

Formula for estimating sample size is as follows:  $N = \frac{U_{\alpha}^2 \sigma^2}{\Delta^2}$ , where take  $\alpha = 0.05$  as significance level,  $\sigma$  is the standard deviation,  $\sigma = 2.5$ ,  $\Delta = \frac{1}{10} \sigma = 0.25$ ,

$$N = \frac{1.96^2 2.5^2}{0.25^2} = 384.16 = 384$$

Power calculation was performed using PASS15.0 software for our sample size. In this study, the estimated correlation coefficients between pulmonary function outcomes and individual perception of PM2.5 were more than 0.2. We set the significance level at  $\alpha=0.05$ , the estimated power for the sample size of 400 was more than 98%.

All participants were interviewed face-to-face by a member of our research team, and the pulmonary function test was performed by trained specialists. A total of 400 residents from the two communities completed the questionnaire, 398 of which successfully underwent pulmonary function testing.