

## Data processing and statistical analysis for: Kellermeyer L, Strand M. Factors affecting clinical referrals to the medical library. Hypothesis. 2020Oct;32(1)

```
data xxx; set xxx.xxx; format job_group $15.;
if job_title=. then job_group=" ";
else if job_title<4 or participant_id=73 then job_group="Providers";
else if job_title<6 then job_group="Nursing";
else if job_title<8 then job_group="Assistant";
else if job_title=8 then job_group="Social worker";
else if job_title=9 then job_group="Other";
if job_group="Other" or job_group="Social worker" or job_group="Assistant" then
big_group="Combined"; else big_group=job_group;

how_often= 7 - mean(how_often_portal, how_often_archives, how_often_librarian,
how_often_printer, how_often_medfacts);

how_likely_future= 6 - mean(how_likely_future_portal, how_likely_future_archives,
how_likely_future_libr, how_likely_future_printer, how_likely_future_medfacts);

radio_familiar=6 - mean(radio_familiar_portal, radio_familiar_archives,
radio_familiar_librarian, radio_familiar_printer, radio_familiar_medfacts);

if how_often=. then how_often_cat=.; else how_often_cat=int(how_often);
if how_likely_future=. then how_likely_future_cat=.;
else how_likely_future_cat=int(how_likely_future);
if radio_familiar=. then radio_familiar_cat=.;
else radio_familiar_cat=int(radio_familiar); run;

proc sort data=xxx; by job_group;
proc freq data=xxx; table job_group*how_likely_future_cat; run;
proc freq data=xxx; table job_group*how_often_cat; run;
proc nparlway data=xxx wilcoxon; var how_often; class job_group; run;
proc nparlway data=xxx wilcoxon; var how_likely_future; class job_group; run;

proc means data=xxx n min median max;
var how_often how_likely_future radio_familiar; by job_group; run;
proc boxplot data=xxx; plot how_often*job_group; run;
proc boxplot data=xxx; plot how_likely_future*job_group; run;

proc corr data=xxx spearman;
var how_often how_likely_future radio_familiar empty_length age; run;
proc gplot data=xxx; plot radio_familiar*how_often; run;
proc gplot data=xxx; plot how_likely_future*how_often; run;
```

The FREQ Procedure

|           |                      | Table of job_group by how_likely_future_cat |       |       |       |       |        |
|-----------|----------------------|---|-------|-------|-------|-------|--------|
| Frequency | job_group            | how_likely_future_cat                       |       |       |       |       |        |
| Percent   |                      | 1   | 2     | 3     | 4     | 5     | Total  |
| Row Pct   |                      |   |       |       |       |       |        |
| Col Pct   |                      |   |       |       |       |       |        |
|           | <b>Assistant</b>     | 0   | 0     | 1     | 2     | 2     | 5      |
|           |                      | 0.00  | 0.00  | 1.23  | 2.47  | 2.47  | 6.17   |
|           |                      | 0.00  | 0.00  | 20.00 | 40.00 | 40.00 |        |
|           |                      | 0.00  | 0.00  | 3.45  | 7.14  | 22.22 |        |
|           | <b>Nursing</b>       | 0   | 2     | 3     | 12    | 1     | 18     |
|           |                      | 0.00  | 2.47  | 3.70  | 14.81 | 1.23  | 22.22  |
|           |                      | 0.00  | 11.11 | 16.67 | 66.67 | 5.56  |        |
|           |                      | 0.00  | 14.29 | 10.34 | 42.86 | 11.11 |        |
|           | <b>Other</b>         | 1   | 1     | 1     | 0     | 1     | 4      |
|           |                      | 1.23  | 1.23  | 1.23  | 0.00  | 1.23  | 4.94   |
|           |                      | 25.00                                       | 25.00 | 25.00 | 0.00  | 25.00 |        |
|           |                      | 100.00                                      | 7.14  | 3.45  | 0.00  | 11.11 |        |
|           | <b>Providers</b>     | 0   | 9     | 23    | 14    | 4     | 50     |
|           |                      | 0.00  | 11.11 | 28.40 | 17.28 | 4.94  | 61.73  |
|           |                      | 0.00  | 18.00 | 46.00 | 28.00 | 8.00  |        |
|           |                      | 0.00  | 64.29 | 79.31 | 50.00 | 44.44 |        |
|           | <b>Social worker</b> | 0   | 2     | 1     | 0     | 1     | 4      |
|           |                      | 0.00  | 2.47  | 1.23  | 0.00  | 1.23  | 4.94   |
|           |                      | 0.00  | 50.00 | 25.00 | 0.00  | 25.00 |        |
|           |                      | 0.00  | 14.29 | 3.45  | 0.00  | 11.11 |        |
|           | <b>Total</b>         | 1   | 14    | 29    | 28    | 9     | 81     |
|           |                      | 1.23  | 17.28 | 35.80 | 34.57 | 11.11 | 100.00 |

