

Radiology Employees' Quality of Work Life

Hussein Dargahi¹, Vahid Changizi², and Elaheh Jazayeri Gharabagh³

¹ Department of Health Care Management, School of Allied Health Sciences, Tehran University of Medical Sciences, Tehran, Iran

² Department of Radiology and Radiotherapy Technology, School of Allied Health Sciences, Tehran University of Medical Sciences, Tehran, Iran

³ Department of Radiology and Radiotherapy Technology, Master of Sciences in Medical Physics, School of Allied Health Sciences, Tehran University of Medical Sciences, Tehran, Iran

Received: 12 Apr. 2011; Received in revised form: 17 Oct. 2011; Accepted: 10 Dec. 2011

Abstract- Quality of work Life (QWL) originates from interactions between employees' needs and relative organizational resources. QWL is aimed to improve and retain employees' satisfaction, productivity and effectiveness of all organizations. A cross-sectional descriptive study was conducted among 15 Tehran University of Medical Sciences. A Cross-Sectional, descriptive study was conducted among 15 Tehran University of Medical Sciences' Hospitals' Radiology Departments' Employees by QWL questionnaire. Respondents were asked to express their attitudes about a range of key factors as the most important issues impacting their QWL. The data was collected and analyzed by SPSS version 15 software. Most of the respondents indicated that they were unsatisfied and very unsatisfied with key factors of their QWL. Comparison of QWL key factors of TUMS radiology employees with the other countries indicated that most of the employees are unsatisfied with their poor QWL factors. We hope, the implications of these findings deliberate to improve QWL within each of TUMS hospitals radiology departments and also be relevant and value to policymakers of healthcare organizations in Iran.

© 2012 Tehran University of Medical Sciences. All rights reserved.

Acta Medica Iranica, 2012; 50(4): 250-256.

Keywords: Quality of work life; Radiology employees; Hospital

Introduction

Ever since the concept of Quality of Work Life (QWL) was first used over 30 years ago, a range of definitions and theoretical constructs have succeeded each other with the aim of mitigating the many problems facing the concept (1). Idiomatically, QWL originates from interactions between employees' needs and relative organizational resources. It is supposed that QWL have positive impression on organizational exploration, job satisfaction, job output, job practice, and negative impression on employees' burnout (2).

QWL is a comprehensive program designated to improve employees' satisfaction and helping employees to manage better change and transition (3). A high quality of work life is essential for organizations to continue to attract and retain employees (4). Quality of Work Life includes broad aspects of the work environment that affect employee learning and health (5). QWL includes some objective and subjective factors which may condition operations and other inner aspects concerning the quality of relationships and methods of

management (6). QWL benefits are aligned with the core values which include respect, care, competence, and joy. If an employee gains a positive benefit from even QWL initiatives, then greater job satisfaction will be realized. Employees, who are happier in their jobs, are better employees (7). Quality of work life, as a concept and set of intervention activities, involves itself with planned organizational change aimed at improving both work system productivity and employee satisfaction (8). In healthcare organizations, QWL has been pointed as work environment weak point and power (9).

The attitudes and behaviors of healthcare organizations' employees impress on the hospital services delivery increasingly. Therefore, the study of hospitals employees' socialability, the ways of employees' attraction, employment, training and development are necessary at each stage of hospital services (10-12).

Radiology practices grew in size throughout recent years (13). Therefore, application of risk management is necessary in radiology departments, because it can

Corresponding Author: Hussein Dargahi

Department of Health Care Management, School of Allied Health Sciences, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 21 88622755, Fax: +98 21 88622533, E-mail: hdargahi@sina.tums.ac.ir

reduce patients' sue for damage, prevent their loss and also radiologists paying indemnity much more to patients since the past 15 years (14).

"Sunshine and Meghea" (2006) reported that a severe shortage of radiology employees' existed in the United States. Despite this fact, they demonstrated that total imaging by radiology employees were grown rapidly and radiology employees' average annual work hours were relatively increased by 2% which showed productivity improvement in the radiology departments because of their job satisfaction (15). The satisfaction derived from one's job has implications for both employees and organization. Work (task) performed and supervision received by radiology directors (relationship with supervisor), opportunity for career advancement, job security, adequate staffing, and job stress as QWL factors are significantly related to job satisfaction and productivity (16,17).

