Assessment of Noise Levels in Domestic Kitchen of Urban Areas of Jorhat City

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Environmental parameter mainly noise has a profound effect on human performance, efficiency and efficacy. Noise is an invisible indoor environmental factor that affects the quality of life and productivity of the workers in cooking activity. The present study on assessment of noise level in domestic kitchen of urban areas of Jorhat city was proposed to assess noise level in the kitchen during cooking and to study the relationship between dependent and independent variables. A purposive cum random sampling method was adopted for the study. From Jorhat city 56 numbers of households were selected randomly and women who take part in cooking is unit of enquiry for the purpose of the study. Both interview and observation methods were used for the collection of data on noise level. Noise level-meter is an instrument used for measurement of noise level. Chi square test was done to identify the relationship between variables. The findings showed that the average noise level was found to be 64.70 dB which is more than the permissible or acceptable level of noise (55 dB). The study revealed that there is a significant relationship between noise with

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brand name of the kitchen chimney ('p'=0.041*). Majority of the respondents were not aware about congenial kitchen environment and noise created by chimney in the study area. Conducive kitchen environment is very important to improve work performance and reduction of health hazards.

1. INTRODUCTION

Noise is defined as unwanted sound which can pollute the indoor space and stresses people's well being. A kitchen, the symbol of culture of the family is the centre and the heart of the house. Kitchen is the noisiest room in the house due to the use of different equipments such as chimney and producing noise from 40 to 90 dB [1]. Generally, peoples are not conscious for health problems due noise pollution. High exposure to noise level have experienced of annoyance and irritation, damage to auditory mechanisms, number of health-related effects like physiological disorders, psychological disorders, disturbances of daily activities and performances, hypertensions and heart diseases [2]. The most serious health hazards associated with high level of noise exposure is deafness which initially causes temporary hearing problem or deafness while prolonged exposure to high noise level causes permanent hearing damage. Noisy environment creates lots of health problem such as loss of concentration, sleep, communication etc. Various health issues arise which can disrupt individuals health well beings, including focus, rest, and interaction [2]. Loud noises can seriously affect people's work performances and directly affect the health and productivity and give negative impression [3]. Although cooking, the primary activity at kitchen is not always considered with due weightage as a physically demanding task, it has substantial physical, emotional and cognitive demands on humans [4]. For comfort, increasing productivity and efficiency of women in cooking, kitchen should be well ventilated and noise free while working inside the kitchen. The indoor environmental quality has a serious influence on the quality of life [5]. Kitchen environment is highly conducive to anyone in performing daily activities especially women in the preparation activities. There are various physiological and psychological risk factors which are associated with adverse environmental condition and responsible for deteriorating the worker's working capacity [6]. The environmental parameter mainly noise is the most affecting parameters [7]. The human body and equipments are effective if the environment in congenial to the users or workers. The environment is conducive for the women if noise is 80 dB [8]. Loud noises can seriously affect people's work performances and directly affect to the health and productivity and give negative impression [3]. High level of noise can cause hearing impairment and increase in high blood pressure which affects heart disease Buskh et al. [9]. Keeping this in mind the assessment of noise level in domestic kitchen of urban areas of Jorhat city was proposed to assess noise level in the kitchen during cooking and to study the relationship between dependent and independent variables.

2. METHODOLOGY

A multistage purposive cum random sampling method was adopted for the study. From Jorhat municipality area 56 numbers of households were selected from 3 wards by applying Probability Proportional to Size (PPS) method. People who constructed their own home were the respondents' households for the present research study. Both interview and observation method was adopted for collecting the data. Data were collected personally by the researcher. Noise level meter was used to record the data on noise level during the cooking period in the kitchen. To determine the clarity and reliability of the instrument or the interview schedule, pretesting was done. Self- prepared questionnaire was used to obtain housing attributes of the respondents. Noise level was measured in sample households. Three readings were taken at 15 minutes interval to find out the relation between dependent and independent variables.

Table 1. Dependent and independent variables

Variables	
Dependent variables	**Independent Variables**
1. Noise	a) Total area of the kitchen
	b) Brand Name of the Kitchen chimney

Table 2. Acceptable limit for noise level

Area	Category of Area/Zone	Limits in dB	
		Day Time	**Night Time**
(A)	Industrial Area	75	70
(B)	Commercial	65	55
(C)	Residential	55	45
(D)	Silence Zone	50	40

(Source: standards prescribed by CPCB and BIS, the Noise Pollution (Regulation and Control) Rules, 2000, APCB, 2007)

Analysis is the critical examination of assembled and grouped data, for studying the characteristics of the object under study and determining the patterns of relationship among variables related to it.

