A comparative study on Stress and Sleep Quality using simple random sampling

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Outline:

- Abstract of the case study
- Objectives of the case study
- Introduction
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Abstract:

Stress is your body's response to anything that requires an action. Everyone experiences stress to some degree. This often leads to insomnia and sleep problems . By this same token, lack of proper sleep can contribute to stress. In today's competitive world, students are having high levels of academic stress and personal stress which leads to poor quality of sleep, resulting in insomnia which may affect student's academic achievement index. This study is examining the relationship between stress level and insomnia of SAS department students studying at VIT. The sample selection technique used in this case study is simple random sampling. Primary data is collected using questionnaire method from the chosen population i.e., from the students of VIT. And the results are analysed using pearson's correlation coefficient.

Key words: Stress , Insomnia, Simple random sampling, questionnaire, Correlation

Objectives

- The main objective of the research is to find the stress levels and quality of sleep among the students and its affect on their health

- This stress and poor sleep quality in people further leads to many health problems and a proper diagnosis and treatment is required in order to reduce this.

- This research also helps us to estimate the level of stress and its effect on sleep quality of a person , so that one can understand the severity of the problem and will be able to take proper measures to reduce it.

Introduction

- Simple random sampling is the probabilistic method in which the samples are selected at random from the population
- In the research papers discussed , there are many applications of sampling and the methods of sampling to be used for real time problems and to finite populations
- Sampling allows us to draw the conclusions for the populations which has large number of units.
- Sampling makes the analysis easier for the researchers who are analysing and surveying the problems.

Work plan

Review no	Task	Description	Date
Review 1	Analysis of research papers	Analysis and summary of research papers and brief idea on methods and techniques used for case study	22nd November 2022
Review 2	Developing case study	Developing a case study on the chosen problem and collecting samples through questionnaire method	20th December 2022
Review 3	Analysis of data	Analysing the collected data and drawing conclusions using SRS and correlation on the case study	18th January 2022

1.Sampling

Sample is a finite part drawn from the target population. Based on the result obtained from the sample, researchers may draw conclusion about the target population with a certain level of confidence, following a process called statistical inference.

A sample with representativeness should be selected if not the conclusions drawn will be not reliable.

The sample frame consists the group of individuals that can be selected from the target population.

2.Sampling methods in Clinical Research.

Clinical research is about people having a certain disease or medical condition.

The clinical research findings are dependent on the sampling method we choose.

We have different kinds of sampling methods which can be categorized into probability and non-probability sampling methods.

Probability sampling method include simple random sampling in which the population units have equal chance of getting included into the sample.
The samples are selected at random and with no bias. The other probability sampling include stratified, systematic, cluster, etc. and the non-probabilistic sampling method include convenience sampling, judgemental sampling.

3.Determining sample size

Factors for determining the sample size: Purpose of study, Population size, Risk of selecting a “bad” sample and Sampling Error.
Three criteria used are (a)level of precision, (b)level of confidence or risk, and (c)the degree of variability in the attributes being measured
Strategies for determining the sample size:

- Using a census for a small population
- Using a sample size of a similar study
- Using published data

Formulae for determining the sample size:

- Cochran formula - (for infinite population), $n_o = \frac{Z^2 pq}{e^2}$

  (for finite population correction for proportions) $n = \frac{n_0}{1 + \frac{(n_o - 1)}{N}}$

- Yamane formula (population known and finite) $n = \frac{N}{1 + N(e^2)}$

- Sample size for proportions $n = \frac{p(1-p)Z^2}{e^2}$

4.Developing sample frame for case study:

The choosing of sampling frame is very important for any case study. Unlike quantitative study, the elimination of inferential statistical analysis allows the researchers to be more creative in dealing with sampling issue.

Choosing of sampling frame for qualitative analysis consists of two methods:
(a) single case study(holistic and embedded)
(b) multiple case study.
Sampling frame selected must be scrutinized well for non biased selection of samples and the issue of generalization of data to the bigger population.

5.Comparison of sampling methods:

The study is about comparing the accuracy and precision of several of the sampling methods to study the canopy cover in northern zagros forest. 40 sq of same plot,1 hectare (100*100) were selected. In the sample plot the position of tree , kind of species and two diameter of crown is considered.
The data of perfect inventory was transmitted in ARC GIS software and the dispersion map of trees was extracted then determine the suitable sampling for study of canopy cover (%) used the %E^2 * T, Criteria. To compare the canopy cover(%) all of the sampling methods and perfect inventory used in t test analysis
Here the methods like the rectangular sample and random sampling with circular plot is used. It showed that the rectangular sample was the best method with maximum accuracy.

6.A Cognitive Study on Paddy Cultivation using Random Sampling Technique.

