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AIDS PREVENTION: IMPROVING NURSES' COMPLIANCE WITH GLOVE WEARING THROUGH PERFORMANCE FEEDBACK

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A performance feedback procedure was used to increase glove wearing by nurses in a hospital emergency room in situations in which contact with body fluids was highly likely. Infection-control nurses provided biweekly performance feedback to staff nurses on an individual private basis to inform them of the percentage of contact opportunities in which they wore gloves. Observations made prior to (baseline) and during feedback in a multiple baseline design across 4 subjects indicated that substantial increases in glove wearing in target situations occurred after implementation of the feedback program and that increases occurred across most of the specific situations in which glove wearing was advised. Percentage increases in glove wearing ranged from 22% to 49% across subjects. The results are discussed in terms of prevention of acquired immune deficiency syndrome (AIDS) by use of universal precautions.

DESCRIPTORS: AIDS, performance feedback, compliance, organizational behavior management

Recent reports indicate that an estimated 1 million persons in the United States are infected with human immunodeficiency virus (HIV). It is expected that of those infected, 125,000 to 165,000 will die from 1991 to 1993 ("Mortality," 1991); thus, the threat of AIDS as a serious health problem cannot be ignored.

Many health-care workers in hospitals and clinics are frequently exposed to the body fluids of patients and, thus, are at risk of contacting HIV in the course of treatment procedures. Although the risk of contracting AIDS in this way is lower than from sexual intercourse (American Hospital Association, 1988; Friedland & Klein, 1987; United States Public Health Service, 1986), positive HIV antibody tests for health-care workers have been reported after contact with the body fluids of an HIV-positive patient (Kelen et al., 1988; "Needlestick Transmission," 1984). Some of these infections were contracted via an accidental needle stick, spraying of blood into mucous membranes (e.g., eyes, mouth, etc.), and handling blood without preventive garb in the presence of a break in the skin ("Recommendations for Prevention," 1987). Infected workers had no identifiable risk factors and contracted HIV while providing care to others ("Apparent Transmission," 1986; Grint & McEvoy, 1985; "Human Immunodeficiency Virus," 1987; Neisson-Vernant, Arif, Mathez, Leibowitch, & Monplaisir, 1986; Oskenhendler, Harzix, LeRoux, Rabian, & Clauvel, 1986; Stricof & Morse, 1986).

Fortunately, infection of health-care workers is preventable through the use of universal precautions (American Hospital Association, 1988; Kelly, 1988; United States Public Health Service, 1986) that require the use of preventive barriers to protect against contact with body fluids (e.g., gloves, masks, protective eyewear, gowns). Standards call for the use of universal precautions when caring for all patients, regardless of apparent risk factors (American Hospital Association, 1988).

Although universal precautions have been described and required by federal agencies, little is known about the factors that affect compliance by health-care personnel (Rhame & Maki, 1989). The purpose of the present study was to evaluate the impact of a performance feedback intervention on compliance with universal precautions by nurses in a hospital emergency room setting. A performance feedback strategy (Balcazar, Hopkins, & Suarez, 1986; Daniels & Rosen, 1984) was selected because this approach has been used successfully to

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change safety and health practices (e.g., Geller, Eason, Phillips, & Pierson, 1980; Sulzer-Azaroff & De Santamaria, 1980) and the performance of health-care workers (e.g., Parsons, Cash, & Reid, 1989) in field settings. This research indicates that performance feedback is likely to be useful in establishing and maintaining behaviors that prevent transmission of disease in medical settings.

In the present study, a single important behavior from the list of universal precautions was targeted: wearing protective gloves. This behavior was selected because it occurs frequently in emergency treatment procedures and is among the most important practices in preventing contact with body fluids in a hospital emergency room.

METHOD

Subjects

The participants were 4 registered nurses (RNs), 2 who worked from 10:00 a.m. to 8:00 p.m. and 2 who worked from 12:00 midnight to 10:00 a.m. in a hospital emergency room (ER). All 4 subjects were females ranging in age from 34 to 63 years. Nursing experience ranged from 4 to 35 years.

Setting

The study took place in the ER of a 60-bed hospital located in a rural community. The ER included two rooms, one with six beds for emergencies and the other with four beds for outpatient service. The hospital serves 35,000 people in surrounding counties. Most of the patients received some type of financial assistance (Medicaid or general assistance).

Dependent Measure

Wearing protective rubber gloves in situations in which contact with body fluids was probable served as the dependent measure. Observers were told to observe subjects, noting whether protective rubber gloves were on or off in any of six contact situations: (a) cleaning instruments, (b) cleaning a laceration, (c) giving an injection, (d) phlebotomy, (e) inserting an intravenous catheter, and (f) obtaining and/or transporting specimens.

