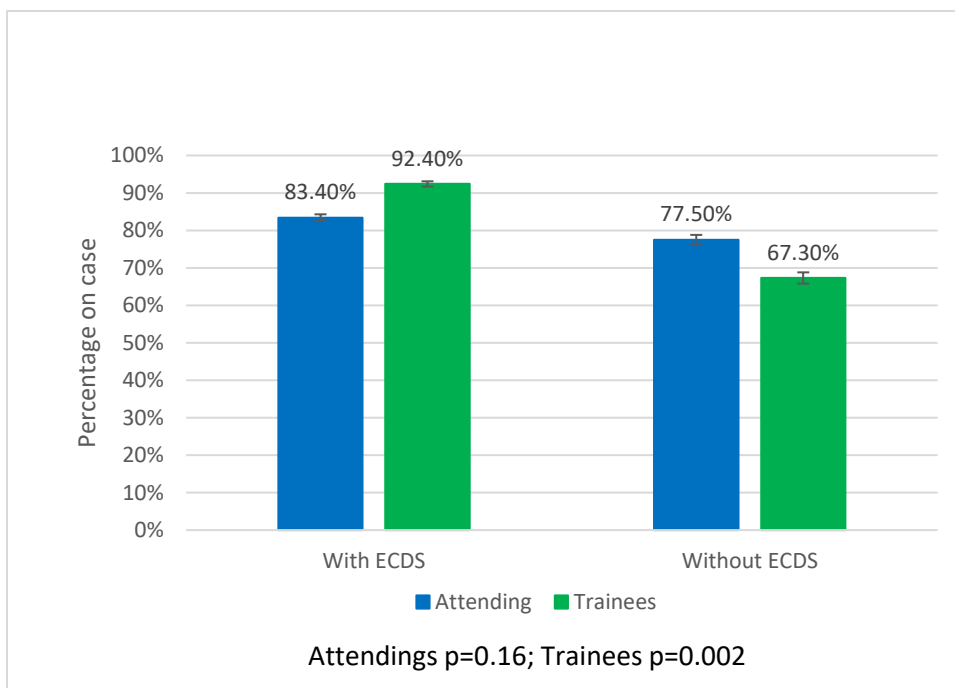


Figure 1. Mean scores on cases with and without ECDS attending vs. trainee physician.

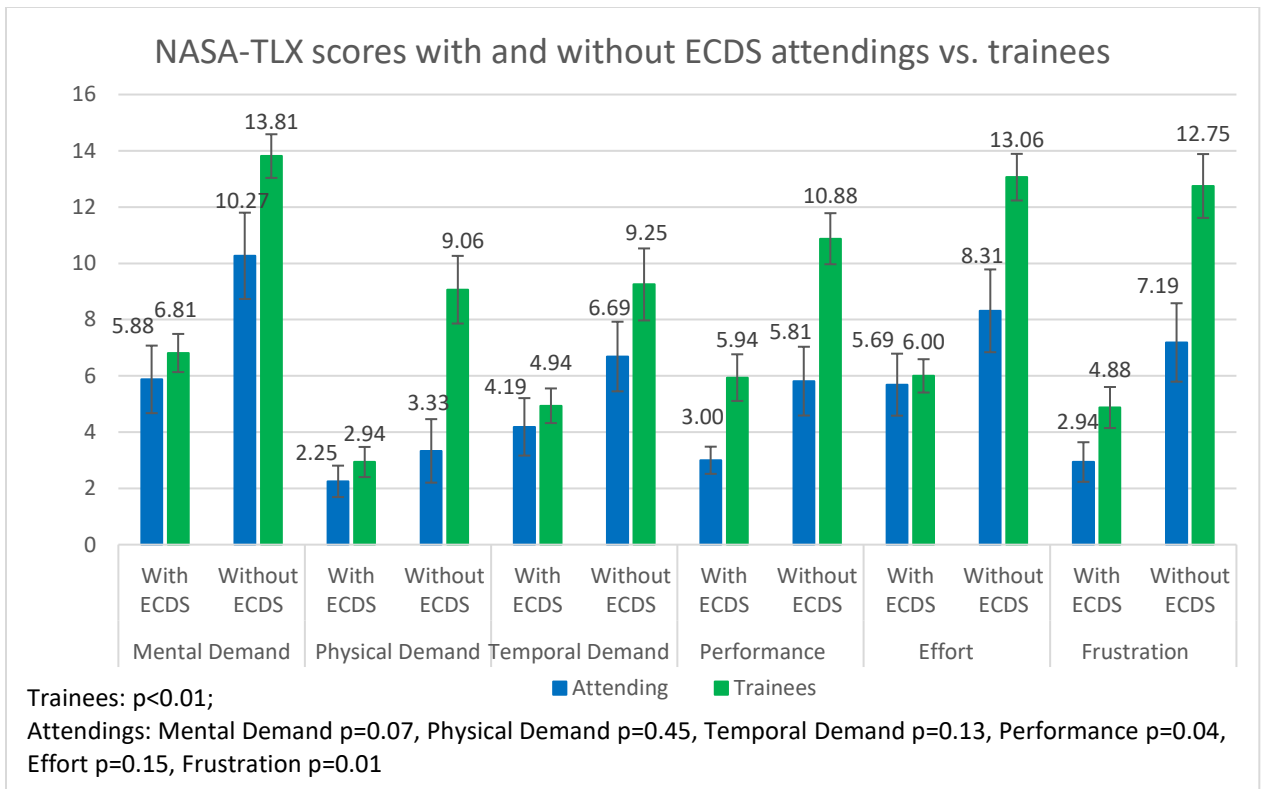


Figure 2. NASA-TLX scores with and without ECDS attending vs. trainee physicians.