Simple Random Sampling was used for the collection of information from 130 farmers out of 1123 farmers in the filed of agriculture at Kodakara block Panchayat A, Trissur. The Paddy farmers are facing major problems such as delay in payment, lack of MSP, problems of price fluctuations, lack of storage facilities, etc. Supply Co. should encourage spot payment system, provide decentralized storage facilities, Government to increase MSP. It was found that majority of the farmers are male and they reside in rural area.

7.Application of a simple random sampling method on surveys at the community level

- The objective of the research was to study the feasibility of a simple random sampling on surveys at the community level and to evaluate the quality of samples under survey.
- The simple random sampling method was used to select a random sample of households from Gongshu and Xiacheng districts of Hangzhou city. KISH method was used to identify one of the adults aged 18-64 years in the sampled household to finish a questionnaire survey. More than 500 people from the sample size was required in each district.

Using a simple random sampling method to do the survey is feasible,in a geographically limited area, based on the electronic listings of household. If enough time is spent to visit households the survey guarantees a representative sample of sampling frame.

8.Level of stress and coping strategies used by the management staff of colleges of education in Nigeria.

The study was about the level of stress and the stress coping strategies used by the management staff of colleges of education in Nigeria. The sample of study consisted of 1500 respondents. Purposive stratified and simple random sampling techniques were used to select the sample and a structured questionnaire was also designed for the study. Data collected were analysed using frequency counts, means, percentages and t-test analysis. The study revealed that the level of stress among management staff was high during the period understudy. The research questions raised were answered descriptively, while the null hypothesis formulated was tested at 0.005 level of significance using t-test analysis.

9.Correlation between stress and anxiety levels in nursing students

- In this journal transversal, descriptive, and correlational study with 71 professionalizing nursing students, with the purpose of describing social demographic data to verify and to correlate stress and anxiety levels. In this sample calculation was not performed for the present study. As the population was small all the nursing students take part in the study. The inclusion criteria were being a nursing student at the institution and voluntary participation in order to answer questionnaires.

- For data analysis, a MS Excel spreadsheet was used for database elaboration and afterwards the statistical package for the social sciences(SPSS) software version 17.0, for descriptive and inferential statistical analysis of data was also used.

- Parameters of mean and standard deviation were used for descriptive analysis.

10.A Study on Stress and Its effect on College Students

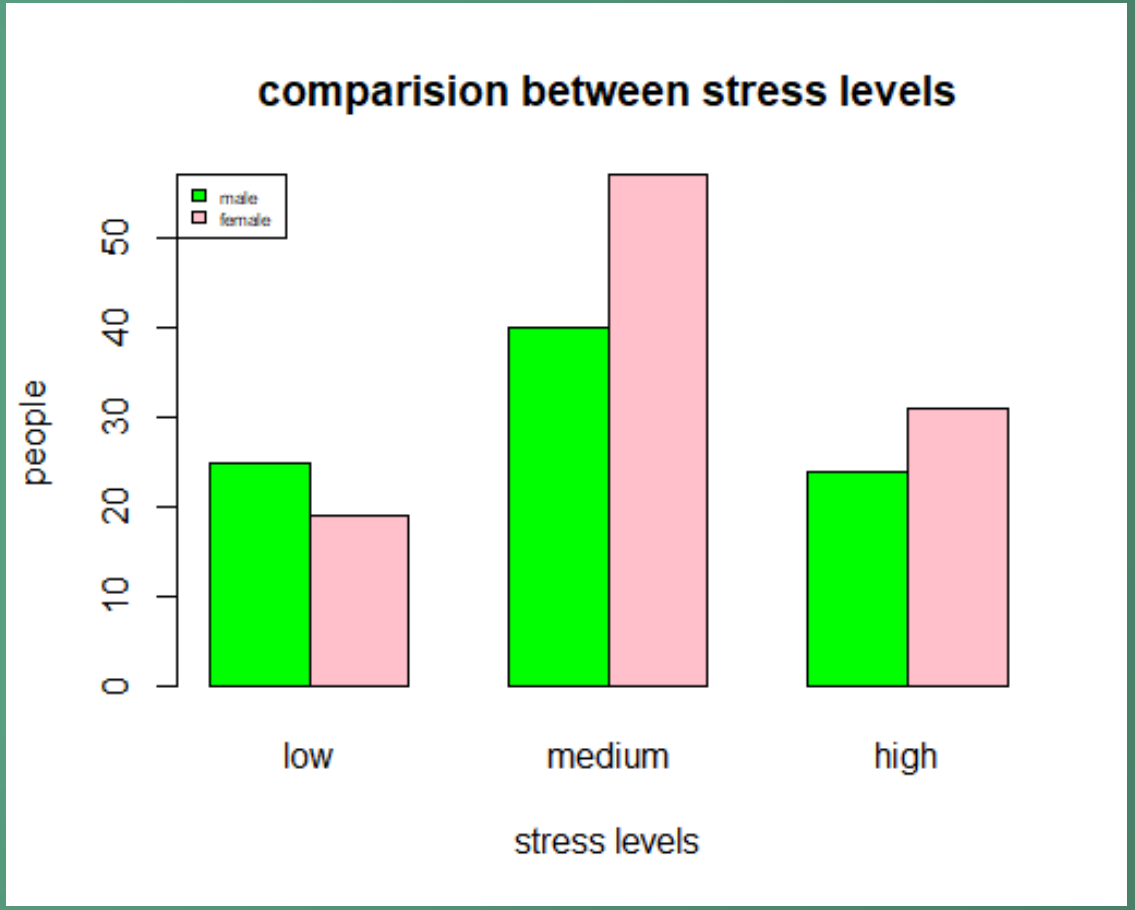
- The method used for the data collection for this study was convenience sampling. The participants in this study were 200 college students in two reputed colleges of Mannarkkad city (Palakkad District, Kerala).

