International Journal of Scientific Engineering and Applied Science (IJSEAS) – Volume-4, Issue-9, September 2018
ISSN: 2395-3470
www.ijseas.com

Bio statistics – Dental Perspective

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ABSTRACT

Bio statistics is a science of measurement applied in the field of biology especially in medicine , encompasses the design of biological experiments, where the details are collected , meaning fully organized , summarized and analysis of such collected details for specific experiments and thus interpreted and inferred .Bio statistical concepts also present in epidemiological studies and clinical trials thus giving an idea to the researcher to measure the given data thus finding the underlying issue or to project an issue to solve the problem.

Keywords: measurement of data, organizing data, displaying data, central tendancy, measures of dispersion.

Introdoction:

Bio statistics is the application of statistical methods to medical science , public health related problems. Biostatistics is also known as biometry bio means science especially medicine and metry is measurement. The word bio metry is taken from the greek word “BIOS” means Life and Metron is measurement. hence biometry is measurement of life. Biostatistical method can be classified in to two broad areas namely descriptive biostatistics and inferential biostatistics.descriptive analyais helps a researcher to organize the collected data and explaining with a single valcue which will be the most representative value of samples , in other hand inferential statistical analysis enables to arrive to aconclusion about the population based on the samples collected . there are different methods for drawing inference which depends on the type of variable and the distribution of data.variables are of two types , dependent variable is the outcome of the researcher interest and independent variable is a variable which the researcher think as a cause. The values of the dependent variable depends on the independent variable.

Scales of Measurement

The collected data hass to be numbered , scaled for measurement for their meaningfull inference . thus the values has to be assigned for the variables . psychologist Stanley Smith Stevens developed the most accepted classification level of measurement namely nominal scale, ordinal scale , interval scale and ratio scale.

Nominal scale

Nominal scale is a qualitative scale , the measurements made on qualitative sale are inferred as qualitative data , the number of nominal scale are assigned as labels this is the lowest in the scale of measurement.

Ordinal scale

Ordinal scale is known as rank order of measurements. The collected data are been ranked as 1st ,2nd,3rd and so on . highest value is been assigned as first rank and next as second rank , the difference between first and second rank and the difference between second and third rank will not be the same. Dichotomous data are also comes under ordinal scale values like healthy/unhealthy , guilty/ non guilty, true/ false are some of its kind.

Interval scale

Unlike ordinal scale the continuum of the scale of measurement (discrete) is been divided equally in to intervals and thus the collected data are been categoriesed in to the specific interval . thus the grouping of the collected data helps in inferrencing many results from the population.

Ratio Scale

A ratio scale pocessesses a meaningful zero value . the ratio scale takes its name from the fact that measurement is the estimation of the ratio between a magnitude of the same kind .it is a continuous scale which has a true zero point . the diference between the interval scale and the ratio sale is the ratio scale is continuous and the scale of interval is discreate. Ratio scale has only positive value and the interval scale has both positive and negative values.

Frequency distribution

Frequency distribution is a list or graphs that displays the frequency of various outcomes in a sample . a frequency distribution is a simple table which shows the values of variables and the frequency with which each value has been observed.the frequency is been noted by tally mark . tally mark represented by four vertical line for four entries and one cross line which represents fifth frequency . the frequency is been tabulated and later converted into percentile frequency for easier inference the percentile frequency are called as relative frequency distribution.

Organizing and displaying

Thus collected data are been organized and displayed for easy sharing of research outcomes to others in an effective manner. There are two types of representation they are diagrammatic representation and graphical representation.

Diagrammatic representation

A diagram is a visual form for presentation of statistical data. diagrams refer to the various types such as bars, circle, maps, pictorials cartograms. diagrammatic presentation of the statistical data table is simple and effective as photographic memory will last long in the mind than any other form. These are the most important guidelines that will help in making them more effective.

