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INVESTIGATING STRESS EFFECT PATTERNS IN HOSPITAL STAFF NURSES: RESULTS OF A CLUSTER ANALYSIS

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Abstract—A comprehensive and reliable assessment of work stress, burnout, affective, and physical symptomatology was conducted with 260 hospital nurses. As previous attempts to categorize nursing stress and burnout by ward type have yielded inconsistent results, an alternative method for grouping nursing stress effects was sought. Cluster analysis was chosen as it offers a statistically sound means of delineating natural groupings within data. Sets of questionnaires measuring burnout, work stressors, and physical and emotional symptomatology were sent to all staff nurses at a large university hospital. Of 709 nurses employed there, a total of 260 nurses returned completed questionnaire packets. These nurses were separated into two equal groups using random sampling procedures. Cluster analysis of this data revealed groupings which were based on nursing stressors (particularly workload and conflict with physicians), social support, and patient loads. These cluster-analytic findings were replicated on both samples, and validated using data not used in the original cluster analysis. Results suggest that the effects of stress have more to do with the characteristics of the work environment and overall workload than with the degree of specialization on the unit. Results also suggest that intraprofessional conflict (i.e. with other nurses) is less psychologically damaging than is interprofessional conflict (i.e. conflict with physicians). Findings are discussed with respect to the burnout process and possible interventions.

Key words—nurses, stress, cluster analysis

The nursing profession is generally considered to be quite stressful. Nurses experience higher rates of mortality, suicide, stress-related disease, psychiatric admissions, and general physical illness than does the general population (Harris, 1989). While some of their work-related stressors are shared with other professions, others, such as the repetitive experience of separation and death, are more specific to nursing (Milazzo, 1988). A review of the literature suggests that the primary sources of nursing stress include work overload, death and separation experiences, poor communication and social support, emotional demands of patients and families, and a constantly changing work environment (Guppy and Gutteridge, 1991; Hipwell *et al.*, 1989; Ogus, 1992; Orpen, 1990). Some authors have even likened the nursing experience to combat, as both involve prolonged exposure to stress and concomitant maintenance of a physiological alarm response (Pasternak, 1988).

One important consequence of nursing stress is the process of burnout, with its resulting affective and physiological symptomatology. Burnout, although similar, is not identical to stress. While the constructs are related, burnout can be understood to be a psychological process in which chronic job stressors are translated into outward affective and physical symptomatology. Burnout involves the transaction of the worker with the job strain, as well as the psychological accomodation which results (Starrin *et al.*, 1990). Similarly, burnout should not be simply equated with the emotional and physical symptoms which are associated with this syndrome. Recent studies have shown burnout to be factorially distinct from depression (Glass *et al.*, 1993), as well as other affective and physical symptoms (Hillhouse and Adler, 1996).

Research suggests that burnout is associated with lower morale, reduced job performance, increased tardiness, absenteeism, job turnover, and alcohol and drug abuse (Chiriboga and Bailey, 1986; Duquette *et al.*, 1994; Easterburg *et al.*, 1994). Thus, the effects of nursing stress have potentially enormous financial and human costs, and a better understanding of related factors and patterns would likely be of considerable benefit.

Much of the early research on nursing stress and burnout has focused on the relative stressfulness of non-critical care (i.e. non-specialized) vs critical care nursing (Dewe, 1988; Gentry and Parkes, 1982; Guppy and Gutteridge, 1991; Keane *et al.*, 1985; Kelly and Cross, 1985; Mallett *et al.*, 1991; Milazzo, 1988; Ogus, 1992). These studies have yielded inconsistent results, with no clear evidence

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of differences in terms of stress or burnout. It has been conjectured that while there may be significant differences in critical care and non-critical care work environments, the presence of moderating factors (e.g. workload, social support, etc.) serves to equalize stress symptoms across wards (Milazzo, 1988). It seems likely that differences in nursing stress symptoms are more related to the psychosocial qualities of the nurses' job and work environment than to the type of ward (Dewe, 1988).

An alternative approach to the use of ward type to categorize nurses is to look for natural structure within the nursing stress effect data. While the ward one works on may not differentiate nurses in terms of stress effects, subgroups may be related to other, less obvious factors. The findings of several previous studies suggest that factors such as experience, social support, inadequate staffing, and age may be more important than ward type in determining the effects of stress (Dewe, 1988; Guppy and Gutteridge, 1991; Keane *et al.*, 1985; Kelly and Cross, 1985).

