CLINICAL RESEARCH

Effect of early nutrition support on length of stay, mortality, and extubation in patients with COVID-19

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Abstract

Background: Many hospitals have been using nutrition support guidelines for patients with coronavirus disease 2019 (COVID-19) as outlined in the April 2020 article released by the American Society for Parenteral and Enteral Nutrition (ASPEN) and the Society of Critical Care Medicine (SCCM). Currently, there are insufficient data on the outcomes of following these guidelines.

Methods: This was a retrospective, observational study of 131 adult inpatients with COVID-19 admitted to an intensive care unit (ICU) at Banner Health to observe differences in length of stay, mortality, and number of days intubated based on the timing of nutrition support start relative to hours intubated and hours in the ICU.

Results: There were no statistically significant differences between length of stay, mortality, or number of days intubated between patients who started nutrition support within <12 h of intubation, >12 h of intubation and <36 h in the ICU, or >36 h of intubation and those who were not intubated. Patients who started nutrition support after >36 h in the ICU had the longest lengths of stay (median [25th, 75th percentile] = 25.5 [19.25, 35.25] days; $P > 0.05$) and number of days intubated (16.5 [10.0, 24.75] days; $P > 0.050$); however, it was not statistically significant. There was a significant difference between the three intubated groups and the nonintubated group on Sequential Organ Failure Assessment scores ($P = 0.01$).

Conclusions: Prospective, multicenter trials are needed; however, following the SCCM/ASPEN guidelines for nutrition support in patients with COVID-19 may be found to decrease length of stay and number of days intubated.

KEYWORDS
COVID-19, enteral nutrition, extubation, intensive care unit, length of stay, mortality

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) first garnered the attention of the World Health Organization (WHO) on December 31, 2019. Now, >2 years later, this novel virus has spread from a single case to >380 million cases worldwide and >5.6 million deaths.[1] The disease that results from contraction of SARS-CoV-2, coronavirus disease 2019 (COVID-19)—accompanied by one or more of the symptoms of fever, fatigue, cough, sneezing, and others—progresses to severe status in about 5% of cases.[2] The respiratory function of these patients declines to a point at which they require some type of ventilation in an intensive care unit (ICU) setting,[3] which eventually necessitates nutrition support to prevent starvation.

Owing to the lack of research specific to COVID-19, as many clinicians understandably prioritized patient care,[4] many COVID-19 nutrition support guidelines have been based on guidelines for critical care nutrition, including pulmonary compromise, and conditions such as acute respiratory distress syndrome (ARDS).[5] The American Society for Parenteral and Enteral Nutrition (ASPEN) nutrition therapy guidelines for patients with COVID-19 in the ICU states that the highest-priority issue is the timing of nutrition support delivery.[5] Based on data from four meta-analyses spanning from 1979 to 2012, the most current ASPEN guidelines released in 2021 recommend starting nutrition support in the critically ill population that is unable to keep up volitional intake within 24–48 h of critical care status.[6]

In April of 2020, the Society of Critical Care Medicine (SCCM) and ASPEN published revised guidelines, which have served as the standard guidelines for nutrition support provision in these patients throughout many Banner Health locations.[5] These guidelines recommend starting nutrition support in patients with COVID-19 within 24–36 h of ICU status or within 12 h of intubation, as well as feeding 1.2–2.0 g per kilogram of actual body weight per day and no more than 70%–80% of caloric requirements. It is critical that information is gathered about the outcomes of following the COVID-19 nutrition guidelines proposed by the SCCM and ASPEN to either reinforce, refine, or propose new guidelines. To better direct patients' nutrition care, the purpose of this study was to determine differences in length of stay (LOS), mortality, and number of days intubated between the following four groups of patients with COVID-19: those who started nutrition support within ≤12 h of intubation; those who started nutrition support within >12 h of intubation and <36 h of ICU status; those who were intubated within >12 h and >36 h of ICU status; and those who were not intubated.

METHODS

Institutional review board (IRB) approval was obtained on January 5, 2021, through Banner Health's IRB. This study had no intervention and required no active recruitment. No variables were controlled through study design, as this study was performed entirely by medical record review after patients had been discharged (a retrospective observational cohort study).

