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Evaluation of Breast Cancer Risk in Relation to Occupation

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Abstract

Background: Breast cancer is the most common cancer in females. At present, evidence exists to support an association of breast cancer with several risk factors such as occupational risk factors. The aim of this study is to further characterize potential associations between breast cancer risk and occupation.

Methods: In this case-control study, we reviewed records from 965 histologically confirmed breast cancer cases. From these, 104 employed women were chosen. The control group consisted of 112 age-matched employed women. Required data were gathered through in-person interviews and medical records reviews. Occupations were classified into four categories: teachers, administrative/clerical workers, healthcare workers, and miscellaneous jobs. Data analysis was performed using the chi-square, t-test, and logistic regression model.

Results: A higher proportion of cases (60.6%) were teachers. Physical activity, smoking, and family history of cancer significantly differed between the case and control groups. After adjustment for potential confounders, we found that teachers had a higher risk for breast cancer compared to other occupations (P<0.001).

Conclusion: The teaching profession can be an important risk factor for breast cancer. Emphasis on early screening programs seems necessary. According to the high percent of female teachers, we recommend a detailed evaluation of exposures in this occupation.

Keywords: Breast cancer, Risk factors, Occupation

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Introduction

Breast cancer, with an incidence of more than one million cases and nearly 600,000 deaths per year, is the most common cancer among women worldwide. It is the second leading cause of cancer death after lung cancer.[1,2] The lifetime risk of developing breast cancer is 12.5%.[3]

Breast cancer is one of the most common cancers among Iranian women with a prevalence of 120 and incidence of 11 per 100,000 women.[4] In Western countries, breast cancer

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mostly occurs in women older than the age of 50, but it affects Iranian women a decade earlier and 23% of the patients are younger than 40 years of age. The majority of breast cancers in Iranian women are diagnosed at advanced stages.[2,4]

Breast cancer is a heterogeneous disease caused by the interaction of various lifestyles, genetic, physiological, and pharmacological factors. Some of the risk factors associated with breast cancer include early menarche, late menopause, obesity, estrogenic compounds, alcohol, hormone replacement therapy (HRT), and family history of breast cancer. However these factors do not perfectly explain its etiology. Most likely, several factors are involved in this disease. However, the risk of certain avoidable occupational or environmental exposures remain unknown or controversial.[5-7]

Several studies have been conducted on occupational risk factors associated with breast cancer. Their results showed increased breast cancer risk in health care workers, administrative /clerical workers, teachers, farmers, cleaners, tailors, textile workers, and flight attendants.[8-10] A case-control study conducted by Chatchai et al. reported an increased risk of breast cancer in people who worked in manufacturing, transport equipment operators, and laborers. The increased risk had a significant association with duration of employment. However, the risk of cancer decreased significantly in office workers. The results of this study indicated a greater risk of developing breast cancer among women employed in industrial occupations.[11]

Exposure to ionizing radiation is a known risk factor for development of breast cancer. It is not clear whether women occupationally exposed to low-dose radiation (nurses and radiology technicians) are at increased risk for breast cancer.[12,13]

Tynes et al. demonstrated that non-ionizing radiation increased the risk of cancer in radio and telegraph operators.[14] Feychting et al. reported a relation between exposure to electromagnetic fields and breast cancer risk.[15]

Several studies assessed the effects of shift work on breast cancer. Rabstein et al. have reported that night-work is a risk factor for the development of estrogen receptor-negative tumors which have poorer prognoses.[16] A case-control study by Grundy et al. observed that a significant association existed between breast cancer risk and long-term night-shift work.[17]

Most previous studies on the association of occupation and breast cancer were conducted in North America and Europe. There have been few occupational studies conducted on Asian populations. Breast cancer incidence rates in Iranian women are increasing. We have evaluated the association of occupation with this disease in order to take steps toward the prevention of breast cancer.

Materials and Methods

Research design and sampling method

We conducted this case-control study during 2014-2015 in Mashhad, Iran. Purposive non-random sampling was used to select the patient and control groups.