Statistically, the most appropriate way to delineate natural groupings within data is through cluster analysis (Hair *et al.*, 1992). This technique thus offers another approach to the study of nursing stress. However, cluster analysis is not without problems. Specifically, the choice of variables strongly influences the characteristics of the subgroups identified. Another frequent criticism of such research points to the typical lack of clear theoretical underpinnings in the selection of variables to be used in the classification of subjects. An additional problem frequently encountered in cluster-analytic research is the lack of reliability checks used to assess the stability of derived cluster solutions. Lastly, cluster solutions should routinely be validated on criterion variables not involved in the original clustering.

In an ever-changing environment of hospital restructuring and reengineering, issues of nursing stress and burnout demand our attention. Yet, many aspects of this phenomena are still poorly understood. The purpose of the present study was to determine whether nurses can be differentiated into stress effect subtypes based on factors other than ward assignment. Cluster analysis was used as an exploratory tool for identifying these nursing stress effect subtypes. In light of the caveats noted above, the results of previous research (Hillhouse and Adler, 1996) were used as a guiding model in our selection of clustering and criterion variables. This model proposes burnout to be both an important effect of nursing stress, as well as an intervening variable between stressors and resulting affective and physical symptoms. The present study used these stress effects (burnout, affective, and physical symptomatology) as clustering variables to identify stress effect subtypes. Nursing unit stressors, as well as social support, work-related and demographic variables served as criterion variables to validate and profile the resulting clusters. Lastly, results were replicated across two equivalent samples in order to check the reliability and stability of the derived results.

METHOD

Subjects and recruitment

Sets of questionnaires and explanatory cover letters were sent to all (n = 709) staff nurses at a large university hospital. Participation was voluntary, anonymous, and no incentives were offered to the participants. A total of 260 of the 709 nurses returned completed questionnaires, reflecting a response rate of 36.7%. This response rate is quite good when compared with other research using institutional populations and no compensation (Sudman and Bradburn, 1988).

Questionnaires

Demographic data. Demographic and work-related information was gathered on gender, age, marital status, nursing experience, and several work-related factors such as number of patients seen per shift, and number of double shifts worked.

Nursing stressors. Hospital unit stressors were assessed using the Nursing Stress Scale (NSS; Gray-Toft and Anderson, 1981). This 34-item survey measures the frequency and major sources of stress experienced by nurses on hospital units. It covers a wide variety of potential stressors, including stress from experiences with death and suffering, conflict with physicians, conflict with other nurses and supervisors, workload, uncertainty and lack of preparation. An additional subscale measures social support on the unit. The NSS has good reliability (test–retest r = 0.81, Cronbach alpha = 0.89), and has been used in a number of studies involving a variety of nursing specialties.

Burnout. Information on burnout was gathered using the Staff Burnout Scale for Health Professionals (SBS-HP; Jones, 1980). The SBS-HP is a 20-item burnout scale which measures adverse cognitive, affective, and psychophysiological dimensions of the burnout syndrome. Its internal reliability has been measured at 0.93. The SBS-HP was chosen over the Maslach Burnout Inventory (Maslach and Jackson, 1981) as it is widely used and is specifically designed to measure burnout in studies involving health professionals.

Affective symptoms. Affective symptoms were assessed using the Profile of Mood States (POMS; McNair *et al.*, 1981). The POMS is a widely used self-report inventory of mood with good internal consistency (Cronbach alpha ranging from 0.84 to 0.95), and good test–retest reliability (r ranging from 0.65 to 0.74).

Physical symptoms. Physical symptoms were measured by the Psychosomatic Symptom Checklist (PSC; Cox *et al.*, 1975). The PSC is a 17-item measure that assesses common physical symptoms such as headache, backache, and hypertension. It has been used in numerous investigations to measure psychosomatic distress and demonstrates good test–retest reliability ($r = 0.80$). As six of the 17 subscale of the PSC (gastric ulcer, asthma, spastic colitis, high blood pressure, eye pain, and diarrhea/constipation) were highly skewed with greater than 95% of the subjects in the present study not reporting that symptom, and since "depression" is an affective symptom already covered in the POMS, these seven symptoms were dropped from our analyses.

