# CHAPTER SIX

# PERFORMANCE OF METHODS IN MEDIUM

# SAMPLES

## 6.1 Introduction:

This chapter compares the performance of the three methods for medium sample sizes. Arbitrarily, these are defined as samples of size 40, 60, 80 and 100. The approach adopted in chapter five will be adhered to here.

## 6.2 Sample of Size 40:

In this section, imbalance of simulation data for three methods with sample size 40 is shown and discussed. Table 25 below represented as example from appendix A to show the imbalance data for three methods for the 1st single layer.
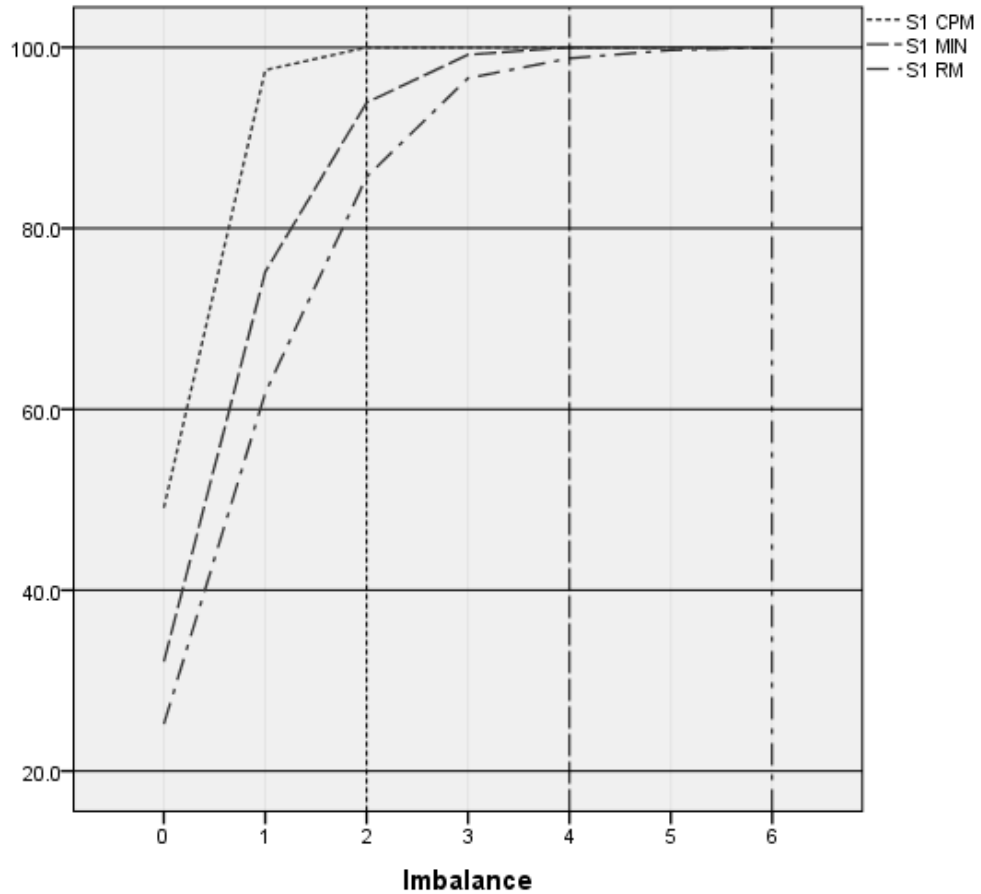
Table (25)

The frequency and percentages of imbalance of CPM, MIN and RM

for the 1$^{st}$ single layer when sample size

is 40. (Simulation repeated 1000 times)

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 491 | 49.1 | 321 | 32.1 | 252 | 25.2 |
| 1 | 484 | 48.4 | 431 | 43.1 | 366 | 36.6 |
| 2 | 25 | 2.5 | 187 | 18.7 | 239 | 23.9 |
| 3 | 0 | 0.0 | 53 | 5.3 | 109 | 10.9 |
| 4 | 0 | 0.0 | 8 | 0.8 | 22 | 2.2 |
| 5 | 0 | 0.0 | 0 | 0.0 | 9 | 0.9 |
| 6 | 0 | 0.0 | 0 | 0.0 | 3 | 0.3 |

It is clear that from table (25), the trials which have full balance
from 1000 trials are 49.1% of CPM trials, compared with 32.1% of
MIN trials and 25.2% of RM trials. The maximum imbalance is 2 in
CPM compared with 4 in MIN and 6 in RM.

The following graph displays the imbalance and its cumulative
percent for three methods to make the comparison clear.

Graph (6.1): The imbalance for randomization methods.

From table (25) and graph (6.1), it is clear that CPM has the least amount of imbalance compared with MIN and RM. So, CPM is the best method in this case which achieve the best imbalance.

Tables from (26) to (36) in appendix A show the imbalance data for $2^{nd}$ to $12^{th}$ single layers with sample size 40 categorized by randomization method.

In the $2^{nd}$ single layer, the trials which have full balance are 48.4% in CPM compared by 31.0% in MIN and 27.0% in RM. The maximum imbalance in CPM is 3, and in MIN is 4 compared with 6 in RM. In the $3^{rd}$ single layer 60.7% of CPM trials have full balance while MIN has 57.4% and RM has 56.0% full balance trials. And the maximum imbalance is 2 in both of CPM and MIN compared with 4 in RM.

In the $4^{th}$ single layer, the full balance is 56.4%, 52.4% and 50.7% for CPM, MIN and RM respectively. While the maximum imbalance equal 2 in both of CPM and MIN compared with 3 in RM. The $5^{th}$ single layer has 47.5%, 22.6% and 16.4% full balance for CPM, MIN and RM respectively. But the maximum imbalance is a little bit more in this layer for MIN and RM when is 6 and 8 respectively, while is just 3 in CPM. Full balance in the $6^{th}$ single layer is obviously different between the methods, while is 45.2% in CPM compared with 22.7% in MIN and 16.1% in RM. As well, maximum imbalance is 3 in CPM, but 6 in MIN and 8 in RM. In the $7^{th}$ single layer 47.7% of CPM trials have full balance compared with 30.0% for MIN and 26.9% for RM. And the maximum imbalance is 3 for CPM compared with 4 for MIN and 6 for RM.

In contrast to MIN and RM, CPM has high full balance trials in the 8$^{th}$ single layer when is 47.4% compared with 29.9% and 25.4% in MIN and RM respectively. And the maximum imbalance is 2, 5 and 6 for three methods by the same above ordered. In the 9$^{th}$ single layer the full balance is 62.5% in CPM, 59.6% in MIN and 57.6% in RM. And the maximum imbalance is 2 in CPM while is 3 in both of MIN and RM. 61.2% of CPM and 58.3% of MIN trials have full balance in the 10$^{th}$ single layer compared with 56.8% in RM. In this layer, the imbalance increased up to 3 in RM and MIN trials whilst is 2 in CPM. 45.7% is the percentage of full balance trials in the 11$^{th}$ single layer whereat trials have done by CPM compared with 22.8% in MIN and 16.3% in RM. The maximum imbalance is 2 in CPM, 7 in MIN and 9 in RM. In the last single layer with sample size 40, the differences in full balance between methods are obvious. Whereat is 47.0% in CPM, 19.9% in MIN and 15.7% in RM. And there is a wide range in maximum imbalance, where is 3 in CPM compared with 6 in MIN and 10 in RM.

