Math 1030   Descibing Data Written Assignment
Magnets and Pain Relief

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Please read through the entire assignment before starting Part I.

Part I: Fill in the "Change" columns in the tables below. This value corresponds to the "pain relief", that is the difference between the initial pain score and that reported after the treatment.

Data From the Magnets and Pain Relief Study

Active Magnets			Placebos		
Pretest	Post	Change	Pretest	Post	Change
10	0	10	8	4	4
10	4	6	10	7	3
8	7	1	10	5	5
10	0	10	10	8	2
10	4	6	9	8	1
10	2	8	10	6	4
10	5	5	9	8	1
10	5	5	10	10	0
9	3	6	10	10	0
10	2	8	7	6	1
9	2	7	10	10	0
10	2	8	8	8	0
10	3	7	10	10	0
10	5	5	10	10	0
10	6	4	10	10	0
8	4	4	10	10	0
10	3	7	9	9	0
10	0	10	10	9	1
8	2	6	10	10	0
10	0	10	10	10	0
10	4	6	10	9	1
9	4	5	200	177	23
10	5	5			
10	9	1		21	
10	10	0			
10	10	0			
10	10	0			
10	10	0			
8	7	1			

279   128   151

29

Part II: Fill in the Frequency tables below:

Active Magnet Pretest

Pain Score	Frequency	Relative Frequency (%)
0	0	—
1	0	—
2	0	—
3	0	—
4	0	—
5	0	—
6	0	—
7	0	—
8	4	13.79%
9	3	10.34%
10	22	75.86%

÷ 29

Active Magnet Pain Relief (Change)

Pain Score	Frequency	Relative Frequency (%)
0	4	13.79%
1	3	10.34%
2	0	—
3	0	—
4	2	6.89%
5	5	17.24%
6	5	17.24%
7	3	10.34%
8	3	10.34%
9	0	—
10	3	13.79%

Placebo Pretest

Pain Score	Frequency	Relative Frequency (%)
0	0	—
1	0	—
2	0	—
3	0	—
4	0	—
5	0	—
6	0	—
7	1	4.76%
8	2	9.52%
9	3	14.28%
10	5	71.42%

÷ 21

Placebo Pain Relief (Change)

Pain Score	Frequency	Relative Frequency (%)
0	11	52.38%
1	5	9.52%
2	1	4.76%
3	1	4.76%
4	2	9.52%
5	1	4.76%
6	0	—
7	0	—
8	0	—
9	0	—
10	0	—

Part III   Compare the mean, range, and distribution (graphing both a double bar graph using **relative frequency** and box plots) of the **pretest** for the active magnet group and the placebo group. **Label the axes with an appropriate verbal description and use colors or shading to distinguish active magnet and placebo data.** (Hint: See the figures in the study for the post test data.)

Show your work for calculating the mean and range for the active magnet and placebo:

(Double Bar Graph)   (BOX PLOT)

