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COMPARISON OF CURB-65 SCORES IN NON-DIABETIC AND DIABETIC SUBJECTS HOSPITALIZED FOR COVID-19 INFECTION

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ABSTRACT

Background: Because diabetics are more susceptible to infections from a variety of bacteria and viruses, including respiratory tract infections, diabetes mellitus has been identified as a contributing factor for comorbidity in people with COVID-19. Out of all the scoring systems designed to evaluate CAP risk, CURB 65 ratings are the simpler one.

Aim: The purpose of this study is to document and evaluate the differences in CURB-65 scores between non-diabetic and diabetic patients admitted to an Indian hospital due to COVID-19 infection.

Methods: CURB-65 scores and glycemic status were assessed in 280 patients who were admitted due to COVID-19 infection. Based on the CURB-65 score, the participants were classified as having mild, moderate, or severe diseases. In addition, assessments were made on death rates, length of hospital stay, ventilator requirements, and ICU admission. Every participant was monitored until their early discharge or death.

Results: Of the participants with diabetes, 65.21% (n = 90) had mild CURB-65, while 97.18% (n = 138) did not. CURB-65 scores were moderate in 30.43% (n=42) of diabetes patients and 2.81% (n=4) of non-diabetic subjects. 24.63% (n=34) of the diabetes participants and 5.63% (n=8) of the non-diabetic subjects required ICU hospitalization (p=0.002). In the study, 4.22% (n=6) of the non-diabetic participants and 18.84% (n=26) of the diabetic subjects required ventilatory assistance. With p=0.007, this difference was statistically significant. Among the participants without diabetes, 24.63% (n=34) died (p<0.0001). For diabetes participants, the mean length of hospital stay was 9.23±5.2 days, while for non-diabetic subjects, it was 7.03±4.28 days (p=0.005).

Conclusion: Compared to non-diabetic participants with COVID-19 infection, people with diabetes mellitus showed greater and increased values of CURB-65 scores. Additionally, compared to non-diabetics, persons with COVID-19 and diabetes mellitus had worse disease severity.

Keywords: diabetes mellitus, CURB 65, coronavirus, COVID-19, and non-diabetic.

INTRODUCTION

COVID-19 is a pandemic disease that is an inflammatory, thrombogenic and viral disease. COVID-19 infection is linked to various risk factors including obstructive sleep apnoea, metabolic syndrome, obesity, diabetes mellitus, and advanced age. These factors are associated with poor outcomes in subjects with COVID-19 infection.[1] Diabetes mellitus is the most common concomitant disease in COVID-19 subjects and is associated with high disease severity in COVID-19 infection pneumonia subjects and high mortality rates. In diabetic subjects, decreased lung function, low-grade chronic systemic inflammation, and immune dysfunction are commonly seen. If a diabetic subject is hospitalized, it is vital to predicting the risk of developing any critical or severe illness. Early detection of this predictability can help in better treatment and low mortality rates.[2]

The COVID-19 pandemic has been linked to elevated incidence of community-acquired pneumonia (CAP). Subjects at high risk of death have been rated using a variety of prognostic assessment methods. In order to predict mortality from community-acquired pneumonia, the two most popular scoring methods are CURB 65 scores and PSI (pneumonia severity index). Because of the intricacy of the scoring system and the requirement to record twenty variables, PSI is rarely or never used in primary care settings, crises, or overcrowded hospitals.3.