The following graph displays the mean and stander deviation of imbalance for randomization methods for single layers with sample size 40.
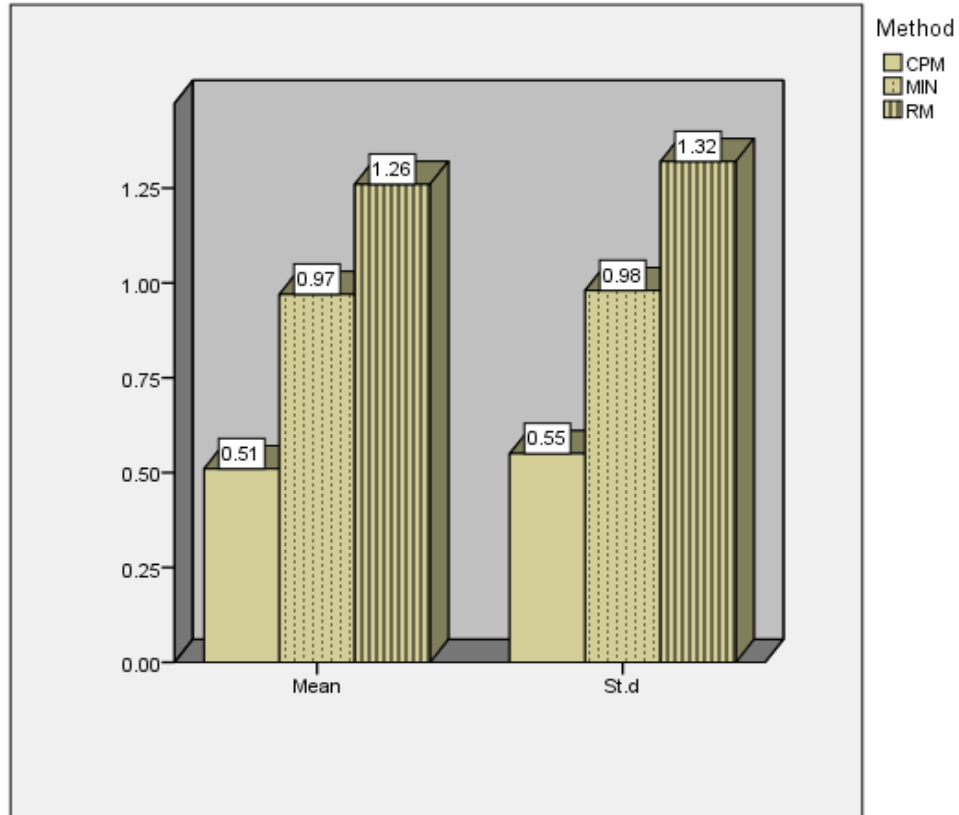
Graph (6.2): The mean and St.d for single layers with sample size 40 by randomization methods.

The following table displays the amount of imbalance with frequency and percentages by randomization methods with sample size 40 for total assigning in treatments A and B.

Table (6.1)

The amount of imbalance for total assigning with sample size 40 by

randomization methods.

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 668 | 66.8 | 786 | 78.6 | 111 | 11.1 |
| 2 | 325 | 32.5 | 214 | 21.4 | 249 | 24.9 |
| 4 | 7 | 0.7 | 0 | 0.0 | 193 | 19.3 |
| 6 | 0 | 0.0 | 0 | 0.0 | 151 | 15.1 |
| 8 | 0 | 0.0 | 0 | 0.0 | 126 | 12.6 |
| 10 | 0 | 0.0 | 0 | 0.0 | 83 | 8.3 |
| 12 | 0 | 0.0 | 0 | 0.0 | 45 | 4.5 |
| 14 | 0 | 0.0 | 0 | 0.0 | 22 | 2.2 |
| 16 | 0 | 0.0 | 0 | 0.0 | 13 | 1.3 |
| 18 | 0 | 0.0 | 0 | 0.0 | 5 | 0.5 |
| 20 | 0 | 0.0 | 0 | 0.0 | 1 | 0.1 |
| 22 | 0 | 0.0 | 0 | 0.0 | 1 | 0.1 |

From table (6.2) above is clear that, the imbalance of total assigning

of patients between treatments when sample size is 40 is not more

than 4 in CPM compared with 2 in MIN while is 22 in RM.

The following graph displays above data to be easy in comparison.
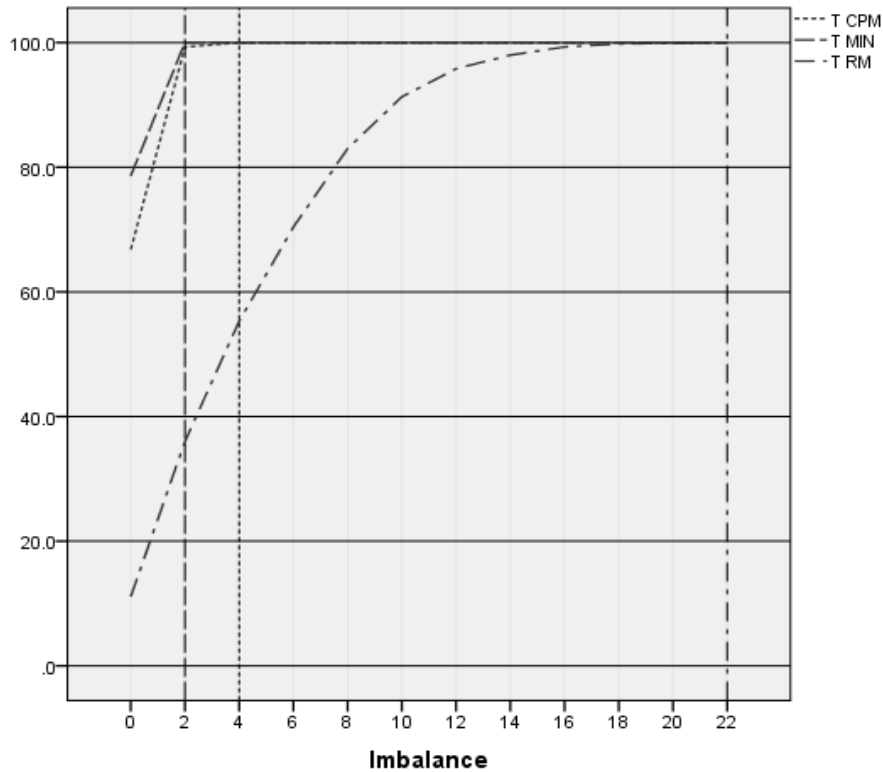


Graph (6.3): The amount of imbalance for total assigning with sample size 40 by methods.

The data in this section clearly show that, in all single layers, CPM has the least imbalance in contrast to MIN and RM. On the other hand, in the total assigning, MIN is a bit better than CPM according to their imbalance. And RM has the maximum imbalance whatever.