QWL is aimed to improve and retain employees' satisfaction, productivity and effectiveness of all organizations because of its definition as a strategy, environment and performance (18).

In looking at Iranian healthcare organizations, one major problem is evident: Lack of strategic human resource management. One of the most important of human resource management factors is QWL that is a comprehensive program designated to improve employees' satisfaction and helping employees to manage better change and transition (19).

"Dargahi and Nasl Saraji" (2006) reported that hospital employees had a poor quality of work life. This is indicating, the majority of these employees were unsatisfied with most aspect of quality of work life. Although, having low income, work environment stress level and career prospects were the huge problems (20). On the other hand, "Dargahi and Sharifiy yazdi" (2007) expressed that most of the hospitals clinical laboratories employees in Iran are unsatisfied with their QWL (21). Also, "Dargahi, Gharib and Goudarzi (2007), "Mirmolaie and Dargahi" (2005) announced that the majority of Iranian nurses and midwives were unsatisfied with their QWL (22,23).

The research reported here aims to assess the attitudes of Tehran University of Medical Sciences (TUMS) Hospitals Radiology Departments' Employees about their quality of work life.

Materials and Methods

A Cross-sectional, descriptive and analytical study was conducted among 250 TUMS Hospitals'. Radiology

Departments Employees as total employees at 15 hospitals by QWL standard questionnaire including 34 questions. We developed our QWL questionnaire through a combination of modifying existing instruments and creating our own questions and scales with QWL 34 variables. Respondents were asked to express their attitudes about a range of key factors as the most important issues impacting their overall QWL. Response rate was 75 percent. Also, demographic information from the employees was collected by this questionnaire. The respondent provided their responses to there items using a 5 point Lickert Scale from no response to very unsatisfied, unsatisfied, very satisfied, and satisfied.

Before beginning the main study, a pilot study performed with 50 randomly respondents to check the reliability of questionnaire. The reliability coefficient for this measure was relatively high (Cronbach alpha=0.92). Also, the face and coincidental validity was performed by 5 human resource management scientists. The data was saved by Excel software and analyzed by the SPSS software and T-test, ANOVA, and Pearson statistical methods.

Results

55% of the radiology employees were 20-25 years old, 70% of them were female and 30% were mule. 69% of the respondents were married, 55% of them had 1-5 years work experience. Also, more than of the radiology employees had BSc. degree.

The results showed:

- Sixty six percent of the respondents indicated that they were unsatisfied and very unsatisfied with lack of job security.
- Seventy six percent of the respondents were unsatisfied and very unsatisfied because of lack of employees' participation in organizational decision making.
- Seventy two percent of the hospital radiology departments' employees demonstrated that they are unsatisfied and very unsatisfied with their job environment, employees' retention and career advancement.
- The vast majority of respondents expressed that they were unsatisfied and very unsatisfied with their monetary compensation / reward system.
- Most of the respondents were unsatisfied and very unsatisfied with their on the job – services training.
- Most of the respondents were unsatisfied and very unsatisfied with environmental and occupational health in the radiology departments.

Radiology employees' quality of work life

- More than half of the radiology employees were unsatisfied and very unsatisfied with lack of clear organizational goals and policies.
- Seventy two percent of the respondents believed that there was not diversity in their job.
- Most of the radiology departments' employees were unsatisfied and very unsatisfied with their work overload.
- Most of the respondents were unsatisfied and very unsatisfied with their job assessment system (Table 1).

Table 1. Distribution frequency of TUMS hospitals radiology employees' quality of work life

