STATISTICAL MODELING FOR DISTRIBUTION OF BODY SURFACE AREA AMONG CANCER PATIENTS

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In several fields especially physiology and medicine, the body surface area (BSA) of a human body is measured or calculated for many various clinical purposes. The BSA calculation which decides quantity of the drug plays very important and massive role in successful chemotherapy programme. Several methods are being practiced for the estimation of the BSA. Sri Lankan oncologists use Dubois and Dubois (D & D) formula to estimate BSA in chemotherapy. D & D formula is BSA = 0.007184× Weight $^{0.425}$ × Height $^{0.725}$. The body behavioral patterns and customs of the Sri Lankans and genetics of Sri Lankans are sharply different from those in the west and consequently body shape and body mass index changes dramatically. As the parameter values of the above formula were obtained using samples from western country, a reasonable doubt is that whether the estimated parameters could be used for Sri Lankan population? Thus re-estimation of parameters of the D & D and best fitting model for distribution of the BSA using Sri Lankan samples are our main objectives. We have collected sample of 51 individuals (25 male and 26 female) from Teaching Hospital of Jaffna. Using the above sample we have re- estimated the parameters of D & D as BSA $= 0.00337959 \times Weight^{0.362} \times Height^{0.960}$. Moreover we proposed couple of Statistical models for the distribution of BSA among cancer patients. Among those models the best model for male is BSA = 1.01+ 0.000108 (Weight×Height) and the best model for female, BSA = 1.14+ 0.000075 (Weight×Height) where weight should be measured in kg and height should be measured in cm. If we consider gender as dummy variable we proposed BSA = 1.03 + 0.134 Gender (1, 0) + 0.000089 (Weight × Height). The calculated BSA using D & D formula is lower than the observed BSA, it may be agreed that the chemotherapy given to the patient will be less and consequently they may get early recurrence. The estimated points by our proposed models are better than D & D and they are very close to observed BSA. We hope that our formulae would be applied for Sri Lankan cancer patients.

Keywords: Linear Models, Parameter Estimation, Body Surface Area, Chemotherapy, Dubois and Dubois formula.