Plate 1. Noise level-meter

3. RESULTS AND DISCUSSION

3.1 Demographic Profile of the Respondents

The results showed that 44.6 per cent of the respondents belonged to the age group of 51-60 years, and 37.50 percent of the respondents in the age group of 40-50 years and the minimum number of respondents i.e. 17.9 per cent were between the age group of 61-70 years. Findings showed that about 42.2 per cent respondents were found to be graduate whereas 21.40 per cent were post graduate and (17.10%), (12.5%) were found to be higher secondary passed and HSLC passed respectively. Regarding the demographic profile of the respondents it was revealed that majority of the respondents (78.60%) belonged to nuclear family and a minimum number of families i.e.21.40 per cent belonged to joint family. Majority of the respondents (78.60%) having 2-4 family members whereas 21.40 per cent having 5-7 members in their respective household. Socio economic characteristics of the family found that the highest percentage (98.20%) were service holder and about 23.2 per cent of the head of the families were found to be business whereas 46.4 per cent of the respondents were also depended on service holder and (30.4%), (23.2 %) were found to be housewife and business. About 32.1 per cent of the families were had monthly income Rs 50,001/- to Rs 70,000/-per month whereas 26.8 per cent had income range between Rs70, 001/- to 90,000/ and more than Rs 90,000 respectively.

3.2 Housing Attributes of the Family

This section of the study deals with the background information of respondents such as area or size of the kitchen, position of burner/stove in the kitchen and brand name of the kitchen chimney.
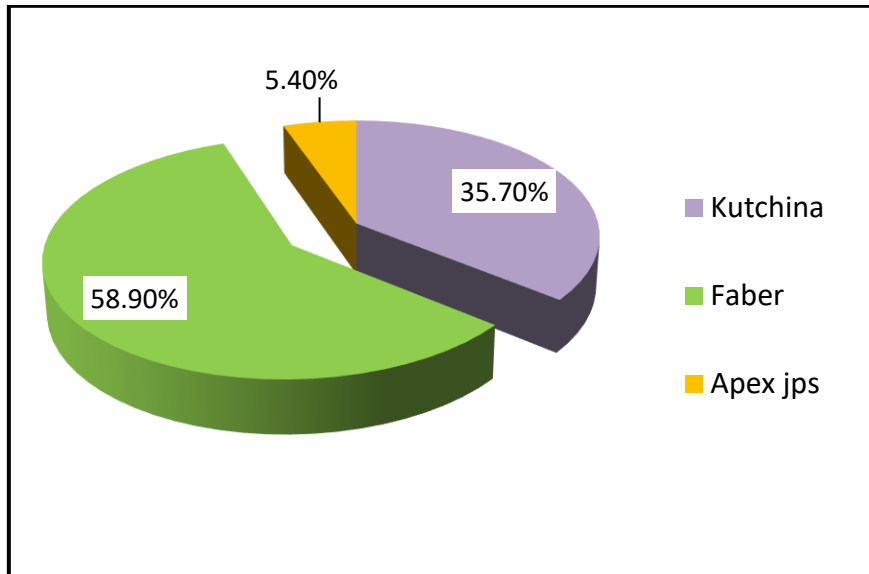
3.3 Size of Kitchen

It is evident from the Table 3 that majority of the kitchens of the selected sample had an area less than 100 square feet (78.50%) which was followed by (21.50%) of the respondents kitchens

Table 3. Distribution of the respondents according to their housing attributes

Sl. no	Attributes	Frequency	Percentage
A.	**Size of Kitchen**		
1	Less than 100 sq.ft	44	78.50
2	More than 100 sq.ft	12	21.5
	Total	56	100.0

B.	Brand name of the kitchen chimney used in the house		
1	Kutchina	20	35.7
2	Faber	33	58.9
4	Apex jps	3	5.4
	Total	56	100.0
C.	Distance from floor to Chimney		
1	Upto 5'5"	33	58.92
2	More than 5'5"	23	41.08
	Total	56	100.0

Fig. 1. Distribution of different brands of the chimney

had an area of more than 100 square feet. This may be due to the fact that time is very less for housewife to maintain a large kitchen as they are involved in skill development activities to supplement their family income.

