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A quasi-experimental study on a quality circle program in a Taiwanese hospital

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Abstract

Objective. To explore the impact of quality circles on job satisfaction, absenteeism, and turnover among hospital nurses in Taiwan.

Design. A quasi-experimental research design.

Setting. In November 1995, a study was initiated to establish quality circles in a 500-bed community hospital in Taiwan. After the administrative process and a pilot study, three of the experimental units began implementing the quality circle program in January 1997. For the comparison group, three non-quality circle medical–surgical units were selected from another building.

Study participants. All registered nurses on the three selected units who met the criteria of having worked full-time on those units for ≥ 6 months were included in the study. There were 53 full-time registered nurses (49 female, four male) who met the criteria and 100% participated. There were no significant differences between the quality circle group and the non-quality circle group in terms of sex, age, and number of years of working experience, education or marital status.

Interventions. After obtaining administrative approval and support, the pilot study began with 3-month quality circle courses and 3-month quality circle process training for the experimental group nurses. Each circle has been meeting for 1 hour each week to identify problems, barriers, and solutions for effective implementation since 1997.

Main outcome measures. (i) Demographic data questionnaire; (ii) Stamps and Piedmont's Index of Work Satisfaction; (iii) hospital records for absenteeism and turnover data.

Results. The data reveal that nurses of the three quality circle units felt more satisfied ($P < 0.01$) than did nurses from the three non-participating units. In the non-participating group, 36% had considered leaving the units, compared to 10% of nurses from the quality circle group. The turnover rate was significantly higher for the non-participating group (40%) than for the quality circle group (13%).

Conclusion. This quality circle program in a Taiwanese hospital significantly improved satisfaction, reduced absenteeism, and lowered turnover of nurses. The findings support other studies reported in the literature.

Keywords: absenteeism, intent to leave, job satisfaction, nurses, quality circles, turnover

Researchers conducting studies of Taiwan's nursing manpower [1–3] have proven that there is a high job turnover among nurses in Taiwan. The data indicate that the factors most related to a nurse leaving the profession are work overload, job dissatisfaction, and inflexible scheduling [4]. To retain nurses, many strategic plans have been encouraged and funded by The Department of Health Executive Yuan, Republic of China since 1993. One of the effective strategies is the implementation of quality circles (QCs) in working units [5]. The QC consists of a small group of employees who voluntarily meet at regular intervals to identify, analyze and solve quality, risk management, cost, and staffing problems in their work areas. Normally members of a particular QC come from the same work area and thus face similar problems in their daily work lives. The benefits gained through the QC process include increasing employee concern for problem prevention, more effective communication, active job involvement, and encouraging teamwork [6–9]. A number of studies such as those by Gillis [6], O'Brien and McHugh [7], Massaro et al. [8], and Cotton [9] have reported successful

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nurse retention related to QC in American hospitals. QCs can be an important vehicle for decreasing turnover if there is a high degree of job satisfaction among nurses [10–12]. Therefore, the purpose of this study was to explore the impact of QCs on job satisfaction, absenteeism and turnover among hospital nurses in Taiwan.

Literature review

The outcomes of QC implementation in a literature review related to this study focused on job satisfaction, absenteeism, and turnover among nurses.

Job satisfaction

QC programs have repeatedly been suggested as a technique for enhancing employee involvement in and satisfaction with their work [9–16]. Employee Attitude Survey questionnaires were designed by Keisses [17] to survey 81 QC participants and 67 non-QC participants in an industrial setting. The results indicated that QC programs have a significant impact on employee job satisfaction and performance. To extend the knowledge and understanding of the effects of QC participation on worker attitudes and morale, Thornberry, Weintraub and Rao [18] selected the Job Descriptive Index to survey 50 QC and 37 non-QC groups from two large organizations in the New England area. The data showed that there were strong and significant differences in job satisfaction with pay, promotion, supervision, the work itself, and co-workers. O'Brien and McHugh [7] stated that QCs provided forums for an increasing acceptance by nurses of their role in establishing quality as a central facet of nursing practice. Calomeni, Solberg and Conn [19] claimed that staff nurses felt satisfaction with their work through empowered knowledge and skills, and the impacts on their nursing role.

