Statistical Analysis

School of Nursing

Biostatistics Evidence Based Practice

Step 1

The purpose of this project is to assess various aspects of a self-awareness/management program that is under development. Seventy-three nurses from a facility were surveyed as part of this project. Descriptive statistics were used to describe the sample. As summarized in Table 1, the ages of the nurses ranged from 34-63 with the average age being 39.7 (SD = 5.1). Almost 56.2 percent of the participants were female. The proportion who were on administrative and direct patient care duty was comparable (49.3% & 50.7%) and the average hours worked per week was 36.7 (SD = 7.6) ranging from 25-49 hours. As shown further in Table 1, average baseline stress score, higher score equals more stress, was 39.0 (SD = 6.2), ranging from 27-53 and average quarter one/or first follow-up stress score was 49.0 (SD = 6.2). The average score on a scale that assessed physical pain/exhaustion, higher scores means more pain/exhaustion, was 151.7 (SD = 18.2), ranging from 113-195.

Table 1
Characteristics of the nurses (N = 73)

	n	%	Range	Mean (SD)	Median
Age (years)	73		34-63	39.7 (5.1)	39.0
Hours worked per week	73		25-49	36.7 (7.6)	38.0
Pain/exhaust	73		113-195	151.7 (18.2)	149.0
Gender					
Male	32	43.8			
Female	41	56.2			
Specialty					
Critical Care	25	34.2			
Med/Surg	22	30.1			
Oncology	26	35.6			
Misuse					
No signs/symptoms of substance	52	71.2			
At least 1 sign of misuse	21	28.8			
Main duty					
Administrative	36	49.3			
Direct patient care	37	50.7			
Stress score					
Baseline	73		27-53	39.0(6.2)	38.0
Quarter1/or first follow-up	73		37-63	49.0(6.2)	49.0

Step 2:

Hypothesis 1: There is an association between main duty and substance misuse.
Null hypothesis: There is no association between main duty and substance misuse.

Assumptions:
Chi square statistical test chosen, because it is used to test relationship between two categorical variables, measures are nominal, and each cell has sufficient number of cases.

The data presented in a crosstabulation table. The data has both variables for all 73 participants. Overall, the participants providing direct patient care had no sign of misuse substance was 31.51%, the participants providing administrative service had no sign of misuse substance was 39.73%. While sign of misuse was compared to administrative and direct patient care, a large proportion of direct patient care participants had sign of misuse (19.18%) as compared to administrative (9.59%). In statistical results, p-value is 0.08, therefore, a Chi square test indicated no significant association between main duty and substance misuse. We accept the null hypothesis and conclude there is no association between these two variables because the p-value is >0.05.

Table 1. Substance misuse (percentage) by main duty.

	No sign of misuse	sign of misuse	Grand Total
Administrative	39.73%	9.59%	49.32%
Direct patient care	31.51%	19.18%	50.68%
Grand Total	**71.23%**	**28.77%**	**100.00%**
p value:	0.082624375		

Hypothesis 2: There is a correlation and predictive relationship between the number of hours worked and physical pain/exhaustion score.
Null hypothesis: There is no correlation between the number of hours worked and physical pain/exhaustion score. There is no predictive relationship between the number of hours worked and physical pain/exhaustion score.

