

# Impact of Environmental Pollution in Restaurant Kitchen in Bangalore City

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**Abstract** - A safe, convenient, sound and healthy living environment is the prerequisite for a good restaurant for the workers as well as customers. The intention of making a restaurant in such a way that it solves basic problem of fixtures and fittings. However, the construction phase of a good restaurant is a critical to design inside and outside structure. Often the builders do not know all the factors to be considered that can maintain a safe, hygienic and healthy environment. It is believed that when restaurant building is ergonomically furnished, then a maximum benefit will be achieved. To meet with the individual's specific needs, an analysis of user's requirement is the most important factor to be considered in the design of special restaurants. User's data such as anthropometric dimension, user's choices and preferences are also necessary to design a suitable living environment in restaurants. In this regard, this paper illustrates some ergonomic features to design and develop good restaurants environment. For the present study 120 workers were selected from the four south Indian restaurant i.e. Sri nidhi sagar, Raaga the family restaurant, Tamarind and Inchara the family restaurant, Bangalore city, Karnataka State. Descriptive cum experimental research design was used for the present study. Purposive sampling procedure was followed to select the sample and data was gathered by interview method. The workers were mainly literate and aged from 25-40 years. The data showed that the existing conditions of the restaurant workers were satisfactory i.e. work environment.

**Keyword:** Restaurant, Barrier free environment, Sustainability, Ergonomics

## I. INTRODUCTION

Ergonomics is a scientific discipline, which is concerned with improving the productivity, health, safety and comfort of people, as well as promoting effective interaction between people, technology they are

using and the environment in which both must operate. Ergonomics aims at making this work more efficient, faster and less fatiguing by improving the interface between the human body and the things workers need to interact with to get work done. As the objectives of the ergonomics are to enhance performance, increase safety and increase user satisfaction, the problems occurred to the office chair should be analyzed and identified first. Ergonomics cover all the aspect of human, environment and machine relationship from the point of view of physical stresses, body motion pain at joints/muscles/nerves/tendons/bones and the like, to environmental factors which can affect hearing, vision and general comfort and health. Thus, it is appropriate to regard the restaurant kitchen, and the work perform therein by the restaurant workers, as an industrial situation requiring applications of the same ergonomic principles that should governed work place layout, equipment design and environment conditions. This is important because of the number of tasks carried out in the restaurant kitchen is traditionally a small area and becoming even smaller since the cost of space is going higher, and possibly as consequence of all these factors, the fact that the restaurant kitchen has become the site of the majority of accidents. This study is based on ethnographic studies of four south Indian restaurants, offers a comprehensive account of how restaurants and the people within them "really work". More specifically, it examines the organizational and institutional environments in which cooks work and how the dynamics of both shape the cook's behavior in the workplace. The designing process of whole of the restaurant environment, and especially those areas of the restaurants, whose technological and functional complexity, technical

infrastructure saturation and spatial limitations required increased concentration and efforts during use, should particularly taken into account. Functional area in this type includes kitchen and sanitary area. Therefore, the present study is designed with the following objective:

1. To study the environmental parameters such as indoor air quality and its effect on their work.

#### ***Limitation of the Study***

1. The study was limited to the restaurant workers only.
2. The study was limited to the metropolitan restaurant workers.
3. The study was limited to the family restaurants only.

#### ***Limitation***

1. The sample was selected from various restaurants of Bangalore city of Karnataka state.

#### ***Assumption***

1. The awareness level of the restaurant workers regarding ergonomic hazards was very poor.

## **II. REVIEW OF LITERATURE**

There are so many environmental parameters which can interfere with task performances like temperature, noise, humidity etc. the environment of the restaurant kitchen usually contains significant levels of dust, fumes, gases which can put the workers at a health risk.

Jaju (2000) concluded that the level of visual performance and perceived level of visual comfort of the elderly subjects consistently declined with decreasing illuminates.

Bhatnagar (2000) stated that noise is an unwanted sound which is not liked by an individual. It is recognized as a dangerous air pollutants affecting quality of life.

