**Answer:**

First, we extracted the relevant data into a contingency table showing the observed frequencies and an extra row for the column totals. From the column totals we can see that overall 62% of children had normal weight. The null hypothesis is that the percentage of children of normal weight versus overweight/obese is the same across all three categories of mother’s BMI. Therefore, under the null hypothesis I we expect 62% of the children to be of normal weight in all three of the mother’s BMI categories. We can calculate the expected number of normal children by multiplying 0.62 times the total number for each BMI category. We inserted these (in parentheses) into the contingency table beneath the corresponding observed count. The number of overweight/obese children in each BMI category was then calculated by subtracting the expected normal number from the total for the BMI category.

|  |  |  |  |
| --- | --- | --- | --- |
| **Mother’s BMI** | Child Normal | Child Over | Total |
| Normal (BMI<25) | 40 (34.7) | 16 (21.3) | 56 |
| Overweight (BMI 25-29.9) | 15 (18) | 14 (11) | 29 |
| Obese (BMI > 30) | 7 (9.3) | 8 (5.7) | 15 |
| Column Totals | 62 | 38 | 100 |

Next, we used the formula to calculate x2.

df=(r-1)\*(c-1),

Next, we calculate x2:

df =(3-1) \* (2-1) = 2

> 1-pchisq(4.95,2)

[1] 0.08416299

The p-value = 0.084, so the differences did not quite achieve the ≤ 0.05 criterion. It is possible that there is an association, and we might be committing a type II error. We might want to repeat the study with a larger sample size.