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Assessment of Baking industries in a Developing Country: The common Hazards, Health challenges, control measures and Association to Asthma

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Abstract

The baking industry is prone to occupational health challenges like allergy and musculoskeletal disorders. The present study aimed at examining the prevalence of workplace health problems and relationship to control measures among bakers in a developing country. It was a cross-sectional descriptive study done in 2013 in Aba South Local Government area, Nigeria using a structured questionnaire. Out of a total of 36 bakeries, 24 bakeries were selected by simple random method. All the bakers in these selected bakeries were then studied. A total of 135 bakers were studied, 85 (63%) were males. The modal age range was 21 – 25 years and over 70% had secondary school education. Majority of the respondents had worked 5 years and about half of the bakers worked an average of between 7 and 12 hours a day. Also 119 (88.1%) were aware that bakery can cause health problems. Musculoskeletal disorders were reported by 21(15.6%) while 20(14.8%) respondents were asthmatic. Nine of the asthmatics claimed worsening of symptoms during work. Years of service did not significantly influence likelihood of developing asthma. However, prevalence of asthma was significantly lower among those that frequently wore facemask (χ^2 = 5.042, p = 0.02). Rashes and skin irritation occurred in 16 (11.9%) of the respondents some of whom used personal protective equipment (PPEs). Prevalence of occupational asthma can be reduced by wearing facemask at work. Other health problems were not significantly affected by PPEs.

Keywords: Asthma, bakers, personal protective equipments, Nigeria.

Introduction

The Baking industry, like, most occupations is prone to occupational health challenges. Most of these hazards are preventable and arise from the neglect of occupational safety measures. In order to protect workers and ensure that employers provide a healthy working environment the Internal Labour Organization developed a workplace safety act[1]. However, a report from Nigeria showed that the attitude of workers was negative or indifferent on issues of occupational health and safety[2]. This is strikingly different from British bakers' workplace risk perception which observed that both the management and workers are responsible for safety of the workplace[3].

High among the workplace health hazards of bakery workers are chronic obstructive pulmonary diseases like emphysema and bronchial asthma[4,5]. The mechanism could be allergy to the contents of the flour such as rye and gliadins or it could be non - allergic as since the flour dust is a known respiratory irritant[6]. Injuries from accidents are equally common among bakery workers. These could arise from slips and falls on wet or uneven floor surfaces. Cuts from sharp or moving machinery, falls from heights as well as burns and scalds from hot ingredients are also frequent causes of accidents[7]. Among bakers musculoskeletal disorders like muscle pains and arthritis arise from manual handling and moving of heavy loads for example while loading or off-loading a vehicle may occur. Other causes of musculoskeletal disorders include work requiring repetitive movements and poor work posture[8]. Most of these are due to poor consideration of ergonomic factors in the workplace.

Some chemicals such as sodium hydroxide and bleach used in cleaning bakeries could cause contact dermatitis and could also be hazardous to the eyes and the respiratory system. Reports have also indicated a higher prevalence of occupational skin diseases among bakery workers than in the general population[9-11]. In addition, bakeries are known to have processes which emit high noise levels exceeding the threshold limit levels[7,12]. Exposure to noise can cause irreversible hearing damage. Indeed hearing defect is one of the commonest health problems among bakers and may sometimes be difficult to detect since the effects can build up slowly over time[13].

The questions that often come to mind include: 'are there policies or practices in bakeries aimed at protecting the workers from these workplace hazards?' If there are, 'are the workers aware and do they adhere to these policies and practices?' Providing answers to these questions will help in programme design targeted at reducing workplace hazards among this group of workers. The present study is aimed at examining the prevalence of workplace hazards and relationship to control measures among bakers in a developing country.