Procedures

Nurses were told that behaviors important in the care of ER patients would be observed; however, the behaviors were not specified. In addition, subjects were informed that at the completion of the project they would be told what behaviors were observed and why. They also were assured that none of the information gained in the study would affect their jobs.

Two nurses who worked in the hospital in or near the ER served as observers along with the first author. With the exception of the first author, the observers were not identified to the subjects. However, the subjects were told that co-workers would be observing them. In addition, on many occasions the first author was present but made no behavioral observations; therefore, it was unlikely that subjects could determine at what times their behavior was being observed.

Observers were trained in the use of the data recording system by requiring them (a) to identify and match each situation as it occurred in the ER with the definition of that situation on the recording sheet, (b) to record subject initials, observer initials, the situation (phlebotomy, cleaning a laceration, etc.), the wearing or nonwearing of gloves, and the date and time on a standard form to demonstrate appropriate use of record-keeping instruments, and (c) to complete a practice session to verify that all could use the recording sheet according to instructions.

At the beginning of the study, observers were instructed to observe behavior whenever one of the six targeted situations occurred during their work shift and were reminded that they should observe performance as unobtrusively as possible. All observers, with the exception of the senior author, collected data during routine working hours so that no personal time was required.

Interobserver Agreement

Two observers made independent and simultaneous recordings of behaviors for 22% of the total observations for Nurse 3, 19% for Nurse 2, 17% for Nurse 4, and 15% for Nurse 1. These observations were compared to establish interobserver

agreement. An agreement was scored if both observers recorded the same condition, date, time, and glove-wearing status.

Interobserver agreement was calculated by summing the number of responses scored by each observer during a session, dividing the smaller number by the larger and multiplying the result by 100. For 3 of the 4 subjects, the agreement percentages were 100%. For Nurse 1, the overall agreement percentage was 93%.

Baseline

During baseline no special instructions were given, and observers were instructed to record glove wearing when the targeted situations were present. Each data point was composed of information collected during one 10-hr shift and was based on four to six different observations. For three cases when fewer than four opportunities were noted on a single shift, the data were not used. Baseline was considered complete for an individual subject when a minimum of four data points of a stable or decreasing nature were obtained.

Intervention

Performance feedback was delivered immediately following baseline and once every 2 weeks (12 to 14 days) thereafter during the intervention phase. During a feedback session, the infection-control nurse presented individually to each subject (a) a list of the six situations in which gloves should be worn, (b) a request for behavior change (please wear gloves when appropriate), (c) the number of times gloves were worn out of all opportunities to wear gloves (expressed as a percentage of opportunities), and (d) a graph plotted with the performance data, including all data points up to that particular feedback session.

Feedback required about 5 min and was always given on a working day so that no personal time was used. The feedback information was prepared by the first author and given to the infection-control nurse, who later presented the prepared written statement and data in private individual sessions. The request for behavior change was made with a positive statement, such as, "We notice you have been wearing gloves 15% of the time, and we are glad of that. We would like to see you increase your glove wearing and request that you do so in all of the situations noted on the performance feedback record." The occurrence of all scheduled feedback sessions was confirmed by the first author who was present at the beginning of every session; however, only the infection-control nurse and the nurse receiving the feedback were present during presentation of the feedback.

Design

A multiple baseline design across subjects was used to test the effects of the performance feedback intervention. Baseline began simultaneously for all subjects, and the intervention was implemented in staggered fashion across subjects until all 4 had received feedback.

RESULTS

Glove-Wearing Adherence

Figure 1 presents the percentage of observations in which gloves were worn by all subjects across all conditions by 10-hr shift. The data from three shifts are not included because of infrequent opportunities for glove wearing.

Increased glove wearing was observed for all 4 nurses during the intervention phase. The performance of Nurse 1 averaged 58.8% during baseline (range, 40% to 67%) and increased to 85.1% during feedback (range, 60% to 100%). Nurse 2 started with a relatively high baseline average of 75.0% (range, 60% to 82%) and increased to 95.0% in the intervention phase (range, 83% to 100%). Nurse 3 wore gloves during 21.3% of all opportunities observed in the baseline phase (range, 0% to 40%) and increased appropriate glove wearing to 66.3% (range, 50% to 83%) during the intervention phase. Nurse 4 wore gloves during 11.7% of the opportunities in the baseline phase (range, 0% to 20%) and increased to an average of 45.4% following performance feedback (range, 20% to 67%). Overall, the performances of the 4 nurses averaged 40.5% during baseline and 73.0% in the intervention phase. In most cases, performance increased or remained