Absenteeism

Absenteeism can be classified as voluntary and involuntary. Voluntary absences are a function of a worker's motivation to attend. Steers and Rodes [20] identified at least three kinds of involuntary factors that lead to absences: illness and accidents, family responsibilities, and transportation problems. Over the years, dozens of strategies have been presented to reduce the absenteeism rate and get absent workers back to work. Many studies have reported that QCs are an effective management tool to reduce absenteeism among employees [21–23]. Of the 25 QC members and 25 non-QC members in Byrd's study, absenteeism records showed positive changes after implementing QCs [21]. Krigsman and O'Brien experimentally compared and behaviorally analyzed two QC-implementing plants located in Chicago and Barcelona. The results suggested that QCs were an effective intervention strategy for decreasing the absenteeism rate [22]. Steel and Lloyd did a longitudinal study to investigate the outcomes of QC participation in which a sample of 225 military and civilian employees of a US Air Force base were surveyed to evaluate cognitive, affective, and behavioral results of a QC program. The results indicated that QC participation had a significant effect on these three variables [23].

Turnover

Campbell and Hatfield [24] presented the impact of QCs on patient care and turnover by establishing QCs in an operating room. Their data indicated a reduction in turnover with a projected saving of $1.5 million in recruiting and replacement costs in nursing alone in the 300-bed hospital where the study was conducted. Burton longitudinally analyzed withdrawal precursors and behavior related to QC intervention in a hospital environment. Ten QCs were established with 108 participating registered nurses, and a pre-test/post-test design was used to measure the changes on participants' job tension, organizational commitment, overall job satisfaction, and absenteeism rate. The data indicated that the absenteeism rate showed a welcome decline of 32% after only 1 year of QC intervention, while the turnover rate fell from 28.1% to 22.6% [25]. Helmer and McKnight demonstrated that QCs were an effective tool to minimize turnover rates [26]. That QC intervention boosts morale and staff retention was proven by a study of Gemignani [27].

Research questions

(i) Is there a difference in job satisfaction between nurses who work in QC units and those who work in non-QC units?
(ii) Is there a difference in absenteeism between nurses who work in QC units and those who work in non-QC units?
(iii) Is there a difference in turnover rate between nurses who work in QC units and those who work in non-QC units?

Methodology

Pilot study

This study was conducted at a 500-bed general hospital in Taiwan using a quasi-experimental research design. In November 1995, with top and middle management commitment, three medical–surgical units were selected in which to implement QCs. The average size of a QC was five to six nurses. In one unit, there were two to three QCs. After 3-month QC courses and 3-month QC process training, each circle met for 1 hour each week to identify problems, barriers, and solutions for effective implementation.

Sample

Three medical–surgical units had been using the QC program since January 1997. They became the experimental units. For the comparison group, three non-QC medical–surgical units from another building were matched with the QC units on

the basis of having similar patient characteristics, staffing, administrative structure, and management style. For example, each unit had one nurse manager, the same physician group, and patients were covered under managed-care.

The unit of analysis was the individual nurse on the QC unit or non-QC unit. All registered nurses on the selected units who met the criteria of having worked full-time on those units for at least 6 months were included in the study. There were 53 full-time registered nurses who met the criteria; all of them participated in the study. The 100% acceptance rate was probably due to hospital policy and the importance and relevance of the topic of quality circles. The administrator of the hospital made a policy that all full-time registered nurses in the QC units must be involved in the QC. The Taiwan Joint Commission on Hospital Accreditation made the implementation of quality circles a target goal for improving quality of care [28] and this is regarded as an important topic by hospital employees.