Material and Methods

Present study was a descriptive cross-sectional study done in 2013 at Aba metropolis. Aba is one of the major commercial centers in South-east Nigeria inhabited mainly by the Ibos. The main occupation in Aba is trading. Ethical permit for the study was obtained from Ethics Committee of University of Nigeria Teaching Hospital Enugu while informed consent was obtained from the respondents. The study instrument was semi-structured questionnaire. This was pre-tested in a nearby commercial center similar to the study site. The questionnaire had 6 sections. The first section obtained the demographic variables of the respondents. Other sections solicited information on the years of service and hours spent daily at the workplace, knowledge of hazards in the workplace, presence of symptoms of occupational diseases, use of personal protective equipment (PPEs) and other control measures, waste disposal methods and presence of pests in the workplace.

Out of a total of 36 bakeries in Aba, 24 bakeries were selected using a simple random method. All the bakers in these selected bakeries (a total of 135) were then studied. Data were analyzed using Statistical Package for Social Sciences (SPSS) version 17. Frequencies and percentages were presented as tables. Prevalence of workplace hazards was obtained and relationship to control measures was done using chi-square. Cross tabulations were used to identify any relationship between some variables and asthma. The Confidence limit was 95% and P values less than 0.05 were regarded as significant.

Results and Discussion

Results: A total number of 135 bakers were studied, 85 (63%) were males. The modal age range was 21 – 25 years and over 70% had secondary school education. Majority of the respondents had worked 5 years or less while only 14 had worked for more than 10 years. About half of the bakers worked an average of between 7 and 12 hours a day, table-1. One hundred and nineteen (88.1%) were aware that working in a bakery could result in an occupational ill health but were able to identify only one or two hazards, table-2. The most prevalent complaints were respiratory symptoms. Musculoskeletal disorders were reported by 21 (15.6%) while rashes and skin irritation occurred in 16 (11.9%) of the respondents some of whom used personal protective equipment (PPEs). Accidents from burns, cuts, falls, electrical shocks and fire explosions were reported by about 22% of the respondents while hearing loss was found among 21 respondents (table-3).

Measures in place to check occupational hazards were: provision of guards over machines to prevent accidents, adequate ventilation, regular checks of electrical fittings and staff trainings among others. About half of the respondents had first aid box in the workplace. The most frequently used PPE was apron (68.1%) followed by gloves (62.2%), while ear plugs were least worn (6.7%), Table 5. Many of the bakery staff reported having seen some pests such as cockroaches, rats and houseflies within the bakery premises (table-4)

Twenty respondents were asthmatic 9 of who claimed worsening of symptoms during work. Years of service did not significantly influence likelihood of developing asthma. However, prevalence of asthma was significantly lower among those that frequently wore facemask, $\chi^2 = 5.697$, $p = 0.017$. The prevalence however was not significantly affected by years of work, gender or awareness of the hazards (table-5).

Discussion: Health hazards are prevalent in bakeries and coupled with low pay and odd hours of work, the baking industry is subject to a high turnover of workers. This perhaps explains why as high as 63% of the bakers in this study fell between 15 and 25 years, showing a relatively very young working group. Present finding is a lot higher than the supposedly very high percentage (26%) reported among bakers of similar age range in Canada[14]. In addition, almost 72% of the respondents had worked for 5 years or less while only 4 of the bakers had worked longer than 15 years – implying a high rate of attrition which has also been noted previously among bakers[15].

Table-1
Demographic characteristics and work duration of respondents

Variable	Frequency (N = 135)	Percent
Sex		
Male	85	63.0
Female	50	37.0
Total	135	100.0
Age (years)		
15 – 20	19	14.1
21 – 25	66	48.9
26 - 30	32	23.7
Above 30	18	13.3
Total	135	100.0
Educational level		
No-formal	6	4.4
Primary	18	13.3
Secondary	95	70.4
Tertiary	16	11.9
Total	135	100.0
Number of years worked		
in bakery 0 – 5	97	71.9
6 – 10	24	17.8
11 -15	10	7.4
16 -20	1	0.7
Above 20	3	2.2
Number of hours worked		
per day		
0 – 6	48	35.6
7 – 12	69	51.1
13 – 18	15	11.1
Above 18	3	2.2

