## Calculation of the sample size:

The sample size was calculated, based on the study from Bara, Determinants of severe acute malnutrition among children under 5 years of age in Nepal: a community based case–control study [1].

Where the prevalence of controls who were bottle fed = Proportion of controls exposed= Pcontrols exp= 18%, (i.e. p1 = 18% = 0.18) and q1 = 1 - 0.18 = 0.82

Now, OR = 4.56

As this study considered 5% significance (α = 0.05) and 90% power to determine the sample size, We have, Zα/2 = 1.96 (at 5% significance level) And, for 90% power, Zβ=1.28

For case control study, the sample size was calculated using the formula given by Schlesselman 1982 [2].

p2 = Proportion of case exposed= Pcase exp= $\frac{OR\*Pcontrols exp}{Pcontrols exp \* (OR-1)+1 }$

 = $\frac{4.56\*0.18}{0.18 \* (4.56-1)+1 }$ = 0.5

q2 = 1-p2 =1- 0.5 = 0.5

Also,

**Average proportion exposed =**‾p = $\frac{p1+p2}{2}$ = $\frac{0.18+0.5}{2}$ = 0.34

‾q **=** 1-‾p = 1- 0.34 = 0.66

Then, the values in formula were put for calculation of sample size of case control study,

n = $\frac{\{Z\_{\frac{α}{2}}\sqrt{\left( 2\overbar{p}\overbar{q}\right)} + Z\_{β}\sqrt{(p\_{1}q\_{1}+p\_{2}q\_{2})}\}^{2} }{(p\_{1}-p\_{2})^{2}}$

 = $\frac{\{1.96\_{}\sqrt{\left( 2×0.34×0.66\right)} + 1.28\sqrt{(0.18×0.82 +0.5×0.5)}\}^{2} }{(0.18 -0.5)^{2}}$ = 43

Thus, sample size required for each group was 43 children.

Since the ratio of selecting cases and controls was 1:2. So the minimum sample size required for the study was calculated to be 43 cases and 86 controls. However, after adding 10% non-response rate overall 50 cases and 100 controls samples were collected.

References:

1. Pravana NK, Piryani S, Chaurasiya SP, Kawan R, Thapa RK, Shrestha S. Determinants of severe acute malnutrition among children under 5 years of age in Nepal: a community-based case–control study. BMJ Open. 2017 Aug;7(8):e017084.
2. Schlesselman, J.J. (1982) Case-control studies, design, conduct, analysis. Oxford University Press, New York.