Table 1
Percentage of Opportunities in Which Gloves Were Worn by Type of Situation for 4 Nurses during Baseline (BL) and Feedback Intervention (FB) Phases

	Nurses							
	1		2		3		4	
Situation	BL	FB	BL	FB	BL	FB	BL	FB
Cleaning instruments	40	100	100	100	67	100	33	100
Cleaning laceration	100	100	100	100	40	100	67	100
Giving injection	0	57	10	67	5	0	0	0
Phlebotomy	67	100	100	100	0	100	0	0
Insert IV catheter	67	100	80	93	57	100	0	71
Transport specimens	50	100	91	100	17	69	20	57

stable for the sessions immediately following delivery of feedback.

The occurrence or nonoccurrence of glove wearing was also analyzed by type of contact situation during baseline and feedback phases (Table 1). Nurse 1 showed improved glove wearing in all situations except cleaning a laceration (where glove wearing was already at 100% during baseline). Nurse 2 showed improvement in three situations, including giving an injection, inserting an IV, and transporting specimens; this nurse was never observed to have gloves off during the other situations in baseline. Nurse 3 improved glove wearing in all situations, except while giving an injection. Nurse 4 had no observed opportunities during baseline for phlebotomy. However, her performance improved in all areas except giving an injection, which remained unchanged. It is clear that glove-wearing behavior was affected least when giving an injection; 2 of the 4 nurses showed no performance improvements in this situation (Table 1).

DISCUSSION

The results of this study show that performance feedback by the infection-control nurse resulted in an increase in appropriate glove-wearing behavior by ER nurses. Furthermore, increased glove wearing was noted across several different situations in which risk of contact with body fluids was high. Unfortunately, because of staff turnover, follow-up data could not be collected to assess the extent to which this feedback program or its benefits were maintained.

The findings of the present research confirm other applications of performance feedback that have shown immediate and meaningful changes in behavior when feedback is applied (Balcazar et al., 1986). These results also confirm the findings of other studies that have demonstrated beneficial effects on health-care practices using performance management strategies (e.g., Kunz et al., 1982).

Substantial research in performance feedback suggests that feedback given by a formal supervisor is most effective (Balcazar et al., 1986). However, in the present study, feedback was delivered by a nurse who was not a line supervisor and who did not work in the same department as the target nurses. This indicates that a formal supervisory relationship is not necessary to produce performance changes; however, a larger increase in glove-wearing behavior might have occurred if the ER line supervisor had given the feedback.

With respect to AIDS, Rhame and Maki (1989) protest that although universal precautions have been instituted to avoid required HIV testing, little has been done to ensure that rules are followed by hospital staff. The present study sought to remedy this problem by applying a program to improve compliance. However, in spite of the observed success, anecdotal data indicate that the problem is a difficult one. Nurses reported that wearing gloves was difficult and failed to engage in this behavior, even under high-risk conditions, at some level