Table-2
Respondents' knowledge of health hazards and Presence of pests in bakery industry

Awareness of hazards	Yes	No
	119 (88.1)	**16 (11.9)**
Awareness that working in a bakery can cause the following		
Breathlessness	13 (9.6)	122 (90.4)
Cough	15 (11.1)	120 (88.9)
Chest tightness	15 (11.1)	120 (88.9)
Catarrh	50 (37.0)	85 (63.0)
Itching	17 (12.6)	118 (87.4)
Skin irritation	19 (14.1)	116 (85.9)
Burns	46 (34.1)	89 (65.9)
Cuts	23 (17.0)	112 (83.0)
Falls/Slips	26 (19.3)	109 (80.7)
Fire/explosions	37 (27.4)	98 (72.6)
Hearing problems from excess noise	52 (38.5)	83 (61.5)
Electrical shock	23 (17.0)	112 (83.0)

Table-3
Symptoms often encountered at workplace

Symptoms	Present (%)	Absent (%)
Respiratory Complaints:		
Sneezing	44 (32.6)	91 (67.4)
Catarrh	40 (29.6)	95 (70.4)
Cough	31 (23.0)	104 (77)
Chest tightness	25 (18.5)	110 (81.5)
Prevalence of asthma	20 (14.8)	115 (85.2)
Breathlessness	19 (14.1)	116 (85.9)
Musculoskeletal disorders	21 (15.6)	114 (84.4)
Hearing loss **Skin irritation/Rashes** **Accidents:**	21 (15.6) 16 (11.9)	114 (84.4) 119 (88.1)
Burns	7 (5.2)	128 (94.8)
Cuts	6 (4.4)	129 (95.6)
Falls/Slips	6 (4.4)	129 (95.6)
Fire/explosions	5 (3.7)	130 (96.3)
Electrical shock	5 (3.7)	130 (96.3)

Although a high proportion of the respondents were aware that health problems could arise from their occupational exposure in the bakery, most of them lacked knowledge of these hazards and their presenting symptoms. This implies that the bakers may not be applying adequate preventive measures to protect themselves. An earlier study had also reported poor knowledge of occupational diseases and their methods of prevention among bakers[16]. This indicates the training needs for these workers in order to equip them with information on the risks they are exposed to daily at work and how to control them. This is because a relationship has been found to exist among similar workers between reduced occupational symptoms and having good knowledge of the potential health effects of their exposures[6].

Table-4
Use of PPEs and other control measures at work

Regular use of PPEs at work	Frequency	Percent
Apron	92	68.1
Gloves	84	62.2
Shoes/Boots	76	56.3
Facemask	73	54.1
Hat	55	40.7
Fire Extinguisher	24	17.8
Vacuum cleaner	12	8.9
Air vents	10	7.4
Ear plugs	9	6.7
Environmental Control		
Regular checks on the electrical fittings	93	68.9
Adequate ventilation	82	60.7
Trained in the use of fire extinguisher	78	57.8
Safety guards over machines to prevent injuries	66	48.9
Work shifts	45	33.3
Measures used in pest control		
Trapping	18	13.3
Nets	28	20.7
Fumigation	33	24.4
Waste disposal methods in bakeries		
Waste bins	108	80.0
Incinerator	12	8.9
Open dumping	5	3.7
Burning	5	3.7
Recycling	1	0.7

Table-5
Variables and their relationship to asthma

Variables	Presence of Asthma (%)		χ^2 (P value)
	Yes (%)	No (%)	
Years worked in bakery 5years or less More than 5years	13 (13.3) 7 (18.9)	85 (86.7) 30 (81.1)	0.680 (0.409)
Sex distribution Male Female	11 (12.9) 9 (18.0)	74 (87.1) 41 (82.0)	0.638 (0.424)
Awareness of hazards in bakery Yes No	20 (17.1) 0 (0.0)	97 (82.9) 18 (100.0)	3.612(0.057)
Wear facemask regularly Yes No	5 (7.5) 15 (22.1)	62 (92.5) 53 (77.9)	5.697 (0.017)*

*Significant.

