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### Food safety and hygiene in anganwadi kitchens of North-East region of Delhi

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#### Abstract

**Background:** Integrated Child Development Scheme (ICDS) is the landmark scheme in the history of nutrition in India to combat malnutrition among children. ICDS scheme represents one of the largest programs for early childhood development to improve the conditions of children, pregnant women and lactating mothers. Despite progress in the health sector, India has very high child morbidity and mortality rates. Million children in the world are at risk due to unsafe food. Safe food supply depends on both sound knowledge and stringent food laws. It is important for the AW kitchens to realize their shared responsibility to provide nutritious and safe food to the children.

**Methods:** An observational checklist was used to assess food safety and hygiene in 5 Anganwadi kitchens of North East district, Delhi. The tool is used to gather information regarding Food Safety Management Systems (FSMS) currently in place at ICDS kitchens.

**Results:** The food safety score was found be average in 2 out of 5 anganwadi kitchens which implies that the food safety in these anganwadi kitchens is compromised in one or the other food safety parameters and it could also rise to food safety incidents in these anganwadis.

**Conclusions:** Effective food hygiene training and the enactment of safe food handling practices learnt during training are critical elements in the control of food-borne illnesses in the ICDS kitchens. The current findings indicate a need to review the effectiveness of current food safety management systems at place in various anganwadi kitchens and further stress on a food safety protocol that needs to be revised by the department periodically.

**Keywords:** Food safety, ICDS, malnutrition, food handlers, hygiene, FSMS

#### Introduction

The Integrated Child Development Services (ICDS) Scheme launched on 2nd October, 1975 is one of the flagship programs of the Government of India and represents one of the world's largest and unique programs for early childhood care and development. It is the foremost symbol of a country's commitment to its children and nursing mothers, as a response to the challenge of providing pre-school non-formal education on one hand and breaking the vicious cycle of malnutrition, morbidity, reduced learning capacity and mortality on the other. The beneficiaries under the scheme are children in the age group of 0-6 years, pregnant women and lactating mothers.

Nearly every fifth child in the world lives in India, and around 40% of children remain undernourished with their growth and development impeded irrevocably, over the lifetime and leads to morbidity and mortality of children under six years. To overcome this problem, the ICDS program was initiated which helps to promote holistic development of children under six years through Anganwadi at the community level. Among the various functions of ICDS, supplementary feeding is directly linked with the prevention and control of malnutrition in children.

Studies have shown that there are more than 200 known diseases transmitted through food. Every year billions of people experience one or more episodes of food borne diseases. Proper food safety and hygiene can prevent most of the food borne diseases so there is a need to emphasize food safety at every step of food preparation. Food-borne diseases have been increasing in recent years, with a greater impact on the health and economy of developing countries than developed countries (WHO, 2008).

Food safety is a process that ensures quality in the production and preparation of food products.

A safe and hygienic food is the assurance that it will not cause harm to the consumer upon its preparation or consumption according to its hygiene and sanitary requirements. In spite of government all over the world are doing striving efforts to improve the food safety of the food supply, the occurrence of food borne diseases still remains a public health issue in both developed and developing countries.

ICDS provides health, nutrition, immunization, preschool education, health and nutrition education, and referral services to young children and their mothers. The program provides a comprehensive and holistic package of services through a network of community level anganwadi centres (AWC). The anganwadi means a courtyard play center located within the village or urban area. The Anganwadi worker is the main functionary of the centre along with anganwadi helper who assist the anganwadi worker in daily routine activities. Anganwadi worker has a pivotal role in assuring food safety and nutrition to the beneficiaries due to her close and continuous contact with the community and has more chances to interact and to educate the mothers also on various aspects of food safety and hygiene (Sheethal et. al, 2015) [2].