Data analyses

Our data analysis strategy was as follows. A factor analysis was performed initially on the stress effect scale items (e.g. SBS-HP, POMS, and PSC) in order to confirm the factorial validity of the subscales of these measures in this sample. Cluster analysis can be dramatically affected by the inclusion of only one or two undifferentiated variables. Thus, it is important to examine the factor structure of the variables to be included in the cluster analysis in the specific sample (Hair *et al.*, 1992). The factor analysis was repeated with the NSS.

Next, cluster analysis was applied using the stress effect factors derived in the previous analysis, using Ward's minimum variance method. Ward's method, which uses the squared within group deviations about the cluster means as its distance measure, outperforms most of the clustering techniques commonly available in recovering cluster structures from known data (Lorr, 1983). The inverse scree test was used to determine the number of clusters (Hair *et al.*, 1992). This test examines distances between clusters at successive steps, and stops when the distances make a sudden jump. The cluster solution was replicated across parallel data sets by randomly dividing our subject population into two samples, thus enabling us to examine its reliability (Blashfield, 1980). In other words, after identifying homogenous clusters in the initial sample (Sample 1), the same clustering procedure was then applied to the data of Sample 2.

RESULTS

The study sample

The mean age of the 260 nurses was 34.0 (SD = 7.8) years, 96.5% were women ($n = 251$), and all were college educated. These nurses had been employed in their current positions an average of 4.7 years (SD = 4.1), although they reported working as nurses an average of 11.2 years (SD = 7.7).

Factor analysis

Principal component factor analysis with varimax rotation was used to examine the factor structure of the individual items from the stress effect scales (e.g. POMS, PSC, and SBS-HP). Before performing the factor analysis, the original data set of 87 items was reduced to reach a more reasonable variable-to-case ratio. First, redundant and overlapping items were eliminated, including the vigor and fatigue subscales of the POMS (physical symptom subscales), and three items on the SBS-HP ("I feel fatigued during the workday", "Lately, I have missed work due to either colds, flu, fever, or other illnesses", and "I experience headaches while on the job"). Lastly, we calculated Cronbach alphas, and eliminated items that correlated poorly with each total scale score. This eliminated three items from the SBS-HP ("I feel that the pressures of work have contributed to marital and family difficulties in my life", "I am very concerned with my own comfort and welfare at work", and "I am having some work performance problems lately due to uncooperative patients"). These reductions resulted in a total item pool of 67.

Using the scree test (Cattell, 1966), the factor analysis identified six factors which accounted for 51% of the total stress effect variance. Four of these factors corresponded to the POMS scales. The first factor contained items from the depression–dejection subscale of the POMS, as well as three confusion–bewilderment subscale items (uncertain about things, unable to concentrate, and efficient), and one item from the PSC (insomnia). This factor was labeled "depression". The second factor included items from the anger–hostility subscale of the POMS, and was referred to as "anger". The third factor was comprised of items from the tension–anxiety subscale (panicky, anxious, nervous, shaky, and uneasy), depression–dejection subscale (terrified and desperate), the confusion–bewilderment subscale (bewildered, muddled, confused), and one item from the SBS-HP ("I often have the desire to take medication (e.g. tranquilizers) to calm down while at work."). This factor was labeled "panicky–overwhelmed". The fourth factor contained the remaining tension–anxiety items (tense, on edge, relaxed, and restless), and one item from the confusion–bewilderment subscale (forgetful). This factor was labeled "tension–anxiety". The fifth factor was comprised of the SBS-HP items, while the sixth factor consisted of PSC items.

This procedure was then repeated using items from the NSS. Five factors emerged which corresponded respectively to the "death and suffering", "conflict with physicians", "conflict with other nurses and supervisors", "workload", and "lack of social support" subscales of the NSS. The sixth fac-

tor was a combination of the uncertainty concerning treatment, and lack of preparation to deal with the emotional needs of patients and their families subscales. This last factor was labeled "uncertain-lack of preparation". Together, these factors accounted for 56.8% of the NSS total variance.

A reliability analysis of these derived factors demonstrated excellent internal reliability, with Cronbach alphas ranging from 0.76 to 0.92, with the majority being greater than 0.80.

Cluster analysis

After randomly dividing the subject population into two samples of 130 subjects each, the stress effect subscales identified in the initial factor analysis were then entered into a cluster analysis. These samples closely resembled each other in terms of age [$F(1247) = 0.04$, $P > 0.05$], experience [$F(1249) = 0.15$, $P > 0.05$], stress effect scores [Pillais ($S = 1$, $M = 2$, $n = 123$ 1/2) = 0.03, $F(6249) = 0.33$, $P > 0.05$], and nursing stressor scores [Pillais ($S = 1$, $M = 2$, $n = 123$) = 0.04, $F(6248) = 1.87$, $P > 0.05$].

