

This Week's Citation Classic

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Cohen E N, Bellville J W & Brown B W, Jr. Anesthesia, pregnancy, and miscarriage: a study of operating room nurses and anesthesiologists.

Anesthesiology 35:343-7, 1971.

[Departments of Anesthesia, and Community and Preventive Medicine, Stanford University School of Medicine, CA]

Retrospective surveys of 67 operating room nurses and 92 general duty nurses indicate that during the years 1966-1970, 29.7 percent of pregnancies in operating room nurses ended in spontaneous miscarriage compared with only 8.8 percent in the control group. A similar pattern was observed in a second study of 50 anesthesiologists and 81 physicians practicing in specialties other than anesthesia. During the period 1965-1970, the physician anesthesiologists evidenced a 37.8 percent spontaneous miscarriage rate compared with 10.3 percent in the control group. [The SC¹® indicates that this paper has been cited in over 190 publications since 1971, making this the 3rd most-cited paper published in this journal.]

Ellis N. Cohen

Department of Anesthesia
Stanford University Medical Center
Stanford, CA 94305

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"While attending the Third European Anesthesiology Conference in Prague in 1970, I heard with significant concern reports presented by Askrog¹ of Denmark and Lencz² of Rumania suggesting an association between work in the operating room and a high incidence of spontaneous abortion in female anesthesiologists. These investigators had, in turn, been stimulated by an earlier survey of female anesthesiologists in Russia reported by Vaisman³ in 1967. Unfortunately, each of these three studies was technically defective, lacking adequate statistical control. Although epidemiology was far removed from my major interests in drug metabolism, I felt the need to initiate a well-controlled study to evaluate the problem and confirm or deny its existence.

"Accordingly, two retrospective surveys were planned and conducted. Each included an operating room-exposed and an unexposed control group. The first study comprised 159 married operating room and general duty nurses. The second study involved

131 anesthesiologists and physicians practicing in specialties other than anesthesia. Every effort was made to conduct the study so as to avoid bias. The first study of nurses was conducted by means of a long, detailed questionnaire. All questions were asked in fixed format by two trained observers. The second study in physicians was completed by mailed questionnaires. Only after completion of the questionnaire were the respondents instructed to open a second sealed envelope which explained the purpose of the study. Results of both studies were confirmatory and indicated large statistically significant differences between the experimental and control groups in the incidence of spontaneous abortion. We thus concluded the presence of a fetal lethality associated with work in the operating room, possibly due to the anesthetic gases, although we could not incriminate the anesthetic agents in a cause-effect relationship.

"Subsequent to publication of the above report, some 20 epidemiologic studies have been conducted in the US and abroad which largely confirm the presence of similar occupational hazards. Individuals at risk include physicians, nurses, technicians, dentists, and chairside assistants. In the US alone, this number exceeds some 214,000 individuals. The most recent survey conducted in 1980 among dentists and dental assistants establishes the additional presence of a serious neurological dysfunction among those anesthesiologically exposed and strongly suggests a causative role for nitrous oxide.⁴

"Frequent citation of our paper lies primarily in its broad public health concern. As a result of this small, carefully controlled study, the operating room environment was recognized as a new source of potential health hazard. Wide interest in this problem rapidly developed among occupationally exposed doctors, dentists, and nurses and from governmental agencies concerned with the control of health hazards in the workplace. These interests and concerns led to expanded studies serving to define the seriousness and extent of the problem."

1. Askrog V F. Teratogenic effects of inhalational anesthetics. (Abstract.) (Hoder J, Jedlička R & Pokorný J, eds.) *Advances in anaesthesiology and resuscitation: proceedings of the third European Congress of Anaesthesiology held in Prague 31.8.-4.9.1970*. Prague: Avicenum—Czechoslovak Medical Press, 1972. Vol. I, p. 383.
2. Lencz L, Nemes C & Berta L. Psychische Belastungen und Morbidität der Anaesthesisten. (Abstract.) (Hoder J, Jedlička R & Pokorný J, eds.) *Advances in anaesthesiology and resuscitation: proceedings of the third European Congress of Anaesthesiology held in Prague 31.8.-4.9.1970*. Prague: Avicenum—Czechoslovak Medical Press, 1972. Vol. II, p. 1581.
3. Vaisman A I. Working conditions in surgery and their effect on the health of anesthesiologists. *Eksp. Khir. Anest.* 3:44-9, 1967.
4. Cohen E N, Brown B W, Wu M L, Whitcheer C E, Brodsky J B, Gift H C, Greenfield W, Jones T W & Driscoll E J. Occupational disease in dentistry and chronic exposure to trace anesthetic gases. *J. Amer. Dent. Assn.* 101:21-31, 1980.