

## Factors Contributing to the Job Satisfaction of Nuclear Medicine Technologists: A National Study

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Work holds an important place in the life of most Americans. It occupies almost half of their waking hours and may dramatically influence their quality of life. Perceptions of self worth are often defined by workers' attitudes towards their jobs. Job satisfaction is believed to affect productivity, absenteeism, turnover, and overall organizational effectiveness (1, 2). Locke defined job satisfaction as "the pleasurable emotional state that results from the belief that one's job achieves or helps to achieve one's work values" (3). Job satisfaction is derived largely from intrinsic and extrinsic benefits or rewards that workers receive from their work (4). Because work has a variety of meanings for individuals, one's value system may modify the importance of various rewards, thus impacting their overall satisfaction.

Factors that affect job satisfaction have been actively studied over the last three decades in the belief that applying this knowledge might produce better quality service or products, and a higher quality of life for employees (5). In health care settings, service is delivered through direct interaction with patients. Consequently, employee work satisfaction may influence patient care and organizational effectiveness.

The majority of research pertaining to job satisfaction has been conducted in business, industry and government (6). Research on job satisfaction for health professions is limited, and none addresses nuclear medicine technologists specifically. Awareness of the rewards that influence job satisfaction of nuclear medicine technologists could help in planning strategies to alleviate job and occupational turnover. This knowledge will take on increasing importance in the future as the pool of available workers is expected to shrink (7).

The purpose of this study was to determine the relationship between five facets of job satisfaction (co-workers, salary, advancement opportunities, supervision, work performed on the job) for certified nuclear medicine technologists and overall, or global, job satisfaction. The work performed on the job is an intrinsic reward while fellow employees, salary, advancement opportunities, and supervision are extrinsic rewards. Previous research has indicated a relationship between both

types of rewards and one's perception of the job, although intrinsic variables are more consistently correlated with high levels of job satisfaction (4,8,9).

Results of our study indicate that satisfaction with work on the job was a significant predictor of overall job satisfaction for both groups. In addition, satisfaction with pay for staff technologists and satisfaction with opportunities for promotion for managers were significant predictors of overall satisfaction. Strategies for enhancing job satisfaction and decreasing and occupational turnover are also discussed.

### METHODS

This study employed a cross-sectional, individual difference research design with multiple regression analysis to examine the effect of five dimensions of nuclear medicine technologists' satisfaction upon their overall job satisfaction.

The population for this study consisted of all nuclear medicine technologists in the United States certified by the Nuclear Medicine Technology Certification Board (NMTCB). A random sample of ten percent of the population was selected ( $n = 682$ ). Questionnaires consisting of a cover letter explaining the nature of the study and a postage paid response envelope were mailed to each subject in the sample. Three return mailings were conducted for non-respondents.

The first page of a two-page questionnaire developed for the study included questions regarding demographic characteristics. The second page contained the Job Descriptive Index (JDI), a scale developed by Smith et al. (10) to measure five facets of satisfaction with work on the job (WORK), supervision (SUPER), advancement (promotional) opportunities (PROMO), salary (PAY), and people on the job (PEOPLE). An overall (GLOBAL) measure of job satisfaction was also included.

For each of the separate dimensions, there was a group of adjectives or descriptive phrases to which the respondents scored "Y" if the phrase described their work situation; "N" if it did not, or a "?" if they were unsure. Each response was converted to a numerical value resulting in a score for each facet measured. The minimum possible score for each dimension was zero. The maximum score, indicating the highest possible satisfaction level, was 54 for satisfaction with people

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on the job (PEOPLE) and work (WORK) subscales; 27 for promotional opportunities (PROMO) and salary (PAY) subscales; 39 for supervision (SUPER) subscale, and 54 for the measure of overall (GLOBAL) job satisfaction.

The psychometric properties of the JDI have been addressed by Smith et al. (10) who reported an average-corrected reliability estimate of 0.79 and corrected split-half internal consistencies of > 0.80 for each of the facets. In a review of studies that utilized the JDI, Cook et al. (11) found the psychometric properties to be acceptable for social science research.