Participants

Patient group

Patients had to fulfill the following criteria to be included in the study: 1) biopsy-proven breast cancer diagnosed from 2010-2014; 2) being employed before the diagnosis of breast cancer; 3) willingness to participate in the study; and 4) referred to one of the oncology wards at the teaching hospitals of Mashhad University of Medical Sciences, Mashhad, Iran. These hospitals are the main referral centers in Mashhad. Therefore, patients with different socio-economic status are hospitalized in these centers. Accordingly, our patient group could be representative of the general population.

Control group

The control group consisted of employed individuals with no personal history of breast cancer who referred to three health centers to receive common health care in Mashhad. These health centers are located in three different socio-

Table 1. Characteristics of the case and control groups.

Variables	Control	Case	*P*-value
Age	8.54 ± 48.92	10.73 ± 50.97	0.11
BMI	4.17 ± 26.09	5.99 ± 27.26	0.17
Smoking history[(a)]			
Yes	(%11.6)13	(%26)27	≤0.001
No	(%96.1)99	(%74)77	
Marital status			
married	(%94.6)106	(%91.3)95	0.34
single	(%5.4)6	(%8.7)9	
Education			
Illiterate to diploma	(%48.2)54	(%37.5)39	0.11
Academic	(%51.8)58	(%62.5)65	
Physical activity[(b)]			
low	(%46.4)52	(%63.5)66	0.03**
moderate	(%37.5)42	(%23.1)24	
High	(%16.1)18	(%13.5)14	
Breast feeding[(c)]			
Yes	(%88.4)99	(%84.6)88	0.41
No	(%11.6)13	(%15.4)16	
HRT[(d)]			
Yes	(%2.7)3	(%1)1	0.62[(f)]
No	(%97.3)109	(%99)103	
Oral contraceptive pills[(e)]			
Yes	(%31.2)35	(%40.4)42	0.20[(f)]
No	(%68.8)77	(%59.6)62	
Family history of cancer			
Yes	(%31.3)35	(%42.3)44	0.009**
No	(%68.8)77	(%57.7)60	

(a) Active smoker, passive smoker, ex- smoker. (b) Low physical activity: <1 turn of activity for at least 30 minutes per week; Moderate physical activity: 2-3 turns of activity for at least 30 minutes per week; High physical activity: >3 turns of activity for at least 30 minutes per week. (c) At least 1 year of breastfeeding. (d) Hormone replacement therapy (HRT): At least 1 month of regular use. (e) At least 1 year of regular use. (f) Fisher exact test. ** $P \leq 0.05$

economic areas. Therefore, the control population had a similar socio-economic status to the patient population.

Sample size

According to a comparison of the ratio of breast cancer in high risk occupational groups to low-risk occupational groups,[18] we estimated the sample size at 132 patients in each group (P=0.41, α =0.05, β=0.2).[19] There were 104 available patients with breast cancer due to low female employment rates, breast cancer mortality, and unwillingness to participate in the study. Therefore, we enrolled 104 patients and 112 controls in this study.

Data collection

An occupational medicine resident reviewed the medical records of 965 patients with breast cancer and excluded 861 patients due to the mentioned criteria. Finally, we recruited 104 patients for participation in this study. Demographic data and medical history were obtained from the patients' records. The resident conducted telephone interviews with the available patients and recorded occupational exposures according to the designed check list.

The resident conducted interviews in person with the control group and recorded demographic data, medical history, and occupational exposures in the mentioned checklist.

Occupations in this study were classified into 4 groups: teachers, administrative/clerical workers, healthcare workers (HCWs) that included doctors, nurses, dentists, laboratory technicians, radiology technicians, and hospital service employees, and

Table 2. Relationship between breast cancer and occupation, physical activity, smoking and family history of cancer in a regression model.

