The nursing staff and physicians of a large midwestern teaching hospital thought that additional registered nurse (RN) personnel were necessary in the labor and delivery (L&D) unit. The hospital had a Level 3 referral obstetric service with approximately 3,200 deliveries annually. The L&D unit was staffed by RNs for patient care and unit secretaries and unit helpers who did not have patient care responsibilities. The unit had experienced a significant increase in patient volume, particularly in high-risk antepartum patients who were of higher acuity. This had resulted from the growth of a new maternal fetal medicine group practice and an infertility program. Also, the personnel cost per delivery had been increasing at the rate of 10% to 15% annually. An inexpensive method for evaluating staffing requirements was developed after a trial of staff reporting on patient volume and acuity. As is often the case, staff reporting was found to be incomplete and missing data made analysis unreliable.

The staffing for an L&D unit usually is based on a hospital's historic pattern. The American College of Obstetricians and Gynecologists (ACOG) and American Academy of Pediatrics (AAP) Guidelines indicate nurse staffing ratios for different stages of labor, subsequent delivery and recovery. However, length of stay, use of tocolytic agents, high-risk patients, physician practice patterns, antepartum patients, monitoring practices and geographic design of the unit also influence the nursing care required. Most nursing literature outlines the staffing requirements of labor, delivery, recovery, postpartum (LDRP) care arrangements, cross-training opportunities or alternative staffing approaches. In these studies, the overall goal was to decrease the personnel cost per delivery while maintaining quality.

Attempts also have been made to develop a maternity patient classification system. While the classification approach is similar to the method of data collection used for this study, it requires additional daily paperwork by the bedside nurse. With some classification systems, patients are classified repeatedly each shift to determine acuity and staffing projections. Jones did an hourly assessment of patient by Diagnosis-Related Group (DRG) and case mix to determine staffing patterns for units in a multihospital system.

Methodology and results

Two goals were defined for this project: (1) to match actual staffing closely to required staffing as determined by patient volume and acuity and (2) to slow the rate of increase in personnel cost per delivery while maintaining the same quality of care. A study design minimizes data collection by nurses. The study was done originally in 1988 and has been repeated four times. Data collection was completed by independent observers who recorded hourly clinical information from the patient flow board. Actual current staffing was recorded simultaneously.

Data from 20 day shifts, 20 evening shifts and 16 night shifts were analyzed. Randomly selected shifts covered all days of the week over a 3-month period. As is characteristic of this type of unit, a wide and unpredictable variability in workload existed. Following data collection, required staffing for each patient was assigned by clinical nurse specialists, using professional standards as guidelines. The assigned required staffing was adjusted in light of issues unique to this particular L&D area. For example, the
recovery room was isolated geographically from the other patient care rooms, so 1:1 staffing was necessary even if only a single patient was in recovery. Required staffing was calculated hourly by totaling the assignments for each patient in the unit at that time.

Data from a total of 56 shifts (448 hours) were analyzed. The sample statistics for average daily deliveries, percent cesarean sections (c-sections), number of antepartum patients, maternal transports and number of procedures were compared to the statistics for the quarter to determine if the sample was representative of activity. The average required staffing (in full-time equivalents FTEs) by hour of day illustrates the significant variation that was identified. See Exhibit II.) (Exhibit II omitted) Workload was fairly consistent, but lowest across the entire night shift. Workload began to increase at 7:30 a.m., peaking between 8:30 and 10:30 a.m. The pattern of workload distribution was attributed in part to elective labor inductions and c-sections. Variability in workload was noted also from day to day, with the greatest fluctuation occurring on the day shift, the least on the night shift.

The required staffing was adjusted to provide a minimum staffing of 4.0 FTEs regardless of patient census or acuity. This minimum staffing was selected because of the need to maintain a state of readiness for emergency c-sections and unanticipated admissions and deliveries. This adjustment minimized the effect of very low patient care requirements on the calculated average workload. The overall pattern of workload was unchanged with this adjustment.

