Original Article

The effect of *Rosmarinus* herbal tea on occupational burnout in Iran Chemical Industry Investment company employees

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Abstract

Background: Burnout is one of the most important problems that the employees encounter. Many health problems arise due to burnout which is to be dealt with by the employees and the owners in the industry. Among many different ways of dealing with this problem, herbal therapy seems to be a promising solution. The present study intended to investigate the effect of *Rosmarinus officinalis* (RO) on burnout in employees who work in industrial environments.

Materials and Methods: An experimental study was performed to see whether RO has an effect on burnout or not. A total of 66 employees, aged between 20 and 60 years, who had worked for at least 1 year in the technical wards of Iran Chemical Industry Investment Company took part in the study. The participants were randomly assigned to two groups of control (n = 33) and RO (n = 33). The RO group received 4 g of Rosemary in 150 cc water per day for 2 months. The control group, on the other hand, did not receive anything. The data were collected via Geldard (1989) Burnout Inventory before and after the treatment. A t-test was performed to analyze the collected data.

Results: The results of statistical tests showed that after intervention, the score of occupational burnout in RO group was better, and a significant difference was found between the control and experimental groups (P = 0.03), in favor of the experimental group.

Conclusions: The results of the study revealed that *Rosmarinus* had a positive effect on burnout in employees in this study. Further studies in this field are suggested.

Key words: Burnout, Iran Chemical Industry Investment Company, nurses, *Rosmarinus*

Introduction

Industrial centers are one of the economic and business poles in each country, which play a key role in growth and development. This growth is achieved when the human resources, working in these centers, are mentally and physically healthy. On the other hand, industrial work environment is one of the most stressful places, which causes occupational burnout in the staff. The staff in such an environment face problems such as less human communications, pollutants, industrial smells, noise, working with tools and chemicals, working in height, etc., and are prone to occupational burnout under such pressures.[1] Occupational burnout is one of the greatest problems in the working environment and acts as a reason for many of staff's physical and mental tensions.[2] Occupational burnout refers to physical and emotional fatigue, accompanied with a feeling of incapability and negative attitude about one's abilities, compared to others and the surrounding environment.[3] Fatigue, stress, and burnout, resulting from work, have a vast effect on the physical health and functioning of staff, and lead to psychological consequences.[4] Therefore, the formation

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process of fatigue should be clarified. Fatigue is caused by a group of physical signs such as a headache, drowsiness, and muscular pain. Laboratory investigation shows a high amount of poisonous waste materials, resulting from oxidative process, released in the blood. Existence of such waste materials causes harm to body organs and, therefore, the individuals have short- and long-term complications.[5] When the level of such materials increases in blood, the person gets anxious, irritable, depressed, and has no motivation due to lowered circulation to the brain.[6] All these conditions lead to an increase in stress (as an unpleasant feeling) and negatively affect the person's personal and social function.[7] To lower such complications, occupational mental health experts emphasize on human factors, although potential stressful resources exist in the working environment, organization, and the outside environment (such as the family and society).[8] They believe that the most accessible tool is the person itself. They also believe that the person can be ensured against mental stress and pressure through empowerment and increase of his/her personal abilities.[9] In addition to the pivotal role of counselors including psychiatric nurses who can help to achieve such a goal,[3]one of the strategies that seems to be applicable in prevention or reduction of physical and mental tensions is usage of herbals. One of these herbals is *Rosmarinus* with its antioxidation effect that can reduce stress and fatigue.[10] This antioxidation property itself can control nitric acid synthesis, increase circulation in the brain and limbs, cause vasodilatation, prevent platelet accumulation on the internal layer of the veins and arteries, and prevent oxidation of materials such as lipids in blood. All these effects somehow reduce the complications resulting from stress and fatigue and prevent further hazards.[11] Research shows that the antidepressant effect of orselic acid in *Rosmarinus* is similar to that of medications affecting the D1 and D2 receptors in the dopaminergic system.[12] Many studies have reported the antispasmodic effects of *Rosmarinus* on smooth muscles, in reducing stress, and providing relief from headache.[13,14] Consumption of *Rosmarinus* also causes vasodilatation and better circulation. This property of *Rosmarinus* results in better circulation to the limbs and brain, which brings about discharge of waste materials from the tissues, relieves fatigue, and gives peace and comfort.[15] Another study was conducted on the phenyl antioxidant property of this herbal, and reported a reduction in oxidation of lipids and production of waste materials in blood and an increase in the level of ascorbic acid and exit of the oxidation process products, and circulation.[10] Another study was conducted on the effect of lavender and *Rosmarinus* on nursing graduates' and teachers' anxiety in the University of Florida and reported their anti-stress effects.[16] The studies on occupational burnout have been mostly conducted among nurses and teachers in Iran, and few studies investigated this issue among industrial workers. So far, no Iranian study has investigated the occupational burnout among the workers in chemical industries in the form of an interventional study on application of herbals. On the other hand, the researcher has worked in chemical industry complex as a nurse, is closely in touch with the work-related conditions and pressure in the industrial environment, and has witnessed several events during work due to human reasons such as fatigue, stress, and lack of adequate attention and concentration in the workers. With regard to the importance and benefits of herbal therapy, which is a type of revived traditional medicine, this study aimed at investigating the effect of *Rosmarinus* on occupational burnout among the workers in Iranian Chemical Industry Investigation Company (ICIIC).

