INTRODUCTION

• Hospitals are under pressure to reduce hospital-acquired and surgical site infections (SSI). In addition, fears over COVID-19 has transformed the practice of healthcare requiring healthcare personnel to adopt new strategies to prevent the spread of infectious disease. (Fig. 1a and 1b).

• To assist in this goal our institution recently adopted a “hygienic” flat (HF) computer keyboard device (Esteline, Bellevue, WA) which has flat keys covered by a flat silicone screen (Fig. 2).

• Although easily cleaned, typing on this keyboard may be more difficult due to loss of tactile feedback as it is completely flat. Subsequently, there is the potential for increased errors which may contribute to avoidable harm to the patient.

• The purpose of this study is to compare accuracy, speed and error correction between a HF keyboard and a conventional keyboard (Fig. 2 and 3).

METHODS

• 40 participants (physicians, nurses and medical students) were recruited from the operating room to perform a one-minute practice and subsequent one-minute recorded typing test (toptyper.com) on each keyboard.

• Participants were randomly assigned the order of the keyboard using a crossover design.

• During the one-minute test, correct words were displayed in white font, while errors were in yellow.

• Primary outcomes were words per minute (WPM), accuracy, and error correction rate. Accuracy was defined as the number of incorrectly typed characters divided by the number of total characters typed.

• As a secondary outcome, the total number of typed words for each patient admitted to the urology service in July 2018 were tallied. The data for word count, accuracy and speed were applied for reference.

• Word count did not include template derived information and only words specifically typed by the physician. Outcomes were compared using Student’s T-test with p<0.05 considered significant.

RESULTS

• Subjects typed significantly faster using the conventional keyboard (58 WPM) compared to the HF keyboard (50 WPM; p<0.001) (Fig 4).

• Accuracy was significantly higher using the conventional (94.5% vs. 90%; p<0.0236) compared to the HF keyboard. The percent error correction was similar (52% vs 52%; p=0.31).

• During the one-month study period, the urology service typed an average of 526 (range 43-9480) words for 67 patients with a total of 35,245 words.

• Applying speed and error rates to this one-month period, using the conventional keyboard would save 88.9 minutes vs. the HF keyboard.

• This equates to 17.7 hours saved typing over a one-year period with a conventional keyboard. With regards to accuracy, using the HF keyboard would yield 19,032 more errors over a one-year period.

DISCUSSION

• In the United States it is estimated that more than 500,000 SSIs occur annually with a direct cost of $10 billion.1

• Surface contamination has also been shown to play a role in the transmission of nosocomial infection2 but there has been no published information demonstrating that the HF keyboard reduces the infection rate.

• SARS-CoV-2 has been found to exist on hard surfaces for up to 3 days.3

In the perioperative environment, time is a significant contributor to overall cost, with OR cost estimated at up to $62 per minute.4

Furthermore, medical error has been shown to cost $13.5 billion per year in 2008.5 While it is important to decrease SSI’s, any attempt at reducing SSIs must not come at the cost of efficiency and patient safety.

CONCLUSIONS

• Keyboards that allow easy sterilization between uses have become an essential part of the prevention of transmission of infectious diseases during the COVID era. However, the HF keyboard tested in our study came at the price of a 16% reduction in typing speed and 5% greater error rate.

• The optimal keyboard for reducing infection transmission would not compromise speed, accuracy, or lead to an increased number of medical errors.

REFERENCES


9. Loma Linda University Department of Urology, Loma Linda, CA