The study and data collection took place at a level 1 trauma acute care teaching hospital with approximately 700 beds. As part of the Banner Health system, many patients with COVID-19 were transferred to Banner Health (BUMCP) when they presented to hospitals designated as not taking patients with COVID-19, as well as whenever patients with COVID-19 required a higher level of care or treatments only available there. A single-stage cluster sampling method was used; all patients who met the criteria at the hospital of study during the time period of the study were included.

A total of 655 inpatients with COVID-19 were admitted to BUMCP between June 1 and July 31, 2020, and were screened for eligibility. Data collection was performed through a search function of the electronic health record (EHR; Cerner/PowerChart) used by BUMCP, which allowed for the generation of a list of patients who met the inclusion criteria for the study. This list was cross-checked with a list of patients who tested positive for COVID-19, which was provided by a BUMCP analyst. Manual medical record review was performed to further narrow down the patients by the inclusion and exclusion criteria. After that, the EHR for each of those patients was reviewed to collect the individual data points from various places in the EHR, including but not limited to physician and dietitian progress notes, the medication administration record, and hourly "Ins and Outs" documentation.

The data collected included demographic data such as age, sex, body mass index (BMI; weight [kg] divided by square height [m^2]), and race and ethnicity. Recorded adverse events included death, emesis, aspiration, and whether aspiration or emesis occurred when the patient was lying in a prone position (facedown). Information on nutrition support was obtained, including primary modality and submodality (such as exclusive parenteral nutrition or peripheral parenteral nutrition), type of feeding tube, formula, and method of administration. Time of initiating nutrition support, relative to intubation or ICU admission, was recorded. Extubation was determined as removal from the ventilator or was capped at 2 months. Average caloric and protein intake, including any propofol and protein modulars, for the first week of nutrition support was collected, as well as whether that

amounted to at least 70% or >80% of patients' calorie goals or at least 1.2 or >2.0 g/kg/day for protein. Severity of malnutrition was recorded as inadequate information to assess, does not meet, mild, moderate, or severe, with diagnostic criteria listed in Table 1. To measure severity of disease, the Sequential Organ Failure Assessment (SOFA) score was calculated on the basis of the criteria listed in Table 2, using the worst values within 24 h of intubation or, if not intubated, within 24 h of critical care status. Other variables of interest included LOS and whether the patient underwent extracorporeal membrane oxygenation or continuous renal replacement therapy at any point during the period observed. Whether patients already had some form of preexisting cardiovascular or respiratory disease, immune system deficiency, cancer, or diabetes was noted because patients with these preexisting conditions are more likely to suffer from a complicated course of COVID-19, according to WHO.[6] Of these, the primary outcomes were LOS, mortality, and number of days intubated.

Group placement was defined by when nutrition support started, whether intubation occurred, when intubation occurred, and how long a patient had been in the ICU at those points. These factors were pulled from the ASPEN guidelines for feeding patients with COVID-19, which recommend beginning within 24–36 h of ICU status or within 12 h of intubation. To cover all of the combinations of possibilities, the following groups were created:

- Group 1: Patients who started nutrition support within ≤12 h of intubation
- Group 2: Patients who started nutrition support within >12 h of intubation and <36 h in the ICU
- Group 3: Patients who started nutrition support within >12 h of intubation and >36 h in the ICU
- Group 4: Patients who were not intubated

STATISTICAL ANALYSIS

Descriptive analyses were performed on all demographic data by using frequencies for categorical data and mean ± standard deviation for continuous variables. Age and BMI were compared between groups by using analysis of variance (ANOVA); and sex, race and ethnicity, and preexisting disease were compared by using a chi-square test. It is pertinent to note that the Hispanic ethnicity may encompass many different cultures, lineages, and nationalities. The term Hispanic is used in this study because it was the term selected by the hospital where the research took place. All continuous variables were tested for normality using the Shapiro-Wilks test. An ANOVA with Bonferroni post

TABLE 1 Diagnostic criteria for malnutrition at time of starting nutrition support, as determined by the dietitian

Degree of Malnutrition	Defining Criteria
Inadequate information	The dietitian was unable to gather sufficient evidence
Does not meet	The patient did not meet at least two criteria from any category below
Mild	- Estimated energy needs 49% or less in the past 5 or more days - Estimated energy needs 75% or less in the past 7 or more days - Muscle mass depletion - Delayed wound healing - Significant stress factor[a]
Moderate	- Estimated energy needs 74% or less in the past 7 or more days - Significant unintended weight loss from usual weight - Mild depletion of muscle mass - Mild depletion of body fat 1+ edema
Severe	- Weight <75% of ideal or BMI < 16 - Estimated energy needs 49% or less in the past 5 or more days - Severe unintended weight loss from usual weight - Severe depletion of muscle mass - Severe depletion of body fat - Greater than or equal to 2+ edema

Abbreviation: BMI, body mass index.