Materials and Methods

This is a two-group two-step clinical trial (IRCT2013052813416N2) that was conducted in 2013 in ICIIC which produces detergents rare materials. The study population comprised all permanent, on-contract, and casual staff working in the technical section of the company, who met the inclusion criteria. Inclusion criteria were working in a day shift, not having faced stressful events of everyday life such as a death, divorce, and other miserable events in a year prior to the study, being interested in participating in the study, having at least 1 year of work experience in one of the technical units of ICIIC, being exposed to industrial stressful factors (noise, environmental pollutants, tools and machinery, etc.), no history of cardiovascular diseases and psychotic disorders, and taking the related medications.

Through a random selection, 66 staff were randomly selected and assigned to two groups, i.e. study and control, by subjects' selection of a color ball from a box. During the intervention, 4 g of dried *Rosmarinus* leaf and its stem was infused in 150 cc of boiled water by the researcher and her co-worker, and was given to the subjects at 10 AM on all week days except Thursdays and Fridays for 2 months. No intervention was conducted in the control group. Data collection tool was a two-section questionnaire. The first section included demographic characteristics such as age, marital status, working position, employment position, and staff's education level. The second section was Geldard occupational burnout questionnaire, which is used in many studies now. It contains 40 items and measures how much the staffs are exposed to the risk of occupational burnout. It is scored based on Likert's scale and each item receives scores 1–7 (absolutely disagree = 7, disagree = 6, relatively disagree = 5, no idea = 4, relatively agree = 3, agree = 2, and absolutely agree = 1). Based on Geldard occupational

burnout questionnaire, the scores range between 40 and 280 points, and lower scores show lower occupational burnout and vice versa. This questionnaire has been used in several studies and its reliability has been established. Khakpour and Birashk reported the reliability of the tool as 0.86 and Erfani reported it as 0.76. In another study, reliability of the questionnaire was calculated as 0.73 through test re-test.[3] The data were qualitative and quantitative in the present study and were analyzed by descriptive and inferential statistical tests. Occupational burnout questionnaire was completed before and immediately after intervention in both groups.

Ethical considerations

Confirmation of the Isfahan University of Medical Sciences's Ethics Committee and informed consent of samples by written. There is no obligation to participate in research subjects and assured them that all information will be confidential and no mention in the report of results.

Results

Sixty-six workers in two groups of 33 subjects each, i.e. study and control groups, were studied. There was no significant difference in the demographic characteristics of subjects of the two groups. Mean ages in the control and study groups were 35.5 (7.4) years and 36.7 (8.7) years, respectively ($P = 0.55$). Most of the subjects in the control and study groups were married (87.9% and 84.8%, respectively; $P = 0.27$). The highest frequency was in the subjects working on a contract. The *t*-test showed no significant difference in the mean scores of occupational burnout between the two groups before intervention ($P = 0.85$), but the mean scores were different after intervention ($P = 0.03$). Paired *t*-test showed no significant difference in the mean scores of occupational burnout before and after intervention in the control group ($P = 0.83$), but their difference was significant in the study group [Table 1]. The findings showed no significant association between occupational burnout and age, marital status, employment status, education, and work experience [Table 2]. Drinking infused *Rosmarinus* decreased the percentage of the subjects obtaining occupational burnout scores of 120–200 by 21.2% and increased the percentage of those obtaining scores of 81–120 by 15.9%. About 6.1% of the subjects in the study group obtained a score of 40–80 after intervention.

