

# Perception on Work Environment Stress by Cooks in Commercial Kitchens

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**Abstract:** *The workplace entails an environment in which the worker performs his work while an effective workplace is an environment where results can be achieved as expected by management. The air quality in the commercial kitchens was found to be below the satisfaction level by majority of the respondents (59%). Among them catering centre had very poor air quality. In the present study 62.2 per cent have said that the lighting levels are insufficient to perform the work and are often experiencing strain and irritation in their eyes. Among the three cooking environments catering centres (26.6%) were found to have low lighting levels followed by restaurants (18.8%). It was found that 42 per cent of the cooks are not comfortable with the noise levels at their work place of which 20 per cent restaurant cooks and 15.5 per cent catering centre cooks revealed that communicating with others requires effort due to noise in the kitchens and is very bothering leading to irritation and distraction at work. Fifty six per cent of the cooks of which 22.2 per cent representing catering centre and 20 per cent from restaurant and fast food centres respectively suffer from heat strain due to direct exposure to heat. Cleanliness was not given due importance in the selected commercial kitchens.*

**Keywords:** Air quality, Cooks, Commercial kitchens, Lighting, Noise, Stress, Thermal comfort, Work Environment

## 1. Introduction

A large number of work environment studies have shown that workers/users are satisfied with reference to specific workspace features. These features preference by users are highly significant to their productivity and workspace satisfaction, they are lighting, ventilation rates, access to natural light and acoustic environment [1]. Lighting and other factors like ergonomic furniture has been found to have positive influence on employees health [2],[3] and consequently on productivity. Physical environment as an aspect of the work environment have directly affected the human sense and subtly changed interpersonal interactions and thus productivity.

Commercial kitchens are complex environments where the cooks are exposed to harsh work environment and many work-related hazards that may cause injuries and illnesses that in succession impact their lives, income, and family members. Due to their constant exposure to harsh heat for long hours and exertions of different body parts, most often they struggle with musculoskeletal strain. Most of the aches arise from manual handling of loads, standing for long hours, carrying heavy items or pushing and pulling the object from one place to other, poor posture and repetitive movement of body parts. Such work profiles warrant immediate attention for an in depth ergonomic evaluation for safeguarding productivity and health of the cooks.

The aim of this study was to assess the perception of stress experienced by the cooks in their work environment. The result of this study will help to design ergonomic interventions to reduce the stress and increase the comfort level of the cooks.

## 2. Materials and Methods

Exploratory research design was selected for conducting this study. To assess the perception of stress on work environment among cooks in commercial kitchens, a sample of 90 main cooks from three different commercial food service centers viz., Restaurants, Catering centre and Fast-food centre situated in and around Hyderabad city, Telangana State were selected through purposive sampling method. The study had the limitation of the population restricted to male cooks with minimum 5 years of direct exposure to cooking environment. The questionnaire sought information on the working conditions of the selected kitchens viz., air quality, lighting, noise, thermal comfort and cleanliness. In this study, the respondents were asked about the frequency of stress they experience during the cooking activities due to their work environment. Percentage was used to analyse the data.

## 3. Results and Discussion

In commercial kitchens, working conditions are demanding. Concerns over the indoor environment have increased during recent years as a result of knowledge about the significance of thermal conditions and air quality on health, comfort and productivity of the workforce.

### 3.1 Air quality

According to the study, the air quality in the commercial kitchens was found to be below the satisfaction level of majority of the respondents (59%). In catering centre poor air quality was found to be high (24.4%) due to the usage of fire wood in preparing various cuisines in large quantities. In restaurants due to insufficient ventilation the respondents found the working environment to be less conducive.

**Table 1:** Distribution of sample by perception on air quality in work environment (N=90)

Air quality	Restaurant	Catering centre	Fast Food centre	Total
Always	19 (21.1)	22 (24.4)	18 (20)	59 (65.55)
Some times	8 (8.8)	5 (5.5)	7 (7.7)	20 (22.22)
Never	3 (3.3)	3 (3.3)	5 (5.5)	11 (12.22)
Total	30	30	30	90 (100)

In these commercial kitchens every cuisine comprises 20 -30 dishes with 24 common cooking techniques viz., deep-frying, quick-frying, crisp-frying, barbeque, simmering, braising, marinade, pan-frying, stir frying, boiling, quick-boiling, stewing, steaming, roasting, smoking, salad, sprinkling, sautéing, baking, scalded, fry and simmer. Some dishes require much oil and seasoning for cooking. Therefore, the emissions from different styles of cooking operation makes significant contribution to indoor air pollution in commercial kitchens, particularly the fumes emitted from vegetable cooking oils during stir-frying and deep-frying.