## 6.3 Sample of Size 60:

In this section, imbalance of simulation data for three methods with sample size 60 is displayed and discussed. Table 37 below represented as example from appendix A to show the imbalance data for three methods for the $1^{st}$ single layer.
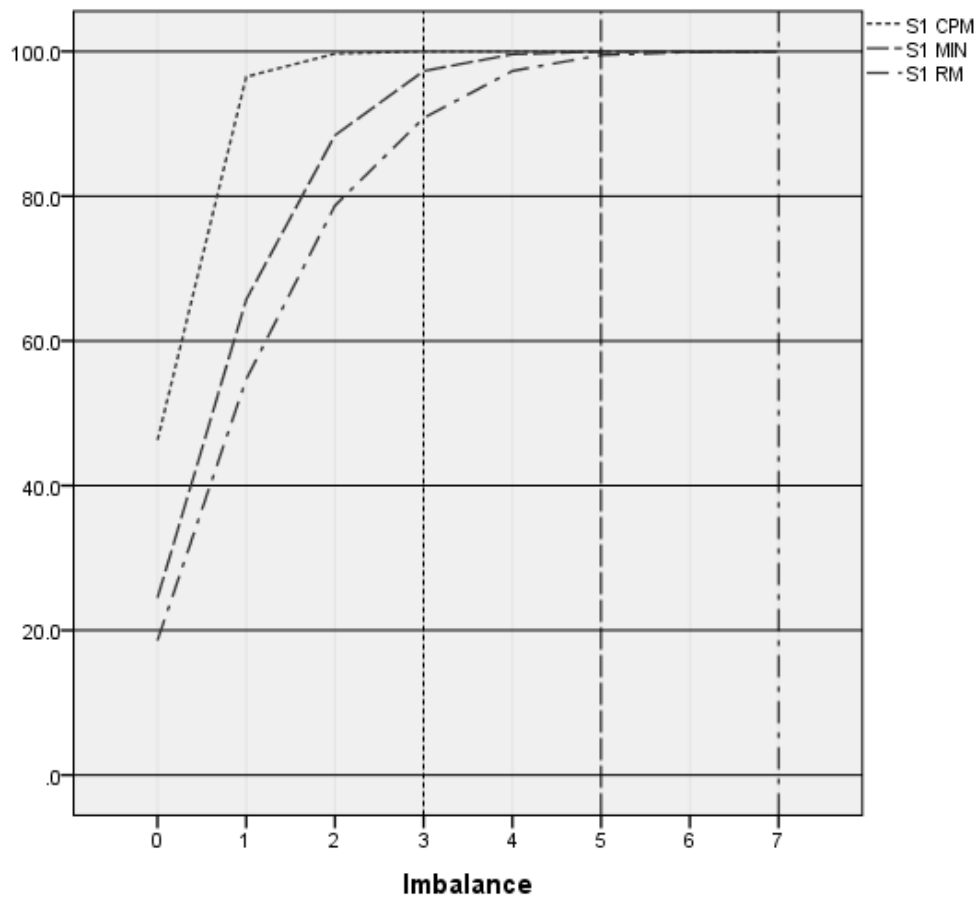
Table (37)

Show the frequency and percentages of imbalance of CPM, MIN and RM for the $1^{st}$ single layer when sample size is 60. (Simulation repeated 1000 times)

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 463 | 46.3 | 245 | 24.5 | 186 | 18.6 |
| 1 | 502 | 50.2 | 412 | 41.2 | 361 | 36.1 |
| 2 | 32 | 3.2 | 227 | 22.7 | 240 | 24.0 |
| 3 | 3 | 0.3 | 89 | 8.9 | 121 | 12.1 |
| 4 | 0 | 0.0 | 23 | 2.3 | 65 | 6.5 |
| 5 | 0 | 0.0 | 4 | 0.4 | 22 | 2.2 |
| 6 | 0 | 0.0 | 0 | 0.0 | 4 | 0.4 |
| 7 | 0 | 0.0 | 0 | 0.0 | 1 | 0.1 |

It is clear that from table (37), the trials which have full balance from 1000 trials are 46.3% of CPM trials, compared with 24.5% of MIN trials and 18.6% of RM trials. The maximum imbalance is 3 in CPM compared with 5 in MIN and 7 in RM.

The following graph displays the imbalance and its cumulative percent for three methods to make the comparison clear.



Graph (6.4): The imbalance for randomization methods.

From table 37 and graph (6.4), it is clear that CPM has the least amount of imbalance compared with MIN and RM. So, CPM is the best method in this case which achieve the best imbalance.

Tables from (38) to (48) in appendix A show the imbalance data for $2^{nd}$ to $12^{th}$ single layers with sample size 60 categorized by randomization method.

In the $2^{nd}$ single layer, the trials which have full balance are 47.6% in CPM compared by 24.4% in MIN and 22.0% in RM. The maximum imbalance in CPM is 3, and in MIN is 6 compared with 7 in RM. In the $3^{rd}$ single layer 55.3% of CPM trials have full balance while MIN has 48.1% and RM has 45.1% full balance trials. And the maximum imbalance is 2 in CPM, 3 in MIN compared with 4 in RM.

In the $4^{th}$ single layer, the full balance is 56.4%, 49.0% and 45.8% for CPM, MIN and RM respectively. While the maximum imbalance equal 2 in both of CPM and MIN compared with 3 in RM. The $5^{th}$ single layer has 46.3%, 19.4% and 11.2% full balance for CPM, MIN and RM respectively. The maximum imbalance is more in this layer for MIN and RM when is 7 and 10 respectively, while is just 3 in CPM. Full balance in the $6^{th}$ single layer is

obviously different between the methods, while is 46.1% in CPM compared with 17.3% in MIN and 15.2% in RM. As well, maximum imbalance is 3 in CPM, but 7 in MIN and 10 in RM. In the 7th single layer 50.3% of CPM trials have full balance compared with 27.3% for MIN and 23.5% for RM. And the maximum imbalance is 3 for CPM compared with 5 for MIN and 7 for RM.

In contrast to MIN and RM, CPM has high full balance trials in the 8th single layer when is 49.4% compared with 26.1% and 21.7% in MIN and RM respectively. And the maximum imbalance is 3, 6 and 7 for three methods by the same above ordered. In the 9th single layer the full balance is 53.0% in CPM, 45.3% in MIN and 44.5% in RM. And the maximum imbalance is 2 in CPM, 3 in MIN and 4 in RM. 52.9% of CPM and 45.9% of MIN trials have full balance in the 10th single layer compared with 43.1% in RM. In this layer, the imbalance increased up to 4 in RM, 3 in MIN and 2 in CPM. 43.4% is the percentage of full balance trials in the 11th single layer whereat trials have done by CPM compared with 15.8% in MIN and 12.1% in RM. The maximum imbalance is 2 in CPM, 6 in MIN and 11 in RM. In the last single layer with sample size 60, the differences in full balance between methods are obvious. Whereat is

42.1% in CPM, 15.6% in MIN and 12.1% in RM. And there is a wide range in maximum imbalance, where is 3 in CPM compared with 8 in MIN and 11 in RM.