On the other hand, the CURB-65 scoring criteria make use of the five variables, which simplifies it. Age 65 years or older, blood BP (B) (systolic ≤90 mmHg and ≤60 mmHg), respiration rate (R) of ≥30/min, urea >7 mmol/L (U), and confusion (C) are among these requirements. A total of five is obtained by assigning a score of 0 or 1 to each component. The 30-day death rate in persons with CAP is extensively and accurately predicted by CURB-65 scores. Additionally, CURB-65 scores offer a broad range of specificity sensitivities.4

Additionally, based on the scoring, CURB-65 scores enable patient stratification into three different treatment modalities: a score of 0-1 indicates a low risk of 30-day mortality (0.7–3.2%), meaning that subjects can be managed in the outpatient department; a score of 2 indicates an intermediate risk (13%) meaning that subjects must be admitted to the hospital; and a score of 3-5 indicates a high risk of 30-day mortality (17–57%), meaning that subjects should be considered for ICU admission.5, 6

Data from earlier studies have demonstrated that CURB-65 is not very useful in directing the care of patients who are admitted to the intensive care unit, hospitalized, or treated as outpatients. Furthermore, it is unclear how CURB-65 scores are applied to diabetic people who test positive for COVID-19.7. Additionally, research indicates that COVID-19 participants who are older than 65 and have comorbidities have higher CURB-65 scores. Therefore, the purpose of the current study was to document and compare the CURB-65 scores of non-diabetic and diabetic patients who were admitted to an Indian medical facility with a COVID-19 infection.

MATERIALS AND METHODS

In this cross-sectional investigation, we have studied patients with and without diabetes who were hospitalized for COVID-19 infection. Their CURB-65 scores recorded and compared. The participants who were accepted to the Institute with COVID-19 made up the study population. All subjects or those present gave their informed consent in writing and verbally after being fully told about the study's design.

During the designated study period, 280 hospitalized participants with COVID-19 infections were enrolled in the study. These 280 participants were split into two groups: 138 diabetics and 142 non-diabetics infected with COVID-19. Participants with Type 1 and Type 2 diabetes mellitus were included in the study. Based on past or present biochemical and laboratory analyses, the World Health Organization's (WHO) definition of diabetes mellitus was used to determine the patient's state, whether or not medication was received.

Either positive RT-PCR (reverse transcription-polymerase chain reaction) results from specimens taken from the upper respiratory tract as either nose or throat swabs, or radiologic findings of CORADS 4/5, validated the covid-19 status. Only those patients who arrived at the hospital with minor symptoms were counted in the study. Patients with gestational diabetes, pre-diabetic patients, and subjects unwilling to engage in the study were the exclusion criteria for the research.

Following the study subjects' final inclusion, each subject had a thorough medical history taken, and then they underwent a general checkup. The subjects' age and gender were recorded, along with other pertinent demographic information, vital blood biochemistry, consciousness level, glycemic status (including random blood sugar), heart rate, oxygen saturation at rest, respiratory rate, blood pressure, and fever. After that, CURB-65 scores were determined for each participant in both groups.

Multivariate statistical methods and logistic regression were used to statistically evaluate the gathered data. Two formats were used to show the data: tabular and descriptive. The chi-square test and SPSS version 22.0, 2013, Armonk, NY: IBM Corp., were used. With a significance threshold of 0.05%, the results were presented as percentages, numbers, mean, and standard deviations.

RESULTS

280 individuals with COVID-19 infections in all were involved in the study; they were split into two groups: 138 individuals with diabetes (n = 138) and 142 individuals without diabetes (n = 142). Comparably, the mean age of study participants with diabetes was 43.4±2.63 years and 44.2±3.12 years.

In the current study, there were 90 male and 52 female non-diabetic patients as well as 82 male and 56 female diabetes subjects. The bulk of the participants with diabetes were between the ages of 51 and 60 and 61 and 70. Of these, 52 were in the 51–60 age range, 18 were in the >70 age range, 12 were in the 41–50 age range, and at least 4 were in the 31–40 age range. As seen in Table 1, the bulk of the 36 subjects who were not diabetics were between the ages of 61 and 70, 34 subjects were between the ages of 41 and 50, 24 subjects were in the 51-60 age range, 22 subjects were under 30, 20 subjects were in the 31-40 age range, and 6 subjects were older than 70.

