"Operation not needed" is defined as patients who were safely discharged without an operation or patients who had an operation, but nothing was found. The distribution of data samples for prediction task 2 is 37 operation not needed cases and 38 operation of benefit cases. An experienced surgical resident from UPMC manually segmented 3D PI ROIs from the CT scans (5 mm Axial cut) for each case. The most concerning ~10-15 cm segment of bowel for necrosis with a 1 cm margin was selected. A total of 7 slices per patient were segmented for consistency. For both prediction task 1 and prediction task 2, we independently completed the following procedure for testing and training: 1.) Extracted radiomic features from the 3D PI ROIs that resulted in 99 total features. 2.) Used LASSO feature selection to determine the subset of the original 99 features that are most significant for performance of the prediction task. 3.) Used leave-one-out cross-validation for testing and training to account for the small dataset size in our preliminary analysis. Implemented and trained several machine learning models (AdaBoost, SVM, and Naive Bayes). 4.) Evaluated the trained models in terms of AUC and Accuracy and determined the ideal model structure based on these performance metrics. RESULTS/ANTICIPATED RESULTS: Prediction Task 1: The top-performing model for this task was an SVM model trained using 19 features. This model had an AUC of 0.79 and an accuracy of 75%. Prediction Task 2: The top-performing model for this task was an SVM model trained using 28 features. This model had an AUC of 0.74 and an accuracy of 64%. DISCUSSION/SIGNIFICANCE OF IMPACT: To the best of our knowledge, this is the first study to use radiomic-based machine learning models for the prediction of tissue ischemia, specifically intestinal ischemia in the setting of PI. In this preliminary study, which serves as a proof of concept, the performance of our models has demonstrated the potential of machine learning based only on radiomic imaging features to have discriminative power for surgical decision-making problems. While many non-imaging-related clinical factors play a role in the gestalt of clinical decision making when PI presents, we have presented radiomic-based models that may augment this decision-making process, especially for more difficult cases when clinical features indicating acute abdomen are absent. It should be noted that prediction task 2, whether or not a patient presenting with PI would benefit from an operation, has lower performance than prediction task 1 and is also a more challenging task for physicians in real clinical environments. While our results are promising and demonstrate potential, we are currently working to increase our dataset to 300 patients to further train and assess our models. References DuBose, Joseph J., et al. "Pneumatosis Intestinalis Predictive Evaluation Study (PIPES): a multicenter epidemiologic study of the Eastern Association for the Surgery of Trauma." Journal of Trauma and Acute Care Surgery 75.1 (2013): 15-23. Knechtle, Stuart J., Andrew M. Davidoff, and Reed P. Rice. "Pneumatosis intestinalis. Surgical management and clinical outcome." Annals of Surgery 212.2 (1990): 160.

3032

MKit: Pilot Results of Primary Prevention Sexual Violence WebApp

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OBJECTIVES/SPECIFIC AIMS: Sexual violence (SV) is a public health crisis. High rates of SV are observed among college-age youth, yet holistic interventions are currently lacking. The purpose of this study was to conduct a pilot feasibility and acceptability test of a WebApp, MKit, which translates a clinical life skills approach to influence the health and well-being of university students. METHODS/STUDY POPULATION: We randomized two residence halls at a public university in the Midwest into a control group (n=139) that received typical university programming around SV and healthy relationships, or an intervention group (n=122) receiving MKit and the usual SV programming. We used online surveys to assess acceptability, feasibility, and usability at 3- and 5-months. Focus groups were conducted with a subsample of participants at 5-months to further investigate safety. RESULTS/ANTICIPATED RESULTS: The mean number of uses of MKit was 2.84 in a 5-month period. The majority of intervention participants endorsed the acceptability and usability of MKit as easy to use, well integrated, accessible, and easy to learn quickly. There were no concerns regarding personal safety. DISCUSSION/SIGNIFICANCE OF IMPACT: MKit provides a promising resource platform to deliver messages regarding healthy relationships and SV within the university context. By delivering SV-related content through a holistic life skills approach, MKit may offer new opportunities to reach and engage a wide range of students on how to foster healthy relationships.

3086

Virtual World-based Cardiac Rehabilitation to Promote Healthy Lifestyle Among Cardiac Patients

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OBJECTIVES/SPECIFIC AIMS: Our aim was to assess the feasibility and acceptability of a VW-based cardiac rehabilitation (CR) program (Destination Rehab) as an extension of a face-to-face conventional CR program. We hypothesized that a VW-based CR program could be successfully implemented as an extension of conventional CR and would have high acceptability among cardiac patients. METHODS/STUDY POPULATION: We recruited 30 adult cardiac patients (10/site) hospitalized at Mayo Clinic Hospitals in Rochester, MN, Jacksonville, FL or Scottsdale, AZ with a diagnosis for CR (eg, acute coronary syndrome (ACS), heart failure, elective percutaneous coronary intervention (PCI)). Other inclusion criteria included at least 1 modifiable, lifestyle risk factor target: sedentary lifestyle (< 3 hours physical activity (PA)/week), unhealthy diet (< 5 servings fruits and vegetables/day) or current smoking (>1 year). Patients participated in an 8-week, health education program using a VW platform from a prior proof-of-concept study and provided intervention usability, usefulness and satisfaction feedback. We assessed cardiovascular (CV) health behaviors (diet, PA) and risk factors (eg, blood pressure (BP), lipids) at baseline and immediate post-intervention. RESULTS/ANTICIPATED RESULTS: Among 30 patients enrolled (mean age; 59 years; 50% women; 65% <college graduate; 32% annual household income <$50,000), 28 (98%) completed the study. The majority (64%) were enrolled in conventional CR with a high session completion rate (median 36 sessions, interquartile range 8-36). The most common CR indication was PCI (68%). There were statistically significant improvements in PA from baseline to post-intervention: vigorous PA, +10.7 (SD 11.7) minutes/day (p = 0.05) and flexibility exercises +0.9 (SD 0.9) days/week for men (p=0.05). There were favorable trends in risk factors: systolic BP

