Methods:

2.4 Outcome variable

This study evaluated overweight/obesity from BMI score. The BMI score was calculated from respondent’s height (meters) and weight (kilograms). Then, the BMI categorized as binary outcome variable, if, the BMI score greater than 25 kg/m2, the respondents’ are categorized as overweight/obese.

2.5 Explanatory variables

Most of the questions were close ended. So, the respondents choose their answers from a set of pre-defined responses. Further the responses were sorted and coded according to the convenience of analysis. First of all, we categorized respondents age as <18, 18-29, 30-43, and 44+ years age groups. Then the blood group was taken from medical records of the respondents. Data on respondents “Occupation” were collected in open ended then it categorized as “Business”, “Government”, “Health worker”, “Housewife”, and “Unemployed/None”. Information on respondents’ education were collected into four categories (Below SSC, SSC, HSC, and, Bachelor or Higher). We also considered travel history, medical records related to COVID-19, hand washing practices, eating habits, and other risk factors.

2.6 Statistical analyses

In this study, several statistical analyses have been performed to conduct the study such as exploratory data analysis, chi-square test for independence, independent sample t-test and finally binary logistic regression. The exploratory data analysis was performed to summarize the data. The chi-square test is performed to identify the factors associated with the status of overweight/obese of the respondents (p-value ≤ 0.20) as suggested by (Hasan et al., 2020). Finally, logistic regression was conducted to find out the significant variables that works for or works against the overweight/obesity status. The final logistic regression model was multiple in nature and performed with those significant variables found in the individual model and finally the significant factors (p ≤ 0.05) was obtained. Statistical analyses were performed using R software.