After evaluating the CURB-65 scores of study participants who had diabetes and those who did not, it was discovered that, of the 81.42% (n=228) study participants in the group with mild CURB-65 scores, 65.21% (n=90) were diabetic patients and 97.18% (n=138) were non-diabetic. Among the entire 16.42% (n=46) study participants, 30.43% (n=42) of them were diabetes individuals and 2.81% (n=4) of non-diabetic subjects had intermediate CURB-65 scores. There were 4.34% (n=6) diabetes participants and no non-diabetic subjects for CURB-65 scores that were classified as severe. With p<0.001, this difference in mild, moderate, and severe CURB ratings between patients with diabetes and those without was statistically significant (Table 2).

Regarding the different study parameters, the percentage of patients who required ICU admission was 24.63% (n=34) among the diabetic subjects and 5.63% (n=8) among the non-diabetic subjects. The difference between the two groups was statistically significant (p=0.002). In this study, 4.22% (n=6) of the non-diabetic participants and 18.84% (n=26) of the diabetes subjects required ventilatory support in the intensive care unit. With p=0.007, this difference was statistically significant. According to Table 3, of these participants who were all admitted to the intensive care unit, 24.63% (n=34) of the diabetes subjects died and no subject died with 0 mortality among the non-diabetic subjects. These findings were statistically significant with p<0.0001. The average length of hospital stay for individuals with diabetes was 9.23±5.2 days, whereas for those without the condition it was 7.03±4.28 days. This difference was statistically significant (p=0.005).

Upon evaluating the study patients' death rates according to their CURB-65 scores, it was seen that none of the subjects with modest CURB-65 scores, whether they had diabetes or not, passed away from COVID-19. Table 4 demonstrates statistically significant differences with p<0.001 between the two participants who died with the severe CURB-65 scores and the 36 subjects who died from COVID-19 infection with a moderate score.

DISCUSSION

280 individuals with COVID-19 infections in all were involved in the study; they were split into two groups: 138 individuals with diabetes (n = 138) and 142 individuals without diabetes (n = 142). Comparable average ages of 43.4±2.63 and 44.2±3.12 years were found in study participants with diabetes.

In the current study, there were 90 male and 52 female non-diabetic patients as well as 82 male and 56 female diabetes subjects. The bulk of the participants with diabetes were between the ages of 51 and 60 and 61 and 70. Of these, 52 were in the 51–60 age range, 18 were in the >70 age range, 12 were in the 41–50 age range, and at least 4 were in the 31–40 age range.In non-diabetics, the majority of 36 subjects were between the age of 61-70 years, 34 subjects between 41-50 years, 24 subjects in 51-60 years, 22 subjects <30 years of age, 20 subjects in 31-40 years of age, and 6 subjects in >70 years of age. These findings were comparable to the studies of Nikniaz Z et al[8] in 2021 and Guo J et al[9] in 2020 where authors assessed subjects with demographics comparable to the present study.

The study's findings demonstrated that, with regard to CURB-65 scores in both diabetes and non-diabetic study participants, 65.21% (n = 90) of the group had mild CURB-65 scores, while 97.18% (n = 138) of the group had non-diabetic scores, for a total of 81.42% (n = 228) study participants. Among the entire 16.42% (n=46) study participants, 30.43% (n=42) of them were diabetes individuals and 2.81% (n=4) of non-diabetic subjects had intermediate CURB-65 scores. There were 4.34% (n=6) diabetes participants and no non-diabetic subjects for CURB-65 scores that were classified as severe. For patients with diabetes and those without, the difference in CURB ratings for mild, moderate, and severe cases was statistically significant (p<0.001). These outcomes supported the findings of de Almeida-Pititto B et al. (2002) and Satici C et al. (2020), who found that participants with and without diabetes had similar CURB-65 scores.

