

Occupational risks in the O.R.

Current concepts and a review of those at risk

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There are a number of risk factors operating room nurses and related O.R. personnel should be constantly aware of. In the following submission, risk factors associated with the operating room nursing profession will be divided into the following categories for discussion:

- physical
- toxins
- radiation
- infectious agents
- burnout

A description of the most important disease process from the standpoint of productive years of life lost as well as pathophysiology will be discussed. Also, a nursing diagnosis will be established for the workers at risk with respect to the selected disease process.

Physical

Backpain is the leading cause of lost work time for nurses, with unaided patient lifting thought to be the primary cause. (Stellman, 1982). Gibeau (cited in Holt, 1983) reports that more than 90% of the compensation cases for lost time in the Province of Alberta are associated with sprains and strains due to back problems.

There are several mechanical devices available for operating room staff to use when assisting with patient transfer. However, too often, O.R. staff are in a rush and neglect to use them.

One device, called the roller, fits under the patient's trunk. Even when this device is used, considerable physical effort is required to position the patient properly on the roller. If the patient is obese, the strain is compounded.

Surgery calling for the patient to be in a 'prone position' often entails the use of much physical strength. More often than not, this task falls on the nurse. Even though protocol states that attendants are supposed to do most of the patient transferring, they are frequently absent when needed.

Snook (cited in Levy & Wegman, 1983) stated that some data indicates much low back pain among nurses. Other data indicates little difference between nurses and more sedentary workers in overall prevalence. He does mention that the onset of low

back pain in nurses comes at an early age and is precipitated by factors at work. One of the precipitating factors is the posture that must be sustained for long periods of time. Many surgical cases that the scrub nurse, for instance, is involved with can be of long duration. It is not uncommon for an operation to last four or five hours. During that period, the nurse maintains one position with little or no movement.

Magora (cited in Holt, 1983) reports data indicating that static work posture is associated with increased absenteeism due to low back pain. Brequist-Ullman (cited in Holt, 1983) report that standing on the job longer than four hours is related to the increased incidence of low back pain. Snook, again, mentions that the rate of recurrence for non-specific back pain is extremely high — estimates range as high as 90%. It is also estimated that there is only a 50% possibility of returning to productive employment for a worker who has been off for longer than six months; if off work over one year, only a 25% possibility; and if over two years, the probability of returning to work is zero.

Toxins

There have been vast amounts of research performed on the exposure of operating room personnel to anaesthetic gases. The O.R. nurse can be exposed to high concentrations of gases during the induction phase of anaesthesia. During cases where the patient is not intubated and anaesthesia is maintained by a mask, high concentrations of gases are to be found in the environment. It is also not uncommon for gases to be inadvertently left on for short periods at the completion of cases. These released gases are not always withdrawn by the scavenging system.

Brunt and Hricko (1983) report an increased risk of miscarriage and birth defects in offspring from operating room personnel exposed to anaesthetic

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gases. Corbett (cited in Levy & Wegman) found an inordinate increase in the incidence of reticuloendothelial and lymphoid malignancies with exposure to gases. Corbett also reported that there is an increased incidence of spontaneous miscarriage among operating room nurses.

Biddle (1984) reported an increased incidence of cervical cancer, abortions, and liver disease with exposure to anaesthetic gases. To alleviate these problems most operating room theatres have some type of scavenger system to keep the toxic concentrations to an acceptable level. Further research will need to be done to ascertain if the scavenger systems are effective.

Toxins which the operating room nurse is exposed to are the disinfectants used for terminal cleaning of instruments and equipment. An example of this is the hypochlorite in high concentration used in the theatre following a hepatitis-B surgical case. This solution, used to prevent cross contamination, requires that gloves and protective goggles be worn by all personnel coming in contact with the solution. It can happen that O.R. personnel become careless and allow the solution to have contact with the skin or splash it into the eyes.

Brunt and Hricko further state that dermatitis is very common among women workers including hospital workers because of contact with disinfectant solutions such as hypochlorite. Gluturaldehyde solutions used to soak instruments also emit toxic fumes.

Radiation

The operating room nurse working in the O.R. environment is exposed to radiation in several ways. In certain procedures, flat plate X-rays are taken during the operation. In this case, all personnel in the theatre are protected by a portable shield. There are certain procedures in which a lead apron must be worn by the operating room personnel in the theatre. A radiation technique called fluoroscopy is a situation where lead aprons must be worn.

Brunt and Hricko (1983) report the potential for increased breast, thyroid and other types of cancer in women exposed during participation in certain surgical procedures requiring radiation techniques. The use of thyroid collars in conjunction with the lead apron is recommended for scrub nurses during fluoroscopy procedures. Kahn and Ryan (cited in Levy & Wegman) state that irradiation of the human embryo early in its development can result in spontaneous abortion or severe fetal abnormality.