The following graph displays the mean and stander deviation of imbalance for randomization methods for single layers with sample size 60.
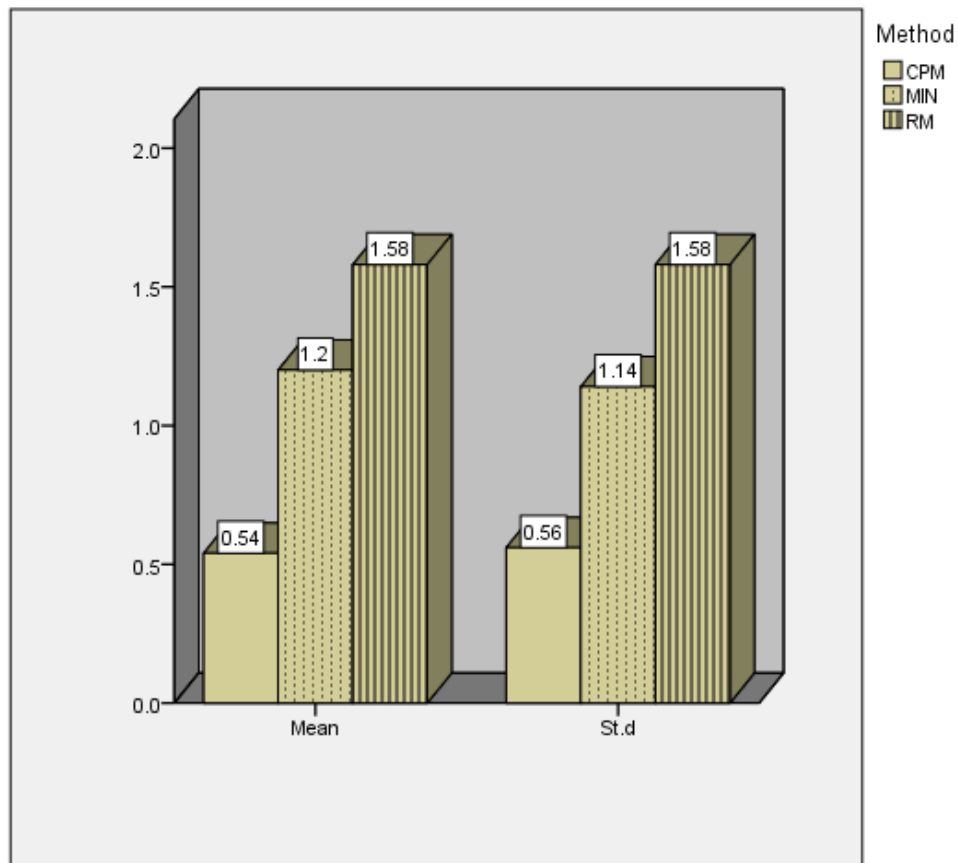


Graph (6.5): Display the mean and St.d for single layers with sample size 60 by randomization methods.

The following table displays the amount of imbalance with frequency and percentages by randomization methods with sample size 60 for total assigning in treatments A and B.

Table (6.2)

The amount of imbalance for total assigning with sample size 60 by randomization methods.

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 624 | 62.4 | 808 | 80.8 | 101 | 10.1 |
| 2 | 358 | 35.8 | 192 | 19.2 | 189 | 18.9 |
| 4 | 17 | 1.7 | 0 | 0.0 | 177 | 17.7 |
| 6 | 1 | 0.1 | 0 | 0.0 | 143 | 14.3 |
| 8 | 0 | 0.0 | 0 | 0.0 | 139 | 13.9 |
| 10 | 0 | 0.0 | 0 | 0.0 | 92 | 9.2 |
| 12 | 0 | 0.0 | 0 | 0.0 | 61 | 6.1 |
| 14 | 0 | 0.0 | 0 | 0.0 | 40 | 4.0 |
| 16 | 0 | 0.0 | 0 | 0.0 | 24 | 2.4 |
| 18 | 0 | 0.0 | 0 | 0.0 | 20 | 2.0 |
| 20 | 0 | 0.0 | 0 | 0.0 | 10 | 1.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 22 | 0 | 0.0 | 0 | 0.0 | 2 | 0.2 |
| 24 | 0 | 0.0 | 0 | 0.0 | 2 | 0.2 |

From table (6.2) above is clear that, the imbalance of total assigning of patients between treatments when sample size is 60 is not more than 6 in CPM compared with 2 in MIN while is 24 in RM.

The following graph displays above data to be easy in comparison.
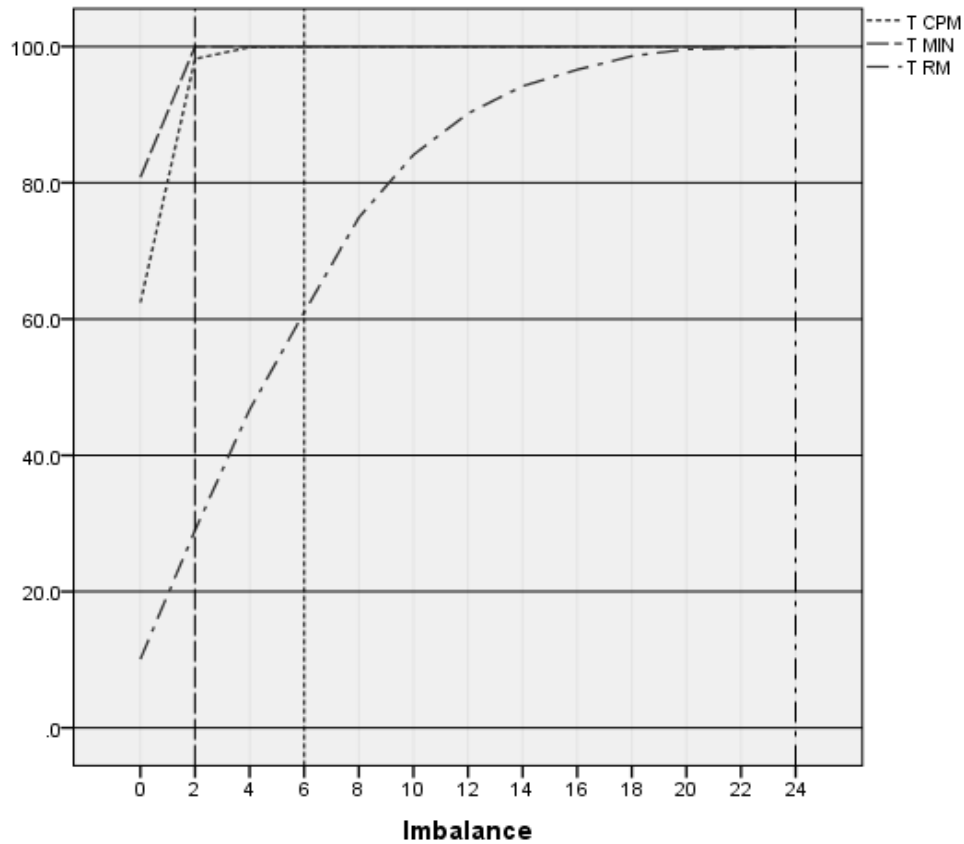


Graph (6.6): The amount of imbalance for total assigning with sample size 60 by methods.

The data in this section clearly show that, in all single layers, CPM has the least imbalance in contrast to MIN and RM. On the other hand, in the total assigning, MIN is a bit better than CPM according to their imbalance. And RM has the maximum imbalance whatever.

