

# 6-Part Webinar Series: Research Methodology

## Part IV: Epidemiology Abnormality, Risks, & Assessment

### Questions Asked: 18 April, 2024

1. I am still confused about Abnormality and risk. How are they the same, and how are they different? What is their connection in Epidemiology?

**Abnormal describes a state, condition, or behavior that is unusual or different from what is considered normal. In medicine and health, an abnormal measure may be benign, preclinical (likely to become disease), or indicator of disease. malignant (cancer). Definitions of abnormality are different methods of defining and diagnosing illnesses. Examples include statistical infrequency, deviation from social norms, failure to function adequately and deviation from ideal health indicators. In epidemiology, a risk factor or determinant is a variable associated with an increased risk of disease.**

2. In the case of maternal mortality, what will be the denominator? Is it women of childbearing age or others?

**It depends on the critical question being asked. Typically - Maternal mortality ratio = (Number of maternal deaths / Number of live births) X 100,000 from a specific population**

3. What is the difference between the Maternal Mortality Ratio and the Maternal Mortality Rate? Especially the difference between Rate, Ratio, and Index.

**Maternal mortality ratio = (Number of maternal deaths / Number of live births) X 100,000**

**Maternal mortality rates are then estimated directly by dividing the number of maternal deaths by the number of person-years of exposure.**

**Maternal mortality index compares the observed to expected maternal mortality rates. A score of less than 1 means more maternal survival than were predicted. A score of more than 1 means higher mortality than were predicted.**

4. How do you calculate DALY? Can you explain the DALY with an example?

**DALY stands for disability-adjusted life year. It is a universal metric that allows researchers and health providers to compare different populations and health conditions across time. DALYs equal the sum of years of life lost (YLLs) and years lived with disability (YLDs). A DALY is represented by the equation  $DALY = YLL + YLD$ . YLL is calculated as the number of deaths (n) x the standard life expectancy at age of death (L1). This measures the reduction in life expectancy. It is the primary metric used by the World Health Organization to assess the global burden of disease. DALYs combine in one consistent summary measure the burden from (a) mortality: years lost because of premature death due to disease; and (b) morbidity: years of life lived adversely affected by disease.**

5. How do they come up with BMI? The surface of the body would be a better parameter than height, wouldn't it?

**Body mass index is often used as a simple measure. With the metric system, the formula for BMI is weight in kilograms (kg) divided by height in meters (m) squared. Since height is commonly measured in centimeters (cm), an alternate formula can be used—divide weight in kg by height in cm squared, and multiply the result by 10,000.**

**Body surface and fat distribution are indeed better indicators of risk. However, these measures are more complex and typically require planned measurements while BMI can be calculated from previous recorded measurements including self-reported heights and weights.**

6. To what extent is the BMI accurate and comparable without accounting for age and sex?

**Age and sex are important categories when reporting BMI.**

7. Where will the level of obesity be in the next 50 years if action is not taken?

**Obesity is a critical risk factor for many diseases with public health and clinical issues designed to reduce. The upward trajectories in obesity prevalence is alarming in nearly all global populations. Hopefully these interventions currently being implemented and new strategies for treatment AND prevention will affect the trends.**

8. What is the exact procedure for measuring the waist circumference? Some people measure between the lower rib and the iliac crest.

**Waist circumference: Measure at the top of your hip bone, bringing the tape measure all the way around the middle level with the naval. Make sure it's not too tight and that it's straight, even at the back. Check the number on the tape measure right after exhaling.**

9. Is the waist circumference affected by racial differences? If you consider the body shape and fat deposition of women from different races, there are observably huge differences; could this affect BMI?

**Numerous studies have indicated the relationship between anthropometric measurements and Visceral adipose tissue (VAT) differed by race/ethnicity.**

10. Between BMI and waist circumference metrics, which gives more accurate and reliable measurements, especially in diabetes management?

