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Decision-tree analysis for predicting first-time pass/fail rates for the NCLEX-RN in associate degree nursing students

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Success in the nursing program is the first step to qualify for taking the National Council Licensure Examination-Registered Nurse (NCLEX-RN). The NCLEX-RN evaluates the knowl¬edge and skills of nursing graduates for being new nurses. Pass¬ing the NCLEX-RN in the United States is a critical outcome of the nursing program. Little evidence shows the use of decision-tree algorithms in identifying predictors and analyzing their associations with pass and fail rates for the NCLEX-RN® in associate degree nursing students. This longitudinal and retrospec¬tive cohort study investigated whether a decision-tree al¬gorithm could be used to develop an accurate prediction model for the students' passing or failing the NCLEX-RN. This study used archived data from 11 cohorts (N=453) of associ¬ate degree nursing students in a selected program in the USA. Collected retrospective archived data included demographic information, pre-admission GPA, scores on the Test of Essential Academic Skills (TEAS) examination for entering into the nursing school, each semester's cumulative GPAs for nursing courses, ATI's RN Comprehensive Predictor scores, and pass or fail for the first attempt on the NCLEX-RN. Any identifying information was removed before data entry and analysis. The Chi-Squared Automatic Interaction Detection (CHAID) analysis of the decision trees module was used to examine the effect of the collected predictors on passing/failing the NCLEX-RN. The CHAID is an analysis that can use a series of merging, splitting and stopping steps based on user-specified criteria to determine how independent variables best combine to explain the outcome in a given dependent variable. The actual percentage scores of Assessment Tech¬nologies Institute®'s RN Comprehensive Predictor® accu¬rately identified students at risk of failing. The classification model correctly classified 92.7% of the students for passing. This study applied the decision-tree model to analyze a sequence database for developing a prediction model for early remediation in preparation for the NCLEX-RN.

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