## 6.4 Sample of Size 80:

In this section, imbalance of simulation data for three methods with sample size 80 is shown and discussed. Table 49 below represented as example from appendix A to show the imbalance data for three methods for the 1$^{st}$ single layer.
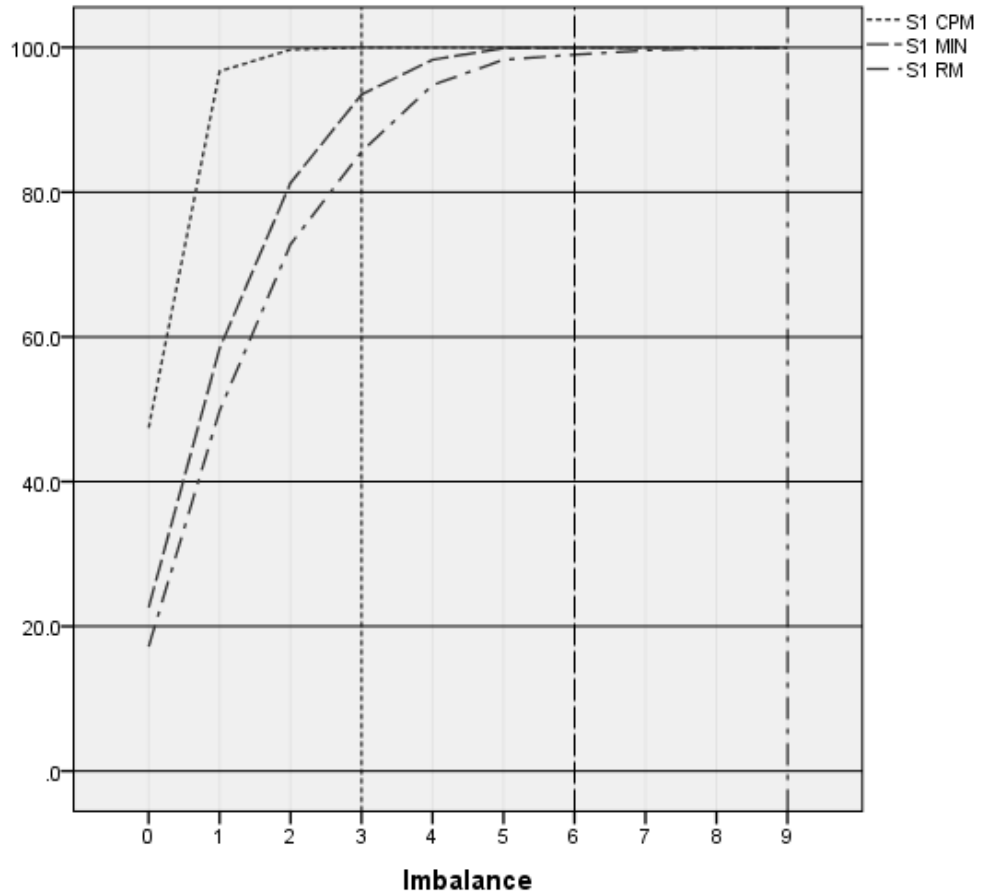
Table( 49)

The frequency and percentages of imbalance of CPM, MIN and RM for the 1$^{st}$ single layer when sample size is 80. (Simulation repeated 1000 times)

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 474 | 47.4 | 226 | 22.6 | 172 | 17.2 |
| 1 | 493 | 49.3 | 358 | 35.8 | 326 | 32.6 |
| 2 | 30 | 3.0 | 229 | 22.9 | 230 | 23.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | 3 | 0.3 | 122 | 12.2 | 128 | 12.8 |
| 4 | 0 | 0.0 | 48 | 4.8 | 92 | 9.2 |
| 5 | 0 | 0.0 | 16 | 1.6 | 35 | 3.5 |
| 6 | 0 | 0.0 | 1 | 0.1 | 7 | 0.7 |
| 7 | 0 | 0.0 | 0 | 0.0 | 6 | 0.6 |
| 8 | 0 | 0.0 | 0 | 0.0 | 3 | 0.3 |
| 9 | 0 | 0.0 | 0 | 0.0 | 1 | 0.1 |

It is clear that from table (49), the trials which had full balance from 1000 trials are 47.4% of CPM trials, compared with 22.6% of MIN trials and 17.2% of RM trials. The maximum imbalance is 3 in CPM compared with 6 in MIN and 9 in RM.

The following graph displays the imbalance and its cumulative percent for three methods to make the comparison clear.

Graph (6.7): The imbalance for randomization methods.

From table (49) and graph (6.7), it is clear that CPM has the least amount of imbalance compared with MIN and RM. So, CPM is the best method in this case which achieve the minimum imbalance.

Tables from (50) to (60) in appendix A show the imbalance data for $2^{nd}$ to $12^{th}$ single layers with sample size 80 categorized by randomization method.

In the $2^{nd}$ single layer, the trials which have full balance are 47.4% in CPM compared by 23.2% in MIN and 19.7% in RM. The maximum imbalance in CPM is 3 and in MIN is 7 compared with 8 in RM. In the $3^{rd}$ single layer 50.4% of CPM trials have full balance while MIN has 40.3% and RM has 36.1% full balance trials. And the maximum imbalance is 2 in CPM, 4 in MIN and 5 in RM.

In the $4^{th}$ single layer, the full balance is 50.8%, 41.3% and 39.4% for CPM, MIN and RM respectively. While the maximum imbalance equal 4 in both of MIN and RM compared with 2 in CPM. The $5^{th}$ single layer has 47.0%, 17.2% and 11.2% full balance for CPM, MIN and RM respectively. But the maximum imbalance is more in this layer for MIN and RM when is 8 and 12 respectively, while is just 3 in CPM. Full balance in the $6^{th}$ single layer is obviously different between the methods, while is 46.7% in CPM compared with 14.4% in MIN and 10.6% in RM. As well, maximum imbalance is 3 in CPM, but 9 in MIN and 12 in RM. In the $7^{th}$ single layer 47.5% of CPM trials have full balance compared with 21.9% for MIN and 17.4% for RM. And the maximum imbalance is 3 for CPM compared with 6 for MIN and 8 for RM.

In contrast to MIN and RM, CPM has high full balance trials in the $8^{th}$ single layer when is 45.8% compared with 21.5% and 18.0% in MIN and RM respectively. And the maximum imbalance is 3, 7 and 8 for three methods by the same above ordered. In the $9^{th}$ single layer the full balance is 52.5% in CPM, 43.0% in MIN and 37.8% in RM. And the maximum imbalance is 2 in CPM while is 3 in MIN and 5 in RM. 51.4% of CPM and 42.9% of MIN trials have full balance in the $10^{th}$ single layer compared with 39.8% in RM. In this layer, the imbalance increased up to 4 in MIN and RM trials whilst is 2 in CPM trials. 46.8% is the percentage of full balance trials in the $11^{th}$ single layer whereat trials have done by CPM compared with 14.4% in MIN and 9.9% in RM. The maximum imbalance is 3 in CPM, 9 in MIN and 12 in RM. In the last single layer with sample size 80, the differences in full balance between methods are obvious. Whereat is 50.1% in CPM, 15.5% in MIN and 11.4% in RM. And there is a wide range in maximum imbalance where is 3 in CPM compared with 9 in MIN and 12 in RM.