Infectious agents

According to Stellman (1982), needle-sticks are believed to be the prime mode of transmission for hepatitis-B. Gantz (Levy & Wegman, 1983) state that splatters on mucous membranes or breaks in the skin are potential portals of entry. Robbins (1985) reports that indirect transfer of hepatitis-B virus occurs by infective material by way of fomites — any substance that adheres to and transmits infectious material.

In the O.R. environment, needle-stick injuries are commonplace. It can happen that an operating room

nurse may not be aware of such an injury, as some of the needles are extremely small and their pricks may be imperceptible.

When a "known" hepatitis-B carrier is having surgery, special precautions are taken by operating room personnel. Staff members are instructed to report to health services for examination and treatment if they think there is a possibility they have been infected. This is fine where it is "a given" that the patient is a carrier; but, are nurses as likely to report a needle-stick injury if the patient is not expected to be a carrier?

Some nurses are extremely diligent when reporting injuries. This writer, as well as many of the readers, can attest to the fact that not all injuries are reported.

Many hospital workers, especially those in high-infection risk areas such as the operating room, can receive a vaccine for immunity against hepatitis-B. Admittedly, regardless of the fact I only work part-time in the O.R., I have neglected to enquire about the vaccine. How many other operating room nurses have done the same, thereby jeopardizing not only their own health, but the health of patients and fellow workers?

Gantz also states that five to ten percent of hepatitis-B patients will become chronic carriers, remaining surface-antigen positive and serving as a potential source of infection for hospital staff and other patients. Gantz also mentions that chronic active hepatitis will occur in 30% of chronic carriers and may result in cirrhosis.

There are other infectious agents that operating room nursing personnel must be equally cautious of: *Pseudomonas aeruginosa*, *Escherichia coli*, *Candida albicans*, staphylococci; and of more recent onset is "the disease of the eighties," acquired immune deficiency syndrome (A.I.D.S.).

Burnout

Burnout is pervasive among nurses and is probably the most important entity from the standpoint of productive years of life lost. "Productive years of life lost" is understood here as the entity that contributes most to the reasons for withdrawal from the nursing profession.

Armstrong (cited in Alexander, 1980) defines burnout as the extent to which workers have become separated or withdrawn from the original meaning and purpose of their work. Also included in the definition is the workers' express estrangement from patients, co-workers, the job itself and the institution that employs them.

Edelwich and Brodsky (cited in Gervais and Howard, 1984) refer to burnout as the apathy, discontent, lack of satisfaction, and the pervasive sense of "this isn't what I thought it would be" that so many nurses report. Veninga (cited in Vachon, 1983) calls it a "debilitating psychological condition brought about by work-related frustrations that result in lowered productivity and morale."

The conditions that lead to burnout in the operating room include: insufficient training, client overload, little pay, long hours, inadequate funding and political constraints (Vachon, 1983). Gervais and Howard report

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that disillusionment and frustration can come from trying to juggle problems related to equipment, scheduling, supply and the inevitable paperwork.

The operating room is an area that requires a skilled professional who is constantly being re-educated as state-of-the-art technical advances are pursued. An example of this is microsurgery and the initiation of transplants.

Selye (cited in Fraser, 1983) states that there are three definable stages to the human stress response, namely the stage of alarm, the stage of resistance, and the stage of exhaustion.

Alarm stage

The stage of alarm occurs as a result of a perceived threat and is characterised by pallor, sweating, and increased heart rate. It is normally short in duration and if the stress persists, it is replaced by the stage of resistance. This resistance is a resistance to those factors which constitute the stress. During the stage of resistance most of the symptoms associated with the alarm stage disappear as the body develops an adaptation to the stressful condition. The capacity to resist is limited, and should the stress be severe or prolonged this stage will be replaced by the stage of exhaustion. It is argued that this stage may be associated with the development of psychosomatic diseases. For example, various emotional disturbances, headaches, insomnia, and abdominal disorders are alleged to be initiated not directly by some external agency but as a result of faulty adaptive reactions.

Human stress exists when an event or state occurs which disturbs homeostasis. The extent of the resulting response is determined by the severity of

the stress. The response is non-specific and it is mediated by way of the neuro-endocrine systems. Faulty adaptation to the stress or failure is alleged to lead to disease. Thus, burnout may be seen as a problem with adaptation to a very stressful environment.

Nursing diagnosis

All operating room nurses are at risk for developing burnout due to the above factors. The knowledge and skill levels of the operating room nurse should be conducive to educational teaching regarding the risk factors of burnout as nurses are professionals. Motivational factors may be a problem as many nurses prefer to leave the work setting immediately after their shift. Structural factors may also be a major problem depending on the support from the managerial hierarchy.

This author's nursing diagnosis would involve giving anticipatory guidance to the operating room staff regarding the etiology of burnout, the signs and symptoms of burnout, and ways to counter burnout.

Conclusion

This submission has dealt with the occupational risk factors that the operating room nurse is exposed: physical, toxic and infectious agents, radiation and burnout. The issue of burnout was given more emphasis because it is felt that it is a pervasive entity which must be addressed more thoroughly in the nursing profession.

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