Every diagram should have a self-explanatory suitable title written in bold letters. Also it should be numbered. The size of the diagram should match the paper and it should be middle of the paper

A proper scale must be chosen for the diagram to look attractive and to create a visual impact on the reader. The most important point is the selection of proper diagram to present set of figures. All types of diagrams are not suited for all types of data.Proper index must be given for identify and understanding the diagram The source of data from where it is been taken should be indicted at the bottom The diagrammatic representation should be simple that even a layman can understand the diagram, too much data in a single pictorial representation may be confusing, so several simple diagrams and pictures are been displayed for better explanation.

Frequency distribution

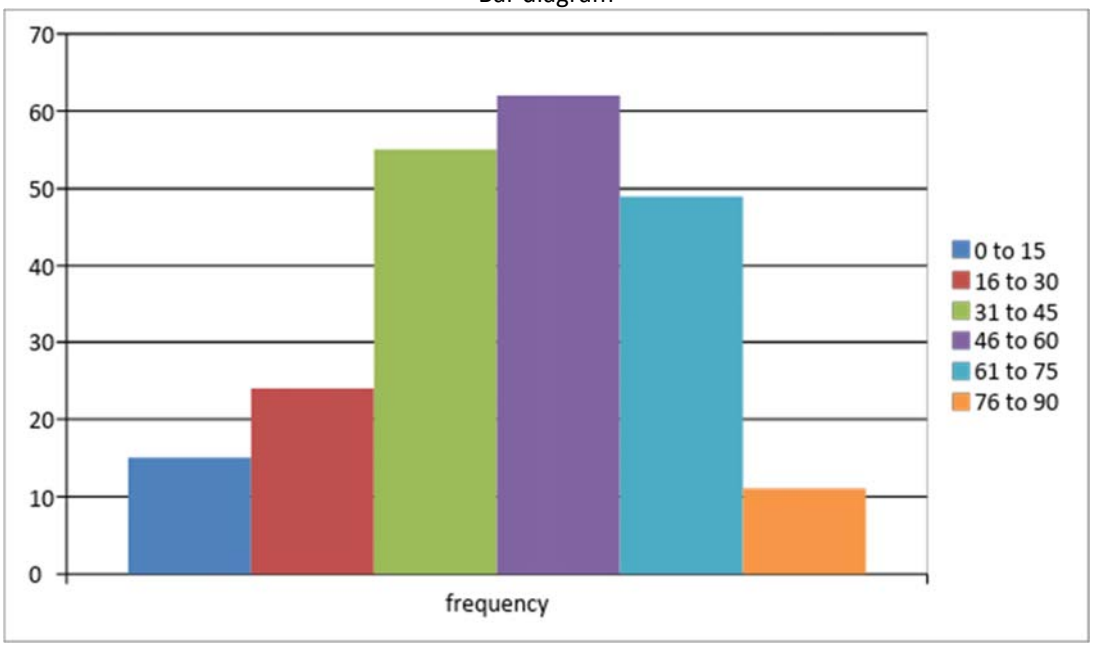
Frequency distribution is a table that displays the frequency of various outcomes of variables. The frequency distribution table summaries the distribution of values of the sample. It explicit the value of the variable and the frequency of theoccurance. The frequency distribution is been calculated by the occurance of the value of it usually it is marked by tally marks and converted into frequency distribution and later to percentile frequency distribution for better explanation. Percentile frequency calculation if"x" is the frequency of the interval or variable and" n" is the total number of frequency the percentile frequency is been calculated as P=(x/n)X100

Lets see a frequency distribution of patients received in the dental clinic for a week

Si No	Range of age of the patients reported for treatment	frequency	Percentile frequency
1	0 to 15 Years	15	7%
2	16 to 30 Years	24	11%
3	31 to 45 years	55	25%
4	46 to 60 years	62	29%
5	61 to 75 years	49	23%
6	76 to 90 years	11	5%
	Total no of patients	216	100