The following graph displays the mean and stander deviation of imbalance for randomization methods for single layers with sample size 80.
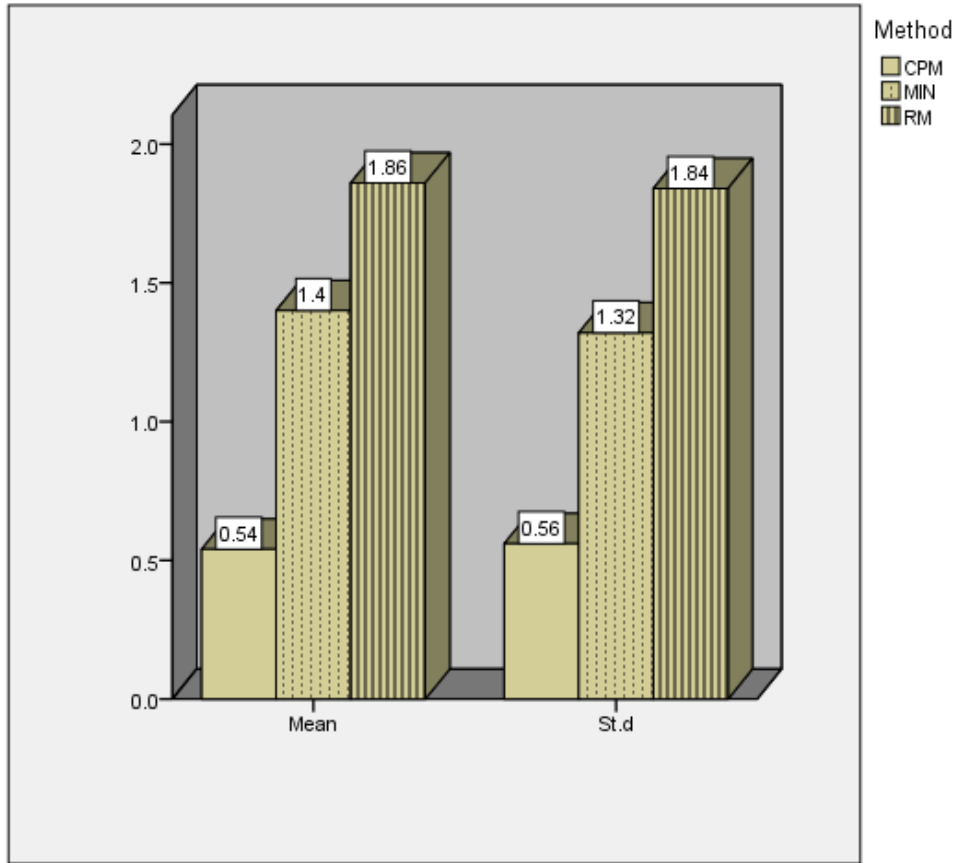
Graph (6.8):The mean and St.d for single layers with sample size 80 by randomization methods.

The following table displays the amount of imbalance with frequency and percentages by randomization methods with sample size 80 for total assigning in treatments A and B.

Table (6.3)

Show the amount of imbalance for total assigning with sample size

80 by randomization methods.

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 678 | 67.8 | 798 | 79.8 | 101 | 10.1 |
| 2 | 308 | 30.8 | 202 | 20.2 | 166 | 16.6 |
| 4 | 14 | 1.4 | 0 | 0.0 | 163 | 16.3 |
| 6 | 0 | 0.0 | 0 | 0.0 | 119 | 11.9 |
| 8 | 0 | 0.0 | 0 | 0.0 | 113 | 11.3 |
| 10 | 0 | 0.0 | 0 | 0.0 | 101 | 10.1 |
| 12 | 0 | 0.0 | 0 | 0.0 | 74 | 7.4 |
| 14 | 0 | 0.0 | 0 | 0.0 | 68 | 6.8 |
| 16 | 0 | 0.0 | 0 | 0.0 | 36 | 3.6 |
| 18 | 0 | 0.0 | 0 | 0.0 | 25 | 2.5 |
| 20 | 0 | 0.0 | 0 | 0.0 | 10 | 1.0 |
| 22 | 0 | 0.0 | 0 | 0.0 | 13 | 1.3 |
| 24 | 0 | 0.0 | 0 | 0.0 | 11 | 1.1 |

From table (6.3) above is clear that, the imbalance of total assigning of patients between treatments when sample size is 80 is not more than 4 in CPM compared with 2 in MIN while is 24 in RM.

The following graph displays above data to be easy in comparison.
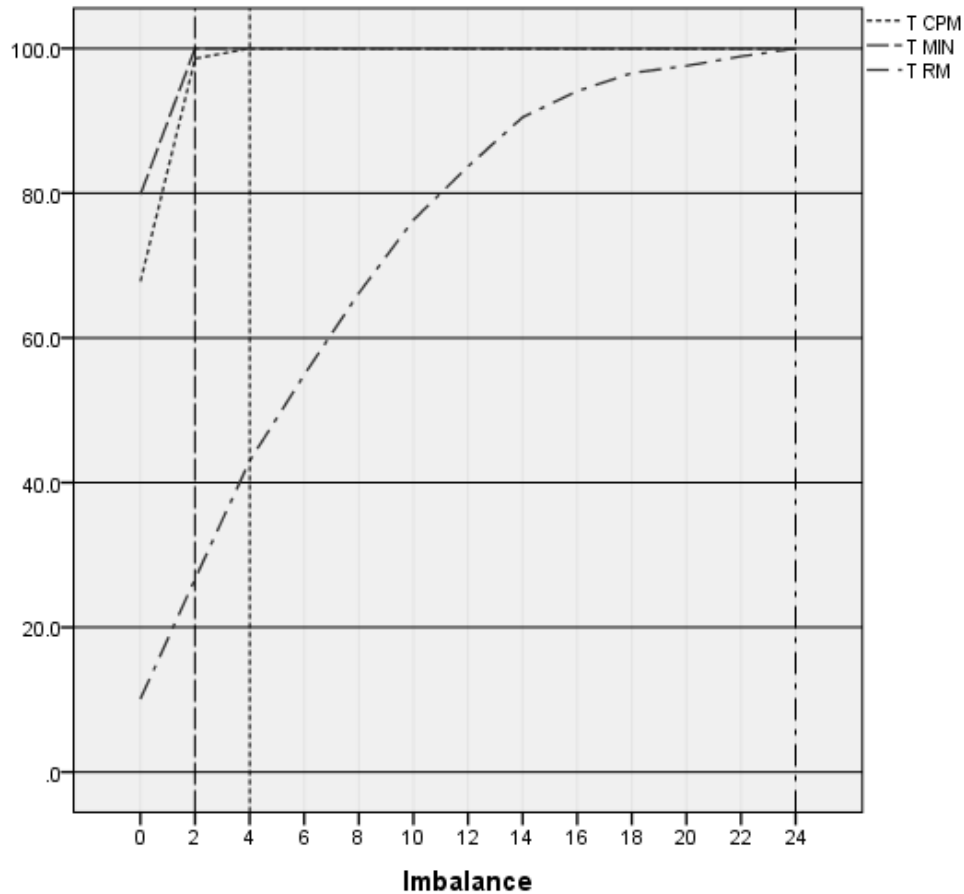


Graph (6.9): The amount of imbalance for total assigning with sample size 80 by methods.

The data in this section clearly show that, in all single layers, CPM has the least imbalance in contrast to MIN and RM. On the other

hand, in the total assigning, MIN is a bit better than CPM according to their imbalance. And RM has the maximum imbalance whatever.