Oils are usually first heated to high temperatures in a wok (large metal pan with raised sides) to reduce noxious odors, resulting in large emissions of effluent [4]. The effluent includes smoke, grease particles and vapor, products of combustion, heat, and moisture. Studies demonstrate clearly the health risk of cooking in commercial kitchens; ventilation plays an important role in providing comfortable and productive working conditions and in securing the contaminant removal.

### 3.2 Lighting

Sufficient lighting is required for performing any task. Table 2 gives the details about the cooks' perception about the lighting environment in commercial kitchens. In the present study 62.2 per cent have said that the lighting levels are insufficient to perform the work and are often experiencing strain and irritation in their eyes sometimes due to dim lights and shadows as observing things in dim lights was causing visual strain. Among the three cooking environments catering centres (26.6%) were found to have low lighting levels followed by restaurants (18.8%). It was imperative to have lighting in the kitchen area that provided excellent brightness uniformity with minimal glare and shadowing effects [5]. Superior white uniformity of the luminaire was required for foodservice operations staff to properly gauge and maximize the visual appeal of the food. Studies show that worker productivity can increase with the quality of light.

**Table 2:** Distribution of sample by perception on lighting in work environment (N=90)

Lighting	Restaurant	Catering centre	Fast Food centre	Total
Always	17 (18.8)	24 (26.6)	15 (16.6)	56 (62.2)
Sometimes	8 (20)	5 (5.5)	11 (12.2)	24 (26.6)
Never	5 (5.5)	1 (1.1)	4 (4.4)	10 (11.1)
Total	30	30	30	90 (100)

Reduced intensity of lighting in a work environment would create visual fatigue for the workers which will directly result in reduction of individual productivity.

### 3.3 Noise

Cooks are exposed to high noise levels during peak hours in the morning, during the lunch time, and in the evening hours that may affect psychological and physiological well-being. In this study it was found that 42 per cent of the cooks are not comfortable with the noise levels at their work place of which 20 per cent restaurant cooks and 15.5 per cent catering centre cooks revealed that communicating with others requires effort due to noise in the kitchens and is very bothering leading to irritation and distraction at work. Sometimes it was found difficult to concentrate on work due to prolonged exposure to noise. The results are in line with study conducted by [6] where they conducted noise survey in different types of restaurants in Hong Kong during peak hours in the breakfast, lunch, and dinner times and found that service employees are exposed to relatively high level of background noise continuously during peak hours, sometimes 8 hours a day. It was found that people in restaurants increased their voice levels when the occupancy density increased.

Noise is one of the main environmental problems in this type of industry. It affects workers health and behavior. In commercial kitchens noise is generated by the cooking appliances which dictate the overall noise level as each individual appliance might contribute significantly to the total noise and heat release from kitchen as this influences the size of the exhaust system required and the flow rate of air to be handled by the system and type of fan used (centrifugal fan with blades that are backward curved, forward curved or radial, or axial fan) will influence the level

**Table 3:** Distribution of sample by perception on noise in work environment (N=90)

Noise	Restaurant	Catering centre	Fast Food centre	Total
Always	18 (20)	14 (15.5)	10 (11.1)	42 (46.66)
Some times	6 (6.6)	12 (13.3)	11 (12.2)	29 (32.2)
Never	6 (6.6)	4 (4.4)	9 (10)	19 (21.1)
Total	30	30	30	90 (100)