Although the majority of food handlers have the required skills and knowledge to handle food safely, human handling errors have been implicated in most outbreaks or food borne disease of food poisoning. The attitudes and practices of food handlers have an important role in the prevention of food borne illnesses. Preventing food borne diseases at the consumption level relies on a combination of Good Handling Practices (GHP) and Good Manufacturing Practices (GMP) during food procurement, preparation, handling and storage (Cempaka, 2017) [1].

Knowledge of food safety, hygiene and sanitation among food handlers and the effective application of such knowledge in food handling practices are essential in ensuring the production of safe food (Cempaka, 2017) [1]. The beneficiaries of supplementary nutrition in ICDS are children 6 months to 6 years of age, pregnant and lactating women, who are especially vulnerable to infections. Thus utmost care is required at all stages of managing supplementary nutrition (Sheethal et. al, 2015) [2].

Research has shown a safe and nutritious diet impacts children's cognitive abilities. Early years providers such as anganwadi system can encourage children to eat well and establish healthy eating patterns that will help set the foundations for their future health and well-being and they could be a contributing asset to the development of a country. The health and well being of children in ICDS Centres is of paramount importance therefore, it is the duty of AW workers and helpers to follow good hygienic and handling practices while preparation of food till its distribution to AW centres.

Most of the studies on ICDS concentrates on the nutritional and health status of the beneficiaries of ICDS and also to assess the physical infrastructure and logistics available in Anganwadi centres. Since, there are very limited studies done on anganwadi workers and helpers of Anganwadi kitchens in Indian context regarding food safety, hygiene and sanitation. Hence, there is a need to conduct assessment of food, safety and hygiene practices in the kitchens of ICDS program.

### Materials and Methods

The present study was conducted to assess the food safety and hygiene of the kitchens providing food to the Anganwadi

Centres over a period of three months from October 2019 to December, 2019 in Anganwadi kitchen of North East district of Delhi.

### Sampling plan

Before conducting the study, the permission was taken from the Department of Women and Child Development, Govt. of NCT of Delhi. The study includes visit of 05 ICDS kitchens located in North East district of Delhi from October 2019 to December, 2019. The consent was taken from the in-charge of all the ICDS kitchens before conducting the visit.

### Sampling tool

A pre-tested and structured observational checklist was used to assess food safety and hygiene in Anganwadi kitchens. The tool is developed on the basis of Schedule 4 of Food Safety and Standards (Licensing and Registration of Food Businesses) Regulations, 2011. The tool is used to gather information regarding Food Safety Management Systems (FSMS) currently in place at ICDS kitchens. The tool helps in understanding Food Safety and Hygiene of the kitchens providing food to the Anganwadi Centres and its distribution at Anganwadi Centres. However, questions have been asked from AW supervisors or workers wherever necessary.

Food safety score was assessed and calculated based on major 5 constructs i) sanitary and hygienic conditions of the kitchen, ii) facilities and equipment, iii) water facilities, iv) Receiving of Raw material, Storage of raw material, preparation of food and transportation of cooked food, v) personal hygiene of AW workers/cooks, pest control and record keeping.

Each theme has a component of 10-12 items except theme i.e. Receiving preparation, storage of raw material, preparation of food and transportation of cooked food has a score of 17 units. This theme has many components due to which the scoring of this theme has been kept at a higher side. This theme has a major role in assessing the food safety and hygiene of AW kitchens.

A good food safety score in kitchen helps in reducing the number of food borne illness in children via the food served by ICDS kitchens. The total score of all the themes is 60 out of which a score of AW kitchen found between 0-20 is seen as a 'poor' food safety score which means the sanitary hygienic condition of the AW kitchen is very bad and it needs lot of improvement. A score between 20-40 can be seen as an 'average' food safety score means most of the things in the AW kitchen are in place but some improvements are still required to be done to strengthen the food safety system of AW kitchen as it could help in reducing the concerns of food safety incidents. A score between 40-60 seems to be a 'good' score means the condition in the said AW kitchen is found to be at par in relation to other AW kitchens and could be used as a model AW kitchen.