Table 1: Mean scores of occupational depression before and after intervention in the two groups

Time	Before		After		Paired t-test	
	Mean	SD	Mean	SD	*t*	*p*
Group						
Control	23.9	135.1	23.7	136.4	0.83	0.22
Study	21.02	134.1	24.5	125	0.048	1.98
Independent *t*-test						
t	0.19		2.06			
P	0.85		0.03			

Table 2: Personal characteristics and occupational burnout scores

Variables	Occupational burnout scores		*P*
	Mean	SD	
Marital status*			
Single	131.8	25.6	0.54
Married	135.4	21.7	
Employment status**			
Permanent	136.1	23.9	0.88
Contract	135.4	21.7	
Casual	132.4	18	
Correlation coefficient			
Age***	−0.11		0.27
Education level****	0.04		0.67
Work experience (years)***	−0.04		0.67

*Independent *t*-test; **one-way ANOVA;*** Pearson correlation coefficient; ****Spearman correlation coefficient

Discussion

This study aimed at investigating the effect of *Rosmarinus* on occupational burnout among the workers in ICIIC.

The obtained results showed that most of the staff suffered from occupational burnout and should have been referred for counseling to prevent further complications. Seyed javadain and Shahbaz Moradi studied occupational burnout in 454 workers of National Oil Company in the south of Iran and found similar results.

More than half of the workers in this industry (56.5%) suffered from occupational burnout.[17] Tang *et al.*, in a study on 345 technical workers and 187 official workers of petrochemical industry, reported that technical workers experienced more occupational burnout and obtained fewer points of job satisfaction and mental health, compared to official workers.[18] In 2010, some Finish researchers studied occupational burnout and its complications among the industrial workers and found that most of these workers suffered from occupational burnout.[19] Similarities in the results of various studies from different countries with various cultures show that this syndrome prevails worldwide. On the other hand, the results obtained after intervention in the present study showed a decrease in occupational burnout among those who were at risk of occupational burnout before intervention and obtained scores that revealed their need for being counseled. They also showed an increase

in the percentage of those whose occupational burnout score was low and worked well. A percentage of study subjects' scores showed that they were active and had no occupational burnout. Although there was no significant difference in the demographic characteristics of the control and study groups ($P = 0.83$), the difference in mean changes of occupational burnout scores was significant after intervention between the two groups. In the present study, medicational intervention was conducted as a sub-group of traditional medicine to show the effect to such a treatment. Bittman *et al.* used music therapy to modify occupational burnout and improve staff's mood status. They conducted a six-season program of music therapy for 112 personnel and investigated the occupational burnout changes and mood status of the personnel by using Meslech questionnaire and mood status protocol. They reported a significant reduction in staff's occupational burnout and mood disorder.[20] There are several studies on the effect of *Rosmarinus* on mood and physical power, which reported results consistent with the present study. Moss *et al.*, in a study on the effect of *Rosmarinus* and lavender essentials on anxiety, fatigue, and mood among 1044 adult subjects, reported positive effect of *Rosmarinus* on subjects' cognitive power and mood, compared to control,[21] which is in line with the present study. In another study, conducted in Mahidel University in Thailand, 20 subjects inhaled *Rosmarinus* essence and their energy was measured before, during, and after intervention, and was compared with that of controls. Their results showed an increase in the level of energy after intervention in the study group and the subjects reported less fatigue.[22] In another study on the effect of *Rosmarinus* and black pepper on the level of attention, concentration, energy, and fatigue in Georgia University in the USA, 40 youngsters who suffered from low level of energy were given black pepper capsules (0.29 g), *Rosmarinus* (1.7 g), and placebo (3.1 g rice flour). The levels of subjects' constant attention, energy, and feeling fatigued were measured three times by standard audiovisual tools while they were doing two homeworks simultaneously. Their results showed that *Rosmarinus* slightly and transiently lowered their errors ($d = 0.21$) and mental fatigue ($d = 0.40$). Meanwhile, analysis of covariance (ANCOVA) test of three time points showed that consumption of *Rosmarinus* and black pepper in this method did not result in improvement of motivation and energy for such homework which needed attention, in the short term and did not lower the subjects' level of fatigue.[23]

