

A Survey on Awareness of Consumers about Health Problems of Air Fresheners: A Case Study at Jimma University, Southwestern Ethiopia

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Abstract: The objective of this study was to assess the magnitude of utilization of air fresheners and also to assess the awareness of the employees of Jimma University about health problems of air fresheners and their attitudes towards these products. Data were collected from 271 respondents that consisted of janitors, instructors, secretaries and officers using semi-structured questionnaires. The collected data were analyzed using SPSS software (version 16). The results of the study indicated that the majority of the employees (217, 80.10%) use air fresheners daily at least once in a day. The health problems of air fresheners that were mentioned by the respondents were sinus (110, 35.72%), asthma (89, 28.90%) and allergic reactions (78, 25.32%). The results also showed that the majority of the respondents are aware of health problems of air fresheners. However, regardless of their awareness, respondents showed positive attitude towards these products. These facts suggested that a strategy should be designed to minimize use air fresheners in offices and create air freshener-free working environment. Further surveys are recommended using large sample size of study population to get more informative data that could help authorities to make decisions in order to stop use of these products in the University.

Key words: Awareness • Aerosol Spray • Phthalate • Air Fresheners • Jimma University • Community-Based Education

INTRODUCTION

Air fresheners are consumer products that are widely used in homes, offices, public restrooms, stores, hotels, schools, hospitals, churches, theaters and in transportation service areas such as airplanes, airports, cars, buses and trains to mask unwanted or foul odors [1, 2]. These products could be scented candles, fragrance gels, aerosol sprays and continuously emitting liquids and/or solids [3, 4].

The popularity and production of air fresheners have been observed to increase from time to time as witnessed by rising global markets of these products. For instance, in 2006 it was reported that the global sale of these products to be 6 billion USD and was also forecasted to be 7.3 billion USD in 2010 [5]. The performance of the European air fresheners market has been forecasted with an anticipated compound annual growth rate of 4.1% for the five-year period 2009-2014, which is expected to lead

the market to a value of USD 3 billion by the end of 2014 [6]. It is also expected that the worldwide market for air fresheners to reach the value of USD 8.2 billion and USD 10.2 billion in 2015 and 2017, respectively [7,8].

It is important to note that air fresheners never “freshen” or clean air. They work by masking foul smells by covering up one smell with strong smells of chemicals or fragrances, or by interfering with our ability to smell by coating our olfactory nerves in nasal passages with an oil film so that we cannot detect offending odors or releasing nerve-deadening chemical which interferes with the ability to smell. In rare cases, they will actually break down the offensive odor [8-10].

As mentioned above, air fresheners do not improve quality of air. Instead, they pollute indoor air by releasing harmful compounds that have adverse effects on human health [10-19]. There are several types of air freshener brands and almost all of them are composed of hazardous volatile organic compounds or compounds that can easily

be oxidized to toxic pollutants that can cause adverse health effects [20-22]. Some of the compounds found in air fresheners are benzyl alcohol, phthalate (e.g., Diethyl Phthalate (DEP), Di-n-butyl Phthalate (DBP), Di-isobutyl Phthalate (DIBP), Di-methyl Phthalate (DMP), Di-isohexyl Phthalate (DIHP)), acetone, benzyl benzoate, benzyl salicylate, butane or isobutane, camphor, terpenes, formaldehyde, toluene, petroleum distillates, 1,4-dichlorobenzene, benzene, xylene, limonene, ethanol or isopropyl alcohol, naphthalene, phenol, glycol ether, pinene and essential oils and aerosol propellants (Such as butane, isobutane or propane) [2,23,24]. These compounds or their derivatives that can be formed during chemical reactions of the compounds with surrounding air (e.g., ozone) after their release from their containers can cause adverse health effects to people [14,25-27]. For instance, if a pregnant woman is exposed to phthalates (Endocrine disruptors) she may give birth to infants with birth defects as these compounds can alter hormone levels which may harm the fetus. The chemicals can also cause miscarriages. Phthalates can also alter hormone levels in males, leading to reproductive problems [9,13,28-30]. In some individuals, who are sensitive to smells, exposure to air fresheners can cause of health problems that include headaches, confusion, dizziness, diarrhea, fatigue, depression, anxiety, nausea and respiratory problems. Reactions can vary from mild to severe. Asthma and allergic reactions, nerve and organ damages (e.g., kidney, lung and liver damage), cancer, neurological damages and eye and skin irritations are also reported health problems upon exposure to chemicals used in air fresheners [2,12,31-39].