The only racial/ethnic distinction in Taiwanese society is between the majority Chinese and the minority aborigines or mountain people [29]; the 53 participants in the study were all Chinese. The 29 nurses in the three QC units included two males, and the 24 nurses in the non-QC units also included two males. A t-test statistical technique was used for testing the demographic homogeneity between the two groups ($P < 0.05$).

Potential subjects were asked to read a covering letter explaining the research project and to sign the informed consent form if they agreed to participate in the study. To ensure confidentiality, no names appeared on the questionnaire or data form but individuals were identified by a number that was their date of birth. Participants completed the questionnaire and returned it to the researcher. Those data were not shared with unit managers or other nurses. Data were collected before QC intervention and again 2 years after.

Instruments

Index of Work Satisfaction

The Index of Work Satisfaction (IWS), based on the need-fulfillment theory developed by Stamps & Piedmonte (1978) was used to measure the level of job satisfaction of registered nurses. IWS is a 48-item questionnaire, measuring a respondent's current level of job satisfaction through an attitude scale. The total score reflects the degree of job satisfaction. The six subscales are: pay, autonomy, task requirements, interaction, professional status, and organizational policies [30]. Cronbach's alpha coefficient is 0.82 for the entire scale. The internal reliabilities of the six subscales range from 0.52 to 0.81 [31]. Content validity of the IWS for the Chinese version is 0.87. The test–retest reliability for the Chinese version is 0.83. The instrument is valid and reliable for use with this population.

Demographic data

Demographic data were collected in this portion of the study to explore the relationships between the individual and work environment characteristics of the respondents as related to job satisfaction, absenteeism, and turnover. These characteristics included age, educational background, marital status, years of employment, and the reasons related to leaving.

Nurses' absenteeism records were examined and a UAI was distributed to collect data within a 12-month period from January 1 to December 30, 1998. Absenteeism was measured by a failure to appear for a scheduled workday. A workday was defined as a shift with either 4 or 8 hours. No distinction was made between paid and unpaid absences. Frequency of overall absenteeism was the total number of absence incidences recorded by the agency: annual vacation, sickness, accidents, and other reasons. The UAI was computed as the total number of absence incidents every 3 months divided by the average number for both groups.

Turnover rates

The measurement of turnover rates was the total number of terminations in each year studied divided by the total number of nurses in that unit. Turnover data were collected for a 12-month period from January 1 to December 30, 1998. In the study, both voluntary and involuntary terminations were computed for the turnover rate. Terminations indicate resignation or transfer to another unit during the study period.

The data on the intent to leave were collected by asking: 'Recently, have you considered leaving your job in this unit?' (Yes/No). The measurement of the intent to leave was computed as the numbers of nurses who said Yes divided by the total numbers of nurses in that unit.

Data collection

The study data were collected by distributing questionnaires directly to nurses. A cover letter explained what was required of each subject. The questionnaires consisted of Stamps and Piedmont's Index of Work Satisfaction and Demographic Data Survey. Data were collected before the QC was implemented and 2 years after.

Results

Most of the nurses were young, unmarried, had been employed for 2–3 years, and had diploma preparation (Table 1). There were no significant differences between the two groups in terms of the demographic items measured. Therefore, because of similarities between them, the researchers believe that any differences seen in the two groups related to the research questions should not be a result of age, educational experience, number of years working experiences or marital status.

Nurses' job satisfaction

Both t-test and ANOVA statistics were used to test the changes between the two groups before and after QC implementation on IWS. A significant difference ($P < 0.05$) between the two groups of nurses was found on three subscales: autonomy, organizational policy and interaction.

Table 1 Demographic data of QC and non-QC groups

Variable	QC group ($n=29$)	Non-QC group ($n=24$)	χ^2
Sex			
Male	2	2	
Female	27	22	0.183
Age (years)			
< 25	21	19	
> 25	8	5	1.095
Working experience (years)			
< 5	22	20	
> 5	7	4	1.071
Education			
Diploma	4	5	
College	23	16	
BSN	2	3	0.26
Marital status			
Single	26	22	
Married	3	2	1.302

All samples participated in the study ($n=53$).
BSN, Baccalaureate degree.