## 6.5 Sample of Size 100:

In this section, imbalance of simulation data for three methods with sample size 100 is shown and discussed. Table 61 below represented as example from appendix A to show the imbalance data for three methods for the 1$^{st}$ single layer.
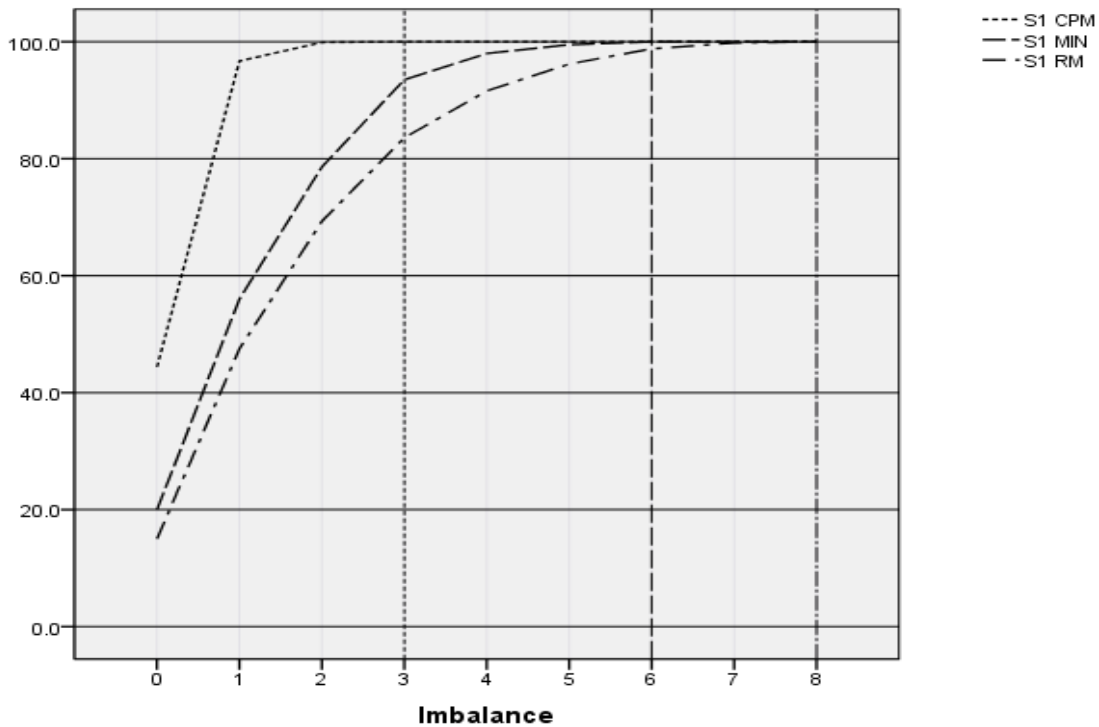
Table (61)

The frequency and percentages of imbalance of CPM, MIN and RM for the 1$^{st}$ single layer when sample size is 100. (Simulation repeated 1000 times)

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 444 | 44.4 | 200 | 20.0 | 150 | 15.0 |
| 1 | 523 | 52.3 | 360 | 36.0 | 325 | 32.5 |
| 2 | 32 | 3.2 | 226 | 22.6 | 218 | 21.8 |
| 3 | 1 | 0.1 | 149 | 14.9 | 143 | 14.3 |
| 4 | 0 | 0.0 | 45 | 4.5 | 80 | 8.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | 0 | 0.0 | 15 | 1.5 | 46 | 4.6 |
| 6 | 0 | 0.0 | 5 | 0.5 | 26 | 2.6 |
| 7 | 0 | 0.0 | 0 | 0.0 | 10 | 1.0 |
| 8 | 0 | 0.0 | 0 | 0.0 | 2 | 0.2 |

It is clear that from table (61), the trials which had full balance from 1000 trials are 44.4% of CPM trials, compared with 20.0% of MIN trials and 15.0% of RM trials. When the amount of imbalance is one, the percentages are 52.3% in CPM, 36.0% in MIN and 32.5% in RM. The maximum imbalance is 3 in CPM compared with 6 in MIN and 8 in RM.

The following graph displays the imbalance and its cumulative percent for three methods to make the comparison clear.

Graph (6.10): The amount of imbalance and its cumulative percentage with sample size 100.

From table (61) and graph (6.10), it is clear that CPM has the least amount of imbalance followed by MIN, and RM has the most amount of imbalance. So, CPM is the best method in this case which achieve the best imbalance.

Tables from (62) to (72) in appendix A show the imbalance data for $2^{nd}$ to $12^{th}$ single layers with sample size 100 categorized by randomization method.

In the $2^{nd}$ single layer, the trials which have full balance are 47.6% in CPM compared by 21.0% in MIN and 13.8% in RM. The maximum imbalance in CPM is 3 compared with 8 and 9 in MIN and RM respectively. In the $3^{rd}$ single layer 48.5% of CPM trials have full balance while MIN and RM just have 34.5% and 32.5% respectively. And the maximum imbalance is 3, 4 and 5 for three methods in the same above ordered.

In the $4^{th}$ single layer, the full balance is 50.6%, 38.5% and 35.0% for CPM, MIN and RM respectively. While the maximum imbalance is 2 in CPM, are 5 for both of MIN and RM. The $5^{th}$ single layer has 46.6%, 13.0% and 9.7% full balance for CPM, MIN and RM respectively. But the maximum imbalance is a little bit more in this layer for MIN and RM when is 9 and 12 respectively, while is just 3 in CPM. Full balance in the $6^{th}$ single layer is 48.1% in CPM compared with 14.6% in MIN and 9.8% in RM. As well, maximum imbalance is 3 in CPM, but 9 in MIN and 12 in RM. In the $7^{th}$ single layer 47.7% of CPM trials have full balance compared with 21.7% for MIN and 17.0% for RM. And the maximum imbalance is 3 for CPM compared with 7 for MIN and 8 for RM.

In contrast to MIN and RM, CPM has high full balance trials in the 8th single layer when is 49.8% compared with 20.6% and 16.4% in MIN and RM. And also there is big difference in maximum imbalance between methods, while is 3 in CPM, 7 in MIN and 11 in RM. In the 9th single layer the full balance is 50.0% in CPM, 37.7% in MIN and 33.4% in RM. And the maximum imbalance is 2 in CPM while in MIN similar to RM where is 4. 50.0% of CPM trials have full balance in the 10th single layer whereas 39.1% of MIN and 34.7% of RM trials have full balance. In this layer, the imbalance increased up to 5 in MIN and RM trials whilst is 3 in CPM trials. 44.1% is the percentage of full balance trials in the 11th single layer whereat trials have done by CPM compared with 13.9% in MIN and 7.9% in RM. It is clear that in this layer, the maximum imbalance 3 in CPM is very small in contrast to MIN when 10 and RM where is 12. In the last single layer with sample size 100, the difference in full balance between methods is obvious. Where is 47.2% in CPM, 14.4% in MIN and 8.9% in RM. And there is a wide range in maximum imbalance where is 3 in CPM compared with 9 in MIN and 12 in RM.

