EDITORIAL

Lot Quality Assurance Sampling (LQAS), an Efficient and Rapid Assessment Technique in Quality Assurance and Public Health Studies

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Keywords

Lot Quality Assurance Sampling • Quality assurance • Decision value • Public health • Bias

Dear Editor,
Effective management and appropriate decision-making of health systems require up-to-date information at the local level where health system programs are implemented. Health managers require to know which health center or area are achieved specific goals and objectives, and which are not achieved [1].
Lot Quality Assurance Sampling (LQAS) technique can be an appropriate idea to achieve this information. LQAS is a significant method for rapid monitoring and assessing preventive and curative health care, surveillance, and population programs. LQAS have been used initially as a quality control and assurance technique for produced in industrial units and developed in the early part of the 20th century. It got an abundant improvement in popularity during the Second World War when it was used as a technique for improving the quality of war materials. The developing interest in using LQAS technique was obtained by WHO as a review of 34 LQAS applications for measuring family physician planning, immunization coverage, the morbidity of disease, technical assessment of health workers performance, etc. LQAS technique is a field implementation. All worldwide organizations including UNICEF, WHO, World Bank use it. The main application of LQAS is to determine whether the subject's lots are acceptable or not [2].
LQAS method is poorly implemented in public health studies for evaluating the quality and adequacy of health services. There is poor evidence about the application of this technique in health care systems worldwide. The goal of simple random sampling is parameter estimation. It needs a large sample size. LQAS is also a random technique and it estimates both parameter and quality of service. Currently, LQAS has opened up unique opportunities for measuring the efficiency of various health services and also to obtain specific social and behavioral outcomes [3]. The sample size and decision values for LQAS calculate via cumulative probability of the binomial distribution based on the risks that the investigators are willing to take. The number of items that are selected from each lot is the sample size. The number of "defects" items that require to found earlier the lot is deemed unacceptable is the decision value.
There are two types of errors (risk) that should be considered: (a) Type I error (Alpha), the risk of accepting a (bad) lot, and (b) Type II error (Beta), the risk of not accepting a (good) lot. Alpha and beta do not exceed 0.10 at the thresholds. Alpha and beta have different values that are depicted in the operating characteristic curve.
To apply the above in the field, we calculated the probabilities of 80% and 50% coverage as upper and lower threshold of appropriate prescribed antimalarial by various sample sizes using the binomial formula. To explain the calculation, let us take the example of $n = 19$ and $d = 6$. To calculate the probability of wrongly classifying a work area as inappropriate, we first have to calculate the probability of having ≤ 6 untreated cases of 19 malaria patients in an area with 80% coverage is 0.93. This also implies that, with 80% coverage in the area, there is a likelihoods of 0.07 (1-0.93) to have ≤ 6 untreated patients. However, with 50% coverage, the probability of having ≤ 6 untreated patients is = 0.08. Thus, total error is = 0.15 as below 20% [4]. Currently, LQAS tables provided the best decision values for various sample sizes and with less than 10% alpha and beta errors across all coverage targets. For example, if there have 14 samples or more (decision value) in each lot with pass outcome, it lot is acceptable. Likewise, if we have more than 5 fail samples in each lot, unacceptable. Therefore, LQAS evaluates the quality and adequacy of health services by reducing cost and the sample size without causing a significant increase in error. In addition, the parameter can be estimated by summing LQAS lots. LQAS also provides a simple understanding for health managers at the local level.

Acknowledgments

We express our gratitude to our colleagues in Clinical Research Development Unit, Razi Psychiatric Hospital", Tabriz University of Medical Sciences, Tabriz, Iran.
Authors' contributions
HA conceptualized the letter and developed all sections of the paper.

Ethics statement

This paper is letter to the editor so it did not need ethical consideration.

Conflict of interest

The author declares that there is no conflict of interests.

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Received on May 14, 2020. Accepted on September 23, 2021.

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How to cite this article: Azizi H. Lot Quality Assurance Sampling (LQAS), an Efficient and Rapid Assessment Technique in Quality Assurance and Public Health Studies. J Prev Med Hyg 2021;62:E793-E794. https://doi.org/10.15167/2421-4248/jpmh2021.62.4.1578