

## **ABSTRACT**

*This research aims to compare dose distribution of Intensity Modulated Radiotherapy (IMRT) and Volumetric Modulated Arc Radiotherapy (VMAT) technique on Planning Target Volume (PTV) and Organ at Risk (OAR) nasopharyngeal cancer patients, and also to compare level of conformity and homogeneity on IMRT and VMAT nasopharyngeal cancer patients. Conformity Index (CI) and Homogeneity Index (HI) have been compared dua data analysis to obtain dose distribution of PTV and OAR through DVH graphic evaluation. Dose distribution evaluation of PTV referring to International Commission on Radiation Unit and Measurements (ICRU), meanwhile dose distribution evaluation of OAR referring to Quantitative Analysis of Normal Tissue Effects in the Clinic (QUANTEC). 10 patients of nasopharyngeal in Fatmawati Hospital have been sampled as respondent in this research. The result shows the average of dose distribution using VMAT and IMRT technique on V95 are 95,1% and 92,8%. Dose distribution for VMAT and IMR technique on OAR spinal cord has myelopathy risk less than 1% in all of patients, dose distribution on OAR optic chiasm has optic neuropathy risk less than 3% in 9 patients, and dose distribution on OAR lens is already fulfilled the limitation principle with the same variation of cataract in 7 patients. In line with that, dose distribution using VMAT technique of OAR brainstem on permanent carvial neuropathy risk and OAR optic nerve on optic neuropathy risk shows lower dose acquirement than IMRT technique. The average value of CI and HI for VMAT technique are 0,95134 and 0,12203, meanwhile for IMRT technique are 0,92869 and 0,13203. Based on comparison of dose distribution of PTV and OAR, and also comparison of CI value and HI value through statistical test using Paired Sample T-test, both techniques show there is no significant difference.*

**Keywords :** *Nasopharyngeal cancer, IMRT, VMAT, PTV, OAR, HI, CI*