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Usefulness of patient education materials for central line associated blood stream infection prevention

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Abstract

Central line-associated blood stream infections (CLABSI) are costly, increase length of hospital stay, and are largely preventable. Patient education is required for patients with central lines in United States facilities accredited by The Joint Commission. Patient participation, awareness and knowledge of CLABSI are pivotal to prevent the acquisition of these life-threatening infections. We completed a systematic evaluation of materials for patients' education on CLABSI using the Patient Education Materials Assessment Tool (PEMAT) in order to determine the actionability and understandability of education materials. The patient education materials we identified received mediocre scores in both categories.

Keywords: Central venous catheter; Bacteraemia; Patient education

Introduction

Central line-associated blood stream infections are healthcare associated infections (HAIs) caused by the entry of pathogens into the vascular system either around or through a central line. They are known to increase institutional costs and the average length of a patient's stay.[1,2] It is estimated that of the three million central lines used annually in American hospitals, 249,000 of them will lead to CLABSIs.[3,4] They have an annual estimated cost of $7,000-29,000 per case in 2007 dollars.[5] The Agency for Healthcare Research and Quality (AHRQ) developed the Patient Education Materials Assessment Tool (PEMAT) as a tool to evaluate the usefulness of materials for patient education.[6] The PEMAT is a quantitative way to determine the actionability (the ease with which a patient can act upon something) and understandability (the extent to which the materials can be understood and processed) regarding materials for patient education. In the context of our research the PEMAT can serve multiple

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functions as it quantitatively evaluates the materials for several traits and characteristics that are of interest, such as word choice, use of visual aids and layout design. We have applied the PEMAT to the evaluation of patient materials for other HAIs.[7,8]

Methods

As most materials for patient education are available online, we completed an environmental scan for patient education materials for CLABSI. In the course of the scan multiple terms and phrases were searched including: central line associated bloodstream infections, CLABSI, patient education materials CLABSI, education materials on CLABSI, CLABSI prevention patient materials, CLABSI patient education, CLABSI healthcare associated infection prevention, central line associated bloodstream infection patient materials, patient education materials intravascular catheter, intravascular catheter materials, catheter bloodstream patient materials.

In order to ensure that all available materials were included in our study, multiple search engines, online databases, and websites of organizations that are leaders in the field of HAI prevention were utilized, including: Bing, Google scholar, Pubmed, mayoclinic.org, Stanford medicine, the Society for Healthcare Epidemiology of America (SHEA), Centers for Disease Control and Prevention (CDC), AHRQ, and the Association for Professionals in Infection Control and Epidemiology (APIC). Two independent reviews were completed including involvement of a patient (PZ) as a research team member to review study findings and evaluations of materials.

In order to quantitatively measure the understandability and actionability of materials for patient education that were found in the course of our environmental scan we utilized the PEMAT.[6] Seventeen statements were employed to quantify the understandability while seven were utilized to determine the actionability of the materials. Comprehensibility, layout, organization and employment of visual aids along with content were the primary goal of the understandability statements. Further, the materials were evaluated on their utilization of medical terminology and capacity to meet the United States Department of Health and Human Services suggestion of materials being qualified as easy to read if they were at a sixth grade reading level.

Results

A total of 14 materials were found in the search. The understandability of patient education materials found averaged 77.1%, with a range between 56-94%. The overall actionability of these materials averaged 69%, with scores ranging from 0-100%. No materials found used a summary. Of materials found, only 35.7% (5/14) used visual aids, despite previous studies finding that patients responded well to such tools.[5] A complete summary of the materials for patient education found in the course of this study is shown in Table I. Except for the material developed by SHEA (which is available in Spanish and English) no materials were found in languages other than English. However, we did not conduct searches in non English-language search engines or websites.

Discussion

The low scores in both the actionability and understandability ratings indicate that there is need for significant improvement in this area. It is evident from both patient feedback and the low PEMAT ratings that materials for patient education need to be improved from the patient perspective. Very few materials included useful visual aids or tangible tools despite previous studies indicating that patients respond well to their employment in such materials.[5,7]

The number of materials for patient education on CLABSI found in the course of our study – compared to similar studies of other HAIs – may reflect relatively less attention on CLABSI given the rise of other emerging pathogens and HAIs such as *Clostridium difficile*.[7,8] Our previous studies on surgical site infections and *C. difficile* infection found 21 and 19 materials respectively.[7,8]

Further patient feedback reflected the need for more efficiently and thoughtfully constructed materials. To better engage patients and their families on CLABSI prevention efforts, materials should be improved through several small but significant amendments. First, materials should include clear checklists for patients and their families to utilize. Second, reviewers were uncertain regarding the value of a summary.

