The first thing to know .. The statistics… we are dealing mainly with quantitative type..because theres 2 main types : 1.quantitative 2.qualitative

 We discus mainly the statistics related to sample (come from quantitative research ) which could be or come through experiment / survey / correlation studies .

 \*In dental or medicine in general or health care experiment or randomized control trial (RCT) .

 We use statestic in meta analysis or systemic review .( we make review for RCTs or quantitative studies in general).

 \*\*One of the most important application of statistic is related to what we call it psychometric evaluation of study . Ana when we call Psychometric properties we does mean psychometric properties in term or validity and realibility of tool we are dealing with. **\*reliability** 🡪 consistency ...it means that the research tool used has to be consistent (i.e.: if we use it on different people it should give the same result for the normal) .

**\*validity** -->measures what it is designed to measure ( a thermometer does not record BP...so the validity for the thermometer is to measure the temperature ) .

 \*\* when we talk about statistics -> we talk about the statistics of of the sample we are not talking about population

The most important thing we talk about population we have to represent this population into sample …. (not all population.. representive sample ).

 Aggregate… the best subject we apply the study on

Parameters : does mean those measurement we measure in this study ….. we concern about 2 main concept in parameter🡪 dependent and independent variables 🡪 for example :effect tooth paste on caries ( toothpaste : independent / caries : dependent )

 In sampling there are 2 main designs : 1. Probability 2. Non probability .

 \*the most important thing we are dealing with in medicine and health care 🡪 probability sample design.

\*\*, probability sampling design : we take the sample randomly

( randomly : systemic collection or selection of sample in scientific way )

This is important for statistical procedure

Sooo… as an outcome the statistics describe the characteristic of the groups which are mainly the samples .

Sooo..what the statistics ? is abranch of math or science that deal mainly with numbers and its process "very long process " deal with collection the data , transform numbers, organize these data ,organize these numbers .

The main purpose of statistics .. to describe and summarize information related ,to make prediction as predector ,and to generalized finding, identify assotiation between diffrent variables .

\*\* types of statistics are mainly 2 🡪 descreptive and inferential

..NOW we deal with inferential more than descriptive , specially if you deal with RCT in dental , medecine.

\*\*the most important key 🡪 **Level of measurement of values** '' this is the key of understanding statistics ''.

-for example 🡪 geneder : male and female 🡪 this is called nominal dichotomas .

\*\* level of measurement : 1. Nominal 2. Ordinal 3. Interval 4. Ratio .

 ***1.nominal level of measurement :***

 For example if we are dealing with incedince of certein phenomena … incidence of falling down … incidence of zika virus ……

All of them … there are 2 choice : yes , no

Sooo.. this variable shoud be nominal dichotomas

\*\* this is the first level of measurement and this is the lowest level of measurement …..

 Because the numbers here doesn’t mean value or magnitude …🡪 it does mean itself for categorizing of the variables .

\*\* for example when we collect data about ceirtien population as geneder for example .. we deal with male and female … we give male🡪1 female 🡪2

… not mean female double male ……… sooo the numbers not magnitude in nominal data ..this is important to know .

\*variable at nominal level …. We call it binary level of measurement or label

\*\*examples of nominal level 🡪 geneder , medical diagnosis '' the numbers just for labeling the diagnosis of pt. ''.

***2.ordinal level of mesurment :***

\*the second level of measurement

\*giving the numbers certain magnitude to some extant .

\*for example … Age 🡪 when we categorize the age of pt. from 1🡪 4 … here the categories are different

\*this is magnitude 🡪 its meaningful to some extant

\*we can categorize age from 1🡪4 / 1🡪5/ 1🡪10 …..

\* and for example when we talk about certain formula like position of patient

\*\* soooo… giving such numbers 🡪its ordinal level measurement .

\*pain intensity 🡪 is agood example for ordinal level of measurement

 0🡪no pain 1🡪 minor pain 2🡪 moderate 3🡪 sever pain

\*categories 🡪 ordinal level of measurement .

***3.interval level of measurement :***

\*the third level of measurement

\*\* at interval level of measurement … the categories take an equal distance between these categories

\*and almost used an experimental studies

\*temperature measurement 🡪is agood example of interval level …. 60F is warmer than 50F ---- which is the difference 10 degree….which is equal for the difference btw 30 and 40

***4. ratio level of measurement :***

\*the highest level of measurement .

\*at ratio level of measurement we are measuring exactly the phenomena .

\*like we are measuring the heart rate of the pt. … 60/70/80 …… and the number here mean itself…. We decide if the patient bradycardia / tachycardia according to the measurnent …. We have acut of point

 …. Below 60 🡪brady cardia …..

\*\* blood pressure / weight 🡪 ratio level of measurement '' highest level ''.

\*\*\*\*\*this table explain the relationship between these 4 levels of measurement :

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ratio | interval | ordinal | nominal |
| 1 | 180 | 70 | 4 | 2 |
| 2 | 110 | 0 | 1 | 1 |
| 3 | 165 | 55 | 3 | 2 |
| 4 | 130 | 20 | 2 | 1 |

\*\* those are 4 subject … we measure their weight at ratio level in kilograms.

and we can transform the ratio level into other levels

\*when we transform the ratio level 180 '' the first subject'' it becomes 70 in interval level , 4 in ordinal level , and 2 in nominal level ……. What do u think?????/

\* at nominal level''lowest level'' 🡪 obese / not obese

We use cut of point : 110 🡪1 130🡪also 1 above 130🡪2

Sooo…. Here the numbers doesn’t mean itself ..doesnt mean the weight .. … but we can category these patients into 2 main categories

1🡪 equal or less 130 2🡪 above 130

\*\*\*at ordinal level 🡪we order the data …. For example ascending order

110🡪1 130🡪2 165🡪3 180🡪4.

\*\*at interval level of measument 🡪 cut point "zero point '' :110

110🡪0 …. Then we take the difference between 110 and 130 = 20

 We take the difference between 110 and 180 = 70

 The difference between 110 and 165 = 55

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