ICU admission was required for different research parameters in 24.63% (n=34) of the diabetic participants and 5.63% (n=8) of the non-diabetic subjects; the difference between the two groups was statistically significant (p=0.002). In this study, 4.22% (n=6) of the non-diabetic female individuals and 18.84% (n=26) of the diabetes subjects required ventilatory assistance in the intensive care unit. With p=0.007, this difference was statistically significant. Among these cases, 24.63% (n=34) of the diabetes subjects died while there was no mortality in the non-diabetic subjects, all of whom were admitted to the intensive care unit. This difference in mortality was statistically significant (p<0.0001). The average length of hospital stay for individuals with diabetes was 9.23±5.2 days, whereas for those without the condition it was 7.03±4.28 days. This difference was statistically significant (p=0.005). These results were consistent with those of Han M et al. (2021) and Karimi F et al. (2021), who found that hospital stays were longer and that patients with diabetes had greater mortality rates, ICU admissions, and ventilation needs.

Regarding the study subjects' mortality rates based on their CURB-65 scores, it was observed that none of the subjects with mild CURB-65 scores, whether or not they had diabetes, passed away from COVID-19. 36 subjects with moderate CURB-65 scores perished from COVID-19 infection, and 2 subjects with severe CURB-65 scores perished; these differences were statistically significant (p<0.001). The present study's outcomes were consistent with those of Nguyen Y et al. (2020) and Bradley J et al. (2021), who found similar fatality rates in patients infected with COVID-19.

CONCLUSION

Considering its limitations, the present study concludes that Increased and higher values of CURB-65 scores were seen for subjects having diabetes mellitus and COVID-19 infection compared to non-diabetic subjects with COVID-19 infection. Also, the disease severity was more in subjects with diabetes mellitus and COVID-19 compared to non-diabetics. The study had a few limitations of smaller sample size, cross-sectional nature, and short monitoring warranting further longitudinal studies.

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S. No	Characteristics	Diabetes	
		Yes (n=138)	No (n=142)
1.	**Mean age (years)**	43.4±2.63	44.2±3.12
2.	**Gender**		
a)	Males	82	90
b)	Females	56	52
3.	**Age range (years)**		
a)	<30	0	22
b)	31-40	4	20
c)	41-50	12	34
d)	51-60	52	24
e)	61-70	52	36
f)	>70	18	6

Table 1: Demographic data of diabetic and non-diabetic study subjects

S. No	CURB-65 scores	Diabetes		Total	p-value
		Yes n=138 (%)	No n=142 (%)		
1.	**Mild**	90 (65.21)	138 (97.18)	228 (81.42)	**<0.001**
2.	**Moderate**	42 (30.43)	4 (2.81)	46 (16.42)	
3.	**Severe**	6 (4.34)	0	6 (2.14)	
4.	**Total**	138 (10 0)	142 (100)	280 (100)	

Table 2: Comparison of CURB-65 scores in diabetic and non-diabetic study subjects

S. No	Parameter	Diabetes			p-value
		Yes n=138 (%)	No n=142 (%)	Total	
1.	**ICU**				
a)	Yes	34 (24.63)	8 (5.63)	42 (15)	**0.002**
b)	No	104 (75.36)	134 (94.36)	238 (85)	
c)	Total	138 (100)	142 (100)	280 (100)	
2.	**Ventilation**				
a)	Yes	26 (18.84)	6 (4.22)	32 (11.42)	**0.007**
b)	No	112 (81.15)	136 (95.77)	248 (88.57)	
c)	Total	138 (100)	142 (100)	280 (100)	
3.	**Mortality**				
a)	Yes	34 (24.63)	0	34 (12.14)	**<0.0001**
b)	No	104 (75.36)	142 (100)	246 (87.85)	
c)	Total	138 (100)	142 (100)	280 (100)	

Table 3: Comparison of various parameters in diabetic and non-diabetic study subjects

S. No	CURB-65 scores	Mortality		Total	p-value
		Yes	No		
1.	**Mild**	0	228	228	**<0.001**
2.	**Moderate**	10	36	46	
3.	**Severe**	4	2	6	
4.	**Total**	14	266	280	

Table 4: Mortality rates based on CURB-65 scores in study subjects