ABSTRACT AND KEYWORDS

Burden of breast and reproductive tract cancers in Kerala is likely to become more acute. The main objectives of the present research work are, to compare various methods for estimating probability of developing cancers on breast, cervix uteri, ovary and corpus uteri cancers in Thiruvananthapuram Taluk, to estimate the burden of these cancers in terms of Disability Adjusted Life Years (or DALY) in Thiruvananthapuram Taluk, to compare DALY according to various social value choices, to compare various analytic approaches for estimating trends in incidence rates of these cancers for the period 1991 to 2010 and to estimate the future burden of these cancers in Thiruvananthapuram and the state of Kerala till 2026.

In the present thesis, the methods to estimate cancer incidence or mortality rates, analytical approaches used for estimating time trends in incidence or mortality rates of cancer, methods such as age-conditional probability and cumulative risk to estimate probability of developing or dying due to cancer, either over a lifetime or over a specified number of years and methods for estimating the burden of cancer in terms of disability-adjusted life years are provided. The data sources mainly include Thiruvananthapuram Population-Based Cancer Registry. Incidence and mortality rates of breast, cervix uteri, ovary and corpus uteri cancers in Thiruvananthapuram are provided. The results are compared with worldwide and Indian data. The various established risk factors associated with the above four cancers and provided.

Estimates for percent change, estimated annual percent change, and average annual percent change via jointpoint regression model respectively of the above four cancers in Thiruvananthapuram for the period 1991-2010 are provided. Then the methods such as age-conditional probability and cumulative risk to estimate the
probability of developing or dying from cancer over a lifetime are provided. The probabilities estimated using age-conditional probability and cumulative risk methods for developing and dying due to the four cancers are provided. Burden of the above cancers estimated using disability-adjusted life year (DALY) method based on the Thiruvananthapuram Cancer Registry data are compared according to different social value choices. Different approaches such as i) without considering social value choices such as discount rate and age-weighting (i.e. zero discounting rate and uniform age-weighting) ii) only considering non-uniform discounting (at a rate of 3%) and uniform age-weights and iii) considering both non-zero discounting (at a rate of 3%) and non-uniform age-weights are used for estimating years of life lost (YLL) due to female breast, cervix, ovary and corpus uteri cancers. Further, years lived with disability (YLD) and DALY for the above four cancers in Thiruvananthapuram are estimated with and without considering competing risk and based on different social value choices. Burden of breast, cervix uteri, ovary and corpus uteri cancers in Thiruvananthapuram estimated for the years 2011, 2016, 2021 and 2026 and the corresponding burden of the above cancers in Kerala are provided.

**Keywords:** Burden of cancer, incidence rates, mortality rates, time trend, Disability-adjusted life years, person-years at risk, age-standardized incidence and mortality rates, annual percent change, Joinpoint regression model, average annual percent change, probability of developing cancer, age-conditional probabilities of developing cancer, cumulative risk, breast, cervix uteri, ovary and corpus uteri.