Row	QWL factors	No Response		Very Unsatisfied		Unsatisfied		Satisfied		Very Satisfied		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
1	Job security feeling	-	-	59	40.1	38	25.9	34	23.1	16	10.9	147	100
2	Psychological calmness feeling	-	-	56	38.1	38	25.9	42	28.6	11	7.4	147	100
3	Participation in decision making	4	2.7	64	43.5	48	32.7	24	16.3	7	4.8	147	100
4	Support from coworkers	-	-	9	6.1	28	19	54	36.6	56	38.3	147	100
5	Career advancement	5	3.4	74	50.3	51	34.7	12	8.2	5	3.4	147	100
6	Desired job environment	2	1.4	62	42.2	44	29.9	23	15.6	16	10.9	147	100
7	Motivation for job promotion	2	1.4	79	53.7	37	25.2	22	15	7	4.7	147	100
8	Trust to senior management	17	11.6	20	13.6	25	17	42	28.6	43	29.2	147	100
9	Monetary compensation and reward system	1	0.7	84	57.1	39	26.5	21	14.3	2	1.4	147	100
10	Job welfare	2	1.4	102	69.4	30	20.6	10	6.6	3	2	147	100
11	Physical education	7	4.8	110	74.8	20	13.6	7	4.8	3	2	147	100
12	On the job training	1	0.7	64	43.5	47	32	30	20.4	5	3.4	147	100
13	Cash payment	9	6.1	110	74.8	25	17	2	1.4	1	0.7	147	100
14	Non cash payment	9	6.1	105	71.4	28	19	3	2	2	1.5	147	100
15	Indirect privileges	12	8.2	105	71.4	22	15	6	4.0	2	1.4	147	100
16	Low job accident	3	2	40	27.2	56	38.2	28	19	20	13.6	147	100
17	Environmental health	-	-	45	30.6	53	36.1	42	28.6	7	4.7	147	100
18	Clear organizational goals and policy	7	4.8	56	38	47	32	35	23.8	2	1.4	147	100
19	Job diversity	2	1.4	70	47.6	35	23.8	26	17.7	14	9.5	147	100
20	Job responsibility	4	2.7	17	11.6	40	27.2	44	29.9	42	28.6	147	100
21	Compatibility between career and personality	1	0.7	34	23.1	29	19.7	39	26.5	44	29.7	147	100
22	Human relations considerations	4	2.7	36	24.5	38	25.9	40	27.2	29	19.7	147	100
23	Social working care	4	2.7	71	48.3	40	27.3	19	12.9	13	8.8	147	100
24	Occupational health	2	1.4	32	21.8	61	41.5	34	23.1	18	12.2	147	100
25	Periodical medical examination	4	2.7	59	40.1	35	23.8	28	19	21	14.4	147	100
26	Management by suggestion system	7	4.8	82	55.8	41	27.9	12	8.2	5	3.3	147	100
27	Transportation facility	6	4.1	84	57.1	24	16.3	20	13.6	13	8.7	147	100
28	Health Insurance	10	6.8	28	19	47	32	38	25.9	24	16.3	147	100
29	Personal dosimetry regulation	14	9.5	38	25.9	39	26.5	27	18.4	29	19.7	147	100
30	Employees resting room	5	3.4	82	55.8	28	19	22	15	10	6.8	147	100
31	Nutrition with milk	12	8.2	92	62.6	10	6.8	17	11.6	16	10.8	147	100
32	Compatibility between workload and number of employees	1	0.7	68	46.3	44	29.9	24	16.3	10	6.8	147	100
33	Work independency	1	0.7	35	23.8	51	34.7	49	33.3	11	7.5	147	100
34	Job assessment system	4	2.7	64	43.5	48	32.7	24	16.3	7	4.8	147	100

One of the most significant findings was the correlation between the respondents' age and their QWL. It seems, radiology employee's' QWL dissatisfaction clearly increased with age, with significant correlation between young workers (under 25 years) and older age workers (more than 45 years) ($P < 0.001$).

Older employees were also more likely to have higher levels of dissatisfaction with their career advancement and their monetary compensation reward payment and job environment ($P < 0.001$). Moreover, we found that there was not significant correlation between the respondents' marriage, sex and academic degrees with their QWL.

Discussion

The results of this study attempts to identify job problems and develops the human resource strategy in order to promote and ensure QWL in Iranian healthcare organizations, and recommend the Iranian human resource management policymakers to present better workplace elements as recognized by the employees. Also, there are several positive attributes of this study. In the first, it is the initial QWL investigation of radiology departments' employees in Iran. Secondly, it is also unique in that we collected information from the employees at 15 radiology hospitals' departments. Thirdly, the findings of this research appeared to be compared with the other similar published literatures to judge credible by radiology departments' employees and managers at each country.