Rhinitis and occupational asthma were among the most common complaints in the present study. Bakers' asthma has been reported by several studies to be the most common occupational asthma[17,18]. Of noteworthy also was that 45% of the asthmatics reported worsening of symptoms during work. Similar trends have been noted[19,20] and indicates the need for environmental management to reduce the amount of flour dust in the workplace. This point was further buttressed by the significant protective effect provided by the use of facemasks. The prevalence of musculoskeletal disorders was quite high among our respondents. These commonly occur from poor ergonomic control at work. Employers usually acquire machines without considering the anthropometric measurements of the employees who will operate these machines. Oftentimes, the machines are procured long before their operators are employed. This therefore results in workers assuming awkward positions while using the machines such that some groups of muscles are subjected to undue tension. Our finding is similar to a previous one also among relatively bakers[21]. This calls for urgent attention in order to eliminate exposure of these young employees to ergonomic stressors.

The occurrence of hearing problems was equally alarmingly high among our study group. As has been noted earlier on, irreversible hearing loss which develops gradually over time can be induced by noise[14]. For these relatively young groups of workers who on the average have worked only five years to have started having hearing complaints tells a lot about the likely levels of noise to which they are exposed at their workplace. This indicates an urgent need for environmental control of noise while providing and educating the workers on the use of ear plugs and muffs in order to preserve their sense of hearing. The skin problems found in the present study is similar to that reported among bakers in Scotland 9. These skin problems are commonly due the irritants and allergens used for baking[22] and could be minimized by the use of appropriate PPEs. Accidents which are known to be the major cause of absenteeism among factory workers were quite common in our study. These could be reduced by good housekeeping and their severity minimized by training and use of appropriate PPEs.

A reasonably high percentage of the bakers reported use of some PPEs particularly aprons and gloves. However, the use of other PPEs like ear plugs was remarkably low. This shows that to an extent the employers make efforts to protect the employees. Nonetheless, going by the occupational health problems of these bakers, the work environment and the low use of PPEs, one can only conclude that more efforts are needed on the part of the employers, in terms of improving the bakery environment to make it more worker friendly, provision of PPEs and training the workers on their as well as monitoring the worker and the work environment to ensure that all are in good condition. The workers on the other hand should attend trainings whenever recommended and should abide by the stipulated rules and regulations.

Conclusion

The study revealed the prevalence of occupational hazards such as musculoskeletal disorders, skin irritation, hearing loss, accidents and respiratory problems and that the prevalence of occupational asthma can be reduced by wearing facemask at work. It also showed that pests commonly occur in bakeries and that workers poorly utilize their PPEs. It is therefore recommended that bakery owners should implement environmental changes aimed at reducing occupational hazards in bakeries.

References

1. Kalejaiye P.O., Occupational health and safety: Issues, challenges and compensation in Nigeria, *Peak Journal of Public Health and Management*, **1(2)**, 16-23 **(2013)**

2. Bolaji A.O. Analytical Study of Carpenters Attitude towards Safety and Occupational Health Practice in Oyo Sate of Nigeria, *J. Hum. Ecol*., **18(2)**, 99-103 **(2005)**

3. Alexopoulos E.C., Kavadi Z., Bakoyannis G., and Papantonopoulos S. Subjective risk assessment and perception in the Greek and English bakery industries, *J Environ Public Health,* 891754. (dol: 10.1155/2009/891754) **(2009)**

4. Bena A., D'Errico A. and Mirabelli D. A system for the active surveillance of occupational bronchial asthma: the results of 2 years of activity of the PRiOR program. *Med Lav*., **90(4),** 556-71 **(1999)**

5. Rushton L., Occupational causes of chronic obstructive pulmonary disease. *Rev Environ Health*., **22(3),** 195-212 **(2007)**