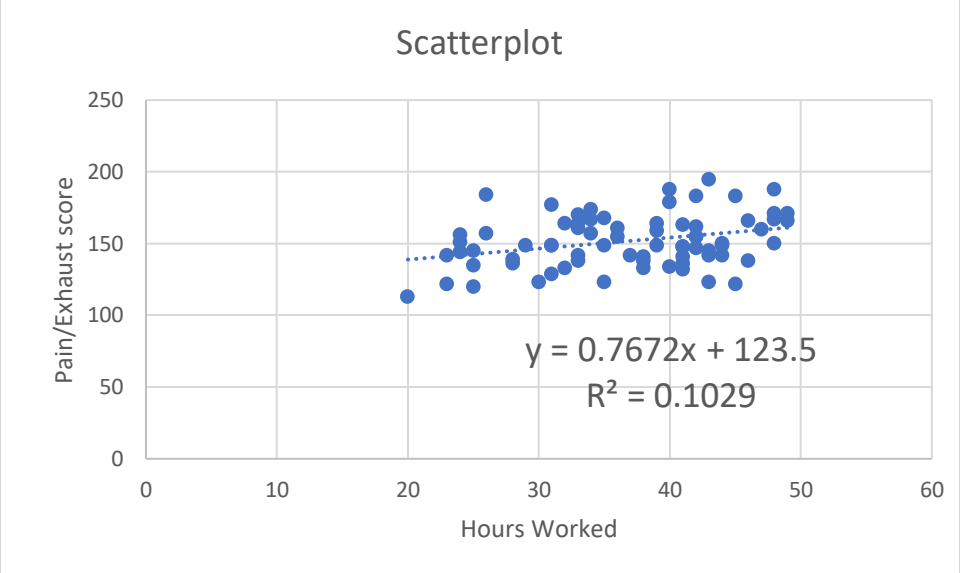
Assumptions:
Pearson correlation: defines the direction and magnitude of a relationship between two continuous variables. Each variable as normally distributed. Number of hours worked (mean = 36.7/median=38), physical pain/exhaustion score (mean =151.7/median=149). The data for both variables measures at the interval level. The scatterplot indicates relationship between both is linear.

Simple linear regression: dependent variable is roughly normal; scatterplot shows the relationship is linear.

The data and variables for this chosen hypothesis were interval and required a scatterplot and Pearson's product/r for analyze. The scatterplot of number of hours worked with physical pain/exhaustion score showed that the points were not narrow from upper left hand corner to the lower right hand corner. This would indicate a moderate relationship between the number of hours worked and physical pain/exhaustion score. The strength and significance of the relationship between the number of hours worked and physical pain/exhaustion score was examined using Pearson Product Moment correlation. There was a moderate, positive correlation between the two variables (r=0.32, n=73, p=.005), with higher levels of hours worked being associated with higher pain/exhaust scores.

A simple linear regression was used to evaluate the number of hours worked to predict physical pain/exhaustion score. Number of hours explained 10% of the variance in the pain/exhaust score (R^2 = 0.10). Overall, the model was statistically significant (F =8.14, P=0.05). For every one point increase in the numbers of hours worked, the pain/exhaustion score was increased by 0.77 points (beta = 0.77, p=0.005). We reject both of the null hypotheses because the statistical test indicate we have a statistically significant correlation and linear relationship between the two variables.

Figure 1. Correlation between number of hours worked and physical pain/exhaustion score.



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.32074572
R Square	0.10287782