As studied by Bittencourt (2001) many different aspect interfere in the environmental climate in the work place among them: the impact on an air temperature, radiant temperature, air speed and relative humidity but the type of physical activity is also get affected by clothing that is worn.

Ravichandran *et al.* (2001) studied that environmental protection should start from home, every household should be sensitive to the problem that emerge with his/her immediate surroundings. Most of the health hazards are due to improper care toward environment.

As studied by Barros (2003) that ventilation (air speed) is the process of air renewal. The basic purpose of ventilation should be to control the purity of air. However, with simple ventilation, we control only the speed. For having control temperature and humidity of the air, air conditioner is needed. He also reported that (Barros, 1999), ventilation is one of the basic sanitary conditions because confined air due to the gases breathing and transpiration has its composition altered by lowering the oxygen percentage and increasing that of carbonic gas and the humidity rate. Only with the constant renewal of the air condition will be made favorable to health through a normal breathing.

Sorensonet *et al.* (2005) concluded that low level of lighting at home contribute to deteriorating mental and physical well being.

#### ***Salient finding from review***

The perusal of the literature in this chapter thus revealed the following.

The environmental conditions at work place affect the workers working capacity as well as produce certain health problem due to high or low temperature, noisy environment, poor lighting conditions and temperature, humidity at work place; it is also responsible for occupational and environmental health hazards. These environmental parameters are some of the factors which affect physiological cost of the workers.

## **III. METHODOLOGY**

Four restaurants were purposively selected for the present study namely- Sri nidhi sagar, Raaga the family restaurant, Tamarind and Inchara the family restaurant, Bangalore city, Karnataka State. An exhaustive list of restaurant workers were taken from their respective departments, then from the list, 120 restaurant workers performing group of activities as preparation of food, cooking, serving and dish washing

were selected. From each subcategory 20 workers were selected for the experimental data thus making 120 samples for survey and 20 samples for controlled group. The details of sampling design are presented in figure. Simple random sampling without replacement was used to select the study area and workers. Sample size was determined before the data collection. For the descriptive data the sample size

of 120 was selected and 20 workers of the total sample were selected for experimental data. Descriptive data was collected personally by using the interview schedule method. Experimental data like moisture, temperature, light and noise was also taken while performing the different activities in restaurant kitchen. All the subjects volunteered for the study. They were informed about the study. The study protocol is presented in figure 1.