[a]Significant stress factors as determined according to an extensive reference list available to the dietitians, including stress factors used for Harris-Benedict calculations, defined terms such as injury, trauma, and specific listed minor and major surgeries.

TABLE 2 Sequential Organ Failure Assessment criteria

Variable	Points
PaO$_2$/FiO$_2$, mm Hg	
≥400	0
300–399	+1
200–299	+2
≤199 and not mechanically ventilated	+2
100–199 and mechanically ventilated	+3
<100 and mechanically ventilated	+4
Platelets, ×10^3/μl	
≥150	0
100–149	+1
50–99	+2
20–49	+3
<20	+4
Glasgow Coma Scale, points	
15	0
13–14	+1
10–12	+2
6–9	+3
<6	+4
Bilirubin, mg/dl	
<1.2	0
1.2–1.9	+1
2.0–5.9	+2
6.0–11.9	+3
≥12.0	+4
MAP or use of vasoactive drugs required, mcg/kg/min	
No hypotension	0
MAPs <70 mm Hg	+1
Dopamine ≤5 or dobutamine (any dose)	+2
Dopamine >5, epinephrine ≤0.1, or norepinephrine ≤0.1	+3
Dopamine >15, epinephrine >0.1, or norepinephrine >0.1	+4
Creatinine, mg/dl	
<1.2	0
1.2–1.9	+1
2.0–3.4	+2
3.5–4.9	+3
≥5	+4

Abbreviations: FiO$_2$, fraction of inspired oxygen; MAP, mean arterial pressure.

hoc pairwise comparisons was used to determine differences between the four groups in both LOS and number of days intubated and for comparing outcomes between the groups on the basis of total protein and total calorie intake in the first week of nutrition support. A Kruskal-Wallis test was used to determine differences in the SOFA score between groups.

RESULTS

A total of 524 patients were excluded for not entering the ICU ($n = 471$), entering the ICU but not requiring nutrition support ($n = 40$), transferring from another hospital and missing the first week of critical illness ($n = 5$), or receiving enteral nutrition support for so short a period that nurses did not document it ($n = 3$); 1 patient was excluded because physicians presumed the patient was likely experiencing a second COVID-19 infection, 1 was <18 years of age, 1 was not a true admission to the hospital of study, 1 was missing too much information, and 1 had an inaccurate time frame of admission for study acceptance. Of those in the ICU who did not receive nutrition support ($n = 40$), 26 transferred from the ICU to a less intense medical unit, 8 went to comfort care services, 6 died during admission, and 1 left against medical advice. This resulted in 131 patients who met the

final inclusion criteria for the study. Inclusion criteria included age of >18 years, inpatient status at BUMCP, a COVID-19 diagnosis, admission during June or July 2020, and intubation and/or admission to an ICU. Of note, pregnant women were included because of the retrospective nature of the study and the lack of intervention, which did not pose any excess risk.

Demographic data are presented in Table 3. Overall, 76.3% ($n = 100$) of the patients had qualified preexisting diseases (cardiac, cancer, respiratory disease, diabetes, or the presence of an immunodeficient state). The patients were primarily of Hispanic ethnicity ($n = 73$, 55.7%) and White ($n = 26$, 19.8%). There were no differences observed between groups in age, BMI, sex, race and ethnicity, and preexisting disease ($P > 0.05$).