Nurses of QC units felt more satisfied with their job than did nurses from non-QC units ($P<0.01$). The summary statistics are presented in Table 2.

Absenteeism

Absenteeism was measured with three separate variables – 'UAI', 'intent to leave' and 'factors related to leaving' among the nurses in the study units. Data on the unit absenteeism index (UAI) were collected quarterly and indicated a strongly significant difference between the two groups ($P<0.01$). Nurses of non-QC units had almost three times more absence incidences as did the QC units' nurses.

Intent to leave

Intent to leave compared the leavers and stayers for the two nursing groups, and Chi-square was computed. A much larger percentage of nurses from the non-QC group (36%) had considered leaving the units compared to those nurses from the QC units (10%). The difference between the two groups on the variable intent to leave was statistically significant at $P<0.01$. There were a total of 22 leavers from the two groups. The frequency of various reasons for leaving were rank ordered from 1 to 10. The factors related to leaving were in multiple choice format and were analyzed using frequencies, percentages and Fisher's exact probability test (see Table 3).

Turnover

Turnover was measured by collecting the number of terminations per year divided by the average number of nurses for the unit, then multiplying this by 100. Data show that the turnover rate was significantly higher for non-QC units (40%) than for QC units (13%).

Discussion

By examining all of the modes of analysis, a holistic view of QC intervention emerges. It appears that the general use of QCs is a strong management tool for effecting changes in attitude. QC participation was significantly related to higher job satisfaction, as well as lower absenteeism and turnover rate. These findings are similar to those studies by O'Brien and McHugh [7], Massaro *et al.* [8], Cotton [9], Schemele *et al.* [15], and Tuttle [16]. QCs may be viewed as mini-job enrichment programs in which employees are encouraged to redefine their roles within the work unit and to provide constructive feedback regarding each other's behavior. These findings support the reports of Shores [14] and Thornberry, Weintaub and Rao [18].

In this study, the absenteeism rate was significantly lower for nurses in QC units than for nurses in non-QC units.

Table 2 Comparison of changes in nurses' job satisfaction between the two groups before and after QC implementation

	QC Group ($n=29$)		Non-QC Group ($n=24$)		
Variable	Mean	SD	Mean	SD	*t*-Value
IWS	0.016	0.258	–0.209	0.338	–2.676**
Pay	–0.095	0.497	–0.192	0.396	0.443
Autonomy	0.183	0.662	–0.239	0.395	–2.739**
Task requirement	0.064	0.833	–0.138	0.383	–1.097
Organizational policy	–0.034	0.355	–0.269	0.414	2.223*
Interaction	0.197	0.495	–0.127	0.49	–2.253*
Professional status	–0.498	0.111	–0.313	0.762	0.328

Difference between QC and non-QC groups: *t*-test,** $P<0.01$; * $P<0.05$.

Table 3 Fisher's exact probability of the top five factors related to job leaving. Items were collected by multiple choice between January 1 and December 30 1998 from 22 leavers

Rank order	Factors	QC Group (n = 5) Frequency (%)	Non-QC Group (n = 17) Frequency (%)	Total (n = 22)	P
1	Dissatisfied with job	1 (8%)	13 (92%)	14	0
2	Dissatisfied with pay	2 (15%)	11 (85%)	13	0.006
2	Leaving nursing	2 (15%)	11 (85%)	13	0.006
4	Returning to school	3 (25%)	9 (75%)	12	0.05
5	Dissatisfied with working situation	0 (0%)	11 (85%)	11	0

n, Total number of leavers in the QC and non-QC groups.