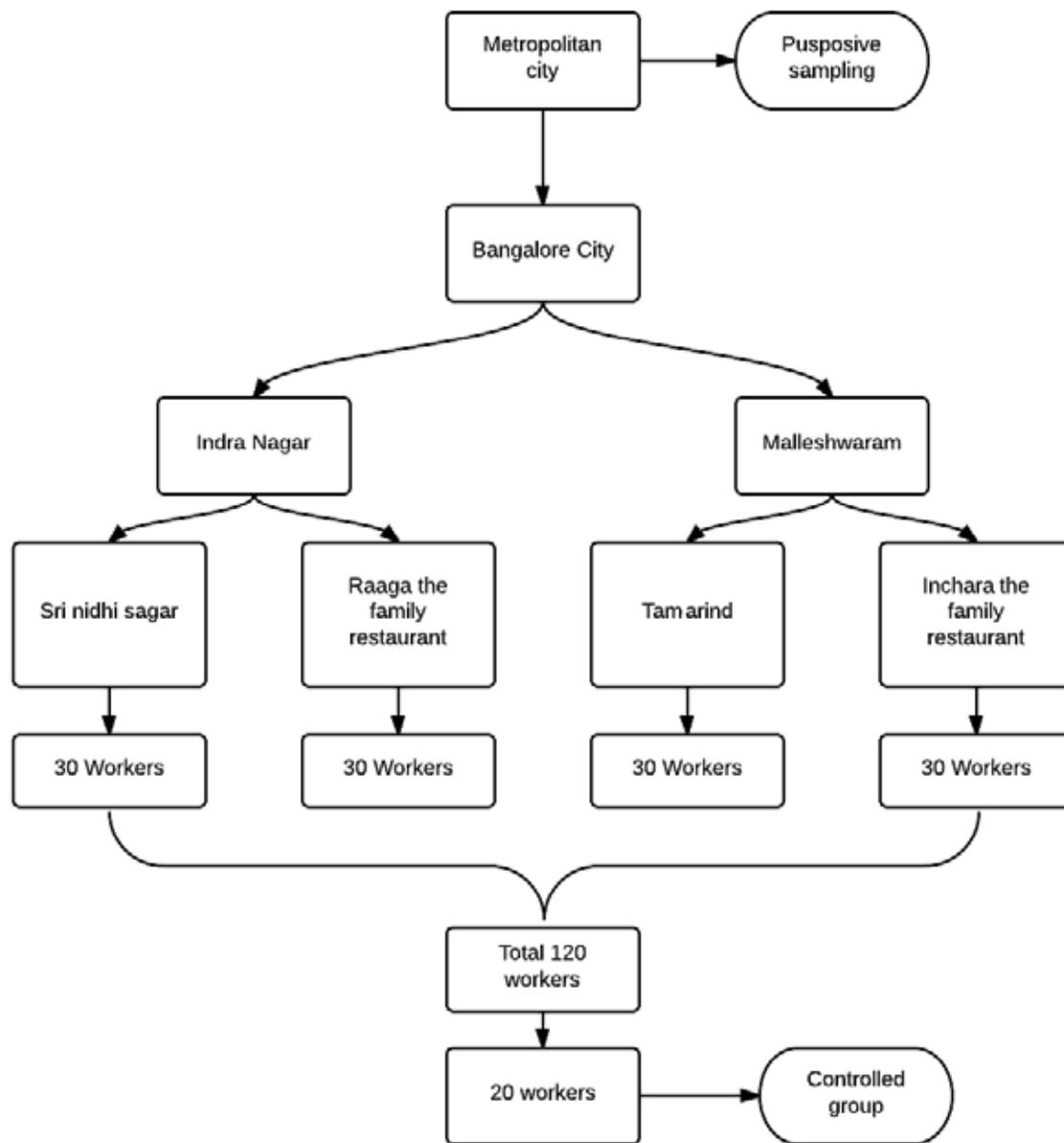


Fig.1 The Study Protocol

#### IV. RESULT AND DISCUSSION

Restaurant where the workers provide services of serving the food home to home should be weather-proof to provide protection from the elements (cold, rain, wind and hot sun) and provide comfort, especially during the hot sunny day. Restaurant kitchen should also provide good ventilation so that the workers who are working inside the farm can comfortably work. Environmental

parameters such as temperature, humidity, light and sound have a profound effect on human performance, efficiency and efficacy. So data on environmental parameters were recorded while collecting the data for other physiological parameters in existing condition. It was clear that almost half of workers were facing the problem of highly noisy area where the majority of workers were engaged in the preparation activity i.e. 15 percent, whereas 4 percent suffered from the problem of poor lighting.

TABLE I ENVIRONMENTAL PARAMETER OF THE RESTAURANT (N=120)

Environmental parameter	Total	Preparation	Cooking	Serving	Dish Washing
Highly noisy working area	60 (50)	18 (5)	14 (11.67)	5 (4.16)	13(10.83)
Poor lighting	5 (4)	4 (3.33)	-	-	1 (0.83)
Comfortable temperature during summer	10 (8)	3 (2.5)	4 (3.33)	2 (1.67)	1 (0.83)
Comfortable temperature during winter	-	-	-	-	-
Too high humidity	-	-	-	-	-
Too low humidity	-	-	-	-	-
Poor air circulation	15 (12.5)	6(5)	5(4.16)	-	4(3.33)
Pollution free air	-	-	-	-	-
Crowded area	20 (17)	4 (3.33)	7(5.83)	5 (4.16)	4(3.33)
Overall poor physical environment	10(8)	3(2.5)	2(1.67)	-	5(4.16)
Other	-	-	-	-	-