	95% CI	OR	*P*-value	B
Occupation				
Teacher(s)		1		
Administrative workers	0.08-0.44	0.19	≤0.001	-1.66
Health care workers	0.43-2.93	1.12	0.80	0.12
Miscellaneous	0.19-1.62	0.55	0.28	-0.58
Physical activity				
Low(r)				
Moderate	0.17-1.11	0.44	0.08	-0.8
High	0.52-3.81	1.41	0.49	0.34
Negative smoking history	0.05-0.38	0.14	≤0.001	-1.96
Family history of cancer	0.30-1.12	0.58	0.10	-0.53

(r): Reference variable in logistic regression model.

miscellaneous (carpenters, hairdressers, tailors, cooks, and factory workers). In order to avoid the effect of short-term occupations, we included only occupations that lasted at least one year in the study. We defined "shift work" as work from 6 pm to 7 am.[20]

Statistical analysis

After data collection, the information was entered into the computer and analyzed by SPSS-11.5 software. The t-test was used to compare quantitative variables between two groups where a normal distribution was followed. Otherwise, we used non-parametric tests. The Mann-Whitney test was used to compare qualitative variables. The relationship between occupational category and breast cancer was analyzed by multivariate analysis. We used logistic regression to control confounding variables. In all calculations, $P<0.05$ was considered statistically significant.

Ethics

All subjects agreed to participate in the research and received assurance that their information

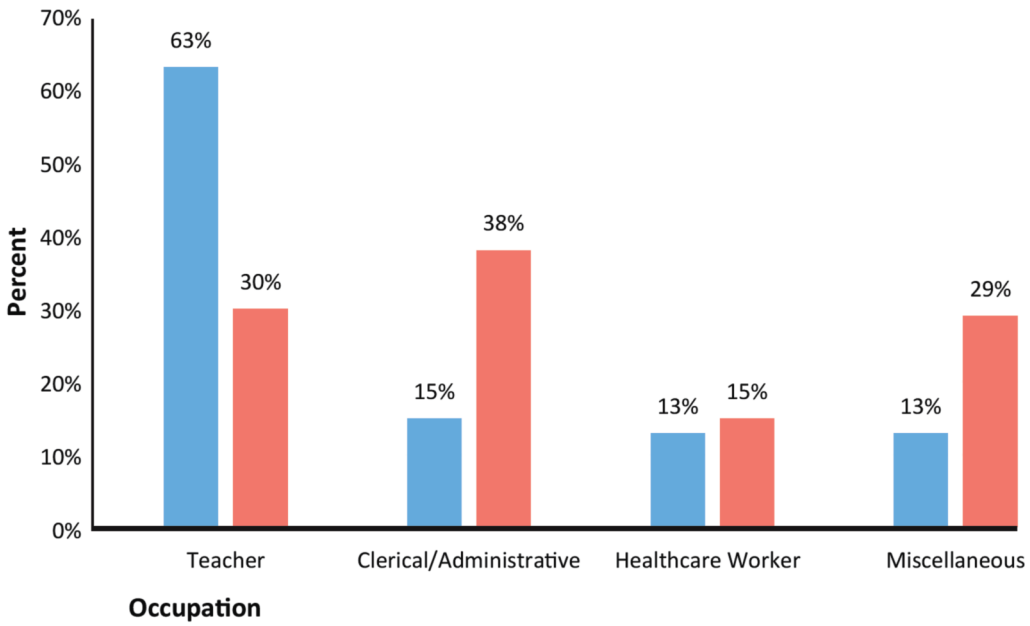

Figure 1. Distribution of various occupations in the treatment and control groups.

would remain confidential. The Medical Ethics Committee of Mashhad University of Medical Sciences approved this study.

Results

There were 104 cases and 114 controls. Most participants were 27-83 years of age. Patients in the case group had a mean age and standard deviation of 50.97±10.37 years, whereas the mean age for the control group was 48.92±8.54 years. The two groups were similar in age, body mass index (BMI), marital status, and education. Smoking history (P<0.001), physical activity (P=0.03), and family history of cancer (P=0.009) significantly differed between the two groups. A more detailed description of the sample's demographic characteristics appears in table 1.

In terms of educational level, 51.8% (n=58) of the control group and 62.5% (n=65) of the case group had academic degrees, which was not statistically significant [95% CI: 0.95-1.58, odds ratio (OR)=1.23].

