

Statistics Project

Name:

Course:

Institution:

Date:



Question 1

The following pivot tables were generated from the Microsoft Excel data provided as follows

i) Table 1: Age group and Gender

Age Group	Gender		Grand Total
	Female	Male	
1	12	4	16
2	19	9	28
3	4		4
4		1	1
Grand Total	35	14	49

ii) Table 2: Age Group and Professional Designation

Age Group	Professional Designation		Grand Total
	RN	RPN	
1	12	4	16
2	15	13	28
3	3	1	4
4	1		1
Grand Total	31	18	49

iii) Table 3: Gender and Professional Designation

Gender	Professional Designation		Grand Total
	RN	RPN	
Female	23	12	35
Male	8	6	14
Grand Total	31	18	49

iv) Table 4: Gender and membership in professional organization

Gender	membership in professional organization_RNAO_or_RPNAO		Grand Total
	Non Member	Member	
Female	21	14	35
Male	12	2	14
Grand Total	33	16	49

b) Table 3 is a pivot table showing the relationship between gender and professional designation. From the table, out of the 35 females present, there are 23 registered nurses (RN) and 12 registered practical nurses (RPN). From the 14 males present, there are 8 registered nurses (RN) and 6 registered practical nurses (RPN). There are 49 nurses in total. From this table (table 3), the sample used indicates there are more females in the nursing profession than the males. More males need to be encouraged to pursue nursing, a field which is dominated by females. More research on the relationship between gender and nursing should be carried out to establish more concrete findings.

QUESTION 2

a) A descriptive statistics summary was generated from Microsoft Excel as shown below

i)

Table 5: Quiz scores meaning of self-regulation

Mean	28.42857
Standard Error	1.028505
Median	29
Mode	20
Standard Deviation	7.199537
Sample Variance	51.83333
Kurtosis	-0.56386
Skewness	-0.34722
Range	30
Minimum	10
Maximum	40
Sum	1393
Count	49

This variable had a mean, $M=28.4285$, median of 29 and standard deviation, $SD=7.199537$.

ii) The descriptive statistics for the variable willingness to accept outcomes for own actions scale as follows

Table 6: willingness to accept outcomes for own actions scale

Mean	19.30612
Standard Error	1.07981
Median	20
Mode	20
Standard Deviation	7.558671
Sample Variance	57.1335
Kurtosis	-0.20046
Skewness	0.028822
Range	31
Minimum	5
Maximum	36
Sum	946
Count	49

The mean and standard deviation are as shown on the above table ($M=19.30612$, $S.D=1.07981$).

- b) The standard error (SE) for Quiz scores meaning of self-regulation is 1.028505 which represents the approximate standard deviation of the sample population. The standard error for willingness to accept outcomes for own actions scale is 1.07981 which also is the standard deviation estimate for the sample population.

- c) A statistical hypothesis to measure the relationship between nurses' knowledge of the meaning of self-regulation and their willingness to accept outcomes for own action was formulated as follows

Null hypothesis

H0: There is NO relationship between nurses' knowledge of the meaning of self-regulation and their willingness to accept outcomes for own action

d) Alternative hypothesis

H1: There is a relationship between nurses' knowledge of the meaning of self-regulation and their willingness to accept outcomes for own action

A linear regression model was used to test this relationship, with the nurses' knowledge of the meaning of self regulation as the independent variable and willingness to accept outcomes for own action as the dependent variable. Both were determined as continuous variable and ratio scale in nature as they are measured on specific numerical scores (Salkind, 2019)

Table 8:
SUMMARY
OUTPUT

<i>Regression Statistics</i>	
	0.800721
Multiple R	456
	0.641154
R Square	851
Adjusted R	0.633519
Square	847
Standard	4.575838
Error	18

