LETTERS TO THE EDITOR

RESEARCH METHODOLOGY IN OCCUPATIONAL MEDICINE

Dear Sir:

I was pleased to see an introduction to research methodology recently published in the *Journal*, and I support the author’s concluding remarks that practising physicians should be encouraged to engage in research and publish their findings. I would add that in most situations, the population to be studied is too small for useful epidemiological studies, including experimental trials, of the employees of an individual plant or company. The investigators should overcome the barriers and pool data from studies with common objectives or conduct multi-centre studies.

I suspect that the article was intended to be a brief introduction, but there were some critical omissions in the article. In order to avoid aborting an epidemiological study or producing inconclusive results, the statistical power and the required study sample size should be calculated before initiating any study. For the uninitiated researchers, simple, standard methods for these calculations are given in most statistical texts and inexpensive computer software is readily available. The US Centers for Disease Control (email address: EpiInfo@CDC.CDC.Gov) provide on request a free copy of Epi Info, a computer program for creating databases and conducting simple statistical analyses and calculations. The rates, proportions, and risk ratios produced by the analyses must have statistical confidence for the results of the study to be meaningful. Consequently, a rare outcome or effect in a cohort study would require a large study population or a long observation period. Similarly, a rare exposure in a case-control study would require a large study sample size. Selection of a control population is a critical step in designing an occupational case-control study. The investigator must ensure that the control population had an equal opportunity of being exposed to the risk factor(s) for the study disease/effect. Otherwise, the risk ratios or differences would be artificially inflated.

Cross-sectional studies can be the design of choice in some situations. For example, Richard Schilling’s pioneering research in occupational byssinosis was based on cross-sectional surveys of cotton and flax workers. In most occupational cross-sectional studies, temporal relationship between the study exposure(s) and effect(s) is established *a priori*. However, the investigator must demonstrate that the onset of the effect(s) followed the study exposure(s) in order to infer potential cause and effect association(s). The main disadvantage of a cross-sectional design is its inability in estimating the absolute or attributable risk of the disease/effect being investigated, essential public health measures.

A notable omission was the historical cohort studies, a commonly used design in occupational epidemiology. These studies are not as time-consuming as prospective cohort studies and they require as little resource as case-control studies. Yet, the historical cohort studies have the same precision as the prospective cohort studies. Loss to follow-up is usually not a problem in cohort studies of mortality which can easily be ascertained in developed countries. This work is best contracted out. Changes in exposure status of occupational cohorts is quite common if not the rule. In occupational epidemiology, cumulative exposures are often used, and changes in exposure status and levels are noted. The problem does not arise in the case of short-term or acute exposures.

I agree with the author that case reports are often frowned upon, but only when the clinician(s) attempt to draw inferences regarding causality. Clinicians generally do not think in terms of populations, aggregates, variance between and within individuals, probability, and chance occurrence of differences in the frequency of events. As the author has stated, case reports have an important role in generating hypotheses.

Review of published work has always been and will be the backbone of research of any kind. Such a review is most useful when the reviewer identifies similarities and differences between studies, recognizes pitfalls in interpreting the results of individual studies, and summarizes his/her findings by making specific recommendations based on accepted scientific principles, not subjective opinions.

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REFERENCES


AUTHOR’S REPLY

Sir,

Dr Sheikh makes a number of relevant points about research in occupational medicine, and provided some