Kitchen is treated as holy place of the family where families performed cooking and bonding together and even socializing with friends and family. In some of families of study area the size of the kitchen was more. They used the kitchen space not only for cooking but also used for worship and as well as dinning purpose.

3.4 Position of Burner/Stove in the Kitchen

The data given in Table 3 on the information of the position of stove in the kitchen and observed that 28.60 per cent of the respondent's kitchen burner/stove was in East side, followed by 25 per cent respondents kitchen stove were in South and North side and only 21.40 per cent respondents kitchen stove was in West side of the kitchen in their house.

3.5 Brand Name of the Kitchen Chimney

Regarding the brand name of the kitchen chimney, it was recorded that from Table 3 and Fig. 1. that most of the respondents were using brand name of Faber (58.90 %), followed by 35.70 per cent were using Kutchina chimney and only 5.40 per cent of respondents were using Apex Jps in their kitchen. Among the different brand of kitchen chimney Faber is most popular brand in the study area.

3.6 Distance from Floor to Chimney

The installation of kitchen chimney was done by the Firm itself. They follow the instruction given by the firm to install the chimney in specified height. The data given in Table 3, highlighted that in the study area of the distance from chimney to floor is 5'5" (58.60 %), and 41.08 per cent households installed their kitchen chimney more than 5'5". The distance between chimney and kitchen slab ranges from 70 – 75 cm. If the height of the kitchen slab is less, than distance between floors to chimney would be less.

3.7 Measurement of Noise (dB) Level in the Domestic Kitchen

Noise is unwanted sound considered unpleasant, loud or disruptive to hearing. A sound, especially one that is loud or unpleasant or that causes disturbance. The instrument to measure sounds in the air is the sound level meter and unit of measuring is dB. Noise level was measured at the time of cooking activity in a selected area.

It was apparent from Fig. 2 that minimum noise level in the selected domestic kitchen was found to be 59.93 dB and the maximum noise level were found to be 69.48 dB respectively. It was also revealed that the average noise level in domestic kitchen of the selected area was found

to be 64.70 dB. Fig 2 indicates the maximum and minimum noise level in domestic kitchen.

As per the recommended standards prescribed by the Noise Pollution [10] it was stated that the acceptable limit of noise level in residential kitchen is 55 dB. The average noise level in domestic kitchen of the study area was found to be 64.70 dB which is more than the permissible or acceptable level of noise (Fig-3). The study is in conformity of the study conducted by Kaur [11] on assessment of indoor pollution in rural and urban houses and it was observed that the average noise level in the kitchen and drawing room was found to be 53.85 dB and 55. 67 dB respectively. According to the recommendations of NBO of India (2002), it reveals that in residential area noise level should not exceed 55 dB.
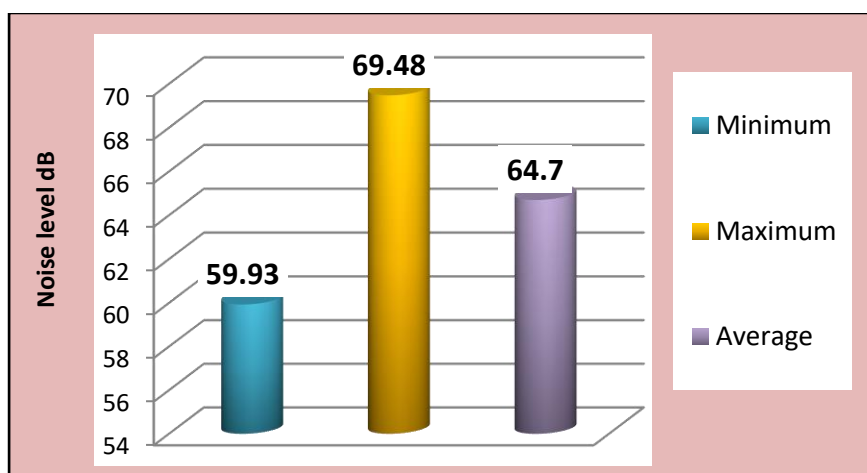