Distribution of occupations in the two groups is shown in figure 1. The majority of participants from the case group were teachers. The control group had mostly clerical/administrative occupations.

After adjusting for factors that statistically differed between the case and control groups (physical activity, smoking, and family history of cancer) in the logistic regression model, we observed that teaching and administrative jobs had significant associations with breast cancer (Table 2). The relationship was direct for teaching, whereas administrative jobs had an inverse association with breast cancer (OR=0.19, 95% CI: 0.08-0.44).

According to the model, the OR for breast cancer in teachers compared to administrative personnel was 100/19 (P<0.001), which meant that the odds of a breast cancer diagnosis in teachers was 5.26 greater than administrative personnel. The odds of breast cancer in patients with smoking exposure compared to patients without exposure was 100/14 (P<0.001).

In terms of occupational pattern, only 5% (5) of the case group and 14.5% (16) of the control group were shift workers (P=0.02). Working experience in the case group was 20.21±9.9 years and 17.6±9.2 years for the control group (P=0.048).

Table 3. Comparison of current employment status in the case group.

Current employment status	Case group N (%)
Working in previous occupation	53 (51)
Changed jobs	1 (1)
Left the job	10 (9.6)
Disabled	1 (1)
Retired	39 (37.5)

According to the analysis during the study, 51% (53) of the patients with breast cancer were working in their previous jobs (Table 3).

The use of personal protective equipment in the control group was higher than the case group. This difference between the two groups was statistically significant (P<0.001) with an OR of 5.04 and 95% CI: 2.27-11.17.

Discussion

According to the results, employment in occupations such as teaching had a significant relationship with breast cancer. Similar studies also reported an increased breast cancer risk in some sectors such as teachers, health care workers, office workers, farmers, tailors, textile workers, and flight attendants.[8,9] In a study by Bernstein et al., teachers who worked in California had an invasive breast cancer incidence rate of 51% and *in situ* breast cancer incidence rate of 67%, which was higher than expected based on race-specific rates. A high rate of mammographic screening was reported as one of the causes for the elevated prevalence of invasive and *in situ* breast cancers. However, due to the increased incidence of non-localized disease in the teachers compared to white non-Hispanic women, the authors mentioned other possible factors such as late age at first birth, HRT, and few numbers of pregnancies as causes for an increased risk of breast cancer in teachers.[21] A study conducted by Dandash et al. on teachers reported that more

than half of the participants had little knowledge about breast cancer risk factors. High income was the most important predictor of better knowledge. Most participants were not aware of the most common methods of screening for breast cancer because of the lack of a national program for periodic assessments. The most identified risk factors were lack of breastfeeding and use of hormone treatments.[22] According to our study, administrative/clerical jobs were considered as a protective factor for the development of breast cancer. This finding supported the study by Lynch et al.[23] According to the mentioned study, there was no significant association between occupational sitting and breast cancer risk in pre-menopausal women and in women with a family history of breast cancer. Higher sitting activities were related to lower rates of breast cancer in both mentioned groups.[23]

Several epidemiological studies have been published on the relationship between specific occupational groups and the risk of breast cancer. The methodologies and results of these studies differ.[24-26] Non-job-related confounding factors have not always been considered and this has led to a lack of transparency regarding the overall pattern. For example, studies on flight attendants were evaluated by the International Agency for Research on Cancer (IARC). However, there have been some methodological problems that included the lack of control of potential confounding effects of lifestyle factors related to the individual's occupation that are simultaneously connected with breast cancer such as alcohol consumption, fewer pregnancies, and late age at first birth. The increased possibility of a breast cancer diagnosis via screening mammography was not ruled out in this group compared with the general population.[27] In the current study, we did not observe any association between other businesses and increased risk of breast cancer.