Frequency Missing = 14

The FREQ Procedure

**Table of job\_group by how\_often\_cat**

| Frequency | job_group            | how_often_cat |       |       |       |       | Total  |
|-----------|----------------------|---------------|-------|-------|-------|-------|--------|
| Percent   |                      | 1             | 2     | 3     | 4     | 5     |        |
| Row Pct   |                      |               |       |       |       |       |        |
| Col Pct   |                      |               |       |       |       |       |        |
|           | <b>Assistant</b>     | 0             | 3     | 1     | 0     | 1     | 5      |
|           |                      | 0.00          | 3.70  | 1.23  | 0.00  | 1.23  | 6.17   |
|           |                      | 0.00          | 60.00 | 20.00 | 0.00  | 20.00 |        |
|           |                      | 0.00          | 14.29 | 12.50 | 0.00  | 50.00 |        |
|           | <b>Nursing</b>       | 7             | 4     | 5     | 2     | 0     | 18     |
|           |                      | 8.64          | 4.94  | 6.17  | 2.47  | 0.00  | 22.22  |
|           |                      | 38.89         | 22.22 | 27.78 | 11.11 | 0.00  |        |
|           |                      | 14.89         | 19.05 | 62.50 | 66.67 | 0.00  |        |
|           | <b>Other</b>         | 2             | 1     | 0     | 1     | 0     | 4      |
|           |                      | 2.47          | 1.23  | 0.00  | 1.23  | 0.00  | 4.94   |
|           |                      | 50.00         | 25.00 | 0.00  | 25.00 | 0.00  |        |
|           |                      | 4.26          | 4.76  | 0.00  | 33.33 | 0.00  |        |
|           | <b>Providers</b>     | 36            | 12    | 1     | 0     | 1     | 50     |
|           |                      | 44.44         | 14.81 | 1.23  | 0.00  | 1.23  | 61.73  |
|           |                      | 72.00         | 24.00 | 2.00  | 0.00  | 2.00  |        |
|           |                      | 76.60         | 57.14 | 12.50 | 0.00  | 50.00 |        |
|           | <b>Social worker</b> | 2             | 1     | 1     | 0     | 0     | 4      |
|           |                      | 2.47          | 1.23  | 1.23  | 0.00  | 0.00  | 4.94   |
|           |                      | 50.00         | 25.00 | 25.00 | 0.00  | 0.00  |        |
|           |                      | 4.26          | 4.76  | 12.50 | 0.00  | 0.00  |        |
|           | <b>Total</b>         | 47            | 21    | 8     | 3     | 2     | 81     |
|           |                      | 58.02         | 25.93 | 9.88  | 3.70  | 2.47  | 100.00 |