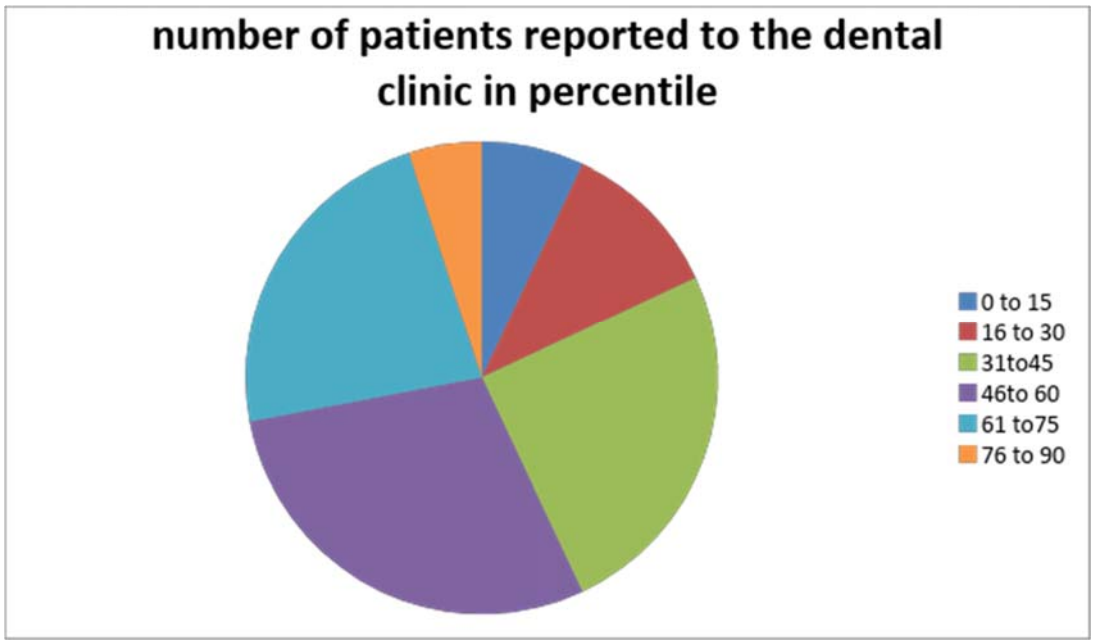
The above table explains the distribution of patients reported in a dental clinic for a week, while critical evaluating the percentile of patients occurrence of the range of 46 to 60 years is the largest and next is 31 to 45 years is 25 percentage and the least is the range of patients from 76 to 90 years . This distribution reveals that maximum range of patients reported to the dental office is from 31 to 75 years.