These findings support earlier research [21–26]. The basic philosophy underlying QCs is that when all employees are given the chance to make a decision and solve a problem, they become more motivated to solve problems and to be as effective as possible. Through open-communication channels, they trust, respect, and understand each other. According to Ouchi [5], effective QC intervention vehicles provide a mechanism through which employees attain desired values, a sense of responsibility, and belonging, which in turn leads to increased organizational commitment and then decreased absenteeism. Researchers found that most factors of absenteeism among hospital nurses in Taiwan involved tiredness, stress, personal problems, and work interfering with home activities [1–4]. In this study, the most frequent reasons for nurses' intention to leave were: dissatisfaction with the job, pay, and working situation. However, personal factors and family factors were ranked much lower.

The results of turnover rate analysis obtained from nurses in QC and non-QC units offer support to QC membership being positively associated with lower turnover behavior. These results are consistent with two previously mentioned studies examining the QC–turnover relationship in health care settings. Campbell and Hatfield [24] reported that turnover had been reduced significantly after establishing QCs in an operating room. A significant implementation was also observed by Burton [25].

There was a strong negative correlation between the scores of job satisfaction and UAI. Nurses who felt more satisfaction with their job had a lower number of absence incidents and stayed longer in the same unit. The data demonstrate that non-QC nurses felt greater dissatisfaction with their jobs, working situation, and pay, and there was a larger percentage of nurses intending to leave. These findings are consistent with prior research [6,8,10–12] that found significant improvements in job satisfaction, correlated with lower absenteeism and turnover rate.

The findings in this study reflect a strong difference between QC and non-QC units. One reason for those results might be the design of this study. Data were collected after the QC program had been implemented for 2 years. For the first year, QC participants had to suffer through training and institutional changes. In the second year, QC participants began to run the QC process effectively and maturely. However, the Hawthorne Effect and the Halo Effect may have played a role in the overall results. The QC participants knew they were being studied, and in fact, received much attention from the administration. Another factor to be considered, which may help to explain the outcome of this study, is cultural influence. The units that were initially selected to have QCs were regarded as important and their supervisor and staff nurses were given extensive attention and prestige. Staff nurses felt rewarded when the executive (one of the research team) invited them to join this study. Furthermore, the key elements which led to successful QCs were: (i) top management support; (ii) effective training of QC participants; (iii) a qualified QC facilitator; (iv) self-scheduling; (v) good physician–nurse relationships; (vi) reward systems. None of these factors should be discounted.

Conclusions

As indicated earlier, QC programs do have a significant positive impact on nurses' satisfaction, reduced absenteeism, and lower turnover. These findings support other results reported in the literature. QCs can be a good management tool to encourage participants to improve organizational communication and boost employee job satisfaction, with the efforts resulting in nurse retention. The major limitations were that this study was conducted in only one hospital, and QC participants were limited to only three units in this hospital.

Recommendations

The results from this study should be viewed as preliminary. To test the inductive conceptual framework of this QC program, the following should be measured and evaluated: nurses' perception of trust, leadership style, the number of participants, quality of nursing care, accident reports, and cost savings. It may also be useful to replicate this study using different samples. In future studies, the amount of time

and money it takes to implement a QC program should be analyzed to determine whether or not the results are worth the expense.