Table 1: Chi-square Test

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristics** | **Overweight/Obese** | | | **P-value** |
| **Yes**  **n (%)** | **No**  **n (%)** | **Total**  **n (%)** |
| **Sex** |  |  |  |  |
| Male | 82 (74.55) | 148 (77.49) | 230 (76.41) | 0.662 |
| Female | 28 (25.45) | 43 (22.51) | 71 (23.59) |  |
| **Age group** |  |  |  |  |
| <18 | 8 (7.27) | 18 (9.42) | 26 (8.64) | 0.008 |
| 18-29 | 43 (39.09) | 40 (20.94) | 83 (27.57) |  |
| 30-43 | 40 (36.36) | 84 (43.98) | 124 (41.20) |  |
| 44+ | 19 (17.27) | 49 (25.65) | 68 (22.59) |  |
| **Blood group** |  |  |  |  |
| A | 29 (26.36) | 54 (28.27) | 83 (27.57) | 0.077 |
| AB | 10 (9.09) | 33 (17.28) | 43 (14.29) |  |
| B | 40 (36.36) | 70 (36.65) | 110 (36.54) |  |
| O | 31 (28.18) | 34 (17.80) | 65 (21.59) |  |
| **Education** |  |  |  |  |
| Bachelor or Higher | 36 (32.73) | 84 (43.98) | 120 (39.87) | 0.114 |
| Below SSC | 32 (29.09) | 35 (18.32) | 67 (22.26) |  |
| HSC | 31 (28.18) | 55 (28.80) | 86 (28.57) |  |
| SSC | 11 (10.00) | 17 (8.90) | 28 (9.30) |  |
| **Coronavirus treatment** |  |  |  |  |
| No | 101 (91.82) | 174 (91.10) | 275 (91.36) | 0.994 |
| Yes | 9 (8.18) | 17 (8.90) | 26 (8.64) |  |
| **Occupation** |  |  |  |  |
| Business | 26 (23.64) | 44 (23.04) | 70 (23.26) | 0.318 |
| Government | 18 (16.36) | 25 (13.09) | 43 (14.29) |  |
| Health worker | 5 (4.55) | 17 (8.90) | 22 (7.31) |  |
| Housewife | 20 (18.18) | 22 (11.52) | 42 (13.95) |  |
| None | 17 (15.45) | 41 (21.47) | 58 (19.27) |  |
| Private | 24 (21.82) | 42 (21.99) | 66 (21.93) |  |
| **Travel history** |  |  |  |  |
| Bank | 8 (7.27) | 5 (2.62) | 13 (4.32) | 0.035 |
| Health care facility | 11 (10.00) | 30 (15.71) | 41 (13.62) |  |
| None/Home | 3 (2.73) | 1 (0.52) | 4 (1.33) |  |
| Local market | 53 (48.18) | 98 (51.31) | 151 (50.17) |  |
| Relative’s house | 17 (15.45) | 16 (8.38) | 33 (10.96) |  |
| Workplace | 18 (21.47) | 41 (21.47) | 59 (19.60) |  |
| **Hand wash with soup (/day)** |  |  |  |  |
| 11-15 times | 29 (26.36) | 58 (30.37) | 87 (28.90) | 0.639 |
| 16-20 times | 2 (1.82) | 5 (2.62) | 7 (2.33) |  |
| 5-10 times | 64 (58.18) | 110 (57.59) | 174 (57.81) |  |
| Less than 5 | 14 (12.73) | 15 (7.85) | 29 (9.63) |  |
| More than 20 times | 1 (0.91) | 3 (1.57) | 4 (1.33) |  |
| **Hand wash with handwashing solution (/day)** |  |  |  |  |
| 11-15 times | 5 (4.55) | 3 (1.57) | 8 (2.66) | 0.488 |
| 16-20 times | 13 (11.82) | 18 (9.42) | 31 (10.30) |  |
| 5-10 times | 17 (15.45) | 29 (15.18) | 46 (15.28) |  |
| Less than 5 | 73 (66.36) | 139 (72.77) | 212 (70.43) |  |
| More than 20 times | 2 (1.82) | 2 (1.05) | 4 (1.33) |  |
| **Hand wash with hand sanitizer (/day)** |  |  |  |  |
| 11-15 times | 21 (19.09) | 44 (23.04) | 65 (21.59) | 0.476 |
| 16-20 times | 0 (0.00) | 3 ( 1.57) | 3 (1.00) |  |
| 5-10 times | 34 (30.91) | 46 (24.08) | 80 (26.58) |  |
| Less than 5 | 53 (48.18) | 95 (49.74) | 148 (49.17) |  |
| More than 20 times | 2 (1.82) | 3 (1.82) | 5 (1.66) |  |
| **Hand wash with just water (/day)** |  |  |  |  |
| 11-15 times | 22 (20.00) | 39 (20.42) | 61 (20.27) | 0.649 |
| 16-20 times | 5 (4.55) | 7 ( 3.66) | 12 (3.99) |  |
| 5-10 times | 41 (37.27) | 69 (36.13) | 110 (36.54) |  |
| Less than 5 | 42 (38.18) | 72 (37.70) | 114 (37.87) |  |
| More than 20 times | 0 (0.00) | 4 (2.09) | 4 (1.33) |  |
| **Fruits** |  |  |  |  |
| Frequently | 81 (73.64) | 147 (76.96) | 228 (75.75) | 0.1842 |
| Occasionally | 24 (21.82) | 30 (15.71) | 54 (17.94) |  |
| Rarely | 4 (3.64) | 5 (2.62) | 9 (2.99) |  |
| Very frequently | 1 (0.91) | 9 (4.71) | 10 (3.32) |  |
| **Protein food** |  |  |  |  |
| Frequently | 75 (68.18) | 130 (68.06) | 205 (68.11) | 0.561 |
| Occasionally | 10 (9.09) | 14 (7.33) | 24 (7.97) |  |
| Rarely | 4 (3.64) | 3 (1.57) | 7 (2.33) |  |
| Very frequently | 21 (19.09) | 44 (23.04) | 65 (21.59) |  |
| **Vitamin Supplement** |  |  |  |  |
| Frequently | 9 (8.18) | 12 (6.28) | 21 (6.98) | 0.890 |
| Occasionally | 31 (28.18) | 58 (30.37) | 89 (29.57) |  |
| Rarely | 69 (62.73) | 120 (62.83) | 189 (62.79) |  |
| Very frequently | 1 (0.91) | 1 (0.52) | 2 (0.66) |  |
| **Water** |  |  |  |  |
| Frequently | 70 (63.64) | 131 (68.59) | 201 (66.78) | 0.346 |
| Occasionally | 5 (4.55) | 3 (1.57) | 8 (2.66) |  |
| Rarely | 2 (1.82) | 6 (3.14) | 8 (2.66) |  |
| Very frequently | 33 (30.00) | 51 (26.70) | 84 (27.91) |  |
| **Exercise** |  |  |  |  |
| Always/Very F | 20 (18.18) | 51 (26.70) | 71 (23.59) | 0.154 |
| Frequently | 4 (3.64) | 4 (2.09) | 8 (2.66) |  |
| Rarely | 29 (26.36) | 34 (17.80) | 63 (20.93) |  |
| Occasionally | 57 (51.82) | 102 (53.40) | 159 (52.82) |  |
| **Symptoms** |  |  |  |  |
| No | 49 (44.55) | 67 (35.08) | 116 (38.54) | 0.133 |
| Yes | 61 (55.45) | 124 (64.92) | 185 (61.46) |  |
| **Exposed by positive patients** |  |  |  |  |
| No | 75 (76.44) | 146 (68.18) | 221 (73.42) | 0.154 |
| Yes | 35 (23.56) | 45 (31.82) | 80 (26.58) |  |
| **Others risk factors** |  |  |  |  |
| No | 73 (66.36) | 140 (66.36) | 213 (70.76) | 0.253 |
| Yes | 37 (33.64) | 51 (33.64) | 88 (29.24) |  |

