

We consider the estimation of unknown parameters in a generalized linear model when some covariates have nonignorable missing values. A pseudo likelihood approach similar to that in Tang et al. (2003) or Zhao and Shao (2015) can be applied by using an instrument, i.e., a covariate that helps identifying parameters under nonignorable missingness. However, we show that this approach does not work well when the instrument is a weak predictor of the response given other covariates. Furthermore, The pseudo likelihood does not make use of all the observed data. We propose an adjusted likelihood method by using the pseudo likelihood to estimate the conditional density of the covariate with missing values given the observed covariates. Our method utilizes all observed data and works well even if the instrument is a weak predictor. It is semiparametric since the propensity of missing covariate data is completely unspecified. To maximize the adjusted likelihood, we develop an iterative algorithm that can be applied by using standard softwares at each iteration. We establish some theoretical results on the convergence of the proposed iterative algorithm and asymptotic normality of the resulting estimators. A variance estimation formula is also derived. Some simulation results and a real data example are presented for illustration.