In this study, the risk of developing breast cancer in non-shift workers was 3.26 times higher than shift workers. The higher number of fixed-shift workers in the current study could be an explanation for this issue. However, Knutsson et al. reported insufficient evidence for a link between night shift work and breast cancer.[28] In the cohort study conducted on 73049 Chinese women, there were 717 new cases of breast cancer diagnosed in the population during follow-up. However the analysis did not show any link between night shift work and breast cancer.[29] In a meta-analysis conducted by Yong et al, the authors concluded that the influence of shift work on breast cancer could not be firmly ruled out according to the available literature. However, there was no reason to accept the fact that shift workers were at higher risk for cancer.[30] In contrast, other studies reported different results. Grundy et al., in 2013, reported that long-term night-shift work had an association with an increased risk of breast cancer.[17] In explaining the differences in various studies, it could be said that the definition of shift work differed among various studies in terms of its relationship with breast cancer. The studies were not similar in study design and methodology.[27, 31, 32]

A number of the current study findings were consistent with previous studies on breast cancer. The results of this study indicated a relationship between physical activity and incidence of breast cancer. The case group had much less activity compared to the control group. The majority of the control group (65%) reported moderate to high physical activity. In a meta-analysis by Wu et al., the role of physical activity in reducing breast cancer was highlighted.[33] Friedenreich has reported a 25% decrease in the risk of breast cancer in women with physical activity compared to those with low activity levels.[34]

Smoking is a known risk factor for breast cancer.[35,36] In our study, the risk of breast cancer in smokers (active smokers and passive smokers) was 3.18 times higher than non-smokers.

A family history of breast cancer is among the risk factors for this disease.[37] Here, we have observed an association between a family history of breast cancer and development of breast cancer.

We observed that education level had no effect on the risk of developing breast cancer. In contrast, Hajian et al. reported that education level had an

inverse relationship to the disease. People with higher education levels had lower risk for developing the breast cancer.[38]

The majority of patients with breast cancer returned to their previous job after completion of treatment in the acute phase. Roelen et al., in the Netherlands reported that in 2002, 2005, and 2008, the percentages of employees who resumed work after cancer decreased in the past decade.[39]

The main strength of this study was the assessment of breast cancer from the occupational point of view. To the best of our knowledge, this was the first paper in Iran which investigated breast cancer in different occupations.

This study has some limitations. The study was a case-control study, so there might have been a possibility of recall bias. Case-control studies are less adept at showing a causal relationship compared to cohort studies. Hence, we recommend that future studies on this issue should be designed as cohort studies. The sample size of this study was limited due to the low number of working women in comparison with housewives. This limitation was unavoidable given that this was a hospital-based study where we evaluated all available cases.

According to the Iranian census, approximately more than half of all Iranian teachers are women and only 20% of the urban female workforce is employed in industrial sectors.[40] Therefore, the possibility of selection bias cannot be ignored. Other environmental risk factors have been mentioned in previous studies. However, due to the diversity of these exposures and lack of documentation, we could not evaluate them. We recommend that all probable risk exposures, either environmental or occupational, be assessed quantitatively in future studies.

In conclusion, according to what we observed and the results of previous studies, teaching could be a risk factor for breast cancer. Greater emphasis should be made on screening this occupational group at a younger age. Due to the high proportion of female teachers, a detailed exposure assessment seemed to be essential in this group.

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Conflict of Interest

No conflict of interest is declared.