(−6.8 mmHg, SD 29.8), total cholesterol (−31.6 mg/dL, SD 46.2) and LDL (−26 mg/dL, SD 44.8) from baseline to post-intervention, although not statistically significant. The majority reported that they would continue to use VW as a resource (76%) and agreed/strongly agreed that the program improved their heart health knowledge (86%) and assisted with adapting healthier lifestyle (100%). Overall, the VW CR program received a rating of 8 (scale 0-10). DISCUSSION/SIGNIFICANCE OF IMPACT: VW-based CR program is a feasible, highly acceptable and innovative platform to influence health behaviors and CV risk and can increase accessibility to disadvantaged populations with higher CVD burdens.

What percent of unnecessary ED visits for chronic conditions can be reduced by extant telemedicine devices?

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OBJECTIVES/SPECIFIC AIMS: This study will elucidate what percent of unnecessary ED visits for chronic conditions can be reduced by extant telemedicine devices, and which telemedicine devices can yield the greatest reduction in unnecessary ED visits for chronic conditions. METHODS/STUDY POPULATION: We intend to use the Nationwide Emergency Department Sample (NEDS) to estimate the percent of ED visits, with a chronic condition as the principal diagnosis, were only evaluation and management services were rendered. The NEDS is the largest publicly available, all-payer ED database, providing national estimates of ED visits. The NEDS contains information on patient demographics, principal diagnosis (captured by ICD-9-CM codes and defined as the main reason for bringing the patient to the hospital), and procedure codes using Current Procedural Terminology, Fourth Edition (CPT-4). Patients with a chronic condition will be identified using Chronic Condition Indicator developed by the Agency for Healthcare Research and Quality and, from them, patients who only received "evaluation and management" services will be extracted using the CPT-4 codes 99281–99283 and G0380–G0383. Then using our previously developed database, wherein FDA-approved OTC medical devices were allied to chronic conditions by applying the transitive property of equality between telemedicine devices – measurement and measurement – conditions pairs, we will elucidate what percent of unnecessary ED visits for chronic conditions which can be reduced by extant telemedicine devices. RESULTS/ANTICIPATED RESULTS: We anticipate multiple OTC telemedicine devices will be necessary to evaluate and manage common principal conditions. DISCUSSION/SIGNIFICANCE OF IMPACT: Telemedicine is seen as a potentially powerful tool for improving healthcare and reducing cost. UnitedHealthcare, the largest US insurance provider, has partnered with Doctors on Demand, the largest players in the telemedicine app space, and other app-based telemedicine services to provide on-demand access to physicians. However, to reach the full potential of telemedicine, and more specifically towards reducing unnecessary ED visits for chronic conditions, telemedicine services need to include capabilities that will allow for the evaluation and management of chronic conditions. This study is a pragmatic first step towards understanding what telemedicine devices would best augment existing telemedicine services to reduce unnecessary ED utilization.

Education/Mentoring/Professional and Career Development

A Systematic Review of Research Competency Assessments for Clinical Researchers

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OBJECTIVES/SPECIFIC AIMS: The purpose of this study was to summarize the existing literature on clinical research competencies and determine what competency assessments currently exist. We also wished to assess which competencies should be included in a research competency assessment tool and to evaluate the validity of current competency assessments. We also examined whether these competency assessments can be used for the purposes of formative and summative evaluation. METHODS/STUDY POPULATION: Prior to conducting our search of the literature, we first compiled a list of search terms (e.g., clinical, research, training, competencies) that could be used to locate articles. We then entered these search terms, in various combinations, on several relevant databases. We evaluated abstracts of the articles revealed by this search to determine whether they met three criteria. The first criterion was that the subjects of the article must be clinical investigators or clinical investigators in training. Relevant disciplines included medicine, public health, nursing, pharmacy, dentistry, and other related fields. The second criterion was that articles should focus on research-based (as opposed to clinical) skills. The last criterion was that research-based competencies (or related terms like skills, abilities, mastery, knowledge) must be assessed in some way. If the abstract suggested that the article met all three criteria, the full article was retrieved and analyzed in-depth. To identify articles that eluded literature search, we then examined the reference section of these articles and examined articles that cited these articles. When no additional articles could be located, the search for articles stopped. Once a pool of potentially eligible articles was identified, the articles underwent peer review by several researchers experienced with clinical research and competency-based education and assessment. Articles that were unanimously judged to meet the criteria were included in the systematic review. RESULTS/ANTICIPATED RESULTS: Approximately 75 articles were selected and reviewed for eligibility. After peer review, we found that only a small fraction of these articles met our criteria for inclusion in the systematic literature review. Our preliminary findings suggest that there are few assessments of clinical research competency and that many of these assessments are poorly validated. DISCUSSION/SIGNIFICANCE OF IMPACT: The findings of the present study suggest that the validation methods used thus far are limited and so the validity of many of these assessments is effectively unproven. Future research on assessments of clinical research competency ought to address these limitations by sampling clinical researchers, using more rigorous validation methods, and by confirming hypothesized factor structures in new samples. The use of better-validated instruments may enhance measurement of trainees' knowledge and skill levels for the purposes of formative and summative assessment.