Frequency Missing = 14

The NPAR1WAY Procedure

**Wilcoxon Scores (Rank Sums) for Variable how\_often  
Classified by Variable job\_group**

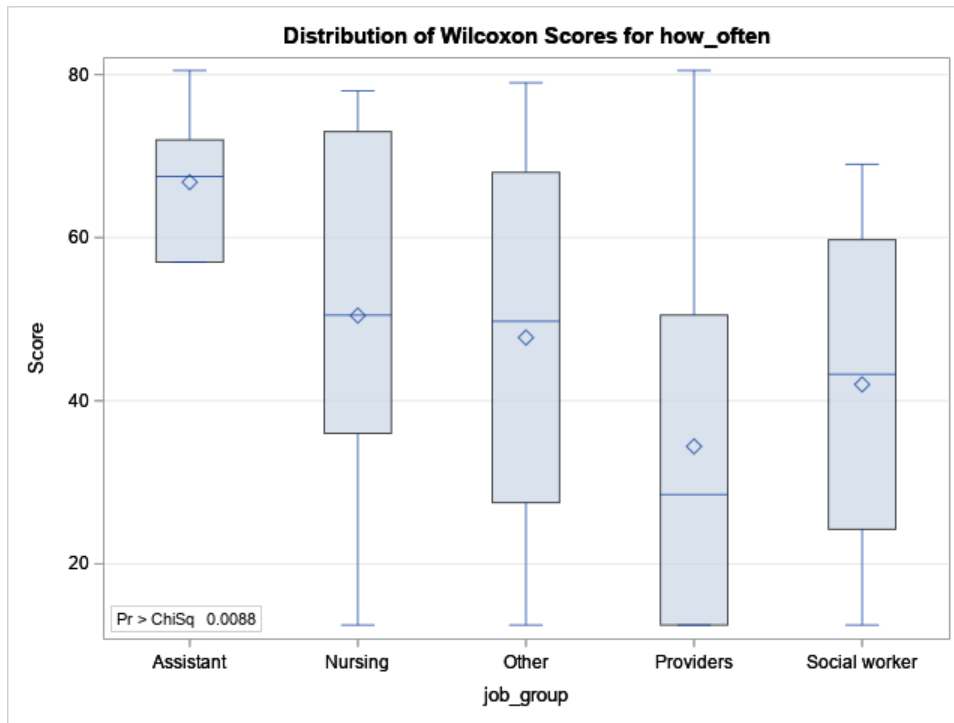
| job_group     | N  | Sum of Scores | Expected Under H0 | Std Dev Under H0 | Mean Score |
|---------------|----|---------------|-------------------|------------------|------------|
| Assistant     | 5  | 334.0         | 205.0             | 50.209161        | 66.800000  |
| Nursing       | 18 | 908.0         | 738.0             | 86.735662        | 50.444444  |
| Other         | 4  | 191.0         | 164.0             | 45.202924        | 47.750000  |
| Providers     | 50 | 1720.0        | 2050.0            | 101.404451       | 34.400000  |
| Social worker | 4  | 168.0         | 164.0             | 45.202924        | 42.000000  |

Average scores were used for ties.