**An increase in the waist circumference by the gender-specific standard deviation (9.9 cm for men and 11.2 for women) was associated with an increase in risk of diabetes in men and women.**

11. Could we also use hip or arm circumference?

**The waist-to-hip ratio compares waist size to hip size. By contrast, body mass index measures weight against your height. The waist-to-hip ratio provides a better picture of health than weight or BMI. One can be at a healthy weight but have too much fat around the midsection. A good rule of thumb is that waist should be smaller than hips, regardless of weight or BMI.**

**Mid-upper arm circumference (MUAC) has an equal ability with BMI to screen overweight or obesity among adults. Therefore, MUAC can be utilized as an alternative index to screen overweight and obesity in resource-limited setups.**

12. Do you have a standard drink for an Asian country?

**That would be best determined by investigators in a country.**

13. May I ask if red wine is really good for the heart?

**It would be best for one to assess the various studies and make such a determination. The results vary.**

14. How much is one drink in ml and %?

**A standard drink is 12 ounces of beer, four ounces of wine or 1-1/4 ounces of 80 proof distilled spirits – each contain about the same amount of alcohol (about 1/2 ounce).**

15. Why is alcohol in the grey line of Public Health, showing both protective and harmful effects?  
More data is important.

**Agree more data is needed. The assessments of harms and benefits of alcohol is complicated by alcohol intake, frequency, type of alcohol, co-morbid conditions, as well as age, gender and ethnicity. Also – such studies must be ethical.**

16. French Paradox slide: Sorry, but I have to raise this...Even suggesting that alcohol consumption could have a beneficial health effect is very irresponsible. We know it does not!

**There are numerous current studies that do suggest a possible benefit from alcohol. While more studies are needed, it is not responsible to simply ignore such studies. In the absence of definitive evidence and given the contentious debate over the risks and benefits of moderate alcohol consumption, those who formulate health policy and conduct such research have a responsibility to clearly acknowledge to the public the existence of evidentiary uncertainty when making recommendations.**

**In the case of the French Paradox – alcohol was described as a potential factor identified from published studies. It was NOT presented as an endorsement of alcohol intake for reduced cardiovascular disease. Rather, this is an example emphasizing the importance of critically assessing the results of studies for potential bias and confounding.**

17. So, what are the recommendations for alcohol consumption? And if any, what are the current updates?

**As above, the benefits and harms remain unclear with regards to policy and recommendations. In the absence of definitive evidence and given the contentious debate over the risks and benefits of moderate alcohol consumption, those who formulate health policy and conduct such research have a responsibility to clearly acknowledge to the public the existence of evidentiary uncertainty when making recommendations.**

18. How can we measure alcohol levels for locally prepared alcohols("tela" and "Areki") in Ethiopia? How do we quantify locally used alcohol-drinking devices?

**Alcohol content is often available on labels or from the distributor. In general - A standard drink is 12 ounces of beer, four ounces of wine or 1-1/4 ounces of 80 proof distilled spirits – each contain about the same amount of alcohol (about 1/2 ounce).**

19. May I ask if exposure to secondary smoking is more harmful than those who are smoking?

**Great, but complicated question. Most studies agree exposure to secondary smoke increases disease risk. Complications include the assessment of the exposure to secondary smoke as compared to the metrics associated with active primary smoking.**

20. When do we use triangulation?

**For epidemiological studies triangulation refers to integrating and comparing results from several studies that use different approaches (or different methods applied to the same study database), each with different sources of bias, to test causal effects. Considering observations in public health – Triangulation includes review and interpretation of multiple data sources that bear on different facets of a broad public health question to identify factors that underlie the observed data and to facilitate decision making. For example - multiple sources of data to examine the same phenomenon. A researcher might gather information from interviews, observations, and documents to gain a comprehensive understanding of a topic.**

21. What study design do we use when we want to explore the effect of a program that was implemented in a health facility? Say maybe we want to see the impact of one health in a laboratory.

**Different studies designs could be applied to address the critical question with selection of the most rigorous design based on available resources, time, and population risks.**

22. Is it possible to eliminate risk factors? I am asking this on the back of putting preventive measures in place to mitigate exposure to diseases.

**Certainly, the major objective and mission that most of us have adopted. Indeed, strategies to prevent and mitigate are dependent on available resources, time, workforce, and population risks. However, strategies are available and are being developed for all the different global populations.**

23. Would you please tell us how we manage an aggregation bias?

**Aggregation bias is a common problem in statistical analysis that can lead to misleading results. This bias occurs when data is aggregated at a higher level than the unit of analysis, resulting in a loss of information and potentially biased estimates. Confusing the units of analysis can lead to an 'ecological fallacy', where one attributes an association between variables to operate at a lower level of disaggregation than actually studied. Often group level statistics reflect an aggregation bias compared to individual or lower level statistics.**

**However, there are several methods that can be used to overcome aggregation bias and obtain more accurate results.**

**1. Collecting disaggregated data**

**2. Using regression analysis**

**3. conducting sensitivity analysis**

**4. Using hierarchical modeling**

**5. Using alternative measures**