The response from mailed questionnaires was 348, or a 51% return rate. Forty-five of the respondents were not working in clinical nuclear medicine, 48 worked part-time, and 27 did not work in hospitals. The intent of the study was to focus on nuclear medicine technologists who worked full-time in hospitals since this is the environment where most are employed (12). Thus, a sub-sample of 228 respondents working full-time in hospitals was utilized for analysis.

## RESULTS

To better understand the sub-sample, some of the demographic data will be reported. Technologists from 40 different states were represented in the sample. The gender distribution was 129 females (56.6%) and 99 males (43.4%); the mean age was 36. One hundred thirty-four respondents (57%) were classified as staff nuclear medicine technologists, 36 (16%) as supervisors, and 58 (25%) as chief technologists/managers. The demographic data matched very closely with that of a national survey of nuclear medicine technologists conducted by the Technologist Section of The Society of Nuclear Medicine (12).

For this study, respondents who listed their title as supervisors or managers (chief technologists) were grouped into the same category (management) for analysis. The rationale was to isolate those technologists who perform the majority of clinical nuclear medicine and those whose function was predominantly in management. From this classification scheme, 134 (58.8%) respondents were grouped as staff and 94 (41.2%) as management.

A forced-entry, multiple regression model was used for each group with overall (GLOBAL) job satisfaction as the criterion (dependent) variable and the WORK, PROMO, PAY, SUPER and PEOPLE subscales as the predictor or independent variables. The standardized regression coefficients ( $\beta$ ) for each independent variable and each group (staff and management) are presented in Table 1. The relative contribution of each independent variable upon overall job satisfaction can be ascertained by the magnitude of its associated standardized or scale-free regression coefficient ( $\beta$ ). Values close to 1.0 indicate a large contribution, while those close to 0 indicate little or no contribution (13).

The predictor (or independent) variables accounted for 69% of the variance in overall (GLOBAL) job satisfaction for staff nuclear medicine technologists, while the same variables accounted for 48% of the variance in overall satisfaction for the manager group (Table 1). For each group, satisfaction with

**TABLE 1. Standard Regression Coefficients**

Independent variables	Staff ( $\beta$ )	Managers ( $\beta$ )
WORK	0.678*	0.545*
PROMO	0.028	0.176*
PAY	0.145*	0.009
SUPER	0.079	0.159
PEOPLE	0.079	0.015
R <sup>2</sup> (for model)	0.693	0.480
F (for model)	56.88	15.51
P (for model)	0.0001	0.0001

p < 0.05.

work performed on the job (WORK) was a significant predictor of their overall job satisfaction (P < 0.05). The relative contribution of the WORK variable was greater for staff technologists ( $\beta = 0.69$ ) than managers ( $\beta = 0.48$ ).

Satisfaction with pay (PAY) was also a significant predictor of staff technologists' overall satisfaction ( $\beta = 0.15$ ). Satisfaction with opportunities for promotion (PROMO) contributed significantly to managers' overall satisfaction ( $\beta = 0.18$ ). Thus, for staff, WORK and PAY were the only significant predictors of overall job satisfaction while WORK and PROMO contributed to managers' satisfaction.

While the strength of the relationship between WORK and overall job satisfaction for both groups was strong, the contribution of PAY (for staff) and PROMO (for managers) was relatively weak.

## DISCUSSION

The purpose of this study was to determine the effect of five aspects (PEOPLE, SUPER, PAY, WORK, PROMO) of nuclear medicine technologists' satisfaction upon their overall (GLOBAL) job satisfaction. The WORK variable contributed significantly to overall job satisfaction for both staff technologists and managers and was the strongest predictor of both groups' job satisfaction. Staff technologists and managers who are more satisfied with the nature of their work are more likely to be satisfied with their overall job.

Significant, albeit weaker, predictors of overall satisfaction were pay (PAY) for staff and opportunities for promotion (PROMO) for managers. These findings are consistent with other research that found intrinsic rewards (the work itself) to be more important to overall job satisfaction than extrinsic rewards (PAY, PROMO, PEOPLE, SUPER) (4,14,15).

Job satisfaction is believed to affect employee turnover, absenteeism and productivity (1-3). Given the current shortage of nuclear medicine technologists, retention of current staff would seem to be one method for coping with the scarcity of personnel. The results of this study suggest that technologists' overall job satisfaction is strongly associated with their perception of the work they perform. While individuals consider multiple factors when choosing a career path, the nature of the work itself may be a key consideration in the decision.