**Kruskal-Wallis Test**

**Chi-Square DF Pr > ChiSq**

13.5812 4 0.0088



The NPAR1WAY Procedure

**Wilcoxon Scores (Rank Sums) for Variable how\_likely\_future  
Classified by Variable job\_group**

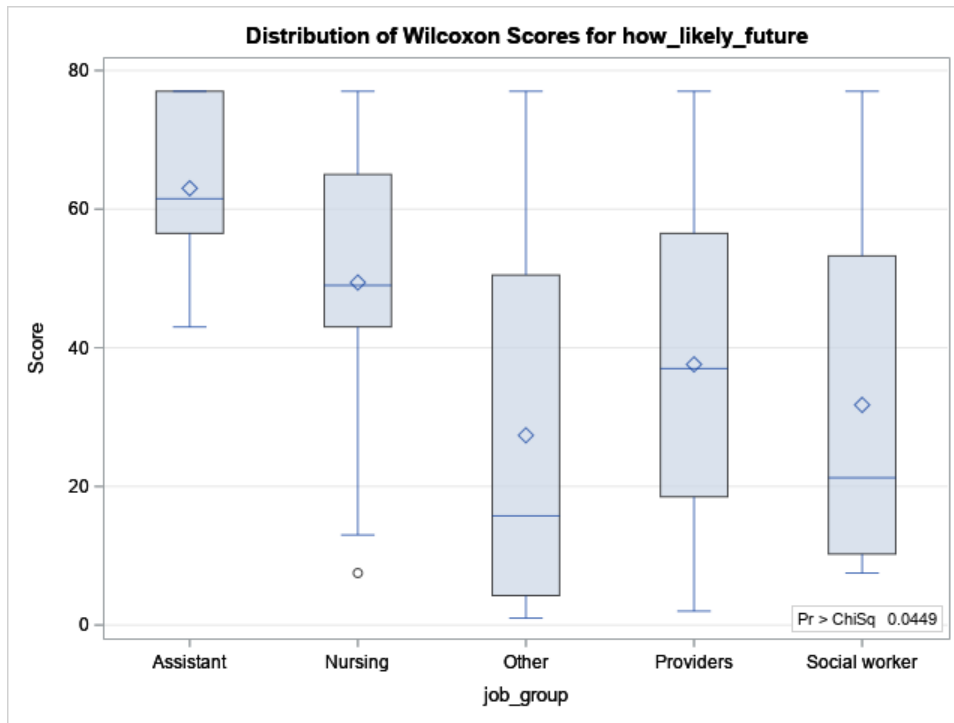
| <b>job_group</b>     | <b>N</b> | <b>Sum of Scores</b> | <b>Expected Under H0</b> | <b>Std Dev Under H0</b> | <b>Mean Score</b> |
|----------------------|----------|----------------------|--------------------------|-------------------------|-------------------|
| <b>Assistant</b>     | 5        | 315.00               | 205.0                    | 50.786317               | 63.000000         |
| <b>Nursing</b>       | 18       | 889.50               | 738.0                    | 87.732691               | 49.416667         |
| <b>Other</b>         | 4        | 109.50               | 164.0                    | 45.722533               | 27.375000         |
| <b>Providers</b>     | 50       | 1880.00              | 2050.0                   | 102.570098              | 37.600000         |
| <b>Social worker</b> | 4        | 127.00               | 164.0                    | 45.722533               | 31.750000         |

**Average scores were used for ties.**

**Kruskal-Wallis Test**

**Chi-Square DF Pr > ChiSq**

9.7455 4 0.0449



The MEANS Procedure  
job\_group=' '

| Variable          | N | Minimum   | Median    | Maximum   |
|-------------------|---|-----------|-----------|-----------|
| how_often         | 7 | 1.0000000 | 1.7500000 | 4.0000000 |
| how_likely_future | 7 | 3.0000000 | 4.0000000 | 5.0000000 |
| radio_familiar    | 7 | 1.0000000 | 2.7500000 | 4.0000000 |

job\_group=Assistant

| Variable          | N | Minimum   | Median    | Maximum   |
|-------------------|---|-----------|-----------|-----------|
| how_often         | 5 | 2.2000000 | 2.8000000 | 5.0000000 |
| how_likely_future | 5 | 3.8000000 | 4.4000000 | 5.0000000 |
| radio_familiar    | 5 | 1.6000000 | 3.8000000 | 4.4000000 |

job\_group=Nursing

| Variable          | N  | Minimum   | Median    | Maximum   |
|-------------------|----|-----------|-----------|-----------|
| how_often         | 18 | 1.0000000 | 2.0000000 | 4.6000000 |
| how_likely_future | 18 | 2.6000000 | 4.0000000 | 5.0000000 |
| radio_familiar    | 18 | 1.0000000 | 2.8000000 | 4.8000000 |