Though scientific information regarding health hazards of air fresheners on human health is increasing, trends showed that use of air fresheners still increasing from time to time. This could be attributed to absence of labeling of air fresheners or failure of manufacturers to disclose ingredients/formulations of many of air freshener products to consumers due to trade secrets and other regulatory protections and also media advertisement of these products [1,2,12]. Lack of awareness of consumers could also be attributed to the fact that the effects of indoor air pollution are mostly chronic and long-term [1,39].

Similar to other countries elsewhere in the world, air fresheners (Especially aerosol type ones) are widely used in Ethiopia. Of public service rendering institutes where air fresheners are being used frequently in every office and rest room is Jimma University. This is a concern on health of both the clients and employees of the Institute.

However, there are no studies conducted in the study area (Even in Ethiopia) on the awareness of users about health problems of these products. Therefore, the present study was initiated to assess the awareness of office holders, instructors, janitors and secretaries (Of Jimma University) that use air fresheners, mainly aerosol spray-type air fresheners, in their offices on daily basis. The finding would help the public to get awareness about health problems of air fresheners and avoid use of these products. It would also help the University to take action against purchasing these products to avoid health problems of its employees and also to avoid wastage of big sum of money that is allocated for purchase of air fresheners every fiscal year.

MATERIALS AND METHODS

Description of the Study Area: This study was conducted at Jimma University. The University is one of the 32 public Universities in Ethiopia. The University is found in Jimma city that is located in the southwestern Ethiopia and 346 km away from Addis Ababa, the capital of Ethiopia. The University is known for its unique philosophy. i.e., community-based education (CBE) [40]. In this program, students of the University, regardless of their field of study and year of stay in the University, students must go to the surrounding community around Jimma city. The purpose is to enable students to identify problems of the community and prioritize them. Based on severity of the identified problems, the students make interventions to solve some the problems by mobilizing the community. Currently, the University accommodates more than 30,000 students (At under graduate and post graduate levels) in its two institutes and five colleges comprising of different Departments. The study was conducted from November 2012 to April 2013.

Study Population: The study population that participated in the study were janitors, secretaries, instructors, office holders such as Department heads and deans and other employees who assumed offices in different levels of colleges in the main campus and Business and Economics College of Jimma University and Jimma University specialized hospital.

Data Collection and Analysis: Data were collected from randomly selected 271 respondents that consisted of 138 (50.9%) males and 133 (49.1%) females. The respondents were selected randomly but attempts were made to make the number of female and male respondents to be equal.

Table 1: Socio demographic characteristics of respondents among workers in Jimma University, Southwest, Ethiopia, May, 2014

Variables	Frequency (n)	Percent(%)
Gender (n=271)		
Male	138	50.9
Female	133	49.1
Educational Status (n =271)		
PhD/MD	7	2.6
MA(MSc)	69	25.5
BA(BSc)	61	22.5
Diploma	93	34.3
12 th grade completes	41	15.1
Occupation (n =271)		
Instructors	87	32.1
Secretaries	85	31.4
Janitors	70	25.8
Office holders	29	10.7

To collect the data, semi-structured questionnaires were prepared in English (Supplementary material I). The questionnaires were distributed for self-administration. Those respondents who were willing but not able to attend the questionnaires in English were provided questionnaires that were translated to local language (Amharic). Based on their socio demographic characteristics, the respondents were grouped into different categories (Table 1). Analysis of the collected data was carried out using SPSS software (Version 16).