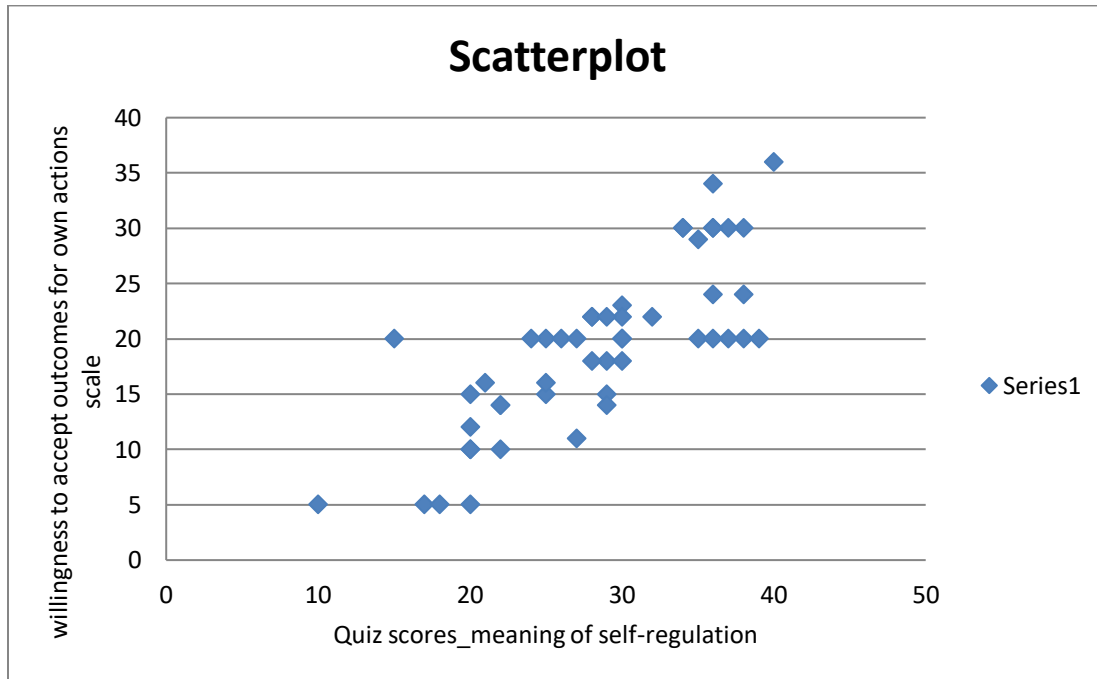
Observations 49

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1758.308	1758.296	83.97571	4.96117E-12
Residual	47	984.0998	20.93671		
Total	48	2742.408	163		

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	4.592747	2.688634	1.70821	0.094195	10.00158	0.81608	10.00158	0.81608
Quiz scores	0.840663	0.091737	9.163757	4.96E-12	0.656112	1.02521	0.656112	1.02521

- e) The multiple R value of 0.8007 denotes the correlation coefficient that measures the strength of a linear relationship between two variables. This value of 0.8007 suggests a strong positive correlation between the dependent and independent variables. This simply means when the nurses’ knowledge of the meaning of self regulation increases their willingness to accept outcomes for own action also increases.
- f) The adjusted R squared is the coefficient of determination which is normally used as an indicator of the goodness of fit (Salkind, 2019). Converting this value into a percentage becomes 63.35%. This means that 63.35% of the dependent variable i.e. willingness to accept outcomes for own action is explained by nurses’ knowledge of the meaning of self regulation as the independent variable.

- g) The scatter plot below attempts to illustrate the relationship between the two variables. The nurses' knowledge of the meaning of self regulation as the independent variable and willingness to accept outcomes for own action as the dependent variable



h)

The p value obtained shows that the regression model is statistically significant ($p < 0.05$). This means that there is a relationship between the dependent and independent variables of the model hence we reject the null hypothesis. From the correlation test, it is evident that there is a strong positive correlation between these two variables meaning that when a nurse is more knowledgeable on the meaning of self regulation he/she is more likely to accept outcomes resulting from his/her own actions compared to a nurse that is less knowledgeable on the same.

Question 3

a)

Step 1

To answer the research question whether nurses differ in their willingness to accept outcomes for own actions based upon their professional designation the following hypothesis was formulated at $\alpha = 0.05$

-Null and Research Hypothesis

H₀: Mean willingness to accept outcomes for own actions from the two unrelated groups are equal

H₁: Mean willingness to accept outcomes for own actions from the two unrelated groups differ

H₀: $\mu_1 = \mu_2$

H₁: $\mu_1 \neq \mu_2$

Target and Sample Population

The target and sample population were registered nurses and registered practical nurses

Independent and Dependent Variables and Level of Measurement

An independent sample t test is ideal to test this hypothesis as we have one continuous dependent variable which has ratio scale of measurement i.e. willingness to accept outcomes for own actions scale and one independent categorical variable which has nominal scale of measurement i.e. professional designation which has two levels namely registered nurse (RN) and Registered Practical Nurse (RPN).