job\_group=Other

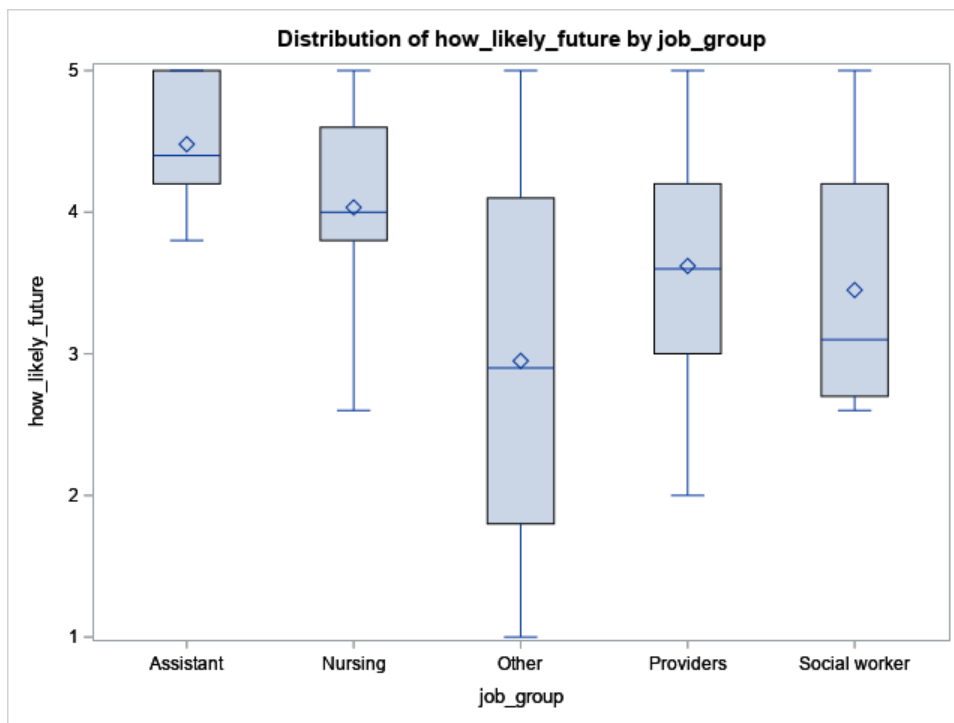
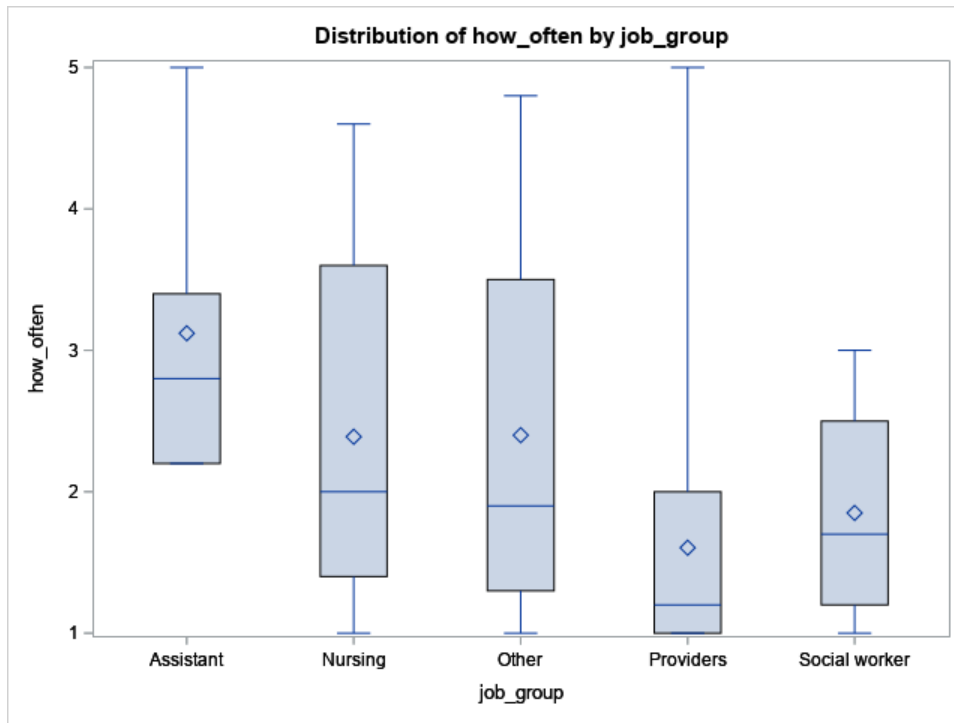
| Variable          | N | Minimum   | Median    | Maximum   |
|-------------------|---|-----------|-----------|-----------|
| how_often         | 4 | 1.0000000 | 1.9000000 | 4.8000000 |
| how_likely_future | 4 | 1.0000000 | 2.9000000 | 5.0000000 |
| radio_familiar    | 4 | 2.0000000 | 2.6000000 | 4.8000000 |