In the present study, not only the possible and potential effects of *Rosmarinus* (2 months) were studied for adequate time, but also it was consumed as an infused drink to make the best use of all ingredients of this herbal and not just its essence.[14,22] Seol *et al.* investigated the antidepressant effect of *Rosmarinus* and *Salvia sclarea* and some other herbals. They studied these extracts by administering them through peritoneal injection to rats and obtained promising and significant results.[24] Some other Bulgarian researchers used *Rosmarinus* as a muscle relaxer and antagonist of alpha 1 and 2 adrenergic receptors and obtained positive results.[25] Mexican researchers studied the spasmolytic effect of *Rosmarinus* on the muscles and its effect on calcium channels, and also tested its ethanol essence on Guinea pigs' ileum and obtained results consistent with the present study.[14] Orally infused *Rosmarinus* was used in the present study, which is a popular and simple method in Iran. In Brasilia, its hydro-alcoholic extract was orally administered for 14 days (1 mg/kg) to the rats which had received inhibitors lowering their mood for 4 days before intervention, and reported improved mood in those rats.[12]

Applying of infused *Rosmarinus* and obtaining a positive and significant effect on reduction of occupational burnout score is a motivation to achieve practical goals of the present study that were prevailing the culture of consumption of natural elements instead of chemical and enriched materials. With regard to our obtained results and those of other studies reporting the anti-anxiety and relaxing effect of *Rosmarinus*, it can be concluded that its long-term effect is unknown and the reported effect in the present study may be transient.

Conclusion

It can be concluded that use of infused *Rosmarinus* for 2 months results in reducing stress and signs of fatigue, and occupational burnout. It also causes relaxation and, consequently, can be used as a complementary medicine. One of the limitations of the present study was selection of no staffs working on shifts and the sampling limited to only one industrial center.

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References

1. Amirov NK, Ilyukhin NE, Rusin MN, Krasnoshchekova VN. Working conditions and professional risk for operational personnel of energy facilities. Gig Sanit 2013;2:39-42. Available From: http://www.Pubmed.com.[Last accessed on 2013 Oct 22].
2. Reyes-Torres M, Ríos-Santos JV, López-Jiménez A, Herrero-Climent M, Bullón P. Job satisfaction and depression in the Spanish Society of Periodontology and Research (SEPA)

