In this study, sample data has been checked for missing data and outliers and cleaned prior to data analysis. Descriptive analysis was performed to show the demographic information of maternal women in the sample and their CMHS status. A generalised linear mixed model (GLMM) including both fixed and random effects was used in this study to show the association between China's 2009 healthcare reform and CMHS utilisation when controlling for other confounding factors. The healthcare reform was specified as fixed effects, women's family code as a random effect; maternal women's age, education, employment, annual personal expenditure, health score, health insurance, chronic disease and parity were included as covariates. The model we used was as following:

$$\eta(y_{ij}) = \beta_{0j} + \beta_{1j}x_{1i} + \beta_{2j}x_{2i} + \cdots + \beta_{pj}x_{pi} + \varepsilon_{ij} \qquad (1)$$

In equation (1), the linear prediction η is the combination of the fixed and random effects excluding the residuals. y_{ij} is the rate of CMHS utilisation. β_{0j} is a constant, β_{pj} represents the effects of x_{pi} on y, and ε_{ij} is a random error. The link function is binomial.

Concentration curve, concentration index (CI) and horizontal inequity index (HI) were used to measure the equity of CMHS utilisation. Before measuring equity, we first measured inequality. Concentration curve and CI were used to measure the extent of income-related inequality of CMHS utilisation. This is calculated as twice the area between the concentration curve and the line of equality and changed from -1 to 1 [34]. A positive concentration index means that high-income women utilize more CMHS utilisation than their low-income counterparts and negative one means the low-income group utilizes more CMHS utilisation than their rich counterparts, the formula is as following:

$$C = \frac{2}{\mu} cov_w(\mathrm{y}_i, R_i) \qquad (2)$$

where C stands for concentration index, y_i is CMHS utilisation index, μ is the mean of CMHS utilisation index, and R_i is the fractional rank of annual personal consumption expenditure distribution.

Inequality can be further explained by decomposing the concentration index into its determining components, then horizontal inequity index (HI) can be computed by subtracting the contribution of need variables (such as women's age, health score and chronic disease) from the concentration index of CMHS utilisation; it is a summary measure of the magnitude of inequity in the dependent variable [35]. These determinants were selected according to previous research but constrained by the variables collected in the investigation [22, 36]. A probit regression model was used to indirectly standardize the CMHS utilisation since the outcome variable is binary. As the standardization of health utilisation holds for a linear model of healthcare, we applied the linear approximation to the probit model to extract marginal effects of each determinant on observed probabilities of the outcome variable. The formula for the concentration index decomposition can be written as follows:

$$y_i = G(\alpha + \sum_j \beta_j x_{ji} + \sum_k \gamma_k z_{ki}) + \varepsilon_i \qquad (3)$$

G is functional transformation, y is the dependent variable, x_{ji} are needs variables, and z_{ki} are control variables. Then the standardized need was estimated using the following equation:

$$\hat{y}_i^{IS} = y_i - G(\hat{\alpha} + \sum_j \hat{\beta}_j x_{ji} + \sum_k \hat{\gamma}_k \bar{z}_k) + \frac{1}{n} \times \sum_{i=1}^{n} G(\hat{\alpha} + \sum_j \hat{\beta}_j x_{ji} + \sum_k \hat{\gamma}_k \bar{z}_k) \qquad (4)$$

where $\hat{y}_i^{IS}$ is standardized continuum of maternal health service utilisation, n is sample size. The more CMHS allocated to the population with greater need, the less inequity of CMHS utilisation.

The statistical analyses were performed using STATA statistical software version 12.0 (StataCorp LP, College station 77845, USA). A two-tailed P value < 0.05 was considered statistically significant.