job\_group=Providers

| Variable          | N  | Minimum   | Median    | Maximum   |
|-------------------|----|-----------|-----------|-----------|
| how_often         | 50 | 1.0000000 | 1.2000000 | 5.0000000 |
| how_likely_future | 50 | 2.0000000 | 3.6000000 | 5.0000000 |
| radio_familiar    | 50 | 1.0000000 | 2.0000000 | 5.0000000 |

job\_group=Social worker

| Variable          | N | Minimum   | Median    | Maximum   |
|-------------------|---|-----------|-----------|-----------|
| how_often         | 4 | 1.0000000 | 1.7000000 | 3.0000000 |
| how_likely_future | 4 | 2.6000000 | 3.1000000 | 5.0000000 |
| radio_familiar    | 4 | 1.6000000 | 2.6000000 | 3.4000000 |



The CORR Procedure

**5 Variables:** how\_often how\_likely\_future radio\_familiar emply\_length age

**Simple Statistics**

| Variable                 | N  | Mean    | Std Dev | Median  | Minimum | Maximum |
|--------------------------|----|---------|---------|---------|---------|---------|
| <b>how_often</b>         | 88 | 1.93996 | 1.05931 | 1.60000 | 1.00000 | 5.00000 |
| <b>how_likely_future</b> | 88 | 3.73409 | 0.84716 | 3.70000 | 1.00000 | 5.00000 |
| <b>radio_familiar</b>    | 88 | 2.45720 | 1.04541 | 2.20000 | 1.00000 | 5.00000 |
| <b>emply_length</b>      | 81 | 3.64198 | 1.34451 | 4.00000 | 1.00000 | 5.00000 |
| <b>age</b>               | 81 | 3.70370 | 1.23940 | 4.00000 | 1.00000 | 6.00000 |

**Spearman Correlation Coefficients**

**Prob > |r| under H0: Rho=0**

**Number of Observations**

|                          | <b>how_often</b> | <b>how_likely_future</b> | <b>radio_familiar</b> | <b>emply_length</b> | <b>age</b> |
|--------------------------|------------------|--------------------------|-----------------------|---------------------|------------|
| <b>how_often</b>         | 1.00000          | 0.42553                  | 0.78202               | 0.11243             | 0.11345    |
|                          |                  | <.0001                   | <.0001                | 0.3176              | 0.3133     |
|                          | 88               | 88                       | 88                    | 81                  | 81         |
| <b>how_likely_future</b> | 0.42553          | 1.00000                  | 0.38442               | 0.13857             | 0.01818    |
|                          | <.0001           |                          | 0.0002                | 0.2173              | 0.8720     |
|                          | 88               | 88                       | 88                    | 81                  | 81         |
| <b>radio_familiar</b>    | 0.78202          | 0.38442                  | 1.00000               | 0.26966             | 0.12731    |
|                          | <.0001           | 0.0002                   |                       | 0.0149              | 0.2574     |
|                          | 88               | 88                       | 88                    | 81                  | 81         |
| <b>emply_length</b>      | 0.11243          | 0.13857                  | 0.26966               | 1.00000             | 0.55047    |
|                          | 0.3176           | 0.2173                   | 0.0149                |                     | <.0001     |
|                          | 81               | 81                       | 81                    | 81                  | 81         |
| <b>age</b>               | 0.11345          | 0.01818                  | 0.12731               | 0.55047             | 1.00000    |
|                          | 0.3133           | 0.8720                   | 0.2574                | <.0001              |            |
|                          | 81               | 81                       | 81                    | 81                  | 81         |