Before initiating the cluster analysis, the data were examined for multivariate outliers, and multicollinearity. Six multivariate outliers were identified. There was no evidence for multicollinearity amongst these subscales. All analyses were performed with and without the outliers, with no significant effect on the results. Therefore, all subjects are included in the following analyses.

Using Ward's method and the squared euclidean distance criterion, three stress effect subtypes were identified in Sample 1 using the inverse scree test. The mean scores of the six subscales for each of the three clusters are shown in Fig. 1. Cluster analysis carried out on the Sample 2 data identified three clusters, which were very similar to those in Sample 1 (see Fig. 1). Visual inspection of the figure suggests an absence of meaningful differences between the replicated clusters. A three (cluster) by two (sample) MANOVA indicated that the cluster X sample interaction was not significant [Pillais ($S = 2$, $M = 1$ 1/2, $n = 123$ 1/2) = 0.07, $F(12,500) = 1.60$, $P > 0.05$], confirming that the same clusters were generated in both samples. An overall cluster main effect emerged on the stress effect subscales [Pillais ($S = 2$, $M = 1$ 1/2, $n = 123$ 1/2) = 1.07, $F(12,500) = 48.01$, $P < 0.001$]. As differences within subtypes were negligible compared to differences between subtypes, data from Samples 1 and 2 were pooled in order to further investigate the trait characteristics of the stress effect subtypes.

Table 1 shows the means, standard deviations, results of univariate tests, and Student–Newman-Keuls (SNK) *post hoc* comparisons for each stress effect scale across the three clusters. Overall, cluster 1 ($n = 82$) demonstrated low levels of depression, anger, tension, panic, burnout, and physical symptoms. Cluster 3 ($n = 67$) evidenced high scores on all these variables. Cluster 2 ($n = 111$) fell midway between 1 and 3 on all scales except burnout, where scores were comparable to those of cluster 3, and panic, where scores were comparable with those of cluster 1.

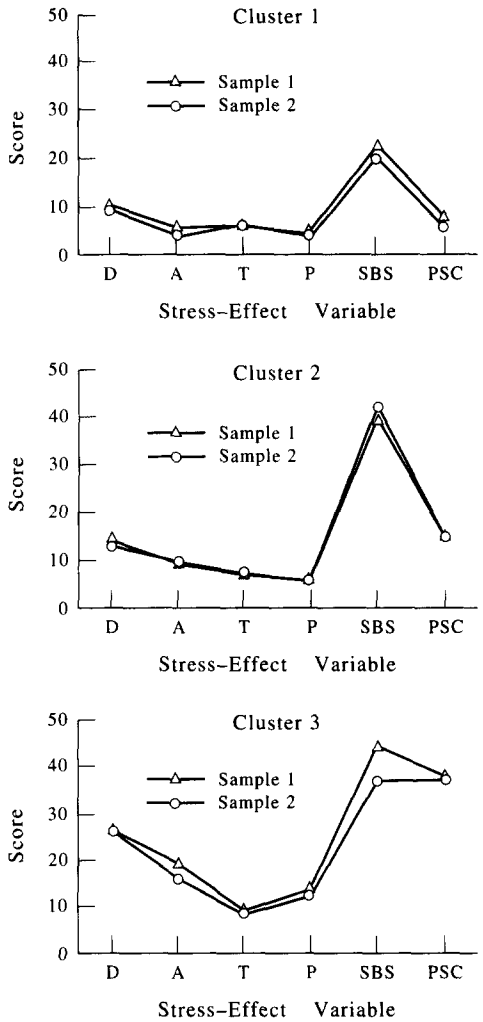

Fig. 1. Scores on the stress effect variables for the three clusters of nurses of samples 1 and 2. Note: D indicates depression; A, anger; T, tension; P, panic–overwhelmed; SBS, staff burnout scale; and PSC, psychosomatic symptom checklist.

Next, the predictive validity of these derived stress effect subtypes was examined by comparing the clusters using data not previously included in the cluster procedure. Demographic information (age and experience), work-related data (average number of patients seen per shift, and number of double shifts worked per month), and nursing stressor data (the six derived subscales from the NSS) was used to profile the characteristics of each cluster. Table 2 depicts the mean demographic, work-related, and nursing stressor scores for each of the three stress effect subtypes.