Step 2

The hypothesis was formulated at $\alpha = 0.05$

Step 3

A two tailed test was performed in excel

Step 4

The output is as shown below.

	<i>RN</i>	<i>RPN</i>
Mean	19.30612245	1.367347
Variance	57.1335034	0.237245
Observations	49	49
Hypothesized Mean Difference	0	
df	48	
t Stat	16.57851314	
P(T<=t) one-tail	8.42055E-22	
t Critical one-tail	1.677224197	
P(T<=t) two-tail	1.68411E-21	
t Critical two-tail	2.010634722	

Step 5

The degrees of freedom was 48

Step 6

The critical t statistic is 2.0106 while the calculated t test statistic is 16.5785. Statistically if the calculated test statistic is greater than the critical value we reject the null hypothesis.

Step 7

The calculated t test statistic is greater than the critical value prompting rejection of the null hypothesis.

Summary

An independent-samples t-test was conducted to compare the willingness to accept outcomes for own actions scale for RN and RPN. There was a statistically significant difference in scores for RN ($M=19.31$, $SD=7.56$) and RPN [$M=1.37$, $SD=0.49$; $t=16.5785$, $df=48$, $p=1.68411E-21 < 0.05$]. Therefore we reject the null hypothesis and conclude that the mean willingness score to accept outcomes for own actions from the two unrelated groups i.e. RN and RPN differ.

b) The mean scores on willingness to accept outcomes for own actions from the two groups differs with registered nurses (RN) having a mean score of 19.3061 while registered practical nurses (RPN) have a mean score of 1.37 which is significantly lesser. From the results it is evident that more training on professional accountability needs to be undertaken on the registered nurses especially RPN. All nurses whether RN or RPN should be willing to take responsibility for their actions in the nursing field.

QUESTION 4

a)

To test on whether there is a difference in nurses' willingness to accept outcomes for his or her own actions based upon employment status, an analysis of variance test (ANOVA) was performed. The following hypothesis was formulated at 0.05 significant level.

H₀: Mean willingness score to accept outcomes is equal across employment status

H₁: Mean willingness score to accept outcomes is different in at least one of the employment status

The dependent variable is the willingness to accept outcomes for his or her own actions and is continuous in nature. The independent variable is the employment status which is categorical in nature with three categories i.e. full time, part time and casual. The test is two tailed as it aims at establishing whether there is a difference in the mean willingness to accept outcomes across the employment status.

An ANOVA output was generated from Microsoft Excel as follows

ANOVA: Single Factor

SUMMARY

Groups	Count	Sum	Average	Variance
Employment status	49	84	1.714286	0.541667
willingness to accept outcomes	49	946	19.30612	57.1335

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	7582.082	1	7582.082	262.9236	3.05E-29	3.940163
Within Groups	2768.408	96	28.83759			
Total	10350.49	97				

A one-way between-groups analysis of variance was conducted to explore whether there is a difference in nurses' willingness to accept outcomes for his or her own actions across three groups according to their employment i.e. (1=full time,2=Part time 3=Casual). The degrees of freedom for this test is 96 i.e. $97 - 1 = 96$. There was a statistically significant difference at the $p < .05$ level in willingness scores for the three employment levels [$F(1, 96) = 262.9236, p = 3.05E-29$]. From the table the calculated F statistic 262.9236 is greater than the F tabulated (critical value) i.e. 3.940163 hence we reject the null hypothesis and conclude that the mean willingness score to accept outcomes is different in at least one of the employment status.

b) The mean scores on willingness to accept outcomes for own actions are different across the three status of employment. More training should be done to the nurses that are on full time, part time or casual basis for professional accountability. This will lead to improved standards of professionalism in the nursing field.

References

Salkind, N. J., & Frey, B. B. (2019). *Statistics for people who (think they) hate statistics*. Thousand Oaks, CA: SAGE.