members, and their relation to the burnout syndrome. Creation of a structural model. Med Oral Patol Oral Cir Bucal 2012;17:e821-4. Available From: http://www.Pubmed.com. [Last accessed on 2013 Nov 05].
3. Sfandiari A. Evaluation of Burnout among nursing staffs in hospitals of Sanandaj. J Kurdistan Univ Med Sci 2001;6:31-5.
4. Silva SG, Silva MC, Nahas MV, Viana SL. Variables associated with leisure-time physical inactivity and main barriers to exercise among industrial workers in Southern Brazil. Cad Saude Publica 2011;27:249-59. Available From: http://www.pubmed.com. [Last accessed on 2013 Oct 27].
5. Wright GR, Howieson S, McSharry C, McMahon AD, Chaudhuri R, Thompson J, *et al*. Effect of improved home ventilation on asthma control and house dust mite allergen levels. Allergy 2009;64:1671-80. Available From: http://www.pubmed.com. [Last accessed on 2013 Oct 27].
6. Ansari MA, Hussain SK, Mudagal MP, Goli D. Neuroprotective effect of allopurinol and nimesulide against cerebral ischemic reperfusion injury in diabetic rats. Department of Pharmacology, Acharya and B.M. Reddy College of Pharmacy, Soldevanhalli, Bangalore, India. Eur Rev Med Pharmacol Sci 2013;17:170-8. Available from: http://www.pubmed.com. [Last accessed on 2013 Oct 29].
7. Casado Á, Castellanos A, López-Fernández ME, Ruiz R, López Imedio E, Castillo C, *et al*. Determination of oxidative and occupational stress in palliative care workers. Clin Chem Lab Med 2011;49:471-7. Available from: http://www.pubmed.com. [Last accessed on 2013 Oct 28].
8. Stoeber J, Rennert D. Perfectionism in school teachers: Relations with stress appraisals, coping styles, and burnout. Anxiety Stress Coping 2008;21:37-53. Available From: http://www.pubmed.com. [Last accessed on 2013 Oct 27].
9. Ríos-Santos JV, Reyes-Torres M, López-Jiménez A, Morillo-Velázquez JM, Bullón Fernández P. Burnout and depression among Spanish periodontology practitioners. Med Oral Pat Oral Cir Bucal 2010;15:813-9. Available from: http://www.pubmed.com. [Last accessed on 2013 Oct 29].
10. Doolaege EH, Vossen E, Raes K, De Meulenaer B, Verhé R, Paelinck H, *et al*. Effect of rosemary extract dose on lipid oxidation, colour stability and antioxidant concentrations, in reduced nitrite liver pâtés. Meat Sci 2012.90:925-31. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 29].
11. Carvalho-da-Silva AM, Van Damme I, Taylor W, Hort J, Wolf B. Oral processing of two milk chocolate samples. Food Funct 2013;4:461-9. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 28].
12. Machado DG, Bettio LE, Cunha MP, Capra JC, Dalmarco JB, Pizzolatti MG, *et al*. Antidepressant-like effect of the extract of Rosmarinus officinalis in mice: Involvement of the monoaminergic system. Prog Neuropsychopharmacol Biol Psychiatry 2009;33:642-50. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 25].
13. Martínez AL, González-Trujano ME, Chávez M, Pellicer F. Antinociceptive effectiveness of triterpenes from rosemary in visceral nociception. J Ethnopharmacol 2012;142:28-34. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 25].
14. Ventura-Martínez R, Rivero-Osorno O, Gómez C, González-Trujano ME. Spasmolytic activity of Rosmarinus officinalis L. involves calcium channels in the guinea pig ileum. J Ethnopharmacol 2011;137:1528-32. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 28].
15. Solhi H, Salehi B, Alimoradian A, Pazouki S, Taghizadeh M, Saleh AM, *et al*. Beneficial effects of rosmarinus officinalis for treatment of opium withdrawal syndrome during addiction treatment programs: A clinical trial. Addict Health 2013;5:90-4. Available from: http://www.pubmed.com.[Last accessed on 2014 Apr 10].
16. McCaffrey R, Thomas DJ, Kinzelman AO. The effects of lavender and rosemary essential oils on test-taking anxiety among graduate nursing students. Holist Nurs Pract 2009;23:88-93. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 29].
17. Seyed javadain S, Shabazmoradi S. Burn out: A research in Oil Drilling company. J Manage Sci 2006;1:36-87.
18. Tang XP, Tian HE, Huang T, Li ZY, Hu KM, Ge XY, *et al*. Appraisal of occupational stressor in petrochemical industry workers. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi 2009;27:730-3. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 29].
19. Ahola K, Väänänen A, Koskinen A, Kouvonen A, Shirom A. Burnout as a predictor of all-cause mortality among industrial employees: A 10-year prospective register-linkage study. J Psychosom Res 2010;69:51-7. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 22].
20. Bittman B, Bruhn KT, Stevens C, Westengard J, Umbach PO. Recreational music-making: A cost-effective group interdisciplinary strategy for reducing burnout and improving mood states in long-term care workers. Adv Mind Body Med 2003;19:4-15. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 25].
21. Moss M, Cook J, Wesnes K, Duckett P. Aromas of rosemary and lavender essential oils differentially affect cognition and mood in healthy adults. Int J Neurosci 2003;113:15-38. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 29].
22. Sayorwan W, Ruangrungsi N, Piriyapunyporn T, Hongratanaworakit T, Kotchabhakdi N, Siripornpanich V. Effects of inhaled rosemary oil on subjective feelings and activities of the nervous system. Sci Pharm 2013;81:531-42. Available from: http://www.pubmed.com. [Last accessed on 2013 Oct 28].
23. Lindheimer JB, Loy BD, O'Connor, PJ. Short-Term Effects of Black Pepper (Piper nigrum) and Rosemary (Rosmarinus officinalis and Rosmarinus eriocalyx) on sustained attention and on energy and fatigue mood states in young adults with low energy. J Med Food 2013;16:765-71. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 29].
24. Seol GH, Shim HS, Kim PJ, Moon HK, Lee KH, Shim I, *et al*. Antidepressant-like effect of Salvia sclarea is explained by modulation of dopamine activities in rats. J Ethnopharmacol 2010;130:187-90. Available from: http://www.pubmed.com. [Last accessed on 2013 Oct 29].
25. Sagorchev P, Lukanov J, Beer AM. Investigations into the specific effects of rosemary oil at the receptor level. Phytomedicine 2010;17:693-7. Available from: http://www.pubmed.com.[Last accessed on 2013 Oct 25].

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