Table 1. Means, standard deviations, and analysis of variance results for stress symptom scales of the pooled sample as a function of stress symptom subtype (n = 260)

Stress symptom	Cluster 1 (n = 82)		Cluster 2 (n = 111)		Cluster 3 (n = 67)		ANOVA	SNK[a]
Depression	9.73	(5.34)	13.37	(6.26)	26.34	(13.65)	F = 75.5[a]	[1,2][1,3][2,3]
Anger	4.96	(4.07)	9.41	(5.81)	18.01	(10.31)	F = 68.2[a]	[1,2][1,3][2,3]
Tension	5.95	(2.17)	7.18	(2.34)	9.16	(2.56)	F = 34.7[a]	[1,2][1,3][2,3]
Panic	4.85	(4.54)	5.80	(3.83)	12.91	(7.56)	F = 51.9[a]	[1,3][2,3]
SBS	22.51	(5.69)	41.79	(9.36)	40.93	(14.03)	F = 102.8	[1,2][1,3]
PSC	8.13	(6.34)	14.93	(7.97)	37.99	(17.51)	F = 150.0	[1,2][1,3][2,3]

Notes: Standard deviations appear in parentheses; Student–Newman–Kuels procedure: mutiple range test denoting pairs of clusters that are significantly different at the 0.05 level.
[a]df = 2,257, $P < 0.001$.

A MANOVA indicated an overall difference among the stress effect clusters on these variables [Pillais (S = 2, M = 1 1/2, n = 123) = 0.20, F(12,498) = 4.66, $P < 0.001$]. Oneway ANOVA's confirmed that these differences occurred in terms of number of patients seen (F = 3.56), and on the "death and suffering" (F = 5.28), "workload" (F = 16.03), "conflict with other nurses and supervisors" (F = 10.47), "conflict with physicians" (F = 10.49), "uncertain–lack of preparation" (F = 3.00), and "lack of social support" (F = 14.24) subscales of the NSS (all Fs: df = 2256, $P < 0.05$).

Post hoc comparisons indicated that cluster 1 was significantly lower than clusters 2 and 3, which were not different from each other on the "death and suffering", "conflict with other nurses and supervisors", "uncertain–lack of preparation", and "lack of social support" subscales (SNK, $P < 0.05$). Cluster 1 was lower than cluster 2, which was lower than cluster 3 on the "workload" and "conflict with physicians" subscales (SNK, $P < 0.05$). Lastly, with regard to number of patients seen, cluster 2 was lower than clusters 1 and 3, which were not different from each other. Using these measures, discriminant analysis yielded two significant functions which correctly classified 57.4% of the subjects with respect to their cluster membership (Wilk's $\lambda = 0.67$, $\chi^2 = 82.06$, $P < 0.001$). This provides additional evidence for the differentiation of these stress effect subtypes. Age, experience, and number of double shifts worked did not significantly differ by subtype.

DISCUSSION

The results of this study suggest that hospital nurses represent a heterogeneous population with respect to the effects of stress. Our cluster analysis revealed three groupings of nurses experiencing unique stress effect patterns. The first group was characterized by relatively low levels of burnout, affective, and physical symptomatology, as well as low perceived stressors, and high social support on their units. They also reported relatively high levels of patient contact, in terms of the number of patients seen each shift. This group was labeled "low stressor/low stress effect", and represented 31.5% of the total respondents. Our second cluster reported moderate levels of physical, and most affective symptoms, but scored high in terms of burnout, and low in terms of the "panic/overwhelmed" scale. These individuals scored high on several of the nursing stressor scales (e.g. "death and suffering", "conflict with other nurses", and "uncertainty–lack of preparation"), and low with

Table 2. Means, standard deviations, and analysis of variance results for nursing stressor scale and work-related variables of the pooled sample as a function of stress effect subtype (n = 260)