Since the character of work is critical to overall job satisfaction, enriching this experience has been suggested as a method of increasing job satisfaction (16). Minimizing routine components of tasks, increasing autonomy over work performed, and expanding job responsibilities to increase visibility of workers as contributing members are all ways to restructure work experience for more variety and interest. For example, technical assistants could be trained to perform certain routine tasks such as record keeping, film developing, etc., that would decrease the amount of time spent on lower level tasks by more highly trained technologists. Learning how to operate new equipment or to perform a new technique and teaching it to others within the department can supply variety and a sense of autonomy in establishing how certain work will be performed. Increasing individuals' visibility within the organization might be accomplished by assigning technologists to appropriate hospital committees or involving them in patient rounds and case conferences. Obviously, methods used to alter job content will depend upon departmental needs, managers' confidence in employees' abilities, and staff's ability to deal with change.

For staff technologists, PAY was also shown to contribute to overall job satisfaction, although to a lesser extent than WORK. A recent study of allied health occupations by the Institute of Medicine indicated that initially the pay of allied health practitioners is comparable to that of other disciplines requiring similar levels of education. (7). However, over the length of a career, salary increases in allied health do not match those of non-health occupations. Furthermore, with the acute shortage of nuclear medicine technologists, some institutions are using salary to attract personnel, exacerbating the lack of pay differential between experienced and new employees. Salary ceilings and salary compression are discouraging to experienced technologists who may opt to leave a particular position or the field altogether. More research is needed to examine the relationship between job responsibilities and pay among experienced and entry level technologists.

Results of this study also suggest that opportunities for promotion (PROMO) significantly influence managers' overall job satisfaction, although to a lesser extent than WORK. It may be interesting to discover how recently these individuals were promoted and if they aspire to a higher position than what they now hold. Since this group has already been promoted at least once, there may be a perception that promotion opportunities are available. Perhaps the perception about promotion, rather than the reality, influences managers' overall job satisfaction.

The PROMO and PEOPLE variables did not contribute significantly in predicting staff technologists' overall (GLOBAL) job satisfaction. Larson et al. stated that the measurement of job satisfaction is not complete without considering individuals' expectations as well as the importance of particular factors (17). Staff technologists may perceive that there are a finite number of lower management positions for which they might qualify. The expectation is that promotion is unlikely. Therefore, an individual is not dissatisfied with the lack of promotion opportunities because

the reality meets expectations. This study also suggests that staff do not view co-workers (PEOPLE) as a significant factor affecting overall (GLOBAL) job satisfaction. Technically oriented individuals are attracted to nuclear medicine technology. Professional education emphasizes technical competence while minimizing interpersonal or people skills. Again, employees' expectations relate to the work itself rather than to co-workers. Whatever their expectations about people on the job, they do not contribute significantly to job satisfaction.

For managers, the PAY and PEOPLE variables were not viewed as significant factors affecting overall (GLOBAL) job satisfaction. That the PEOPLE variable is not significant is particularly surprising given that a large part of a manager's responsibility involves interactions with a wide range of people. The managers in this survey were most probably promoted from staff technologists into positions where the emphasis has changed from technical to managerial competence. Many may have had little or no formal preparation for the new responsibilities, but rather were promoted based on technical expertise. Of all the problems managers face, people issues are usually the most emotional and stress-filled. Perhaps this type of interaction is not a pleasurable aspect of a manager's responsibilities, and does not contribute to job satisfaction. Pay also did not influence managers' overall job satisfaction. In most instances managers receive more compensation than staff technologists. In comparison to others in similar positions, managers may feel that they are adequately paid. Their salary levels may match expectations. It may be that pay is not the primary motivator to become a manager, rather the perceived increase in autonomy and authority gained from the position.

The findings of this study may have implications for retaining nuclear medicine technologists within institutions and within the discipline. Focusing on those factors that increase employee job satisfaction (WORK and PAY for staff technologists and WORK and PROMO for managers) may help retain current staff and offer recruitment strategies for attracting potential employees. However, it is equally important to be aware of employee job expectations and to determine if they reasonably match those of the department. Monitoring job satisfaction and developing strategies for improving employee satisfaction can only be successful if individual expectations as well as the importance of specific job variables are considered.

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