RESULTS AND DISCUSSION

After collecting the required data from the respondents, (i) the degree of utilization of air fresheners by the study population, (ii) awareness of the respondents about the potential health risks of these products and (iii) attitude of the respondents about air fresheners were assessed based on the analysis of the data as discussed in the following sections of this report.

Degree of Utilization of Air Fresheners in Offices:

The collected data on air freshener utilization showed that the majority of the respondents (217, 80.1%) said that they utilize/use air freshener daily in their offices and the rest of the respondents (54, 19.9%) replied that they do not use air freshener in their offices (Table 2). The observed data is consistent with literature reports that showed in modern society majority of the population use air fresheners on daily basis. A report that indicates 70% of the people of Italy and, 75% in USA use air fresheners every day [41] is a typical example in this regard.

Table 2: Degree of utilization of air fresheners, in Jimma University, Southwest Ethiopia, May, 2014

Variables	Frequency (n)	Percentage(%)
Utilization of air freshener in offices (n=271)		
Yes	217	80.10
No	54	19.90
Frequency of utilization of air fresheners/day (n=217)		
Once (in the morning)	93	34.30
Whenever unpleasant comes to office	71	26.29
Twice (morning and afternoon)	49	18.08
Once (in the afternoon)	4	1.50
The amount of products do use monthly(n=217)		
300ml	116	42.80
<300ml	83	30.60
600ml	14	5.20
>600ml	4	1.50
Others	1	0.40

The wide and extensive use of air fresheners could be attributed to advertisements that promote these products via TV channels and magazines. Among those respondents who said that they do not use air fresheners in their offices (54, 19.9%, Table 2) mentioned shortage of the products, allergic reactions to them and also allergic reaction complaints by their clients as possible reasons (Data not given).

Regarding the time and frequency of air fresheners by respondents who use air fresheners, the majority of them (93, 34.3%) use once in the morning whereas 71 (26.20%) and 49 (18.08%) of the respondents use air fresheners whenever they feel unpleasant smell in office and twice (Morning and afternoon), respectively. The rest (4, 1.5%) of the respondents who use air fresheners in their office, use the products only once in the afternoon (Table 2). The respondents, who use air fresheners in their office, were also requested about the quantities of air fresheners they use in a month. The data showed that majority of them (116, 42.8%) use 300 ml (1 bottle) of air freshener per month. Significant number of respondents (83, 30.6%) also said that they use less than 300 ml (1 bottle) of air fresheners in a month (Table 2). Even though the majority of the respondents said that they use only \leq 300 ml air fresheners per month, use of this quantity of air fresheners by each of hundreds of offices of the University per month could cause serious indoor air pollution. Moreover, users utilize air fresheners at least once in a day in five working days of a week.

Table 3: Respondent’s knowledge about air fresheners in Jimma University, Southwest Ethiopia, May, 2014

Variables	Frequency(n)	Percentage (%)
Knowledge of consumers about chemical compositions (or ingredients) of air fresheners (n =271)		
Yes	20	7.4
No	248	91.5
Knowledge of consumers about health problems caused by air fresheners (n =271)		
Yes	193	71.2
No	78	28.8
Health problems associated with exposure to air fresheners*		
Sinus	110	35.72
Asthmatic reactions	89	28.90
Allergic reactions	78	25.32
Other respiratory tract problems	31	10.06

* Multiple responses were possible

Authors also observed that unpleasant odors are common only in and around offices that are found in the Hospital of the University. Thus, use of air fresheners in other offices where there are no any sources of foul smells is unreasonable. Even use of air fresheners can be avoided in offices found in the Hospital of the University by opening windows (Allowing enough air circulation).

