**Modelling an algorithm for clinical diagnosis of lymph node metastasis of prostate cancer in prostate cancer patients**.

N.N. Tembo.

Department of Epidemiology and Biostatistics. School of Public Health, University of Zambia.

1.1. Background

Prostate cancer, a malignancy of the gland (prostate) that produces seminal fluid is the second most common cancer and the fifth leading cause of cancer-attributed death in men worldwide (Aladwani *et al.*, 2020). Many prostate cancers grow slowly and are confined to the prostate causing no serious harm and may need minimal or even no treatment, while other types are aggressive and can spread quickly to major body systems including the lymphatics (Rock *et al.*, 2020). The gold standard for diagnosis of prostate cancer is biopsy, which is an invasive procedure that can come with physical and psychological distress, and is controversial (Xia *et al.*, 2013). In addition, it may result in subjecting suspected cases to unnecessary trauma. Although advanced diagnostic procedures have enabled physicians to detect prostate tumours, spread and provide treatment, this has created controversy over whether we are now exposing patients to unnecessary trauma (Lilja, Ulmert and Vickers, 2008). To address such limitations, researchers incorporated other measurable clinical factors into approaches for the early detection of lymph nodes spread in prostate cancer based on statistical models. One such study is that by Brown in 1980.

According to Brown (1980), when a patient was diagnosed as having cancer of the prostate, an important question in deciding on treatment strategy for patient was whether the cancer had spread to the neighbouring lymph nodes. The question was so critical in prognosis and treatment that it was customary to operate on the patient (i.e. perform a laparotomy) for the sole purpose of examining the nodes and removing tissue samples to examine under the microscope for the evidence of cancer. However certain variables that could be measured without surgery were predictive of the nodal involvement and the purpose of the study was to examine the data for prostate cancer patients receiving surgery, to determine which of the pre-operative variables are predictive of nodal involvement, and how separately the prediction could be (Brown, 1980). Thus, this report is based on the analysis of data obtained in the study by Brown, directed at establishing the most appropriate model for determining nodal involvement of prostate cancer using clinical parameters.

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