References

1. Mousavi SM, Montazeri A, Mohagheghi MA, Jarrahi AM, Harirchi I, Najafi M, et al. Breast cancer in Iran: an epidemiological review. *Breast J.* 2007; 13(4):383-91.
2. Ebrahimi, M; Olfatbahksh, A; Ansari, M, et al. Comprehensive guide to breast diseases. Tehran: Jahad Daneshgahi; 2010.p.34.
3. Shafighi S, Bayani A, Rafee M, Kalantari M. Comparison of sonography results and findings of clinical examination and mammography in diagnosis of breast cancer. *Iran J Surg*. 2007; 15(3):91-5.
4. Harrirchi I, Karbakhsh M, Kashedi A, Momtahen AJ. Breast cancer in Iran: results of a multi-center study. *Asian Pac J Cancer Prev.* 2004; 5(1):24-7.
5. Devita, VT; Lawrence, TS; Rosenberg, SA. Cancer: principals and practice of oncology.8th ed. Philadelphia: Lippincott Williams and Wilkins; 2008.p.1164-69.
6. Kruk J, About H. Environmental exposure and other behavioral risk factor in breast cancer. *Curr Cancer Ther Rev*. 2006; 2(1):3-21.
7. Brody JG, Moysich KB, Humblet O, Attfield KR, Beehler GP, Rudel RA. Environmental pollutants and breast cancer: epidemiologic studies. *Cancer.* 2007; 109(12 Suppl):2667-711.
8. Ji BT, Blair A, Shu XO, Chow WH, Hauptmann M, Dosemeci M, et al. Occupation and breast cancer risk among Shanghai women in a population-based cohort study. *Am J Ind Med.* 2008; 51(2):100-10.
9. Peplonska B, Stewart P, Szeszenia-Dabrowska N, Lissowska J, Brinton LA, Gromiec JP, et al. Occupational exposure to organic solvents and breast cancer in women. *Occup Environ Med.* 2010; 67(11):722-9.
10. Brophy JT, Keith MM, Watterson A, Park R, Gilbertson M, Maticka-Tyndale E, et al. Breast cancer risk in relation to occupations with exposure to carcinogens and endocrine disruptors: a Canadian case-control study. *Environ Health.* 2012; 11:87.
11. Ekpanyaskul C, Khuhaprema T, Wiangnon S, Sangrajrang S. Case-control study of occupational categories and breast cancer risk in Thailand. *Asian Pac*