6. Fishwick D., Harris-Roberts J. and Robinson E. et al. Impact of worker education on respiratory symptoms and sensitization in bakeries, *Oxford Journals Occupational Medicine*., **61(5),** 321-7 **(2011)**

7. Health and Safety Executive. A Baker's dozen. Thirteen essentials for health and safety in bakeries. [Online].2011 [cited 2014 May 19]; Available from: URL:http://books.hse.gov.uk/hse/public/home.jsf **(2011)**

8. Ghamari F., Mohammad B.A. and Tajik R. Ergonomic assessment of working postures in Arak bakery workers by the OWAS method, *Journal of School of Public Health and Institute of Public Health Research*, **7(1)**, 47-55 **(2009)**

9. Steiner M.F.C., Dick F.D., Scaife A.R., Semple S., Paudyal P. and Ayres J.G. Prevalence of skin symptoms among bakery workers. *Oxford Journals Occupational Medicine*., **61(4)**, 280-2 **(2011)**

10. Tacke J., Schmidt A., Fartasch M. and Diepgen T.L. Occupational contact dermatitis in bakers, confectioners and cooks. *Clinical Case Reports,* **33(2),** 112-7 **(1995)**

11. Arrandale V., Meijster T. and Pronk A. et al. Skin symptoms in bakery and auto body shop workers: associations with exposure and respiratory symptoms. *Int Arch Occup Environ Health*., **86(2)**, 167-75 **(2013)**

12. McCullagh M.C., Raymond D., Kerr M.J. and Lusk S.L. Prevalence of hearing loss and accuracy of self-report among factory workers. *Noise Health*., **13,** 340-7 **(2011)**

13. Svagr J.J., Berkowitz D.E. and Stellman J.M. Health effects and Disease patterns. ILO Encyclopedia of Occupational Health and Safety. [Online] (**2011**) [cited 2014 May 19]; Available from:URL:http://www.ilo.org/oshenc/part-x/food-industry/overview-and-health-effects/item/858-health-effects-and-disease-patterns.

14. Statistics 6252-Bakers-Service Canada. [Online].2013 [cited 2014 May 19]: Available from: URL:http//*w*ww.servicecanada.gc.ca/eng/qc/job_futures/statistics/6252.shtml.

15. Agrifood Skills Australia. Final Report: Labour market and training issues in the baking industry. [Online]. 2011 [cited 2014 May 19]: Available from: URL:http://c.ymcdn.com/sites/www.agrifoodskills.net.au/resource/resmgr/baking_project/baking_industry_project_fina.pdf.

16. Yossif H.A.A. and Abd Elaal E.M. Occupational Hazards: Prevention of Health Problems among Bakery workers in Benha City, *Journal of American Science*, **8(3),** 99-108 **(2012)**

17. Naseh S., Ezat R., Kambiz Y. and Afsaneh S. Prevalence of asthma and rhinitis in bakery workers in the city of Sanandaj, Iran. *Iran J Allergy Asthma Immunol*., **6(4),** 215-8 **(2007)**

18. Houba R., Doekes G. and Heederik D., Occupational respiratory allergy in bakery workers: a review of the literature. *AmJ Ind Med*., **34(6),** 529-46 **(1998)**

19. Ige O.M. and Awoyemi O.B., Respiratory symptoms and ventilatory functions of the Bakery workers in Ibadan, Nigeria. *WAJM*. **21(4),** 316-8 **(2002)**

20. Page E.H., Dowell C.H., Mueller C.A., Biagini R.E. and Heederik D. Exposure to flour dust and sensitization among bakery employees, *AMJ Ind Med.,* **53(12),** 1225-32 **(2010)**

21. Tajvar A., Hasheminejad N., Bahrampour A., Chubineh A. and Jalali A., Musculoskeletal disorders among small trade workers: A survey in the bakeries, *Hormozgan Medical Journal*., **15(4),** 304-310 **(2012)**

22. Steenkamp I., Allergies in the workplace, *Current Allergy and Clinical Immunology,* **26(1),** 26-30 **(2013)**