Value in parentheses indicates percentage

The data showed that nearly 8% worker said that they were having the comfortable temperature during the summer. It was found that about 12% of the workers reported the problem of poor air circulation in which only 3% were involved in the dish washing activity. Approximately 17% workers reported that the area in which they worked was quite crowded and about 9% were having the overall poor

physical environment. Among them only 1.67% of the workers were from the cooking activity who felt the problem of poor physical environment. Environmental parameter considered under the study was average but temperature and sound level was little bit higher inside the restaurant kitchen. Figure 4.8 showed the graphical representation of the environmental parameters.

TABLE II EXISTING ENVIRONMENTAL CONDITIONS IN THE RESTAURANT KITCHEN

S.No.	Environmental parameters	Range	
		Maximum	minimum
1	Temperature	28.5	19.4
2	Humidity (%)	72	65
3	Light (lux)	105	15
4	Sound(dB)	110.2	82.3

Similar studies were conducted by experts with different reports on environmental parameters. According to Leithead and Lind, (1964) extreme of temperature may be physically hazardous. High temperature particularly if combined with a heavy physical workload, high humidity or low air speed may lead to dehydration, exhaustion, collapse, abnormality of cardiac function and variety of other problems. Sedentary workers wearing light clothing will generally be most comfortable at temperature somewhere in 20-24 degree centigrade range, with a relative humidity of 40-50%, but there are considerable individual differences. Manual workers require higher air speed and lower temperature (19-25 degree centigrade) depending on physical workload (Pheasant, 1987). The relative humidity and temperature was found to be little higher in the present study. The restaurant workers reported that this temperature will increase during the month of February to May which was hazardous to health. Since the study was conducted in the month of August 28.5-19.4 degree centigrade during the course of data collection. The humidity ranged from 65-72 %. Similarly, the comfortable body temperature as given by Saha (1980) is 20-23°C and the temperature below and above these limits makes the person uncomfortable leading to reduce work efficiency. The comfortable limits of humidity are 40-50% for winter and 40-60% for summer. Relative humidity less than 30% are undesirable reported by Bakshi, (1997). An important challenge facing restaurant industry was noise control found in other studies. Noise emitted from exhaust fans, utensils, sizzling of vegetables, delivering the input and removing the output and various other activities from the restaurant can be annoyance to neighbor and if severe enough can lead to complaints. Noise is considered to be a potential threat to the hearing at Levels in excess of 85 to 95 dB (Pheasant, 1987). The individual's subjective response to noise is determined by its nature and context than its intensity. According to present study the sound level ranged from 82.3-110.2 dB, the higher value was considered hazardous but the workers did not have any problem with this level of sound as they were used to it. The noise from kitchen utensils, conversation between the workers and clients, exhaust fan, clean out could result in noise levels during cooking activity in restaurants. Noise level in the restaurant was considered normal. Environmental conditions such as noise, temperature, humidity and light should also be within the comfortable limits of human. As Bhatnagar (1999) defined noise as an unwanted sound which is not liked by an individual. It is recognized as a dangerous air pollutant affecting human beings in many

ways and in turn affecting quality of life. The parameter of sound is frequency and intensity. The noise levels are also recommended by World Health Organization (1980). In environment the recommended noise level is 55 dB during day and 45 dB during night. Similarly for Indoor it is 45 dB in day time and 35 dB during night. Light is also an important environmental parameters, which can affect the worker's performance and if adverse viewing conditions occur then it may result in visual fatigue and pain.

## V. CONCLUSION

Restaurant kitchen vary in function, size, layout and degree of Mechanization. Lighting needs vary with production type and task. The amount and length of time light is required by the workers working inside the kitchen is different from the workers working outside. General lighting is basic necessity for areas infrequently used or having simple work demands. Work demands were considered as 20-200 lux (CIE, ISO 1995), whereas the luminance level in the present study ranged from 15-105 lux in the working areas.

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