Knowledge of Users about Air fresheners and Their Awareness about the Potential Health Problems of these Products: As discussed in the introduction section, air fresheners are composed of ingredients which are harmful to human health. The respondents who participated in the study were requested about their knowledge the chemical compositions (Ingredients) found in air fresheners. The collected data showed that almost all the respondents (248, 91.5%) do not have any knowledge about chemical compositions (Ingredients) of air fresheners. The rest or few (20, 7.4%) of the respondents said that they know about ingredients of air fresheners (Table 3). However, they could not mention any ingredient by name. This observation indicates the need for awareness raising activities to create awareness among consumers regarding chemical composition (Ingredients) of air fresheners that are known to cause serious human health problems.

Now a day, it is well known that air fresheners cause several human health problems. The responses collected from the study population also showed that the majority (193, 71.2%) of them know that air fresheners can cause human health problems and the rest 78 (28.8%) said that they do not know human health problems of air fresheners

(Table 3). The results showed that though the respondents are aware of human health problems of air fresheners (Table 3), majority of the respondents are still using these products in their offices on daily basis (Table 2). Some of the specific health mentioned by the those respondents who said that they know health problems of air fresheners were sinus (110, 35.72%), asthmatic reactions (89, 28.90%), allergic reactions (78, 25.32%) and other respiratory tract problems (31, 10.06%) (Table 3). This observation is consistent with previous survey reports that associate allergic reactions, asthmatic problems and other breathing difficulties of consumers with exposure to air fresheners [32,42,43]. Our survey showed results that seem paradox. That means the respondents know health problems of air fresheners but they use these products extensively in their offices (Table 2 vs. Table 3). This suggests the need to launch a campaign against the use of air fresheners by describing the details of ingredients of air fresheners that are not described (or listed) by their manufacturers for “trade secret’ reason. The awareness raising can be done by disseminating the health problems of air fresheners through posters, the University’s web site, pamphlets (Using local languages) and training sessions where appropriate. Moreover, institutes must take measures against use of air fresheners to protect their employees from ill-effects of these products as they their impact is believed to be equivalent to second-hand smoke [21].

Attitude of Users Towards Utilization of Air Fresheners:

The survey was also intended to assess the overall attitude (Opinion) of the respondents towards air fresheners. The results showed that despite their knowledge of health problems of air freshener (Table 3), the majority of the respondents (171, 62.10%) said that they still want to use and advise others to use air fresheners (Table 4). Some of the main reasons, according

Table 4: Attitude of users towards air fresheners in Jimma University, Southwest Ethiopia, May, 2014

Variables	Frequency(n)	Percentage(%)
Do you advise others to use air fresheners in their offices (n=271)		
Yes	171	63.10
No	100	36.90
Opinions on using air fresheners (n =271)		
Strongly agree	43	15.9
Agree	118	43.5
Neutral (no idea)	43	15.9
Disagree	55	20.3
Strongly disagree	10	3.7

Table 5: Association of educational status and occupation with the practice of use of air freshener among employees in Jimma University, Southwest Ethiopia, May, 2014

Independent variable	Utilization of air fresheners in office		p-value
	Yes	No	
Educational status of respondents			
12 complete	27(65.9%)	14(34.1%)	0.104
Diploma	80(86.0%)	13(14.0%)	
Degree (BSc/BA)	50(82.0%)	11(18.0%)	
Masters (MA/MSc)	54(78.3%)	15(21.7%)	
PhD/MD	6(85.7%)	1(14.3%)	
Classification of respondents by occupation			
Teachers	68(78.2%)	19(21.8%)	0.022
Secretaries	75(88.2%)	10(11.8%)	
Janitors	56(80.0%)	14(20.0%)	
Office holders	18(62.1%)	11(37.9%)	

to those respondents, were that air fresheners boost working mood or motivate workers and they clean (Freshen) polluted air (data not given). Hundred (36.90%) of the respondents replied that they do not advise others to use air fresheners in their offices or homes as they may cause human health problems (Table 4).