Labor and delivery records from the previous 6 months were used to determine the average number of deliveries and percentage of c-sections for each day of the week. There was a significant difference between deliveries and patient census by day of week, with the weekend having the lowest activity and Friday the highest.

Discussion

Comparison of required to actual staffing revealed that the current staffing pattern did not match the actual pattern of patient volume or acuity by hour of day or day of week. A staffing pattern was developed that provided adequate staffing for 90% of the volume as predicted by the sample. The 90% level of staffing was selected because staffing at 100% would have required a significant increase in staffing on each shift and downtime would increase. Also, the personnel cost per delivery would have increased by approximately 33%. To match the pattern of required staffing more closely, personnel were moved from the night shift to the day shift. Additionally, one RN was scheduled to work from 8 a.m. to 12:30 p.m. daily, the time of peak activity. Also, personnel were shifted from the weekend to Friday, when volume was highest.

Several other actions were taken to address the potential for insufficient staffing, which was predicted to occur approximately 10% of the time: (1) a paid voluntary on-call system was activated when an increase in census or acuity was experienced and (2) a core curriculum for education of resource team staff (float pool) was developed and cross-training was completed by staff from the other maternal/child units. This allowed staff from the resource team and other units to assist with patient care when necessary.

Temporary staff were educated so they could provide competent care for low-risk patients who anticipated vaginal delivery. Also, they were trained to provide recovery care following delivery. Resource team staff (unless previously experienced in L&D) were not
trained to manage high-risk patients, or antepartum patients who required intervention with tocolytic agents, or to assist with c-sections. With staff input, guidelines were developed for changing staffing based on low and high volume. The guidelines were implemented successfully and facilitated staff response to significant changes in volume.

The L&D workload assessment has been repeated annually since 1988 and several changes have been noted over time. In 1989, 1.5 RN FTEs were added to the personnel budget as the volume of patients continued to increase to 3,500 births per year. Workload assessment was completed and an evaluation of the personnel adjustment and the staffing was sufficient to meet requirements 30% of the time. In 1990, the unit moved to a new physical facility, and the workload was reevaluated in the new building. In both instances, staffing patterns were adjusted slightly.

Workload assessment was done in the fall of 1993. Data from 20 day, evening and night shifts showed that the basic pattern of activity by hour of day has changed, the evening shift now having greater activity. (See Exhibit III.) (Exhibit III omitted) The night shift continues to be the shift of least activity, though greater variability was noted in this sample. The activity by day of week has also changed significantly with the day of peak activity shifting from Friday to Tuesday. Weekend volume has continued to be low, so elective inductions are now scheduled on Saturdays and Sundays, as requested by both patients and physicians. Finally, the pattern of delivery by month of year shows some monthly fluctuations, with daily deliveries averaging between one-half and one less between August and January than between February and July.

As a result of more closely matching RN staffing and patient volume and acuity, the actual personnel cost per delivery has increased 14% since 1988, while staff nurse salaries have increased 61% when compounded. Deliveries have increased to 3,800 and the antepartum volume has continued to grow. Only 1.5 RN FTEs have been added to the personnel budget although volume has increased by 600 deliveries (19%). These data have served as a basis for multidisciplinary planning and evaluation of services. Nursing staff, physicians and hospital administrators have been supportive of the plan developed because it is based on objective information. All agree that the unit is staffed appropriately to accommodate the volume and acuity of patients.

References


EXHIBIT I

1992 AAP & ACOG STANDARDS
Recommended nurse/patient ratios for perinatal care services

Staffing ratio--Care provided
1:1-2--Antepartum testing
1:2 Laboring patients
1:1 Patients in second stage of labor
1:1 Ill patients with complications
1:2 Oxytocin induction or augmentation of labor
1:1 Coverage for initiating epidural anesthesia
1:1 Circulation for cesarean delivery
1:2 Postoperative recovery

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