Variable	Cluster 1 (n = 82)		Cluster 2 (n = 111)		Cluster 3 (n = 67)		ANOVA	SNK[a]
Death and suffering	8.70	(4.33)	10.45	(4.51)	10.94	(4.82)	F = 5.38[c]	[1,2][1,3]
Workload	7.32	(3.11)	9.20	(3.12)	10.25	(3.52)	F = 16.03[c]	[1,2][1,3][2,3]
Conflict nurses	4.39	(2.85)	6.08	(3.50)	6.75	(3.50)	F = 10.47[c]	[1,2][1,3]
Conflict Physicians	2.07	(1.26)	2.67	(1.26)	3.10	(1.69)	F = 10.49[c]	[1,2][1,3][2,3]
Uncertainty–lack of preparation	9.25	(4.02)	10.53	(3.89)	10.63	(4.27)	F = 2.00[b]	[1,2][1,3]
Social support	1.79	(1.60)	2.90	(1.85)	3.28	(1.99)	F = 14.24[c]	[1,2][1,3]
Age	34.86	(8.98)	32.79	(7.07)	34.64	(7.55)	F = 1.92 ns	
Nursing years	12.29	(9.05	10.60	(6.91)	10.77	(7.16)	F = 1.18 ns	
Double shifts	3.33	(4.27)	4.00	(4.44)	3.46	(4.25)	F = 0.56 ns	
Patients seen	8.54	(8.03)	5.91	(5.41)	8.24	(8.72)	F = 3.56[b]	[1,2][2,3]

Note: Standard deviations appear in parentheses.
[a]Student–Newman–Kuels procedure: mutiple range test denoting pairs of clusters that are significantly different at the 0.05 level;
[b]df = 2,257, $P < 0.05$;
[c]df = 2,257, $P < 0.01$.

regards to perceived unit social support. They also reported lower patient numbers, but moderate levels of workload and stress from conflict with physicians. While these individuals were somewhat more difficult to characterize, they were labeled as "high stressor and burnout/moderate symptom" group. They comprised almost 43% of this nursing sample. The last cluster was high in perceived stressors, low in unit social support, high in stress effects, and high in patient numbers. This group was identified as "high stressor/high stress effect," and represented nearly 26% of our sample.

The results of the MANOVA and discriminant analysis confirmed the differentiation of these nurses based on these clusters, and yielded two significant functions. Examining these results more carefully, it is clear that the first function serves to separate cluster 1 (low stressor/low stress effect) from the other two clusters. This function seems to be reflected in the overall perception of less general unit stressors, lower burnout, and fewer affective and physical symptoms reported by these nurses vs those of the other two groups. The second function delineates cluster 2 (high stressor and burnout/moderate symptoms) from cluster 3 (high stressors/high stress effects). This function appears related to patient numbers, and stress from workload and conflict with physicians.

It is of interest that while both clusters 1 and 3 were characterized by relatively high patient numbers, and cluster 2 evidenced high scores on some of the nursing unit stressor scales, neither cluster 1 nor 2 reported affective or physical symptoms as severe as those of cluster 3. It appears that neither high perceived unit stressors (in terms of "death and suffering", "conflict with other nurses", or uncertainty–lack of preparation), nor patient numbers alone are sufficient to cause the high levels of reported symptoms typical of the "high stressor/high stress effect" nurses. Rather, it was a combination of stressors, with particular emphasis on "conflict with physicians" and "workload" stress, together with patient load, which resulted in these detrimental effects.

The fact that clusters 2 and 3 evidenced very similar burnout scores, yet dissimilar levels of affective and physical symptoms is also of some interest. The model used to guide this research (Hillhouse and Adler, 1996) predicts stress to be directly related to burnout. This pattern is found in the present data as both clusters 2 and 3 demonstrated high nursing stressor scores (in terms of "death and suffering", "conflict with other nurses", and "uncertainty–lack of preparation"), as well as high burnout scores.

Thus, it appears that high patient load or general nursing stress alone are not sufficient to cause serious symptomatology. It seems that there is a two stage process, whereby certain types of nursing stressors (specifically, "death and suffering", "conflict with other nurses", and "uncertainty–lack of preparation") will typically result in feelings of burnout, but fail to produce the high levels of affective and physical symptoms that are most personally and professionally damaging. It is possible that a combination of lowered workload (reflected in lower "workload" stress scores and smaller patient numbers), and better relations with powerful others (i.e. physicians) serves to buffer these nurses, such that their feelings of burnout are less debilitating. Conversely, it may be the high patient numbers and workloads reported by individuals in cluster 3, together with greater levels of physician conflict which leads these nurses to develop more severe symptomatology.