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### 3.4 Thermal comfort

Table 4 reveals that 56 per cent of the cooks of which 22.2 per cent representing catering centre and 20 per cent from restaurant and fast food centres respectively suffer from heat strain due to direct exposure to heat. Commercial kitchens are the complex environments wherein air temperature, humidity, radiant heat and airflow interact. The heat sources in commercial kitchens are cooking stoves, grills, ovens, hot plates, fryers, kettles, boilers and fuel wood. The respondents complained of hot temperature in the cooking environment

which they do not have control over leading to profuse sweating, exhaustion, irritability due to moist and hot temperature, heat rashes and head ache. No cook was found to consume water during the working hours, other than during food intake time. A study was conducted by [7] on thermal stress of workers in kitchen working environments in Japan. Their results indicated that workers in gas kitchens might be exposed to higher heat stress than those in electric kitchens. Restaurant employees who are regularly subjected to extreme heat can suffer from heat rashes, heat cramps, heat exhaustion, heat stroke and dehydration [8].

On the average thermal conditions in measured kitchens are not fully satisfactory. Thermal conditions are rather good in some kitchens but not acceptable in some. It seems that minimum ventilation rates given per floor area are not adequate to ensure an acceptable indoor climate in commercial kitchens, due to the different loads caused by kitchen equipment.

**Table 4:** Distribution of sample by perception on thermal comfort in work environment (N=90)

Thermal comfort	Restaurant	Catering centre	Fast Food centre	Total
Always	18 (20)	20 (22.2)	18 (20)	56 (62.22)
Sometimes	8 (8.8)	9 (10)	9 (10)	26 (28.88)
Never	4 (4.4)	1 (1.1)	3 (3.3)	8 (8.88)
Total	30	30	30	90 (100)

Ventilation rates in commercial kitchens should always be based on the load caused by the kitchen equipment. This should also be taken into account in building codes and guidelines. Indoor climate should also be considered in kitchen layout design. For instance all cooking equipment and dishwashers should be placed under hoods or ventilated ceiling. According to the measurements, if there is no control system of the air flows, the air flow rate in the kitchen is not suitable most of the time, because of the fluctuation of the heat, the moisture and the impurity load entering the kitchen. Because of this, the possibility of using demand based ventilation should be considered in commercial kitchens as well. The main needs in developing the ventilation of commercial kitchens are the improvement of ventilation design guidelines, as well as the development of control systems for ventilation [9].

### 3.5 Cleanliness

Good sanitation is one of the most important priorities in a commercial kitchen which is easily overlooked. Table 5 reveals that 22.2 per cent of the cooks in catering centres are not satisfied with the cleanliness in the cooking environment as their work gets affected due to dirt circumstances. 20 per cent of cooks from fast food centres says that work place is not clean and motivating as provisions are not made for keeping the premises clean by removing the waste every day. Most food-related illnesses that are caused by restaurants are the result of unsanitary food handling practices [10]. A well designed kitchen has special design points that allow the floors to remain dry. The features follow as: sufficient drainages

**Table 5:** Distribution of sample by perception on cleanliness in work environment (N=90)

Cleanliness	Restaurant	Catering centre	Fast Food centre	Total
Always	15(16.6)	20 (22.2)	18 (20)	53 (58.88)
Some times	10 (11.1)	7 (7.7)	6 (6.6)	23 (25.55)
Never	5 (5.5)	3 (3.3)	6 (6.6)	14 (15.55)
Total	30	30	30	90 (100)

installed for fast elimination of solid water waste, the selection and use of floor materials easy-to-dry, or use of specially designed equipment having a drainage system which prevents its floor from cross-contamination from waste water [11].

There have been several reported problems with wet kitchen floors. First, this is the potential hazard of falls on slippery floors due to the excessive use of water. Second, the hazards associated with an electric leakage via the water in the middle of cleaning floor or operating equipment are increased. Finally, these conditions will increase the exhaustion of employees and decrease labor efficiency [12].

## 4. Conclusion

Food service industry engages skilled cooks for meeting the demands of consumers in different cooking environment. This study explored the work environment stress among cooks in three different commercial food service centres totalling to 90 units in Hyderabad city. The findings of the study revealed that the physical work environment is not satisfactory for the cooks which in a long run can affect their well-being. Proper ergonomic intervention strategies can alleviate the occupational health of the commercial cooks which will increase their productivity and also occupational injuries can be reduced by improving the work environment.

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