Correspondence

Selection bias: Selection of controls as a critical issue in the interpretation of results in a case control study

Sir

This is with reference to an article on the effect of oral hypoglycaemic agents (OHA) on bone metabolism in patients with type 2 diabetes mellitus (T2DM) published recently[1]. The authors have conducted a case-control study to evaluate the effect of various OHA on bone mineral density (BMD) in patients with T2DM. They have concluded that the use of OHA for a period of three years or more does not significantly affect the BMD in patients with T2DM[1]. However, there are a few methodological issues that may significantly affect the interpretation of study results and hence raise a question on the validity and the generalisability of the results obtained in the study.

Firstly, if one enrols controls from a particular hospital within the geographic area, one would have to consider whether the controls were inherently more or less likely to have the exposure of interest. This was missing in the present study with total absence of exposure in the control group, since the controls chosen were healthy hospital employees who were least likely to take oral hypoglycaemic drugs which was the exposure variable in the study. In this study, 41 age- and gender-matched apparently healthy individuals chosen from hospital staff and employees were included as controls[1].

The selection of an appropriate comparison group is a critical issue in the design of case-control studies. The controls must be selected to represent not the entire non diseased population but the population of individuals who would have been identified and included as cases had they developed the disease. If so, they would not provide an accurate estimate of the exposure distribution of the source population, and selection bias would result. The crucial requirement is that the controls should be as comparable to the source population of the cases as possible and that any exclusions or restrictions made in the identification of cases apply equally to both the groups.

Secondly, matching addresses the issue of confounding in the design stage of the case-control study. In the present study, controls were matched for age and sex. It is advisable that if matching is used, matched analysis must be used to take advantage of matching. If matching is done appropriately but not taken into account in analysis, the odds ratio will be biased towards the null.

Lastly under the methodology section, the authors have mentioned that the study design chosen is cross-sectional and later it becomes evident that they have selected cases and controls. The cross-sectional study is categorized under the descriptive epidemiological study design strategy whereas case-control study is observational analytical study[2,3].

References

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2. Hennekens CH, Buring JE. *Case-control studies in epidemiology in medicine*. Boston Toronto: Little Brown and Company; 1987. p. 133.

3. Descriptive and Analytic Studies. Available from: *http://www. cdc.gov /globalhealth/fetp/training_modules/19/desc-and-analyticstudies_ppt_final_ 0925201 3.pdf*, accessed on July 6, 2015.

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