Comparing the Level of Comprehension of Diabetes Education Materials Between Five Electronic Health Records

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* Abstract

* Background and Significance: 3 million people a year require lower extremity amputations (LEA) related to complications from diabetes. This number has decreased since the 1980s because of health promotion initiatives. However, multiple electronic education sources may be written above recommended reading and comprehension levels. Lack of comprehension of health information can directly impact the ability of patients with diabetes to take action on foot care recommendations to prevent LEA.

* Framework: Malcom Knowles theory of adult learning, or Androgogy, introduced the idea that adults learn differently than children and learning must meet the learner where their needs are. This framework outlines the transaction of learning by focusing on the knowledge to be attained and addresses the learner’s needs.

* Objective: The purpose of this study was to compare the reading level, understandability and actionability, or comprehension, of diabetic foot care patient education materials available from five electronic health records (EHRs). These five EHRs include NextGen, eClinicalWorks, Cerner, Epic, and MEDITECH.

* Methods: Five registered nurses, independently assessed the reading level, understandability and actionability (or comprehension) of diabetic foot care patient education materials available from five popular EHRs using the Patient Education Materials Assessment Tool (PEMAT) and the Simple Measure of Gobbledygook (SMOG). Each registered nurse was blinded from one another’s scores. The scores were combined and analysis using SPSS technology.

* Results: PEMAT and SMOG tools have established reliability and validity, verified with Cronbach’s alpha from .98-.99. Repeated measures ANOVA with Tukey's LSD post hoc comparisons determined differences (p<.05) existed in reading level, understandability and actionability among the five sets of patient education materials. The actionability scores of MEDITECH were significantly higher (70 +/- 3.33) than NextGen (60 +/- 0.00) and eClinicalWorks (64 +/- 4.00).

* Conclusion: Among the five EHRs appraised, there were differences between the reading level, understandability, and actionability. MEDITECH scored highest in actionability and within an acceptable reading level rendering it most favorable for patient education.

* Discussion: Providers should be aware EHR generated education may not coincide with patient and/or caregiver abilities to comprehend and act. Providers may be required by a facility to utilize EHR generated educational materials to meet meaningful use standards but, may need to augment with supplemental sources of patient education.
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Abstract Summary:
Five electronic health record (EHR) generated patient education materials were compared to assess the reading level and comprehensibility for patients with diabetes to take action on foot care to prevent lower extremity amputation. Analysis indicated significant differences between education offered and comprehension enough to take action toward health.

Content Outline:

- Introduction
  - The number of people diagnosed with diabetes is growing and the complications they face are serious, like lower extremity amputation. Providers supplement in-office education by offering electronic health record generated education to meet patient learning needs and meet meaningful use standards. As technology and disease rates increase, it is important to ensure readable and comprehensible information patients can act on are being generated by EHRs. They should continue to meet standards to support the patient in their ability to comprehend and act for their or their family’s health to keep the risk for LEA as a complication of diabetes low.
    - By the year 2030 diabetes diagnoses and costs associated with diabetes will increase by at least 50%
    - Example LEA is prevalent and listed in 6 of the most common reasons for hospitalizations among those with diabetes
    - Meaningful use advancing care information initiatives are becoming standards for reimbursement
  - Body
    - Lower extremity amputation numbers remain high despite identified those risk factors possible because of the influence of a person’s education level
      - Education level is a predictor of increased diabetes risks
        - Education level may have correlations to poor outcomes due to lack of ability to comprehend health care education
        - Education level does not solely determine ability to comprehend health care education
          - Health literacy should not be confused with being illiterate or having a lower education level in general
          - Readability of health education material can have a direct impact on patient outcomes
        - There is a gap between availability of and comprehension of patient education about foot care
          - Providers may not realize the information they give out to meet electronic health record meaningful use standards may not offer the kind of readability that fosters comprehension and action in the average reader of health education
        - The purpose of this study was to describe and compared the comprehension, understandability and actionability of diabetes foot care education materials provided by five different electronic health records (EHRs) from five Northwest Ohio ambulatory care sites
Researchers identified education materials related to diabetic foot care between five electronic health records.

Researchers reviewed each of the patient education materials for understandability and reading level using the Patient Education Materials Assessment Tool (PEMAT) and the Simple Measure of Gobbledygook (SMOG) formula.

- Analysis indicated the reading level of the NextGen (8.0 +/- .71) was higher than the reading level of Epic (6.8 +/- .45) and MEDITECH (7.0 +/- .71). The reading level (fig.1) of eClinicalWorks and Cerner were not different than the reading level of any of the other patient education’s materials.

- The understandability scores were not significantly different among the five patient education materials (range 67% - 85%). The actionability scores (fig. 3) of MEDITECH were significantly higher (70 +/-3.33) than NextGen (60 +/- .00) and eClinicalWorks (64 +/- 4.00). The actionability of Epic and Cerner were not different than any of the other EHRs.

**Conclusion**

- Chronbach’s alpha scores of PEMAT and the SMOG ranged from .98-.99 with interclass correlations among the scores ranging from .94-.97 indicating reliability and validity of scoring.
- There were significant differences between the five EHRs in reading level, understandability, and actionability. One of the five EHRs scored highest in actionability and had an acceptable reading level indicating it was most favorable to meet average patient education needs.

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