Data on LOS, number of days intubated, SOFA score, and mortality for the whole sample and by group are presented in Table 4. There was no statistically significant difference between groups for LOS ($P = 0.067$), despite the notable difference observed between groups 1 and 3 (mean difference = 5.8 days) and between groups 3 and 4 (mean difference = 13.6 days). Although there was a significant difference between groups for the number of days intubated ($P < 0.001$), the only significant differences from the post hoc testing showed groups 1–3 were different from group 4, which is likely only because patients in group 4 were never intubated. There was a

TABLE 3 Descriptive statistics and anthropometrics for all groups of the study population

Variable	All ($n = 131$)	Group 1 ($n = 19$)	Group 2 ($n = 28$)	Group 3 ($n = 76$)	Group 4 ($n = 8$)	P value between groups
Age, years	58.0 (14.4)	53.7 (15.1)	56.3 (13.1)	58.7 (13.2)	66.5 (24.0)	0.17
BMI	30.6 (26.0, 37.0)	30.5 (24.3, 44.6)	31.9 (29.4, 36.1)	25.9 (29.4, 35.7)	36.2 (27.6, 40.5)	0.47
Sex	—	—	—	—	—	0.23
Male	76 (58.0)	13 (68.4)	16 (57.1)	45 (59.2)	2 (25.0)	—
Female	55 (42.0)	6 (31.6)	12 (42.9)	31 (40.8)	6 (75.0)	—
Race and ethnicity	—	—	—	—	—	0.25
Hispanic	73 (55.7)	13 (46.4)	13 (46.4)	43 (56.6)	4 (50.0)	—
White	26 (19.8)	2 (10.5)	6 (21.4)	18 (23.7)	—	—
Black	13 (9.9)	2 (10.5)	3 (10.7)	6 (7.9)	2 (25.0)	—
Native American/ Alaskan	14 (10.7)	1 (5.3)	5 (17.9)	7 (9.2)	1 (12.5)	—
Other/multiple	2 (1.5)	—	1 (3.6)	—	1 (12.5)	—
Asian/Pacific Islander	3 (2.3)	1 (5.3)	—	2 (2.6)	—	—
Preexisting disease	100 (76.3)	15 (78.9)	21 (75.0)	58 (76.3)	6 (75.0)	0.99

Note: Continuous variables are presented as mean (SD) for normally distributed variables and median (25th, 75th percentile) for nonnormally distributed variables; categorical variables are presented as n (%).

Abbreviations: —, no data; BMI, body mass index.

TABLE 4 Descriptive statistics by group

	All (n = 131)	Group 1 (n = 19)	Group 2 (n = 28)	Group 3 (n = 76)	Group 4 (n = 8)	P value between groups
Length of stay, days	26.6 (19.1)	18.0 (12.0, 31.0)	19.0 (13.25, 29)	25.5 (19.25, 35.25)	13.0 (11.25, 22.75)	0.067
Total number of days intubated	13.0 (7.0, 22.0)	9.0 (5.0, 20.0)	11.5 (7.0, 18.0)	16.5 (10.0, 24.75)	—	0.101*
Total kilocalories per day	946 (352)	974 (382)[a]	927 (330)	985 (321)[b]	578 (480)[a,b]	0.018**
Total protein per day, g	57.7 (23.8)	59.6 (29.8)	52.8 (23.0)	61.2 (19.7)[c]	37.1 (36.8)[c]	0.027**
Mortality	60 (45.8)	6 (31.6)	13 (46.4)	37 (48.7)	4 (50)	0.602
SOFA score	9.0 (7.0, 11.0)	9.0 (7.0, 11.0)[d]	9.5 (8.25, 12.75)[e]	9.0 (7.0, 11.0)[f]	4 (3.25, 9.0)[d,e,f]	0.013**

Note: Data are presented as mean (standard deviation) for normally distributed variables and median (25th, 75th percentile) for nonnormally distributed variables, with the exception of mortality, which is presented as *n* (%). Values with the same superscript letter are significantly different from each other.

Abbreviations: —, no data; SOFA, Sequential Organ Failure Assessment.

*Only groups 1–3 were included in the analysis for group differences. All groups were significantly different from group 4 (not intubated).

**Statistically significant (*P* < 0.05).

significant difference between groups for SOFA scores (*P* = 0.013, independent-samples Kruskal-Wallis test). This was not clinically significant, as the post hoc pairwise comparison showed groups 1–3 were only significantly different from the group that was not intubated, group 4. A separate analysis of only groups 1–3 showed no significant differences between groups (*P* > 0.05). There was no significant difference observed between groups for mortality (*P* > 0.6026). There was a significant difference between groups in total calories per day (*P* = 0.018) and grams of protein per day (*P* = 0.027). For both, the differences were observed between groups 3 and 4 (mean difference = 408 kcal/day and 24.1 g/day, respectively) and between groups 1 and 4 for total calories (mean difference = 397 kcal/day).