The social support findings reported here are consistent with the results of a recent meta-analysis conducted by Lee and Ashforth (1996). These authors used the conservation of resources theory of stress (Hobfoll, 1989) to examine the relationship of resources and demands with burnout. This theory posits that burnout will result when valued resources are either (1) lost, (2) inadequate to meet demands, or (3) do not yield anticipated returns. Resources are defined as (1) social support, (2) job enhancement opportunities, (3) decision-making participation, and (4) reinforcement contingencies. Demands include (1) role ambiguity, (2) role conflict, (3) stressful events, (4) workload, and (5) pressure. When service workers such as nurses no longer feel they have sufficient emotional resources to handle interpersonal stressors, emotional and physical strain will develop. Unit social support acts as an important resource in that it promotes a sense of competence, and hence self-efficacy and self-esteem. Strong support strengthens unit relationships, thus buffering the person from the effects of interpersonal stressors, while weak support increases the likelihood that interpersonal conflict will lead to emotional and physical strain.

As predicted by this theory, subjects in both clusters 2 and 3 reported low unit social support and high burnout. However, while cluster 3 also evidenced quite high levels of affective and physical symptoms, cluster 2 demonstrated only moderate elevations on these variables. Both of these clusters reported relatively poor relations with other nurses on their units, but only those individuals from cluster 3 also reported poor relations with physicians. Thus, while this data generally supports the idea that emotional and physical strain is related to the combination of poor unit social support and poor interpersonal relations, it seems that more attention needs to be paid toward the nature of the relationships involved (e.g. physicians vs other nurses).

It is clear that conflict with others within your profession (i.e. nurses, in this case) has different effects than conflict with those from other disciplines (i.e. physicians). Intraprofessional conflict is perhaps less threatening, and offers more avenues

for problem resolution than does conflict with individuals who have more power and status, and with whom one typically has less frequent contact. When considering the finding that it is both high work and patient loads together with physician conflict that leads to greater symptomatology, one may conjecture that higher patient numbers may bring nurses into more contact with physicians with whom they have conflictual relations, thus magnifying their stress.

Nevertheless, there is a positive side to many of these findings. First, the fact that some nurses report feeling burned out, yet report only moderate symptomatology suggests that it may be possible to identify these high risk nurses and intervene before they suffer more serious personal and professional consequences. By monitoring these nursing stressors (particularly workload and physician conflict), it may also be possible to identify the individuals most likely to be adversely affected. Early interventions with nurses and on units exhibiting this constellation of stressors may help avert more serious long-term problems.

While workload often varies, and is difficult to control, stress from interprofessional relations may possibly be reduced through education and other interventions. Shifting from a multidisciplinary to interdisciplinary team treatment focus is one technique for increasing interprofessional respect and interdependence. Similary, including physicians, nurses, and other involved staff in performance improvement activities may increase group cohesion, while also providing an avenue for conflict resolution. Further exploration of these areas is warranted.

While nursing stress has traditionally been studied in relationship to ward type and degree of specialization involved, examination of the composition of the clusters derived in this study revealed considerable diversity in terms of work areas surveyed. The clusters were remarkably similar with respect to representation of ICU staff. Staff members from various intensive care units accounted for 29% of the subjects in cluster 1, and 33% of the subjects in both clusters 2 and 3. This finding may explain the inconsistencies encountered in previous studies which have relied on an ICU vs non-ICU division of subjects. Even within a ward or unit, subjects may demonstrate highly individualized responses to work stress. This heterogenous distribution of work type was further underscored by the finding that respondents from all work areas surveyed (e.g. medical/surgical, acute/chronic, specialized/general) were present in all three clusters. These findings provide additional support for the use of factors other than work type/assignment to examine stress effects among nurses.

Despite the fact that we have provided evidence for the reliability and stability of these results by delineating our subgroups in one sample, then replicating them in a separate sample, the relatively low response rate is a potential problem for the generalizability of these results. Although our response rate was quite good when compared with other research using institutional populations and no compensation (Sudman and Bradburn, 1988), it nevertheless reflects only slightly more than one-third of the possible total nurses at this institution. This response rate, together with the fact that we do not know whether responders differ from non-responders may weaken the generalizability of these results. Despite this potential weakness, it is important to note that these results were further validated and elucidated by comparing the clusters across measures not included in the original analytic techniques. Lastly, by developing our subgroups on the basis of well-defined variables selected from a theoretically based model, we have established further reason for confidence in these results in this sample.

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