- They were between the age group of 18 to 21 years old. The study was based on the stress level of these college students. It was found that the major stress level was caused due to academic factors, social factors, family factors, emotional factors and financial factors.

- Thus, the major stress found out in through the study have a direct relation with the stress level of students and further the stress varies according to the students and their psychology.

Analysis and Results

Stress levels			
GENDER	low	medium	high
Male	25	40	24
Female	19	57	31



Correlation:

- Correlation is the statistical measure of the relationship between two or more variables or attributes.
- It ranges from -1 to +1. A correlation coefficient of -1 is perfect negative correlation and 1 is a perfect positive correlation.
- Pearson's correlation coefficient:

$$r = \frac{cov(x,y)}{\sigma_x \sigma_y}$$

- Spearman's rank correlation coefficient

$$\rho = 1 - \frac{6\Sigma d_i^2}{n(n^2-1)}$$

- Using Yamane formula (population known and finite) $n = \frac{N}{1+N(e^2)}$, the sample size required for the population size 400 is 196.

- During analysis of 196 samples , we found out that 12.7% males are having low stress, 20.4% are having mild stress and 12.24% are having high stress. And 9.6% females are having low stress, 29.1% are having and 15.82% are having high stress.

- Using chi-square test we found that stress levels and quality of sleep are dependent on each other($p<0.05$).

- Now we're going to show the correlation between the stress level and quality of sleep of the students.

Stress	Sleep Quality: No (3)	Minor (2)	Insomnia (1)	f_X	Xf_X	X^2f_X	XYf_{XY}
Low (1)	44	0	0	44	44	44	276
Medium (2)	52	25	20	97	194	388	452
High (3)	16	5	34	55	165	1485	276
f_Y	112	30	54	**N=196**	**403**	**1917**	**860**
Yf_y	336	60	54	**450**			
Y^2f_Y	3024	240	54	**3318**			
XYf_{XY}	588	130	142	**860**			

Using Pearson's correlation coefficient ,$\rho_{XY} = \frac{N\Sigma\Sigma XYf_{XY} - (\Sigma Xf_X)(\Sigma Yf_Y)}{\sqrt{((N\Sigma X^2f_X - (\Sigma Xf_X)^2)\left(N\Sigma Y^2f_Y - \left(\Sigma Yf_y\right)^2\right))}}$

$\boldsymbol{\rho = -0.0413}$ This shows that the quality of sleep and stress levels are negatively correlated.

- That means if the stress levels increase , the quality of sleep will reduce automatically.

Conclusion

- We would like to conclude that the sampling method chosen depends upon the population of interest and planning is the key for generating reliable results.
- Probability sampling means one can generalize to the population defined by the sampling frame. Hence, probability samples are the old standard in sampling methodology.
- Simple random sampling provides equal chances for every population unit to be included in the sample.
- Determination of sample size can be done both for finite and infinite population
- Hence for our case study the method of sampling is simple random sampling which is a probabilistic method and since the population is finite , we are using determination of sample size for finite population formula. We are going to study the affect of stress on sleep of students and its after effects in this case study.

- Using SRS, we picked 196 samples from a population of size 400 and the effect of stress on the sleep cycle of the sample students is analysed.
- Using chi-square test we found out that stress and sleep quality are interrelated($p<0.05$).
- Using Pearson's correlation coefficient, we analysed that the sleep quality and stress are negatively correlated($\rho = -0.0413$)i.e., if stress levels of a person increases, the quality of the sleep decreases.
- With this we can conclude that the stress levels of the students are getting effected by various factors like academic stress, family issues etc which is in turn resulting in the reduction of the sleep quality.

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Thank You