The respondents were also requested to give their opinion to the item in the questionnaire “do you think using air fresheners is good to office workers and their clients?”. The observed data showed that the majority of these respondents replied ‘air fresheners are good to office workers and their clients’. Among the respondents, 118 (43.5%) and 43 (15.9%) of them replied as “agree” and “strongly agree”, respectively, to the above mentioned item whereas 55 (20.3%) and 10 (3.7%) of the respondents replied as “disagree” and ‘strongly disagree’, respectively. The rest of the participants (43, 15.9%) of them replied that they are neutral or had no idea (Table 4). The above results showed that the respondents of the study area (Probably people in the country) have positive attitude towards air fresheners and utilization of these products in their offices. The data also indicated that, majority of the respondents still showed high tendency to use air fresheners in their offices. Our finding is not consistent with survey reports from many western countries such as Greece, France and Denmark. Survey results in those countries showed that 60% (From Greece) and 51% (From France and Denmark) of respondents mentioned that air fresheners as potentially harmful [44]. Therefore, some activities are required to change attitude of the University community against the use of these products.

Finally, we made an attempt to see the association of educational status and occupation of respondents with the practice of use of air fresheners. The result indicated that use of air freshener among employees was significantly associated with classification of respondents by their occupation ($p < 0.05$) and there was no association with educational status of the respondents ($p = 0.104$) (Table 5).

CONCLUSIONS

The result of the present survey showed that almost all the study population use air fresheners at least once in a day. Though the majority of the participants of the study are aware of the health problems of air fresheners, they have attitude to continue using these products. This might be due to lack of information about ingredients of air fresheners and their long-term serious health problems. Thus, arranging awareness raising strategies are needed as the effects of indoor air pollution by air fresheners human health problems long-term exposure. Moreover, the public should be informed about the chemical compositions of air fresheners that actually pollute rather than freshen indoor air. Instead of using an air freshener, it is recommended to remove the source of bad smells and open windows and use fans for adequate ventilation of offices and rest rooms in order to minimize the need for air fresheners. It is also recommended that the University should take action to create air freshener-free workplace. No budget should be allocated for purchase of these products as they are harmful to employees as well as their clients. Further surveys are suggested in large sample size

of population of the University to get more informative data that could be used by authorities of the University to design a strategy to avoid use of air fresheners in its offices.