ACTIVE
PLACEBO

	Low	Q1	M	Q3	HIGH
A	8	9.5	10	10	10
P	7	9	10	10	10

RELATIVE FREQ

PAIN LEVEL
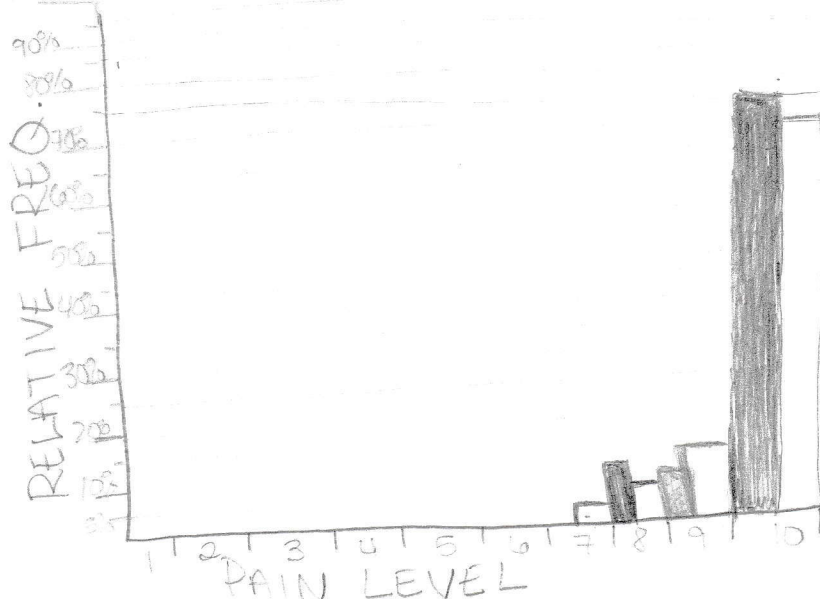
Active ▨   Placebo ▭

Active Magnet: mean = __9.62__   Placebo: mean = __9.52__
                 range = __2__   range = __3__
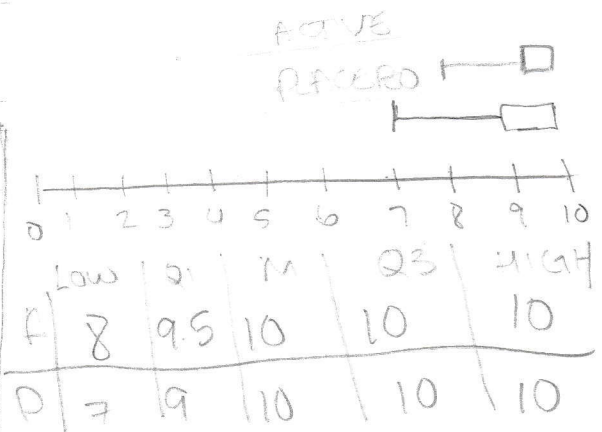
$$\frac{279}{29} = 9.62 = mean$$ $$\frac{200}{21} = 9.52 = mean$$

$$10 - 8 = 2 = Range$$ $$10 - 7 = 3 = Range$$

Active = 22
         3
       + 4
       ___
        29

Placebo = 1
           2
           3
         +15
         ___
          21

A | 8 8 8 9 9 9 10 10 10 10 10 10 10 10 (10) 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10

P | 7 8 8 9 9 9 10 10 10 10 10 10 10 10 10 10 10, 10 10, 10, 10 10 10 10

Part IV Compare the mean, range, and distribution (graphing both a double bar graph using **relative frequency** and box plots) of the **"pain relief"** for the active magnet group and the placebo group. **Label the axes with an appropriate verbal description and use colors or shading to distinguish active magnet and placebo data.**

Show your work for calculating the mean and range for the active magnet and placebo:

$$\frac{151}{29} = 5.21 = mean$$

$$10 - 0 = 10 = range$$

Active Magnet: mean = 5.21
        range = 10

$$\frac{23}{21} = 1.095 = mean$$

$$10 - 5 = 5 = range$$

Placebo: mean = 1.095
        range = 5

Show your work for calculating the values used for the box plots:

A | 0 0 0 0 1 1 4 4 5 5 5 5 5 5 6 6 6 6 7 7 7 8 8 8 10 10 10 10
P | 0 0 0 0 0 0 0 0 0 0 0 0 0 2 1 1 1 2 3 3 4 5

	Low	Q_1	M	Q_3	High
A	0	2.5	6	7.5	10
P	0	0	0	1.5	5

Active
Placebo

0 1 2 3 4 5 6 7 8 9 10

Active   Placebo

100%

Relative Freq.

10%

Pain Level
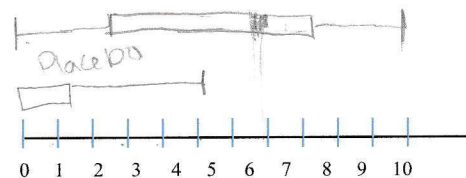
Part IV   Write a paragraph or two to address the following:
- Use numbers to compare the means and ranges, and make a qualitative statement about the distributions of the **pain relief** for the active magnet group and the placebo group.
- Tell why you think the outcomes appear to be similar or different.
- Discuss the limits for which the data can be used.
- Explain why you think this is, or is not, a good preliminary study for the effect of magnets to help with pain relief.

The participants who were administered the placebo saw a much lower average (mean=1.018) of change (pain relief) from the pretest. The change only had a range of 5 pain levels, as compared to 10 pain levels from the active group. The active groups change average was significantly higher, providing a mean of 5.21. Thus we can conclude that the magnets do affect pain levels of post-polio patients.

This data does point to the efficacy of magnets to treat pain, but is limited unless repeated several more times to ensure the consistency of the results.

I do think that this is a good preliminary study for the use of magnets to treat pain. This study is effective at ruling out the placebo effect and clearly lowered the overall pain of the active group.