Estimates of sensitivity, specificity, false rates and expected proportion of population testing positive in screening tests

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ABSTRACT:

This paper proposes and presents indices used as measures to evaluate or assess results obtained from diagnostic screening tests. These indices include sensitivity, specificity, prevalence rates and false rates. We here present statistical methods for estimating these rates and for testing hypotheses concerning them. An estimate of the proportion of a population expected to test positive in a diagnostic screening test is also provided. Further interest is also to estimate the sensitivity and specificity of the test and then the false rates as functions of sensitivity and specificity given knowledge or availability of an estimate of the prevalence rate of a condition in a population. The indices proposed ranges from -1 to 1 inclusively and therefore enables the researcher to determine if an association exists and if it exists between test results and condition as well as whether it is positive and direct or negative and indirect which will serve as an advantage over the traditional methods. The proposed indices provide estimates of the test statistic. When the proposed measures are applied, results indicate that it is easier to interpret and understand more than those obtained using the traditional approaches. In addition, the proposed measure is shown to be at least as efficient and hence as powerful as the traditional methods when applied to sample data.

Keywords:

Traditional odds ratio, prevalence, sensitivity, specificity, false rates.