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REFERENCES

1. Steinemann, A., 2009. Fragranced consumer products and undisclosed ingredients. *Environ Impact Assess. Rev.*, 29: 32-38.
2. Woods, The truth about air fresheners. <http://www.effectiveenvironmentalservices.com/airfresh.html> (Accessed on 21 December 2013).
3. Air Freshener: market research reports. <http://www.MarketResearch.com> (Accessed on 31 December 2013).
4. www.silentmenace.com/-Air_Fresheners.html. The dangers of indoor chemical pollution: Air fresheners (Accessed on 21 December 2013).
5. http://en.wikipedia.org/wiki/Air_freshener#cite_note-1. Marketing data: air care market overview, global cosmetic industry (Accessed on 14 Jan, 2014).
6. www.researchandmarkets.com/reports/1409850/european_air_fresheners_market_analysis_20102014#rela4. European air fresheners market analysis, 2010-2014. (Accessed on 21 December 2013).
7. www.transparencymarketresearch.com/air-fresheners-market.html. Global air fresheners market - industry size, share, trends, analysis and forecast, 2012 – 2018 (Accessed on 21 December, 2103).
8. www.mcs-global.org. Let's clear the air about air fresheners and plug-ins. The global campaign for recognition of multiple chemical sensitivity. (Accessed on 22 December, 2013).
9. Bleasdale, D., 2011. Protect your children from toxic air fresheners. <http://www.dagmarbleasdale.com/2011/04/protect-your-children-from-toxic-air-fresheners/> (Accessed on 18 Jan, 2014).
10. Cone, J.E. and D. Shusterman, 1991. Health effects of indoor odorants. *Environ. Health Perspect*, 95: 53-59.
11. Anderson, R.C. and J.H. Anderson, 1997. Toxic effects of air freshener emissions. *Archives Environ. Health: Intl. J.*, 52: 433-441.
12. Cohen, A., S. Janssen and G. Solomon, 2007. Clearing the air: Hidden hazards of air fresheners. Natural Resources Defense Council (NRDC) September 2007 issue paper.
13. Bridges, B., 2002. Fragrance: emerging health and environmental concerns. *Flavour Fragr. J.*, 17: 361-371.
14. Potera, C., 2011. Indoor air quality: scented products emit a bouquet of VOCs. *Environ Health Perspect.*, 119: A16.
15. www.livestrong.com/article/208333-health-risks-of-scented-air-fresheners/. Health risks of scented air fresheners (Accessed on 21 December 2013).
16. Nazaroff, W.W. and C.J. Weschler, 2004. Cleaning products and air fresheners: exposure to primary and secondary air pollutants. *Atmospheric Environment*, 38: 2841-2865.
17. BEUC opinion report, 2005. The European consumers' organization. Emission of chemicals by air fresheners and tests on 74 consumer products sold in Europe. http://ec.europa.eu/health/ph_risk/committees/04_scher/docs/scher_o_026.pdf (Accessed on Jan 21, 2014).
18. www.thestar.com.my/News/Nation/2013/09/09/A-not-so-innocent-product-Tests-on-air-fresheners-show-high-levels-of-dangerous-chemicals.aspx. Indoor air chemistry: cleaning agents, ozone and toxic air contaminants: Tests on air fresheners show high levels of dangerous chemicals (Accessed on 21 December 2013).
19. Normah, A., M.A. Nur Faratun, S.Y. Hajar and I. Ishak, 2014. A Study on exposure to air pollutants and their effects to the respiratory level among employees of Sentul Railway Electric Multiple Unit (Emu) Depot. *World Applied Sci. J.*, 29: 402-407.
20. Forester, C.D. and J.R. Wells, 2009. Yields of carbonyl products from gas-phase reactions of fragrance compounds with OH radical and ozone. *Environ. Sci. Technol.*, 43: 3561-3568.
21. De Vader, C.L. and B. Paxson, 2009. Fragrance in the workplace is the new second-hand smoke. *Proceedings of ASBBS*, 16 (Number 1).
22. Huang, Y., S. Steven, H. Ho, K.F. Ho, S.C. Lee, Y. Gao, Y. Cheng and C.S. Chan, 2011. Characterization of biogenic volatile organic compounds (BVOCs) in cleaning reagents and air fresheners in Hong Kong. *Atmospheric Environ*, 45: 6191-6196.