Bar diagram



X axis = age group
Y axis =no of patients arrived to dental office

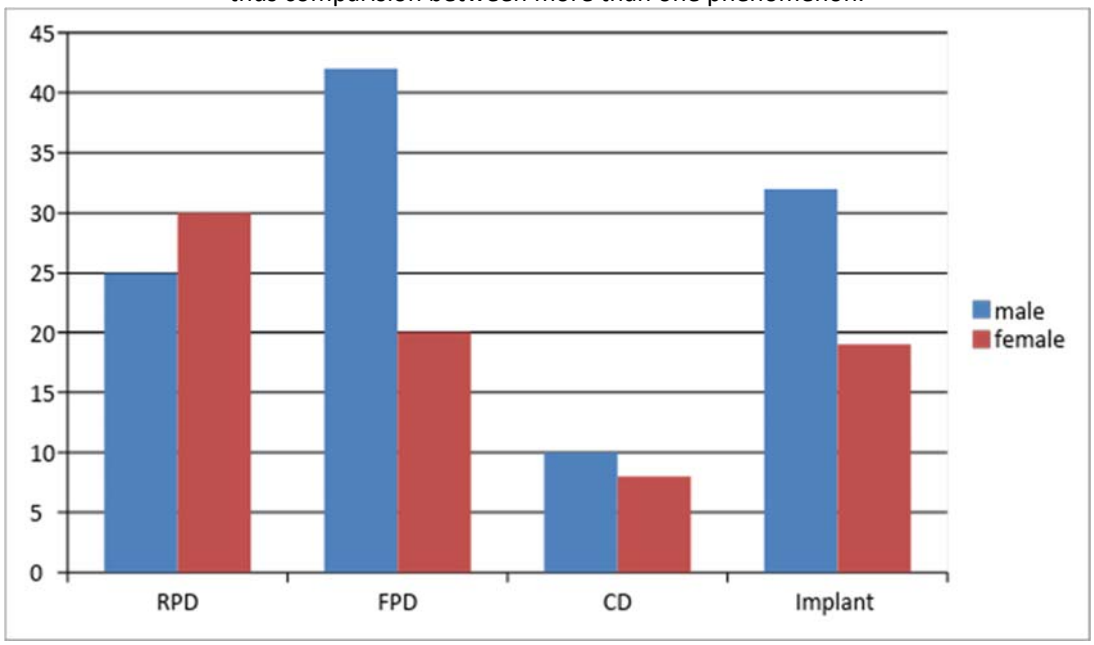
Pie Diagram



The pie diagram explains the number of patients reported to a dental clinic the values are converted into the percentile values where the range of patients from range 46 to 60 is the maximum value of 29% and the least value is of range 76 to 90 its percentile value is 5%.

MULTIPLE BAR DIAGRAM

Multiple bar diagram explains two or more sets of interrelated data and these datas are represented thus comparision between more than one phenomenon.



The above multiple bar graph explains about the distribution of patients in the means of their sex for their types of prosthesis in a dental office for a month

X axis = type of prosthesis and the sex of the patients

Y axis = no of patients treated for the respective types of prosthesis

The data is as follows

Removable Partial Denture Prosthesis		Fixed Partial Denture Prosthesis		Complete Denture Prosthesis		Implant supported prosthesis	
Male	Female	Male	Female	Male	Female	Male	Female
25	30	42	20	10	8	32	19

Frequency polygon

A frequency polygon is a histogram with values of the variables. Instead of rectangles erected over the intervals, points are plotted at the midpoint of the top of such bars are known as histogram the successive points are been joined by the lines. Thus helps a researcher to compare two frequency distributions. If the total frequency is large and when we adapt much narrower class interval the frequency polygon will most often have a much smoother appearance. Thus forms a smother curve.

Measures of central tendency

Measures of central tendency infers to the summary measures used to describe the most typical value in a set of values. Measure of central tendency of a probability distribution is the center location of the frequency distribution. There are three types of measures of central tendency are arithmetic mean, the median and the mode .Mean is the average of the numbers. It is calculating the sum of all the numbers and then divide by how many numbers . Median is the value which separating the higher form and the lower form of the given data, in other words middle most of a given set of values. Mode is the measure of central tendency it is the value which often appears in the frequency distribution.in other words, it is the value that is most likely to be sampled.

Measures of Dispersion

In statistical analysis dispersion is the extent to which a distribution is stretched or squeezed .while measures of central tendency are used to estimate normal and central value of a given data set , measures of dispersion are important for describing the spread of the data or its variation around central value . in descriptive statistics the type of measures of central tendencies are variance, standard deviation and range. Unlike mean median mode in the measures of central tendency measures of dispersion deals with co-efficient of dispersion, standard deviation, index of dispersion, in quartile range, interdecile range , mean difference, median absolute deviation and quartiles .

Conclusion

It is important for every researcher to collect the respective data and organizing the data. Thus collected data are being critically examined for their central tendencies so that normal value of the population has been found. Thus found values help us to know about the population normal values and with the use of measures of dispersion helps a researcher that how the people are dispersed in their qualities from the normal values. Thus helps a researcher to find the answer to the given problem and help him to arrive at the most appropriate results.

References

1. Research Methodology –methods and techniques By Kothati C R., 1987,Wiley eastern limited.
2. Text book on Biomedical research Methodology By Rajan Das and P N Das 2011 Jaypee Brothers Medical publisher.
3 . Principles of Biostatistics, By Marcello Pagano & Kimherlee Gaureau.
4. An Introduction to Medical Statistics By Bald,Martin 1987 , oxford publication.
5. Statistical Methods in Medical research By Armitage,P and Berry.G , 1994, Blackwell publishers.