DISCUSSION

The purpose of this study was to determine any differences in hospital LOS, mortality, or the number of days intubated between groups of patients, decided by when they entered the ICU, when and whether they were intubated, and when they started nutrition support. The ASPEN and SCCM critical care guidelines[6] for nutrition support that recommend starting nutrition support before 24–48 h after admission to the ICU, based on several meta-analyses that showed that initiating nutrition support before 48 h is associated with a trend of decreasing mortality,[6,7] before 36 h is associated with a decreased LOS and a statistically significant increase in infectious morbidity,[8] and before 24 h is associated with a statistically significant decrease in mortality, as well as incidence of pneumonia[9] and a statistically significant decrease in morbidity of infectious origin.[7] Although this information supports the practice of starting early nutrition in the ICU setting, it is not specific for respiratory diseases such as ARDS. Guidelines for when to start nutrition support were released by the SCCM and ASPEN last year and have yet to be thoroughly studied because of the rapid onset of the COVID-19 pandemic.[5]

Group 4 was the only group found to have any statistically significant differences in primary outcomes, specifically between the total number of days intubated compared with those of the other groups. There is no clinical significance to this result because the statistical significance was expected, as group 4 was never intubated.

The overall clinical picture of the patients in group 4 (*n* = 8), who were never intubated, is also worth considering. One patient was not intubated owing to the wishes of the family, and subsequently passed. Three of them were discharged on hospice services, two died in the hospital while receiving comfort care, and two were

discharged after having some improvement. Whether the health of most of these patients had already deteriorated enough to prevent them from being candidates for intubation in the first place, or whether initiating nutrition support earlier could have improved their chances for survival, was outside the scope of this study. For reference, the mortality rate for group 4 was 50% ($n = 4$). The SOFA scores for group 4 were lower than those of the other groups, with the lowest mean overall of 5.5 (±3.3). This could possibly be explained by the lack of intubation, which would have increased the scores by 3–4 points each.

Group 1 was expected to have the best outcomes, such as shortest LOS, fewest number of days intubated, and lowest mortality rates, because they began nutrition support within ≤12 h of intubation and <24 h of ICU status. In theory, they had the least amount of time for starvation to take effect and contribute to the worsening of clinical outcomes.[10] Unfortunately, although perhaps not unexpectedly, the small size of group 1 ($n = 19$) made accurate statistical analyses difficult, and no statistical significance was found. Of clinical significance, group 1 did have both a shorter average LOS and lower total number of days intubated than group 3, which was the group expected to have the worst outcomes because its patients started nutrition support the latest at >12 h of intubation and >36 h in the ICU. Group 3 had the longest average LOS (30.1 ± 22.1 days) and longest average total number of days intubated (18 ± 10.8 days) of all the groups, yet no statistical significance was found. This warrants future study with larger sample sizes that may be able to detect a statistically significant difference.

There is some previously established research on optimal calorie ranges for ICU patients. With $n = 298$, the Intensive Nutrition in Acute Lung Injury (INTACT) trial was able to find statistically significant results for a higher hazard risk of death with increased calorie provision during 1 week of ICU status.[11] Unfortunately, none of the data collected for this study were statistically significant for calories or protein in regard to mortality and could not support the published research. Clinically significant findings to note were that group 3 had the highest average calorie provision per day (985 ± 320 kcal), a statistically significant difference from that of group 4 (577 ± 479 kcal). This may be related to stopping nutrition support earlier for patients in group 4 who died or transitioned to comfort care. All groups (besides group 4, which tied) had a greater frequency of patients who met exactly between 70% and 79% of their estimated calorie needs in the first week in the ICU compared with the frequency of patients who were fed >80% of their estimated calorie needs. This is theorized to be desirable for patients with COVID-19 because of the risks of overfeeding (defined as >80% of estimated calorie needs

in the first week of critical illness), as established in the INTACT trial. This could be an indication that the COVID-19 nutrition recommendations are, in fact, being followed for most of the patients in ICUs at BUMCP, in accordance with the ASPEN guidelines, which also recommend feeding patients with COVID-19 no more than 80% of their calorie goals in the first week in the ICU.

