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Cost Analysis of Hospital-Acquired Infections (HAIs) Intervention: A Nursing Perspective

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Abstract

An economic analysis is a systematic process of collecting, categorizing, and analyzing cost related to a health problem or an intervention and its outcomes for purposes of making decisions (CDC, 2013). This presentation is a review of a meta-analysis of HAIs, the financial implications of HAIs in the United States, and a comparison of the methodology used with standard methods of cost analysis using the cost-benefit analysis (CBA) approach as a reference.

Background Information about HAIS

HAIs are infections patients get while in a health care facility to receive medical treatment (CDC, 2016). HAIs represent a significant threat to patient safety and are a public health problem (CDC, 2016). About 1 in 25 hospital patients has at least one HAI, making them a significant cause of morbidity and mortality (CDC, 2015; Healthy People 2020, 2014). The incidence of an HAI increases the cost of a patient's health care by \$10,375 and 3.30 extended days of hospital admission (Hassan, Tuckman, Patrick, Kountz, and Kohn (2010). As the liaisons between physicians, the inter professional team, and patients, nurses on a daily basis endure long working hours, higher than the recommended nurse to client ratio, and resultant occupational hazards from preventable HAIs.

The US Department of Health and Human Services (HHS) established the HHS Steering Committee for the prevention of HAIs in 2008 to develop an action plan for the prevention of HAI (CDC, 2015). Strategies to achieve the goals of the steering committee include the use of infection control assessment tools, the targeted assessment for prevention strategy, and use of prevention toolkits, basic infection control and prevention methods, and protection of healthcare personnel (CDC, 2015). Other national interventions to reduce and prevent HAIs include the hospital readmission reduction program and the hospital-acquired condition (HAC) reduction program. Following implementation of these interventions, there was a 50% reduction in central line-associated blood infections, 17% decrease in surgical site infections, and 17% decrease in abdominal hysterectomy-related infections between 2008 and 2014 (CDC, 2016). Between 2011 and 2014, hospital-onset methicillin difficile infections decreased by 13% while hospital-onset *Clostridium difficile* infections (CDI) fell by 8% (CDC, 2016). Despite the reduction in some HAIs, more work needs to be done (CDC, 2016).

A Meta-Analysis of HAIs

A 3-step methodology was used for the meta-analysis of the cost of HAIs in the U.S. by Zimlichman et al., (2013). First, epidemiological and economic outcomes, incidence rates, attributable costs, and added length of hospital stay (LOS) were estimated. Second, Zimlichman et al., (2013) modeled the variation of the above outcomes within a large patient population, and finally, the Monte Carlo simulation was used to generate point estimates and 95% CIs for attributable costs and LOS (Zimlichman et al., 2016). The financial impact of HAIs was estimated using the 2009 National In-patient Sample (NIS) of the Health Care Utilization Project (HCUP).

The Five HAIs with the most significant impact on the healthcare system were found to be surgical site infections (SSI), central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), ventilator-associated pneumonia (VAP), and CDI were the HAIs used for the analysis. CLABSI was found to be the most costly HAI at \$ 45, 814 and accounted for 15.7 excess LOS (Zimlichman et al., 2013). The costs of SSI was at \$20, 785, CDI at \$11, 285, and CAUTI at \$896. The

total annual costs for the 5 significant infections were \$9.8 billion. SSI contributed the most to overall costs (33.7% of the total), followed by VAP (31.6%), CLABSI (18.9%), CDI (15.4%), and CAUTI (<1%) (Zimlichman et al., 2013).

Evaluation of the Methodology for Cost Analysis of HAIs

The methodological approach was satisfactory as the researchers followed a systematic process to arrive at the cost of HAIs and the social and financial implications on the healthcare system (CDC, 2016). The meta-analysis mainly relied on LOS and cost of direct treatment and did not factor in indirect costs such as staff benefits related to excess LOS of patients and intangibles such as the cost of staff training and campaigns meant to reduce HAIs (CDC, 2013). The meta-analysis did not also provide information about the causes of HAIs, the benefits of lowering HAIs and interventions needed to reduce HAIs.

As a nurse and student of health policy, I am developing a research proposal to conduct an economic analysis of the five most common HAIs using the CBA, and Cost-effectiveness (CEA) approaches as guidelines. CEA is a tool used to guide health care decision making regarding choices of medical care to be offered (US Department of Veterans Affairs, 2018). The primary purpose of a CBA analysis is to help social decision making and rationalize health policy decisions (Boardman, Greenberg, Vining, & Weimer, 2017). Unlike CEA, a CBA usually identifies the benefits of an intervention as well as its cost, and places a monetary value on any benefits identified.

Conclusion

The Meta-analysis of HAIs in the United States by Zimlichman et al., (2013) followed a systematic process of data collection, analysis and interpretation of findings. However, from a nursing perspective, vital elements of CBA and CEA were not addressed such as indirect cost and benefits of HAIs reduction. Though the substantive matter of nursing is to prevent illness, promote health, and alleviate pain, we are also duty bound to ensure health care is safe, effective, and affordable. Nurses need to show interest in policy decisions that affect the profession and patients. A holistic nursing economic analysis should include elements of both CEA and CBA.

Title:

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Abstract Summary:

HAIs are infections suffered by clients while receiving treatment for health problems. The five U.S. major HAIs cost 9.8 billion between 2011 and 2013 (Zimlichman et al., 2013). HAIs represent a major threat to client safety and as well as their economic burden on clients, nurses must be concerned.

Content Outline:

Presentation Content Outline

A. Background Information about HAIs

- i. Economic Implications
- ii. Nursing implications

B. An Example of a Meta-Analysis of HAIs

- i. Epidemiologic and economic outcomes
- ii. Incidence Rates
- iii. Attributable cost
- iv. Added Length of stay

C. Evaluation of HAIs Intervention Cost Analysis

- i. Cost-Benefit Analysis (CBA)
- ii. Cost-Effectiveness Analysis (CEA)

D. Conclusion

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Professional Experience: I have been medical/surgical nurse for 3 years in Ghana and a pediatric nurse in the US for 3 years spanning between 2006 and 2016. I am a nurse educator and have taught at the diploma, ADN, BSN levels in Ghana and the U.S. for 10 years. I was a founding instructor for the establishment Garden City University College in Ghana, helping design the first curriculum and syllabi for the school. I have provided professional support and consultations for the establishment of other nursing schools in Ghana and helped in raising NCLEX pass rate in a community college from about 60% to a 100%

Author Summary: The presenter is an instructor at the TTUHSC SON and a 3rd year PhD nursing student at the UT Arlington. Obtained his BSN and MSN from the University of Ghana. Research interest: Diabetes medication adherence, Strategies to Promote the voices of nurses in health policy. He is married with 2 children.