23. <http://mcs-america.org/airfresh.pdf>. Let's clear the air about air fresheners and plug-ins. (Accessed on 14 Jan, 2014).
24. Gosselin, R.E., R.P. Smith, H.C. Hodge and J.E. Braddock, 1984. Clinical toxicology of commercial products. 5th edition, Williams and Wilkins.
25. Nazaroff, W.W., B.K. Coleman, H. Destailats, A.T. Hodgson, D.L. Liu, M.M. Lunden, B.C. Singer and C.J. Weschler, 2006. Indoor air chemistry: cleaning agents, ozone and toxic Air contaminants. Final report: Contract No. 01-336. California Air Resources Board and the California Environmental Protection Agency: California Air Resources Board Research Division, CA, USA. (<http://mcs-america.org/indoorair.pdf>).
26. Moran, R.E., D.H. Bennett, D.J. Tancredi, X. Wu, B. Ritz and I. Hertz-Picciotto, 2012. Frequency and longitudinal trends of household care product use Atmospheric Environment Atmospheric Environ., 55: 417-424.
27. Main, K.M., G.K. Mortensen, M.M. Kaleva, K.A. Boisen, I.N. Damgaard, M. Chellakooty, I.M. Schmidt, A.M. Suomi, H.E. Virtanen, J.H. Petersen, A.M. Andersson, J. Toppari and E. Niels, 2006. Human breast milk contamination with phthalates and alterations of endogenous reproductive hormones in infants three months of age," Environ. Health Perspect, 114: 270-276.
28. Hauser, R., J.D. Meeker, S. Duty, M.J. Silva and A.M. Calafat, 2006. Altered semen quality in relation to urinary concentrations of phthalate monoester and oxidative metabolites. Epidemiology, 17: 682-691.
29. Swan, S.H., K.M. Main, F. Liu, S.L. Stewart, R.L. Kruse, A.M. Calafat, C.S. Mao, J.B. Redmon, C.L. Ternand, S. Sullivan and J.L. Teague, 2005. Decrease in anogenital distance among male infants with prenatal phthalate exposure. Environ. Health Perspect, 113: 1056-1061.
30. Bornehag, C.G., J. Sundell, C.J. Weschler, T. Sigsgaard, B. Lundgren, M. Hasselgren and L. Hägerhed-Engman, 2004. The association between asthma and allergic symptoms in children and phthalates in house dust: a nested case-control study, Environ. Health Perspect, 112: 1393-1397.
31. Rumchev, K., 2004. Association of domestic exposure to volatile organic compounds with asthma in young children. Thorax, 59: 746-751.
32. Caress, S.M. and A.C. Steinemann, 2009. Prevalence of fragrance sensitivity in the American population. Features, 71: 46-50.
33. Farrow, A., K. Northstone and J. Golding, 2003. Symptoms of mothers and infants related to total volatile organic compounds in household products. Archives Environ. Health: An Intl. J., 58: 633-641.
34. www.naturalnews.com/034181_air_fresheners_allergies.htm. Study: Exposure to common air fresheners can cause allergies, asthma. (Accessed on 21 December 2013).
35. Mackar, R., 2006. National Institute of Environmental Health Sciences (NIEHS) press release: Chemicals in many air fresheners may reduce lung function. <http://www.nih.gov/news/pr/jul2006/niehs-27.htm> (Accessed on Jan 18, 2014).
36. Kwon, J.T., M. Lee, G.B. Seo, H.M. Kim, I. Shim, D.H. Lee, T. Kim, J.K. Seo, P. Kim and K. Choi, 2013. Cytotoxic effects of air freshener biocides in lung epithelial cells. Nat. Product Commun., 8: 1301-1304.
37. www.naturallifemagazine.com/0810/airfresheners.htm. Air fresheners or air pollutants? (Accessed on 21 December 2013).
38. Senthilkumaran, S., R. Meenakshisundaram, A.D. Michaels, N. Balamurgan and P. Thirumalaikolundusubramanian, 2012. Ventricular fibrillation after exposure to air freshener-death just a breath away. J. Electrocardiol., 45: 164-166.
39. Haghlesan, M., 2013. How does Indoor environmental quality affect public health in sustainable urban? Res. J. Chem. Environ. Sci., 1: 37- 41.
40. Mekonnen, A., 2000. Community-based education: Concept and practice. Ethiop. J. Health Dev., 14: 227-237.
41. Pors, J. and R. Fuhlendorff, 2003. Mapping of chemical substances in air fresheners and other fragrance liberating products, Danish Environmental Protection Agency, Survey, pp: 30.
42. Caress, S.M. and A.C. Steinemann, 2005. National prevalence of asthma and chemical hypersensitivity: an examination of potential overlap. J. Occup Environ Med., 47: 518-522.
43. Torfs, R., K. De Brouwere, M. Spruyt, E. Goelen, M. Nickmilder and A. Bernard, 2008. Exposure and risk assessment of air fresheners. A final report of study accomplished under the authority of the Federal Public Service Health, Food Chain Safety and Environment.
44. Special Eurobarometer 314, 2009. Europeans' attitudes toward chemicals in consumer products: Risk perception of potential health hazards.