Reviewing the Research Methods, Statistical Techniques, and Psychometric Properties Used in the Medical Sciences Research Articles Published between 2015-2019

Medical science is associated with different disciplines. This multi-disciplinary nature creates a context for the use of different research methods. The appearance of new methods and even the old ones were not considered comprehensively in the current research methodology books. Though research methodology has been the subject of many books and research papers, Nordsteien, Horntvedt, and Syse (2017) believe that no textbook has ever provided a comprehensive list of qualitative and quantitative research methods for medical students. In addition, the emergence of mixed-methods, action research, and content analysis research approaches has further complicated the matter. It can also be added that no comprehensive report has ever specified to the actual practice of research methods in medical science. Therefore, the major aim of this project is to categorize the existing research methods used in medical science research articles (RAs).

Likewise the appearance and use of research methods, the widening accessibility of technological devices and special statistical software has stimulated overarching use of statistical methods in many subareas of medical science. Through the appearance and exploitation of new statistical packages and, of course, new developments in empirical studies, the use of statistics is not regarded as optional but essential for the discipline. As a matter of fact, nowadays, statistics in medical science research areas has its own identity, problems, and principles of exploitation. However, there is a big gap between the statistical practices presented in the statistical books for medical research and their real practices. Accordingly, Bangert and Baumberger (2005) put forth that 'the generalization of research outcomes to practice is dependent on the reader's ability to understand the research methods and analyses used in studies' (p. 480). Therefore, it is essential for readers and researchers to be aware of the statistical techniques used in the field in order to enhance their ability in understanding and interpreting them. From the teaching point of view, numerous statistical methodologies are available but, in fact, it is impossible to teach them all in a single research class. The lack of time, as Kennedy (1988) emphasized, is another serious problem for instructors to teach statistical procedures for those who have no background of statistics. Hence, the research instructor must decide to teach the most appropriate statistical procedures in the brief amount of time specified for this purpose. In such situations, the reasonable decision is to select the most frequently used procedures in the literature to teach in research classes. Therefore, the second objective of this project is to assess the frequency of statistical techniques used in the medical science RAs over the past 5 years (from 2015 to 2019) and to examine their levels of sophistication.

Another important issue in the area of medical science is psychometric properties of its research findings. The common belief among all the researchers is that research findings must be legitimized and rigorous. Hence, one thing that scientific 'research cannot afford is to be haphazard or lacking rigor' (Dörnyie, 2007, p. 48). Researchers should always come back and assess the quality and legitimacy of their findings. Quality of the data obtained from measurement instruments and the quality of the decisions and interpretations inferred from the data are consequential (Chan, 2014). Validity and reliability measures are the two well-known criteria for indicating the quality of the research instruments. Reviewing literature reveals that all the leading figures in different scientific fields of study emphasize that the validity and

reliability of the scores and the interpretations derived from the tests and experiments need to be checked. Therefore, the third objective of this study is to shed some lights on the issues and challenges involved in reporting reliability and validity measures in medical science RAs. Drawing on this review, the researchers present the trends in reporting psychometric properties of the scores derived from different research methods and instruments. The study also reflects on the statistical and qualitative methods used to assess different kinds of validity and reliability.