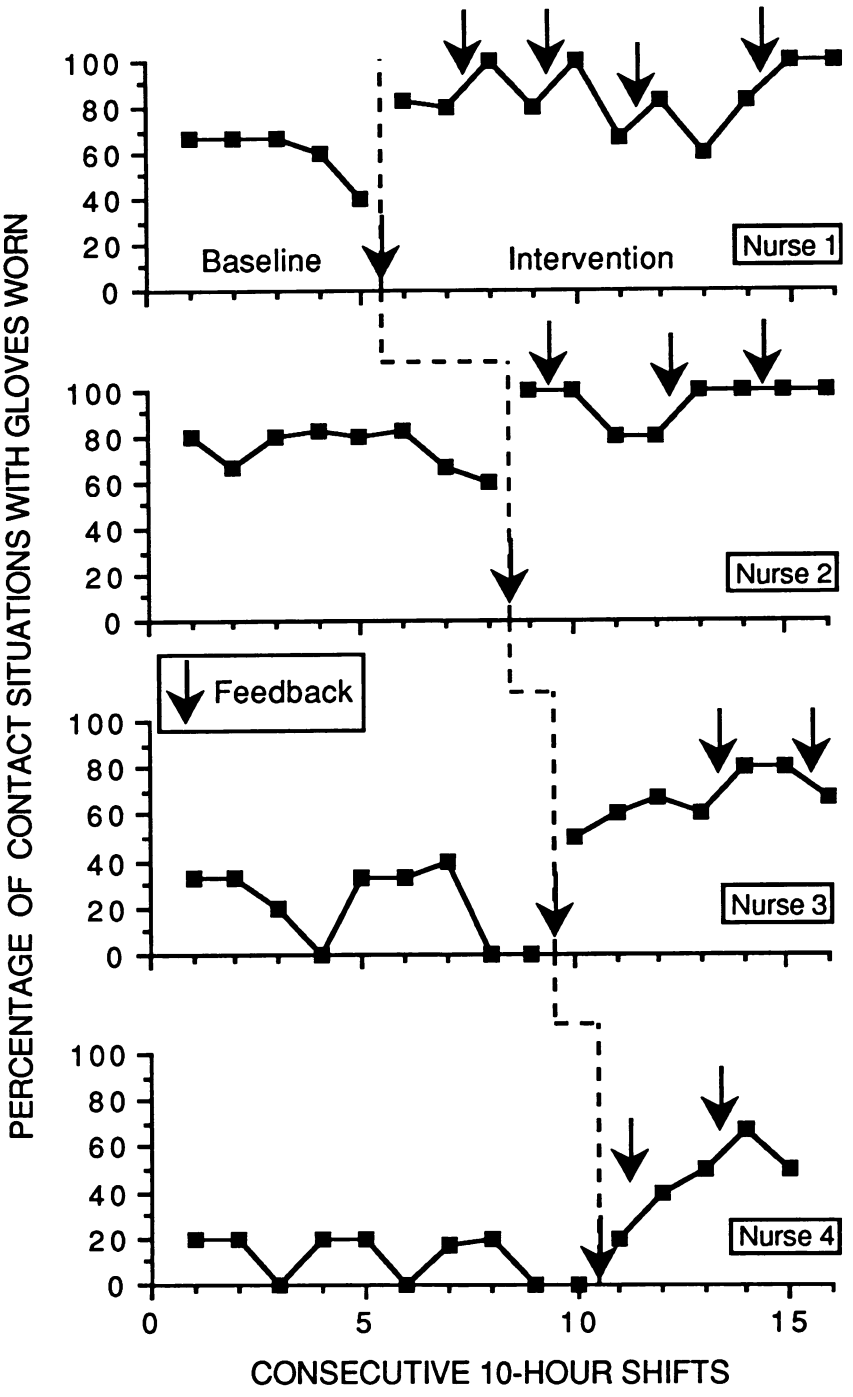

Figure 1. Percentage of contact situations in which gloves were worn by 4 ER nurses for consecutive 10-hr shifts. Arrows indicate the delivery of feedback by the infection-control nurse.

throughout the study. Many reasons were given for this lack of protection. For example, nurses reported that many of the patients were people whom they had known most of their lives, making it seem unrealistic for them to have AIDS. Also, some reported that they did not view elderly people as capable of transmitting HIV.

Anecdotal reports also indicated that compliance with universal precautions may be impractical due to poor glove quality. Many gloves had holes in them before they were used or were so thin that they ripped while being put on. Furthermore, the fingers of the gloves often adhered so that one's hand could not fit inside, and many were so large they were too cumbersome for fine motor use. Based on these reports, it appears that standards regarding glove quality must be addressed as part of comprehensive effort to improve safe performances.

The situation in which compliance was lowest occurred while giving an injection. Nurses reported this standard to be too rigid and, therefore, often failed to comply with universal precautions under these conditions. All subjects questioned the protective effectiveness of gloves while giving injections, phlebotomy, and IVs, reporting that needle sticks are especially likely during these situations, making the gloves useless. In addition, nurses indicated that gloves were not needed when giving subcutaneous and intramuscular injections because the risk of contact with body fluids is negligible during these procedures.

The urgency of care in the ER also makes compliance difficult. In some cases, when attempts to find a usable pair of gloves were unsuccessful, nurses became frustrated and administered care without protection. This practice may be advantageous to patients, but could put health-care workers at risk. Under such conditions, the immediate choice is between failure to care for the patient and protection from an unknown risk. This may lead to greater risk taking and failure to follow precautions, especially when obtaining protection is a cumbersome process.

Based on the current results and the responses of nurses summarized above, several areas are important for future research. First, the feedback intervention might be applied to other components of universal precautions, including use of protective eyewear, masks, or clothing. Second, environmental factors affecting the ease of compliance with universal precautions need to be examined (e.g., method of glove use, location of gloves, etc.). Finally, additional studies of the role of performance management strategies are urgently needed to establish high-quality programs and motivate health-care personnel to take preventive steps against AIDS contagion when conditions mitigate against such practices.

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