There were several strengths to this study. Groups were defined based on published ASPEN/SCCM guidelines. The study was conducted at the largest hospital in the state and took place during the first "peak" in June and July 2020. These were likely to be the patients with the most severe COVID-19 in the area, a largely Hispanic population, and the data are reflective of that and could be generalized to similar populations of patients with COVID-19. Data collection had some advantages as well, with all data collected for 100% of eligible patients within the study time frame and requiring no recruitment or follow-up adherence. This study investigated several different variables for enteral nutrition support, including tube type and placement, formula, protein modular use, etc. This allowed more hypotheses to be considered during statistical analysis. Lastly, this study was greatly clinically relevant because there is a pronounced research deficit regarding nutrition support in patients with COVID-19.[4,5]

Despite these strengths, there were some limitations. Although the total number of patients included was 131, within-group totals were skewed significantly and may have prevented the discovery of statistically significant results. Time for data collection spanned only 2 months during 2020 at a single facility. This limited the overall number of patients included in the study ($n = 131$), with most of them belonging to group 3 ($n = 76$). If a longer time frame had been examined, there potentially could have been enough patients in each group to see more statistically significant results. Study design was retrospective and observational, thereby correlation and not causation, meaning there was no intervention and no extra effort by clinicians to follow the ASPEN nutrition guidelines, even though they were already the recommended practice for dietitians at the hospital of study. Additionally, any anonymization or randomization was not possible. Data collection was also limited to what was available in each patient's medical record, indicating the validity of the data strongly relied on how doctors, dietitians, and nurses documented. The initiation and amount of enteral formula received and the start of ventilation documentation were both obtained from the "Ins and Outs" section of the medical record. This may have limited the accuracy of these data points, as it is well known these areas of the medical record may not always be prioritized by healthcare staff. The timing of notation for ICU admission notes and

intubation notes relative to when those events actually occurred (or flow sheet documentation by respiratory therapists) was also highly important, as this information was used to determine placement in groups 1–4. The study was also limited by the accuracy of the researcher's manual collection and entry of the data. The lack of prior published research specific to nutrition support with COVID-19 was a significant limitation.

This study observed the time period during the first COVID-19 surge in the area, before more defined treatments or antibody therapy was available to treat COVID-19. Much time has passed, and these therapies are available to qualifying patients in some cases, which may improve outcomes. Additional research that takes these new variables into consideration will be needed. Finally, malnutrition was often difficult to assess, owing to a limited ability to conduct nutrition-focused physical exams because most assessments of patients with COVID-19 were completed without entering the patient's room, as well as the inability to interview intubated and sedated patients to obtain their nutrition history. Because of this, SOFA score was also calculated to help measure severity of illness.

This study is delimited to one hospital in the healthcare system where the study took place, owing to limited personnel for data collection within the short time frame available. Inclusion criteria were limited to adults aged 18 years or older, despite the presence of a large neonatal ICU at BUMCP, because of a lack of guidelines released by ASPEN for infants. Patients who were readmitted with COVID-19 were excluded, owing to a desire to limit data collection to the initial acute phase of the illness and to keep data points independent. One could also speculate that the immune system of those reinfected with the virus may have an advantage in recovery, which could cause a type I error.

CONCLUSION

This study did not show any statistically significant decrease in mortality, LOS, or number of days intubated for patients who had a smaller length of time between hospital admission and the start of nutrition support, but it did show clinical significance. The group with the longest times to start nutrition support, group 3 (started nutrition support within >12 h of being intubated and >36 h of ICU status), had the longest average LOS (30.1 ± 22.1 days) and average number of days intubated (18 ± 10.8 days) compared with those of all the other groups, which all started nutrition support within <12 h of being intubated and/or <36 h of being in the ICU. This supports future study with prospective, multicenter trials, which could find that starting nutrition support sooner in critically ill patients with COVID-19 aids in reducing the total number of days intubated and/or LOS. While further study takes place, this finding could also support dietitians' and other clinicians' current and continued use of the ASPEN guidelines for nutrition therapy in patients with COVID-19 who require ICU care.

AUTHOR CONTRIBUTIONS

Brittney R. Taylor contributed significantly to the acquisition of data. Brittney R. Taylor and Teresa Hart performed all statistical analyses and interpretation of the data. Brittney R. Taylor, Teresa Hart, Shauna Grant, and Maureen McCoy contributed significantly to the conception and design of the work and to the drafting, revising, and approval of the final manuscript to be published and agree to be held accountable for all aspects relating to accuracy and integrity of the work.

CONFLICTS OF INTEREST
None declared.

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