Table I. Rates of understandability and actionability of patient education materials for CLABSI prevention

	Site Searched/ Search Engine Used	Associated Institution	Actionability Rating (%)	Understandability Rating (%)	URL
1	Bing	Danbury Hospital	80	83	http://www.danburyhospital.org/~/media/Files/Patient%20Education/patiented-english/pdf_GeneralMedicine/CentralLineInfection.ashx
2	Bing	Gulf Coast Veterans Healthcare System	80	75	http://www.biloxi.va.gov/patients/Pamphlets/CLABSI.pdf
3	Bing	California Department of Public Health	80	64.5	https://www.cdph.ca.gov/programs/hai/Pages/CentralLine-associatedBloodStreamInfection(CLABSI).aspx
4	Bing	Amerinet	91	76.5	http://www.amerinet-gpo.com/Documents/CLABSI-prevention-infographics.pdf
5	Bing	Intermountain Healthcare	100	94	https://intermountainhealthcare.org/ext/Dcmnt?ncid=520653050
6	Bing	Qualityforum.org	0	92	http://public.qualityforum.org/Chart%20Graphics/Reducing%20Central%20Line-Associated%20Bloodstream%20Infection%20CLABSI%20Rates%20Across%20the%20Country.pdf
7	Bing	Mount Sinai Hospital	80	70	http://www.mountsinai.org/patient-care/health-library/diseases-and-conditions/central-line-associated-bloodstream-infections

	Site Searched/ Search Engine Used	Associated Institution	Actionability Rating (%)	Understandability Rating (%)	URL
8	Bing	University of Pittsburgh Medical Center	80	87	http://www.upmc.com/patients-visitors/education/infection-control/Pages/preventing-central-line-associated-bloodstream-infection.aspx
9	Bing	Jointcommission.org	20	68	http://www.jointcommission.org/assets/1/6/CLABSI_infographic_final.pdf
10	Bing	Children's Hospital of Minnesota	80	75	https://www.childrensmn.org/Manuals/PFS/Condill/194452.pdf
11	Bing	Society for Healthcare Epidemiology of America	80	79	http://www.cdc.gov/hai/pdfs/bsi/BSI_tagged.pdf
12	Bing	University of California- San Francisco Medical Center	55	70.5	http://www.ucsfhealth.org/about/central_line_infection/
13	Bing	National Institutes of Health	70	66.5	https://www.nlm.nih.gov/medlineplus/ency/patientinstructions/000474.htm
14	Bing	New Jersey Department of Health	70	79	https://web.doh.state.nj.us/apps2/hpr/preventing_clabsi.shtml

Further, certain details that some materials have included such as the amount of time patients and providers should wash their hands and the use of a paper towel to turn off the water faucet in order to not contaminate clean hands, do not improve a material's score when evaluated using the PEMAT. Reviewer feedback indicates that the inclusion of such details would be useful for patients.

This study has limitations that merit further consideration. First, the number of evaluators of the materials was limited. Although one patient who had had a HAI participated in the study, she is not representative of the entire patient population. Second, the PEMAT itself has limitations that we have previously described,[7,8] which have led to reviewers commenting on the scores for certain materials that they evaluate being higher than a material that they perceive – outside of the PEMAT – to be of higher quality. These findings may be useful for adaptation or future refinement of the PEMAT or similar tools. This is necessary in order to create a tool that is truly generating an accurate assessment of the materials available for patients to educate themselves on HAIs. For example, the PEMAT has higher points for materials that utilize the bolding of fonts but does not accommodate when materials employ more sophisticated and effective text highlighting tools.

With the consideration of these limitations, the conclusions from our work can be maximized in the creation of thorough, concise and intelligible materials for patient education on CLABSI to expand their utility for the patient population. Additionally, patients in the intensive care unit may not be best served by written material for patient education alone.[9] Future efforts should consider optimal strategies for delivering information about the use of central lines for patients and their families.

In conclusion, CLABSI is a costly and serious HAI whose incidence may be curbed by engagement of the patient population in prevention efforts. This study shows that patient education materials on this topic are available but can be further refined and developed in order to best utilize patient time and efforts. By improving the quality of materials for patient education on CLABSI, patients will be better able to engage in prevention efforts.

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