ABSTRACT

Energy is essential for socio-economic development. However, energy is also at the core of modern socio-economic and environmental challenges. Energy poverty affects millions of households in developing countries who rely on solid biomass to meet their household energy needs. This has several repercussions including indoor air pollution from indoor burning of wood fuels in inefficient traditional cookstoves. Particulate matter (PM) and Carbon Monoxide (CO) emitted from indoor biomass combustion have a direct impact on respiratory health. Physical injury associated with biomass use is also a concern. There are ongoing efforts to address some of these challenges, such as improved cookstoves programmes, which are perceived to have several benefits, including time-saving, health improvement, preservation of forests and their ecosystem services, and emissions reduction. However, despite these benefits, there has been remarkably slow progress in the adoption and use of Improved cookstoves (ICS) and other modern clean energy technologies. This study, therefore, aims to assess the impact of clean energy applications on energy poverty in Vihiga County. The specific objectives will be to evaluate the factors determining use of ICS, to determine the influence of different household energy technologies on household-level indoor air pollution, and to assess the influence of household-level indoor air pollution on respiratory health outcomes. This study is necessary because it is projected that most rural populations in Sub-Saharan Africa will continue to rely on biomass for the foreseeable future. Moreover, people spend most time indoors and 90% of households in developing countries depend on wood fuel to meet their energy needs. This study is an application of Maslow's hierarchy of needs theory. The research design shall be mainly quantitative. Households' survey will be conducted using questionnaires while indoor air pollution monitoring of $PM_{2.5}$ and CO will be done using PATS + PM (particles and temperature sensor) meter and EL-USB-CO data logger, respectively. Modelling the socio-vi

economic and demographic characteristics influencing decisions on the use of ICS will be done using probit model. Inverse propensity score weighting (IPSW) technique will be used in impact estimation. The sampling frame is the entire household population in Vihiga county. A representative sample will be drawn from the population using Cochran's formula. This research will benefit research institutions and policy makers in the energy, environment and medical sectors.