Organizational features can affect how staff views their quality of work life. Determining staff perceptions about quality of work life is an important consideration for employees interested in improving employee job satisfaction (24).

Sirgy et al (2001) developed a new measure based on need satisfaction and spillover theories. They identified seven major needs, each having several dimensions. These are health and safety needs, economic and family needs, social needs, esteem needs, actualization needs, knowledge needs, and aesthetic needs (25).

The results of this research showed that more than half of the respondents were unsatisfied with lack of job security. But, "Halsted and Donnelly" (2005) showed that academic and private radiology departments practices should take specific steps to enhance the retention of their existing staff members. They believed that these steps can be helpful to any institution to retain radiology employees (26). In response to threats to job

security, the radiology departments could improve services, determine optimal staffing levels and reduce the number of layers of organization by implementing self-directed work (27).

Most of TUMS hospitals radiology departments' employees believed that they were not participated in organizational decision – making. In recent years, healthcare organizations leaders must create integrity – based ethics programs, which direct corporate actions and goals and assist to employees in shaping organizational relationships and decisions based on mission, vision, and care values. These leaders can model integrity by addressing conflicting values overtly in decision – making processes and engage employees in a participative decision practice regarding those things that most impacted their jobs (28,29).

Most of TUMS radiology departments' employees expressed that they were unsatisfied with their job environment and employees retention. The greatest source of job stress which are associated with job environment of radiology employees, stems from structural conditions. Current workplace environments have a negative impact on job satisfaction of radiology employees (30). Today, radiology employees' retention is a huge problem, because of job stress and insufficient opportunities for career advancement. Also, there is service / satisfaction link between employees' retention and higher levels of customer satisfaction (31). "Cronan" (2004) believes that today's radiology workforce has a personal perception of success that may not be fulfilled solely by the contemporary practice of medicine. It has helped to shape the specialty into one that is altering its structure to attract and retain its workforce (32). Almost, one half of the radiology employees at three Breast Cancer Surveillance Consortium (BCSS) in Vermont of USA reported not enjoying of their job (33). "Asante" (1999) reported that understanding the culture of radiology department and work with employees beyond the regular staff meetings, to keep the lines of communication open, flexible scheduling, and motivate employees on the job by radiology departments directors and supervisors, create a new atmosphere to improve job promotion, job environment and career advancement (34).

The results of our research showed that vast majority of the hospitals radiology departments' employees were unsatisfied with their organizational reward system. Although, "Reiner" and "Siegel" (2008) reported that by creating customized reward system, thereby creating a comprehensive means to improve individual and collective job performance (35).

However, most of our research respondents were unsatisfied with their on the job –training. "Morello" and "Murphy" (2004) reported that proven education and training initiatives demonstrates positive workforce effects and enhance the future radiology workforce in both private and academic settings (36). Also, results of a research in Australia showed that short term, intensive continuing education programs can improve the ability of radiographers. Moreover, radiographers' ability to use radiological vocabulary needs improvement (37). "Honea" and "Mensch" (1999) believed that in order to avoid unnecessary interruptions in radiological services, property trained radiographers are needed (38).

Most of the respondents were unsatisfied with occupational health, especially radiation safety regulations in their jobs. But, it is necessary in radiology departments. The role of ergonomics in modern day radiology is to ensure that working conditions are optimized in order to avoid injury and fatigue. Adequate workplace ergonomics can go a long way in increasing productivity, efficiency, and job satisfaction (39). "Rumriech" and "Johnson" (2003) which surveyed 90 faculty radiology employees in Indiana University, showed that nearly half of respondents rating themselves as "very dissatisfied" or "dissatisfied" with their departments occupational environment. Also, they were least satisfied regarding work space ergonomics, room layout, amount of work space and lighting (40). These results are compatible with our results as mentioned before.

We found that most of the respondents were unsatisfied with lack of clear organizational goals and policies and human relations considerations in the hospitals' radiology departments. The development and implementation of practice policies are key to dealing with a spectrum of practice issues. To be effective, policies must have meaningful consequences for breach (41).

70% of our research respondents were unsatisfied with their job diversity. But, it is not compatible with "ochoa" research named "changing the face of radiology". He reported that radiology employees accepted the challenge to become more diversified and expand their skills (42).