References

1. Yang KP. A study of nurses' job satisfaction and turnover rate among nurses. *J Nursing* (Taiwan) 1993; **41:** 31–39.
2. Yang KP, Simms LM, Yin JC. Factors influencing nursing-sensitive outcomes in Taiwanese nursing homes. *Online Journal of Issues in Nursing* 1999; August 3.
3. Hung IC, Hwang LL. Understanding hospital nurse turnover: A system dynamics approach. *Human Resource J* (Taiwan) 1996; **6:** 1–17.
4. Pan II, Yen CM. A survey of the relationship among job characteristics, achievement motivation, job involvement, job satisfaction, and retention of the hospital nurses. *J Public Health* (Taiwan) 1998; **17:** 48–58.
5. Ouchi WG. *Theory Z*. Reading: Addison-Wesley, 1981.
6. Gillis V. Implementing quality circles in hospitals. *Dissertation Abstracts Int* 1987; **47:** 3320-B.
7. O'Brien B, McHugh M. QCs: One organization's experience. *J Nursing Care Qual* 1994; **8:** 20–24.
8. Massaro T, Munroe D, Schisler L *et al*. A professional practice model: Two key components. *Nursing Manage* 1996; **27:** 43–47.
9. Cotton JL. Does employee involvement work? *J Nursing Care Qual* 1997; **12:** 33–45.
10. McNeely RL, Schultz B, Naatz F. Management notes. Quality circles, human service organizations, and the law. *Admin Social Work* 1997; **21:** 65–71.
11. Leininger S, Cohen PA. The quality circle of hip fracture care. *Nursing Case Manage* 1998; **3:** 220–226.
12. Hawley R. Empowering people with diabetic nephropathy. *J Diabetes Nursing,* 1999; **3:** 70–74.
13. Mohr WL. *Quality Circles*. Reading: Addison-Wesley, 1983.
14. Shores DL. An exploratory study into the relationship between QCs and job satisfaction. *Dissertation Abstract Int* 1984; **45:** 2014-A.
15. Schmele JA, Allen ME, Butler S, Gresham D. QCs in the public health sector: implementation and effect. *Public Health Nursing* 1991; **8:** 190–195.
16. Tuttle D. Quality circles as problem-solving tools in peri-operative settings. *Am Operational Room Nursing J* 1996; **63:** 625–629.
17. Keisses D. The impact of QCs on employee job satisfaction and performance. *QC Digest* 1983; **3:** 58–73.
18. Thornberry NE, Weintraub JR, Rao A. QCs and employee satisfaction. *QC Digest* 1987; **7:** 73–77.
19. Calomeni CA, Solberg LI, Conn SA. Nurses on quality improvement teams: how do they benefit? *J Nursing Care Qual* 1999; **13:** 75–90.
20. Steers RM, Rodes SR. Major influences on employee attendance: A process model. *J Appl Psychol* 1978; **63:** 391–407.
21. Byrd PA. An analysis of the impact of quality circles in an applied setting. *Dissertation Abstracts Int* 1986; **47:** 1149-A.
22. Krigsman N, O'Brien RM. QCs, feedback and reinforcement: An experimental comparison and behavioral analysis. *Organizational Behavior Manage* 1987; **9:** 67–82.
23. Steel RP, Lloyd RF. Cognitive, affective, and behavioral outcomes of participation in QCs: Conceptual and empirical findings. *J Appl Behav Sci* 1987; **24:** 1–17.
24. Campbell D, Hatfield BP. How quality circles work: An 'inside look' at two different hospitals. *Hospital Topics* 1982; **63:** 46–48.
25. Burton GE. Quality circles in a hospital environment. *Hospital Topics* 1986; **67:** 11–14.
26. Helmer FE, McKnight P. Management strategies to minimize nursing turnover. *Health Care Manage Rev* 1989; **14:** 73–80.
27. Gemignani J. Best practice that boosts productivity. *Business Health* 1998; **16:** 37–42.
28. Total Quality Improvement Program and Accreditation. The Taiwan Joint Commission on Hospital Accreditation 2000. http://www.tjcha.org.tw/
29. Chang TA. Cultural Revolution of aborigines. *Health, Welfare Environment Mag* 1998; **2:** 4–10.
30. Slavitt DB, Stamps PL, Piedmont FB, Haase AM. Nurses' satisfaction with their work situation. *Nursing Res* 1978; **27:** 114–120.
31. Stamps PL, Piedmont FB, Slavitt DB, Haase AM. Measurement of work satisfaction among health professionals. *Medical Care* 1978; **16:** 337–352.

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