J Cancer Prev. 2010; 11(3):793-7.
12. Pukkala E, Auvinen A, Wahlberg G. Incidence of cancer among Finnish airline cabin attendants, 1967-92. *BMJ.* 1995; 311(7006):649-52.
13. Boice JD Jr, Mandel JS, Doody MM. Breast cancer among radiologic technologists. *JAMA.* 1995; 274(5):394-401.
14. Tynes T, Hannevik M, Andersen A, Vistnes AI, Haldorsen T. Incidence of breast cancer in Norwegian female radio and telegraph operators. *Cancer Causes Control.* 1996; 7(2):197-204.
15. Feychting M, Forssén U, Rutqvist LE, Ahlbom A. Magnetic fields and breast cancer in Swedish adults residing near high-voltage power lines. *Epidemiology.* 1998; 9(4):392-7.
16. Rabstein S, Harth V, Pesch B, Pallapies D, Lotz A, Justenhoven C, et al. Night work and breast cancer estrogen receptor status--results from the German GENICA study. *Scand J Work Environ Health.* 2013; 39(5):448-55.
17. Grundy A, Richardson H, Burstyn I, Lohrisch C, SenGupta SK, Lai AS, et al. Increased risk of breast cancer associated with long-term shift work in Canada. *Occup Environ Med*. 2013; 70(12):831-8.
18. Fleming, LE. Cancer of reproductive organs. In: Rosenstock, L; Cullen, MR; Brodkin, CA; Redlich, CA, editors. Clinical occupational and environmental medicine. 2nd ed. Philadelphia: WB Saunders; 2005.p.791-805.
19. Buja A, Mastrangelo G, Perissinotto E, Grigoletto F, Frigo AC, Rausa G, et al. Cancer incidence among female flight attendants: a meta-analysis of published data. *J Womens Health (Larchmt)*. 2006; 15(1):98-105.
20. Caruso, C; Rosa, R. Shift work and long Work Hours. In: Rom, WN, editor. Occupational and environmental medicine. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2007.p.1360-63.
21. Bernstein L, Allen M, Anton-Culver H, Deapen D, Horn-Ross PL, Peel D, et al. High breast cancer incidence rates among California teachers: results from the California Teachers Study (United States). *Cancer Causes Control.* 2002; 13(7):625-35.
22. Dandash KF, Al-Mohaimeed A. Knowledge, attitudes and practices surrounding breast cancer and screening in female teachers of buraidah, Saudi Arabia. *Int J Health Sci (Qassim)*. 2007; 1(1):61-71.
23. Lynch BM, Courneya KS, Friedenreich CM. A case-control study of lifetime occupational sitting and likelihood of breast cancer. *Cancer Causes Control.* 2013; 24(6):1257-62.
24. Goldberg MS, Labrèche F. Occupational risk factors for female breast cancer: a review. *Occup Environ Med.* 1996; 53(3):145-56.
25. MacArthur AC, Le ND, Abanto ZU, Gallagher RP. Occupational female breast and reproductive cancer mortality in British Columbia, Canada, 1950-94. *Occup Med (Lond).* 2007; 57(4):246-53.
26. Pukkala E, Martinsen JI, Lynge E, Gunnarsdottir HK, Sparén P, Tryggvadottir L, et al. Occupation and cancer - follow-up of 15 million people in five Nordic countries. *Acta Oncol*. 2009; 48(5):646-790.
27. Blair, Aaron. IARC monographs on the evaluation of carcinogenic risks to humans: Painting, firefighting, and shift work. [Internet]. Lyon: International Agency for Research on Cancer; 2010.p.41.Available at: http://monographs.iarc.fr/ENG/Monographs/vol98/index.php.
28. Knutsson A, Alfredsson L, Karlsson B, Akerstedt T, Fransson EI, Westerholm P, et al. Breast cancer among shift workers: results of the WOLF longitudinal cohort study. *Scand J Work Environ Health.* 2013; 39(2):170-7.
29. Pronk A, Ji BT, Shu XO, Xue S, Yang G, Li HL, et al. Night-shift work and breast cancer risk in a cohort of Chinese women. *Am J Epidemiol.* 2010; 171(9):953-9.
30. Yong M, Nasterlack M. Shift work and cancer: state of science and practical consequences. *Arh Hig Rada Toksikol.* 2012; 63(2):153-60.
31. Davis S, Mirick DK, Stevens RG. Night shift work, light at night, and risk of breast cancer. *J Natl Cancer Inst.* 2001; 93(20):1557-62.
32. Kolstad HA. Nightshift work and risk of breast cancer and other cancers-a critical review of the epidemiologic evidence. *Scand J Work Environ Health.* 2008; 34(1):5-22.
33. Wu Y, Zhang D, Kang S. Physical activity and risk of breast cancer: a meta-analysis of prospective studies. *Breast Cancer Res Treat.* 2013; 137(3):869-82.
34. Friedenreich CM. Physical activity and breast cancer: review of the epidemiologic evidence and biologic mechanisms. *Recent Results Cancer Res.* 2011; 188:125-39.
35. Baccaro LF, Conde DM, Costa-Paiva L, de Souza Santos Machado V, Pinto-Neto AM. Cancer in women over 50 years of age: A focus on smoking. *Cancers (Basel)*. 2015; 7(1):450-9.
36. Wada K, Kawachi T, Hori A, Takeyama N, Tanabashi S, Matsushita S, et al. Husband's smoking status and breast cancer risk in Japan: From the Takayama study. *Cancer Sci.* 2015; 106(4):455-60.
37. Pharoah PD, Day NE, Duffy S, Easton DF, Ponder BA. Family history and the risk of breast cancer: a systematic review and meta-analysis. *Int J Cancer.* 1997; 71(5):800-9.
38. Hajian-Tilaki K, Kaveh-Ahangar T, Hajian-Tilaki E. Is educational level associated with breast cancer risk in Iranian women? *Breast Cancer.* 2012; 19(1):64-70.
39. Roelen CA, Koopmans PC, Groothoff JW, van der Klink JJ, Bültmann U. Return to work after cancer diagnosed in 2002, 2005 and 2008. *J Occup Rehabil*.

2011; 21(3):335-41.
40. Where Are Iran's Working Women? [Internet]. Middle East Institute: Washington, D.C; 2009. Available from: http://www.mei.edu/content/where-are-irans-working-women. [Cited at: January 29, 2009].