The radiology employees, workload is high in TUMS Hospitals Radiology Departments as we reported here. "Nakajima et al" (2008) obtained data for the number of radiology employees from 26 countries and found that the number of radiology employees in japan is lowest among 26 countries, and the workload is the highest (43). Overtime work was characterized by

higher levels of job stress and perceptions of overwork in healthcare workers in the U.S. Several significant associations emerged between hours of work and measures of health and well – being, particularly for the workers in the higher overtime group (44). It is compatible with our research results. Also, "Sunshine et al". (2002) showed that excess works are further evidence of radiology employees and workload currently is increasing in the United States of America (45). This is confirmed by the Society of Chairman of Academic Radiology Departments (SCARD) which reported that workload continues to increase in this country at 2005 (46, 47). Although, weighed data were used from the American Collage of Radiology Survey showed that there was an overall balance between the demand and supply of radiology employees in 2003 (48). "Meghea and Sunshine" (2007) examined what factors lead radiology employees to desire different work hour and reported that imaging workload was increasing in the United States by increasing the intensity of their work rather than by lengthening hours (49).

Vagharseyyedin et al. (2010) identified six major predictors of the healthcare workers' QWL: leadership and management styles / decision making latitude, shift working, salary and fringe benefits, relationship with colleagues, and workload / job strain (50).

Most of TUMS Radiology Departments Employees were unsatisfied with their job assessment. It seems, they need a new model to assess their performance. "Cristofaro et al" (2007) reported that different evaluation systems and indicators have recently been used to measure the activity volumes of Italian hospital departments, and in particular of diagnostic imaging units. They also introduce an important index that is new to Italian radiology employees' professional and scientific culture. This index, adjusted to reflect the Italian situation, might help to assess the true technological and scientific content of the radiology department's activity (51).

"Dehghan Nayeri et al" (2005) who studied the viewpoints of nursing care managers and supervisors in the teaching hospitals of Tehran, Iran, revealed that human resource issues are the most important factor in promoting and impeding their productivity. They maintained that satisfactory human resource can improve employees' productivity and quality of work life (52).

Low quality of work life may affect the quality of services and organizational commitment and may be a contributing factor associated with shortage of

healthcare providers (53). In conclusion, TUMS Hospitals Radiology Departments Employees responding to this survey have a poor quality of work life. This is indicating that most of the employees are unsatisfied with most quality of work life factors. We hope, the implications of these findings deliberate to improve QWL within each of TUMS hospital radiology departments. These findings may also be relevance and value to radiology employees, human resource management scientists, researchers, policy makers and evaluators of health care organizations in Iran. Therefore, our main conclusions are that QWL is increasingly important for policy makers. In addition, it is essential to have objective indicators and to conduct surveys in order reliably measure QWL.

We recommend Iranian healthcare policymakers and leaders should make substantial investments in the development of human resource management by preparing of strategic planning based on SWOT analysis and enhance model of EFQM to improve QWL in radiology departments.

Ethical Considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and / falsification, double publication, redundancy, etc. have been completely observed by authors.

Acknowledgements

We would like to thank TUMS hospitals radiology departments' technicians, technologists and radiologists, because this survey would not have been possible without their assistance. This research was supported by Vice-Chancellorship for Research Affairs of Tehran University of Medical Sciences. The authors declare that they have no conflicts of interest.

