Words and concepts matter

Dentistry is replete with outdated, confusing, and inaccurate terminology, not to mention all the warmly held concepts accepted by the profession as scientific law, yet never subjected to critical appraisal. For example, is there a difference between a bicuspid and a premolar? Is the biologic width of periodontal attachment really a width at all?[1] Do asymptomatic third molars cause incisor crowding in adulthood?[2] Does mode of breathing cause alterations in facial morphology during growth?[3] Is there such a thing as ideal occlusion?[4] As we endeavor to recast ourselves as primary care providers, extolling the importance of the oral-systemic link to the public, it is essential that oral health care professionals use consistent, accurate language and hold its concepts to the same standard of evidence-informed analysis employed by our peers in other branches of health care.

From the time of the first reports about COVID-19 at the end of 2019 and the beginning of 2020 there has been a deluge of scientific articles, statements, commentaries, and different narratives both in the lay press and in the medical literature about this pandemic. As with all communications, it is essential that the meaning of a message is clear and understood in the manner it was intended. This has not always been the case with the emergence of self-appointed experts and messengers that chime in with scant understanding and knowledge of medicine, epidemiology, and statistics, which unfortunately often results in both unintended misinformation and intended disinformation.[5] Here follow some examples of terms that are often used incorrectly.

Case fatality rate is an estimate of how many individuals with a confirmed diagnosis of a disease of interest die as a result of the disease, while mortality rate refers to the portion of the population that dies as a result of the disease. The case fatality rate differs from the mortality rate because the population included in the case rate calculation comprises only a population with disease while the mortality rate includes a population with and without the disease. For example, if in a population of 10,000 people, 500 became sick, and 100 of these individuals died, the case fatality rate — the proportion of those with the disease — would be 20% (100/500 = 0.20), but the mortality rate would be only 1% (100/10,000 = 0.01).

In the previous example, the term rate was used. In epidemiologic terms, a rate usually measures the frequency of an occurrence over a defined period of time. For example, an incidence rate quantifies the number of cases of a disease that develop in a population during a specific time period using summed person-years of observation in the denominator. A comparable measure is the attack rate but here the denominator is the population that is known to have been exposed at the start of the time interval. For example, individuals exposed to an infected person within a household over a short period of time.

Unfortunately, even within a specific field of study, such as epidemiology, there exists confusion when concepts are termed one thing and mean something different. For example, a proportion refers to a part of the whole, ie, the numerator is included in the denominator, such as the proportion of people in the population of interest that has a disease (the people with the disease are included in the population). Thus, case fatality rate, although it has the word "rate" in its name, is actually a proportion (the proportion of infected people that die) and not a rate, as case fatality rate is not reported as a measure during a specific time period. Yet, there are cases, such as the COVID pandemic, where the reference to a specific time period is not reported as we know when the epidemic started, or it is reported for specific time periods – such as the last 2 weeks of hospitalizations.

Other terms that are used synonymously are disease, disorder, and condition. According to discussions by editors of the American Medical Association Manual of Style, a guide commonly used in the biomedical literature, there are subtle differences between these terms.[6,7] "Disease denotes a condition characterized by functional impairment, structural change, and the presence of specific signs and symptoms," "disorder, in contrast denotes a condition characterized by functional impairment without structural change and, while certain disorders or categories of disorders might be accompanied by specific signs

and symptoms, their presence is not required for a condition to be termed a disorder," and "condition simply indicates a state of health, whether well or ill; a condition conferring illness might be further classified as a disease or a disorder—however, condition might be used in place of disease or disorder when a value-neutral term is desired."[8] Using these definitions, caries is a disease, dental phobia is a disorder, and oral health is a condition.

A pervasive term commonly found in the biomedical literature is risk factor. This term implies that the factor of interest precedes the onset of and is associated with an increased likelihood of developing the disease, disorder, or condition. Importantly, a risk factor is not necessarily the same as the cause. For example, socioeconomic status is a risk factor for cardiac disease ... but not a cause.[9] Correlation is not causation. The implication of causation is another area of concern, confusion, and consternation, but this is a discussion beyond this commentary.[10,11]

Relatedly, association and effect imply different things but are sometimes used synonymously. An association simply signifies a relationship between two or more variables, with one not necessarily causing the other. When these variable are measured at the same time, no continuum can be ascertained and consequently it is not possible to determine a temporal relationship, ie, which variable preceded another variable. An effect implies that an estimate has been measured that can determine if one variable influenced another variable or an outcome.

COVID-19 has given the oral health community the opportunity and hopefully the impetus to critically reappraise our use of words and our dissemination and communication of concepts related to health, disease, disorders, and conditions. The epidemiologic terms that we have clarified in this commentary are important reminders that words have specific meanings and if used inappropriately can contribute to misinformation. We will only achieve scientific advancement in health once we commit to a well-defined lexicon.

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