Fig. 2. Distribution of maximum and minimum value of noise in domestic kitchen
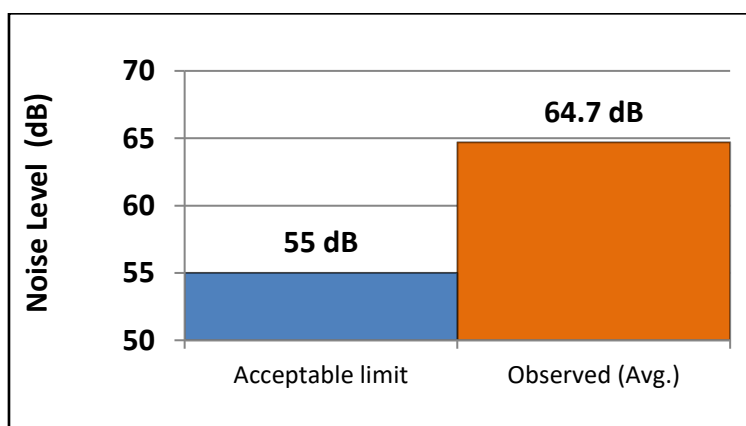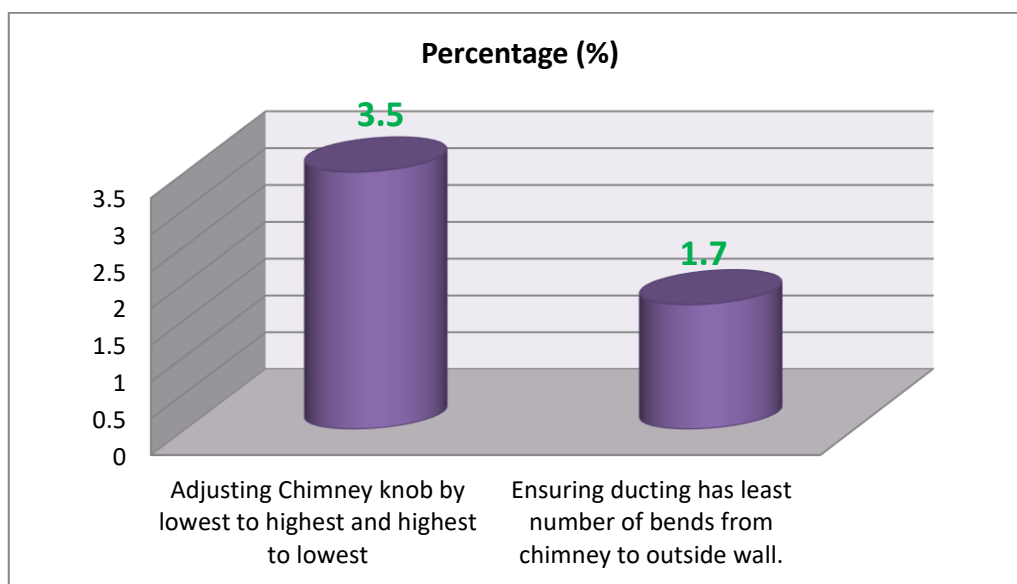

Fig. 3. Distribution of observed (Avg.) and acceptable limit of noise level

Fig. 4. Distribution of respondents according to practices followed for reduction of noise in the kitchen

3.8 Distribution of Respondents according to practices followed for Noise Control in Domestic Kitchen

Based on the data analysis on practices followed by the respondents for noise control in domestic kitchen is shown in Fig 4 indicated that 3.50 per cent of the respondents were adjusting chimney knob by lowest to highest and highest to lowest and a very meagre per cent (1.70%) of the respondents ensured ducting has least number of bends from chimney to outside wall respectively. The respondents in the study area are not aware regarding noise and its impact on human health.

3.9 Identification of the Relationship between the Selected Independent Variables and Dependent Variables

The studies of the relationship between the selected independent variables and dependent variables were computed using Chi-square test. The dependent variable was noise level whereas independent variables selected were area of the kitchen and brand name of the Kitchen chimney. From the analysis of the data it was found that, no significant association was found between noise and area of the kitchen, ('p'=0.286). Although, there lies a significant relationship between noise and brand name of the kitchen chimney ('p'=0.041**). This data signifies that choosing the good brand name of chimney also

reduce the noise level in the kitchen. Therefore, the null hypothesis is partially accepted.

4. CONCLUSION

Noise is unwanted sound which can hinder the regular activities of the workers physically and psychologically. It was also unfolded that the average noise level in the kitchen was found to be more than the acceptable limit. The environmental parameters of the kitchens under the study area were not conducive. To make the noise level acceptable or congenial, to the user sound absorbing material could be used.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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