Cervical cancer is a significant public health concern in Ethiopia. **It is mainly caused by persistent infection with the human papillomaviruses. The aim of this study was to** assess the relationship between carcinogenic risk of probable, possible and low risk HPV infection and those of cervical intraepithelial neoplasia (CIN) and cervical cancer.  A cross sectional study nested from prospective cohort study was conducted in Bahir Dar, northwest Ethiopia. Statistical analyses were performed using SPSS version 26.0. HPV-16 was associated with a relatively higher risk of CIN II+, (AOR = 15.42; 95% CI: 6.81 – 34.91). In addition, HPV-52, -18, -53 and -58, were significantly associated with an increased risk of CIN II+, (AOR = 7.38(1.73 – 31.54), 5.42(1.61 -18.31), 4.08(1.53 – 10.87), and 3.17(1.00 – 10.03)), respectively. The current study shows high rate of HPV with predominance of HPV-16, -53, -58, -18, -35, and -52. The quadrivalent and nonavalent vaccine had only covered 27.1% and 45% of the circulating HPV genotypes. Ethiopia may need to consider introduction of nonavalent vaccine into the national public health strategy. Polyvalent vaccine which includes the genotypes not covered by existing approved vaccines should be considered.