Sample size determination and sampling procedure

To estimate the sample size for a continuous outcome variable such as costs and assuming that mean (average) cost μ and standard deviation σ are normally distributed. The width of the precision of a given sample size according to Johnston et. al. [1] can be expressed as:

$$\left(W = 1.96 \times \frac{\sigma}{\sqrt{n}}\right)^2 \quad (1)$$

However, it is difficult to identify studies with appropriate value for σ, therefore in the absence of this, Johnston et. al. proposed the following formula:

$$\left(\frac{1.96 \times C_v}{V}\right)^2 \quad (2)$$

Where C_v denote the coefficient of variation (i.e. the ratio of the standard deviation and the mean cost), V represent the desired level of precision which is 95% confidence interval (CI). The C_v for a 95% CI is 0.50. Thus, the minimum sample size was determined as follows:

$$n = \left(\frac{1.96 \times 0.50}{0.05}\right)^2 = 384 \quad (3)$$

Adjusting the sample size for 10% non-response rate:

$$n_f = \frac{n}{1 - NR} \quad (4)$$

Where n_f denotes non-response and NR, non-response rate

$$n_f = \frac{384}{1 - 0.1} = 427 \quad (5)$$

Reference

1. Johnston KM, Lakzadeh P, Donato BM, Szabo SM. Methods of sample size calculation in descriptive retrospective burden of illness studies. BMC medical research methodology. 2019 Dec;19(1):1-7.