The findings of the study revealed that (about 7.27% respondents were overweight/obese and less than 18 years old. Most of the respondents were from 18-29 years old (39.09%) and overweight/obese. About 36.36% of the overweight/obese respondents were from blood group “B” and it followed by “O” (28.18%), “A” (26.36%), and “AB” (9.09%). Majority of the overweight/obese respondents are bachelor or higher degree holder (32.73%). Maximum respondents (48.18%) reported they travelled local market before COVID-19 and they are also overweight/obese. More than half of the respondents (73.64%) frequently eats fruits and they are overweight/obese. About 52% respondents were obese who exercise occasionally. Less than 50% of the respondents haven’t any COVID-19 symptoms who were overweight/obese. 23.56% overweight/obese patients exposed by positive patients. An overview of various factors associated with the respondents BMI status has demonstrated in Table 1. No association was found between COVID-19 treatment, occupation, handwashing with soup, handwashing with handwashing solution, handwashing with hand sanitizer, handwashing with just water, protein food taking, Vitamin supplement taking, water taking, and other risk factors with of the respondents BMI status (p > 0.20). Respondents’ age group, blood group, education, travel history, fruits, exercise, and symptoms showed a significant association among the respondents BMI status (Table 1).

Table 2: Logistic Regression

|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristics** | **Coefficient** | **OR (95% CI)** | **P-value** |
| **Age group** |  |  |  |
| <18 | Reference | - | - |
| 18-29 | 0.214 | 1.24 (1.01 - 1.53) | 0.047\* |
| 30-43 | 0.029 | 1.03 (0.84 - 1.26) | 0.779 |
| 44+ | -0.030 | 0.97 (0.78 - 1.21) | 0.788 |
| **Blood group** |  |  |  |
| A | Reference | - | - |
| AB | -0.17382 | 0.84 (0.70 - 1.01) | 0.058 |
| B | -0.04268 | 0.96 (0.84 - 1.10) | 0.542 |
| O | 0.06381 | 1.07 (0.91 - 1.25) | 0.423 |
| **Education** |  |  |  |
| Bachelor or Higher | Reference | - | - |
| Below SSC | 0.129 | 1.14 (0.96 - 1.35) | 0.139 |
| HSC | 0.083 | 1.09 (0.95 - 1.25) | 0.231 |
| SSC | 0.043 | 1.0 (0.85 - 1.28) | 0.668 |
| **Travel history** |  |  |  |
| Bank | 0.402 | 1.50 (1.12 - 1.99) | 0.006\*\* |
| Health care facility | -0.029 | 0.97 (0.80 - 1.17) | 0.768 |
| None/Home | 0.331 | 1.39 (0.85 - 2.27) | 0.184 |
| Local market | 0.066 | 1.07 (0.92 - 1.24) | 0.371 |
| Relative’s house | 0.149 | 1.16 (0.94 - 1.43) | 0.166 |
| Workplace | Reference | - | - |
| **Fruits** |  |  |  |
| Frequently | 0.293 | 1.34 (0.99 - 1.81) | 0.058 |
| Occasionally | 0.334 | 1.40 (1.01 - 1.93) | 0.046\* |
| Rarely | 0.337 | 1.40 (0.90 - 2.18) | 0.134 |
| Very frequently | Reference |  |  |
| **Exercise** |  |  |  |
| Always/Very F | Reference | - | - |
| Frequently | 0.155 | 1.17 (0.82 1.66) | 0.395 |
| Rarely | 0.048 | 1.05 (0.87 - 1.26) | 0.602 |
| Occasionally | 0.021 | 1.02 (0.89 - 1.17) | 0.761 |
| **Symptoms** |  |  |  |
| No | Reference | - | - |
| Yes | -0.082 | 0.92 (0.82 - 1.04) | 0.188 |
| **Exposed by positive patients** |  |  |  |
| No | Reference | - | - |
| Yes | 0.057 | 1.06 (0.93 - 1.20) | 0.381 |

In the overall model (Table 2), only age group of respondents (p-value = 0.047), travel history (p-value = 0.006) and fruits taking (p-value = 0.046) were found to be statistically significant variables. However, it was found that the respondents from 18-29 years’ age group were 1.24 times more likely to overweight/obese than the respondents from less than 18 years old [OR= 1.24, 95% confidence interval (CI): 1.01-1.53)]. Travel history of bank showed a significant positive relationship with the BMI status [OR= 1.50, CI: 1.12-1.99]. The result indicated that for travel history of bank are more overweight/obese than the people who travel workplace before COVID-19 infections. The respondents take fruit occasionally were 1.40 times more likely to overweight/obese [OR= 1.40, CI: 1.01-1.93].

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| --- |
|  |
| Fig |
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| Fig |

The r-squared values of Fig 1 revealed that 21%, 29%, and 24% of the variability observed in the target variable BMI is explained by the regression models, respectively.