References

1. Martel JP, Dupuis G. Quality of work life: theoretical and methodological problems, and presentation of a new model and measuring instrument. *Soc Indic Res* 2006;77(2):333-68.
2. Efraty D, Sirgy MJ. The effects of quality of working life (QWL) on employee behavioral responses. *Soc Indic Res* 2004;22(1):31-47.
3. Heskett, JL, Sasser WE Jr, Schlesinger LA. *The Service Profit Chain*. New York, NY: Free Press; 1997.
4. Sandrick K. Putting the emphasis on employees. *Trustee* 2003;56(1):6-10, 1.
5. Cole DC, Robson LS, Lemieux-Charles L, McGuire W, Sicotte C, Champagne F. Quality of working life indicators in Canadian health care organizations: a tool for healthy, health care workplaces? *Occup Med (Lond)* 2005;55(1):54-9.
6. Argentero P, Miglioretti M, Angilletta C. Quality of work life in a cohort of Italian health workers. *G Ital Med Lav Ergon* 2007;29(1 Suppl A):A50-4.
7. St. Elizabeth's Hospital. Work/Life Benefits Programs. [Internet] 2011 Jul 15 [cited 2011 Sep 15]; Available from: http://www.steliz.org/hr/work_life_benefits.html
8. Wyatt TA. Quality of working life: Cross-cultural considerations. *Asia Pacific J Management* 1988;6(1):129-40.
9. Knox S, Irving JA. An interactive quality of work life model applied to organizational transition. *J Nurs Adm* 1997;27(1):39-47.
10. Feldman DC. Organizational socialization of hospital employees. A comparative view of occupational groups. *Med Care* 1977;15(10):799-813.
11. Klingensmith WC 3rd. Quantitating radiologist staffing requirements in a practice group. *Invest Radiol* 1993;28(8):767-9.
12. Floyd JL. Radiology job sharing: improving quality of life and maximizing resources for radiology groups. *J Am Coll Radiol* 2004;1(10):782-3.
13. Bhargavan M, Sunshine JH. The growing size of radiology practices. *J Am Coll Radiol* 2008;5(7):801-5.
14. Raskin MM. Survival strategies for radiology: some practical tips on how to reduce the risk of being sued and losing. *J Am Coll Radiol* 2006;3(9):689-93.
15. Sunshine JH, Meghea C. How could the radiologist shortage have eased? *AJR Am J Roentgenol* 2006;187(5):1160-5.
16. Akroyd HD, Long TA. Correlates to radiology managers' job satisfaction. *Radiol Manage* 1990;12(3):71-5.
17. Crawford J, Gressley D. Job satisfaction in the medical imaging profession: alleviating the shortage of personnel. *Radiol Manage* 1993;15(2):35-40.
18. Lau RSM, Bruce EM. A win-win paradigm for quality of work life and business performance. *Human Resource Development Quarterly* 1998;9(3):211-26.
19. Bidmeshkipour M. An analysis of strategic human resource management in Iran. *European J Soc Sci* 2009;9(1):30-8.
20. Dargahi H, Nasl Saraji G. Study of quality of work life (QWL). *Iranian J Publ Health* 2006;35(4):8-14.
21. Dargahi H, Sharifiy Yazdi MK. Quality of work life in Tehran Hospitals clinical laboratories employees. *Pak J Med Sci* 2007;34(3):630-3.