The following graph display the mean and stander deviation of imbalance for randomization methods for single layers with sample size 100.
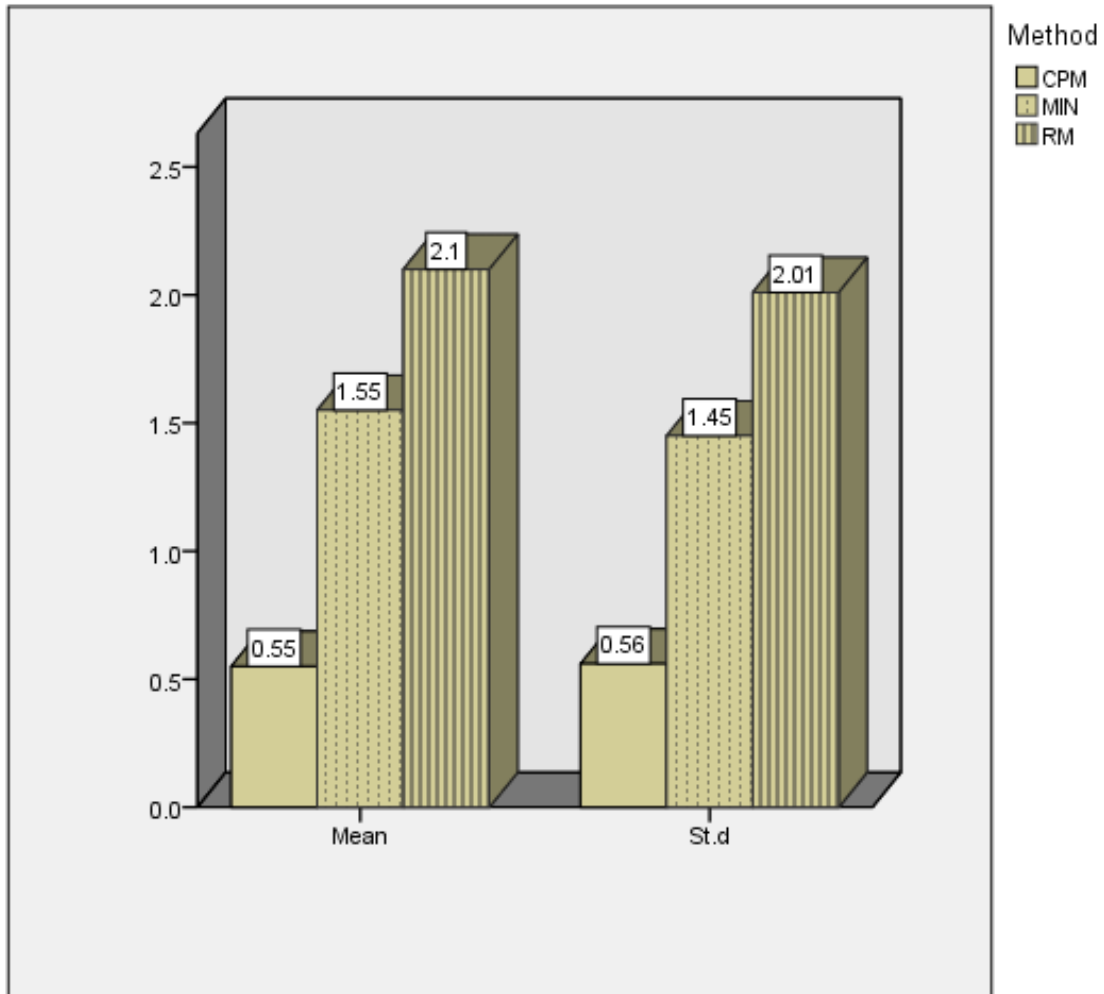


Graph (6.11): The mean and St.d of imbalance for randomization methods.

The following table displays the amount of imbalance with frequency and percentages by randomization methods with sample size 100 for total assigning in treatments A and B.

Table(6.4)

The amount of imbalance for total assigning with sample size 100 by randomization methods.

| Imbalance | CPM | | MIN | | RM | |
|---|---|---|---|---|---|---|
| | Freq. | Per. | Freq. | Per. | Freq. | Per. |
| 0 | 629 | 62.9 | 796 | 79.6 | 72 | 7.2 |
| 2 | 357 | 35.7 | 203 | 20.3 | 162 | 16.2 |
| 4 | 14 | 1.4 | 1 | 0.1 | 167 | 16.7 |
| 6 | 0 | 0.0 | 0 | 0.0 | 127 | 12.7 |
| 8 | 0 | 0.0 | 0 | 0.0 | 102 | 10.2 |
| 10 | 0 | 0.0 | 0 | 0.0 | 107 | 10.7 |
| 12 | 0 | 0.0 | 0 | 0.0 | 75 | 7.5 |
| 14 | 0 | 0.0 | 0 | 0.0 | 66 | 6.6 |
| 16 | 0 | 0.0 | 0 | 0.0 | 36 | 3.6 |
| 18 | 0 | 0.0 | 0 | 0.0 | 28 | 2.8 |
| 20 | 0 | 0.0 | 0 | 0.0 | 13 | 1.3 |

| 22 | 0 | 0.0 | 0 | 0.0 | 18 | 1.8 |
|---|---|---|---|---|---|---|
| 24 | 0 | 0.0 | 0 | 0.0 | 27 | 2.7 |

From table (6.4) above is clear that, the imbalance of total assigning of patients between treatments when sample size is 100 is not more than 4 in both of CPM and MIN while is 24 in RM.

The following graph display above data to be easy in comparison.
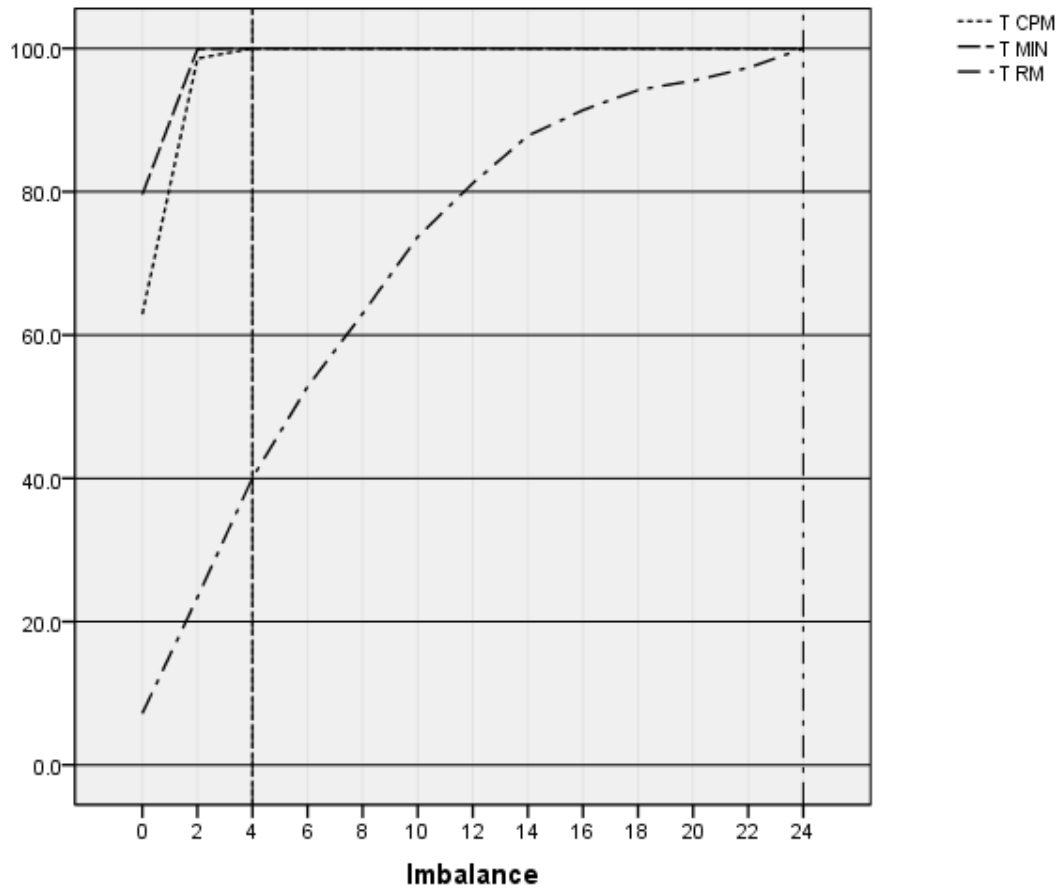


Graph (6.12): The amount of imbalance for total assigning with sample size 100 by methods.

The data in this section clearly show that, in all single layers, CPM has the least imbalance in contrast to MIN and RM. On the other hand, in the total assigning, CPM is similar to MIN according to their imbalance. And RM has the maximum imbalance whatever.