Adjusted R Square	0.0902423
Standard Error	7.25128178
Observations	73

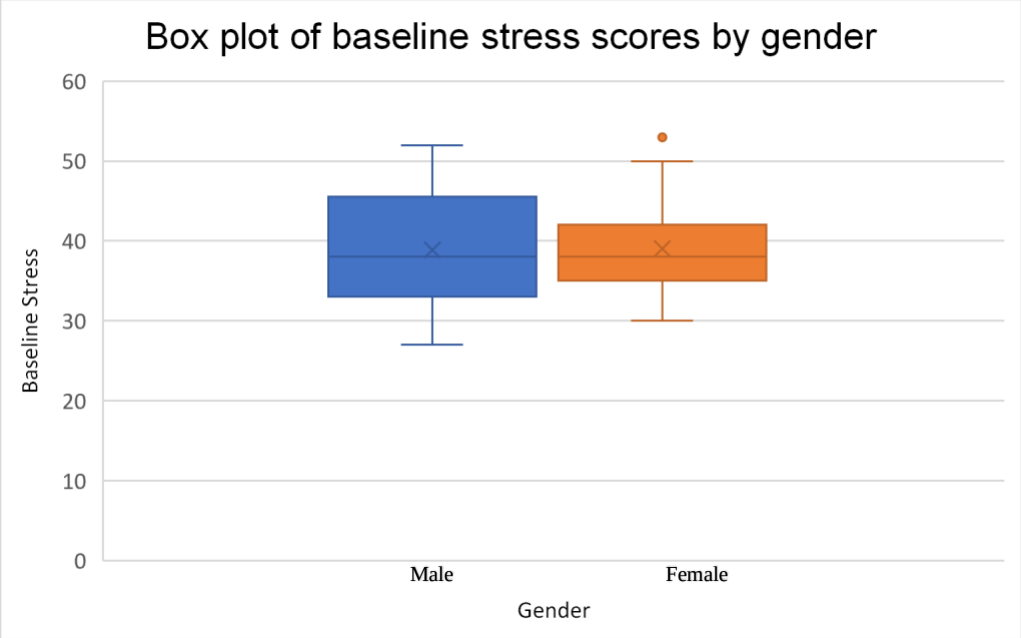
ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	428.112657	428.112657	8.14195138	0.00566343
Residual	71	3733.25721	52.5810874		
Total	72	4161.36986			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	16.3612123	7.17775866	2.27943193	0.02564928	2.04916801	30.6732566	2.04916801	30.6732566
pain/exhaust	0.13410094	0.04699672	2.85341048	0.00566343	0.04039214	0.22780974	0.04039214	0.22780974

Step 3
Baseline stress scores by gender.

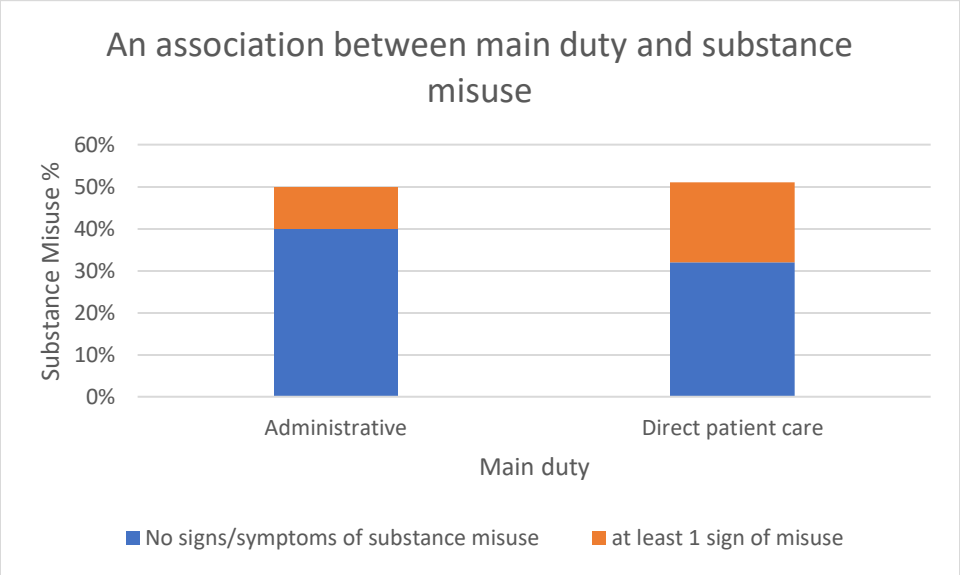
Figure 2: Box plot of baseline stress scores by gender



As seen in the box and whisker plot above (Figure 2), the distribution of baseline stress scores is normally distributed for males and females. Males have almost similar average baseline stress score (38.9) than females (39.0).

Step 4:
Hypothesis 1: There is an association between main duty and substance misuse.

Figure 3: An association between main duty and substance misuse



As seen in the clustered column graphic chart above (Figure 3), 40% of the sample reported no signs/symptoms of substance misuse with administrative duty, 32% of the sample reported no signs/symptoms of substance misuse with direct patient care duty, 10% of the sample reported at least 1 sign of misuse with administrative duty, and 19% of the sample reported at least 1 sign of misuse with direct patient care.