22. Dargahi H, Gharib M, Goodarzi M. Quality of work life in nursing employees of Tehran University of Medical Sciences Hospitals. *HAYAT* 2007;13(2):13-23.
23. Mirmolaei T, Dargahi H, Kazemnejad A, Mohajerrahbari M. Job satisfaction of midwives. *HAYAT* 2005;11(1-2):97-106.
24. Krueger P, Brazil K, Lohfeld L, Edward HG, Lewis D, Tjam E. Organization specific predictors of job satisfaction: findings from a Canadian multi-site quality of work life cross-sectional survey. *BMC Health Serv Res* 2002;2(1):6.
25. Sirgy MJ, Efraty D, Siegel P, Lee DJ. A new measure of quality of work life based on need satisfaction and spillover theories. *Soc Indicators Res* 2001;55(3):241-307.
26. Halsted MJ, Donnelly LF, Strife JL. Radiologist recruitment and retention: how can we improve? *J Am Coll Radiol* 2005;2(4):369-75.
27. Brandon GM. Flattening the organization: implementing self-directed work groups. *Radiol Manage* 1996;18(2):35-42.
28. Casady WM, Dowd TA. Shared leadership and the evolution of "one great department". *Radiol Manage* 2005;27(4):52-4, 56-9.
29. Heeley GF. Leading with integrity. How to balance conflicting values. *Health Prog* 1998;79(5):60-2.
30. Sehlen S, Vordermark D, Schäfer C, Herschbach P, Bayerl A, Pigorsch S, Rittweger J, Dormin C, Bölling T, Wypior HJ, Zehentmayr F, Schulze W, Geinitz H; DEGRO Quality of Life Work Group. Job stress and job satisfaction of physicians, radiographers, nurses and physicists working in radiotherapy: a multicenter analysis by the DEGRO Quality of Life Work Group. *Radiat Oncol* 2009;4:6.
31. Gerson RF. Employee retention: a customer service approach. *Radiol Manage* 2002;24(3):16-23.
32. Cronan JJ. The new radiology workforce: changing expectations. *J Am Coll Radiol* 2004;1(5):313-6.
33. Geller BM, Bowles EJ, Sohng HY, Brenner RJ, Miglioretti DL, Carney PA, Elmore JG. Radiologists' performance and their enjoyment of interpreting screening mammograms. *AJR Am J Roentgenol* 2009;192(2):361-9.
34. Asante E. Beyond culture and regular staff meetings. *Radiol Manage* 1999;21(1):29-33.
35. Reiner B, Siegel E. The potential for gaming techniques in radiology education and practice. *J Am Coll Radiol* 2008;5(2):110-4.
36. Morello FA Jr, Murphy WA Jr. Ensuring the radiologist workforce: opportunities during education. *J Am Coll Radiol* 2004;1(11):848-53.
37. Smith TN, Traise P, Cook A. The influence of a continuing education program on the image interpretation accuracy of rural radiographers. *Rural Remote Health* 2009;9(2):1145.
38. Honea R, Mensch B. Maintaining continuity of clinical operations while implementing large-scale filmless operations. *J Digit Imaging* 1999;12(2 Suppl 1):50-3.
39. Goyal N, Jain N, Rachapalli V. Ergonomics in radiology. *Clin Radiol* 2009;64(2):119-26.
40. Rumreich LL, Johnson AJ. From traditional reading rooms to a soft copy environment: radiologist satisfaction survey. *J Digit Imaging* 2003;16(3):262-9.
41. Muroff LR. Dealing with the problematic partner or associate. *J Am Coll Radiol* 2007;4(8):527-32.
42. Ochoa G. Changing the face of radiology: redesigning patient-focused care. *Radiol Manage* 1997;19(1):42-5.
43. Nakajima Y, Yamada K, Imamura K, Kobayashi K. Radiologist supply and workload: international comparison: Working Group of Japanese College of Radiology. *Radiat Med* 2008;26(8):455-65.
44. Grosch JW, Caruso CC, Rosa RR, Sauter SL. Long hours of work in the U.S.: associations with demographic and organizational characteristics, psychosocial working conditions, and health. *Am J Ind Med* 2006;49(11):943-52.
45. Sunshine JH, Cypel YS, Schepps B. Diagnostic radiologists in 2000: basic characteristics, practices, and issues related to the radiologist shortage. *AJR Am J Roentgenol* 2002;178(2):291-301.
46. Lu Y, Arenson RL. The academic radiologist's clinical productivity: an update. *Acad Radiol* 2005;12(9):1211-23.
47. Arenson RL, Lu Y, Elliott SC, Jovais C, Avrin DE. Measuring the academic radiologist's clinical productivity: applying RVU adjustment factors. *Acad Radiol* 2001;8(6):533-40.
48. Meghea CI, Sunshine JH. Who's overworked and who's underworked among radiologists? An update on the radiologist shortage. *Radiology* 2005;236(3):932-8.
49. Meghea C, Sunshine JH. Determinants of radiologists' desired workloads. *J Am Coll Radiol* 2007;4(3):166-70.
50. Cristofaro M, Bibbolino C, Lauria FN, Petrecchia A, Squarcione S, David V. Comparison between indicators for the measurement of radiology activity volumes (Italy-USA). *Radiol Med* 2004;108(4):426-38.
51. Dehghan Nayeri N, Nazari AA, Salsali M, Ahmadi F, Adib Hajbagheri M. Iranian staff nurses' views of their productivity and management factors improving and impeding it: a qualitative study. *Nurs Health Sci* 2006;8(1):51-6.
52. Vagharseyyedin SA, Vanaki Z, Mohammadi E. The nature nursing quality of work life: an integrative review of literature. *West J Nurs Res* 2011;33(6):786-804.
53. Benders J, van de Looij F. Not just money: quality of working life as employment strategy. *Int J Health Care Qual Assur* 1994;7(6):9-15.