### Results

After conducting visits in anganwadi kitchens, the raw data was coded and scores were calculated. The kitchens were assessed on parameters namely i) sanitary and hygienic conditions of the kitchen, ii) facilities and equipment, iii) water facilities, iv) Receiving of Raw material, Storage of raw material, preparation of food and transportation of cooked food, v) personal hygiene of AW workers/cooks, pest control and record keeping.

**Table 1:** Food safety scores of AW kitchens

S. No.	Kitchen code	Maximum Score	Score obtained
1.	01K12019	60	28
2.	02K22020	60	30
3.	03K32020	60	59
4.	04K42020	60	37
5.	05K52019	60	55

The kitchen with code 01K12019 has received a food safety score of 28 which implies an *average* food safety score that means most of the things in the AW kitchen are in place but some improvements are still required to be done to strengthen the food safety management system of AW kitchen. While checking, it has been found that there were no proper lighting in the kitchen. The paints in the kitchen area and ceiling were becoming flaky. The kitchen surface was tiled however, the tiles were found to be broken at some places. There was no separate room for cleaning of utensils. The cooking was being done in an open environment which could be a serious issue for contamination. Overall, the cleanliness in the kitchen was compromised.

The kitchen did not have a good drainage facility. There were no separate place for washed and unwashed utensils as the area of the kitchen was smaller. There were no closed shelves available in the kitchen. The shelves were open which can easily attract dust particles. Dusters were found to be dirty. Water testing certificates and records were available in the kitchen. Raw materials were stored in gunny bags but were not kept above the floor to avoid cross contamination. Raw material was not properly labelled. Storage area was found to be dirty and unhygienic and it was found to be open.

During the visit, one of the peculiar observation found was that the food handlers were washing potatoes and the washed and cut potatoes were placed on dirty rags. Preparation area was found to be dirty. Food hygiene parameters were found to be compromised. The female handlers were using jewellery as well as nail paints which could contribute to source of contamination in the food preparation area. The food handlers/workers were not provided any food safety and hygiene training as reported by the cooks and handlers. Food hygiene do's and don'ts were not pasted in the kitchen premises. Sanitary health cards of food handlers were not available.

The second kitchen with code 02K22020 has received a food safety score of 29 which implies, *average* food safety score means most of the things in the AW kitchen are in place but some improvements are still required to be done to strengthen the food safety system of AW kitchen as it could help in reducing the concerns of food safety incidents. The paints in the kitchen area and ceiling were becoming flaky. The surface of the kitchen lacks smooth surface. There was no window provided in the kitchen for adequate ventilation. There was no separate room for cleaning of utensils. Cleaning aids were not labelled. There was no fire extinguish system available in the kitchen. The kitchen does not have good drainage facility. Dustbin were present in the kitchen but they were not covered. Some of the utensils were found to be tainted. The cleaned utensils were found to be placed on a rack which was covered with lot of rust and dirt, it can easily contaminate utensils. There were no proper sinks for washing purpose, the same was being done in a single room. There were no closed shelves available in the kitchen. The shelves were open which could easily attract dust particles. No purifier was being installed in the kitchen. The supply of water was through MCD which is not safe to drink. Water testing certificates and

records were available in the kitchen. Raw materials were stored in gunny bags but were not kept above the floor to avoid cross contamination. Raw material was not properly labelled. Storage area was found to be dirty and unhygienic. The supervisor reported that they didn't have sufficient space for storage because the work is expanding. Due to this, visitor's room was used for storage area where the safety of food was compromised. Food was spilled in the area where packaging was being done for Take Home Ration. Dusters were found to be dirty. The female handlers were using jewellery as well as nail paints which can contribute to source of contamination in the food preparation area. The food handlers/workers were not provided any food safety training as reported by the cooks and handlers. Food hygiene do's and don'ts were not pasted in the kitchen premises.

The kitchen with code 03K32020 has received a food safety score of 59 which is a good score, implies, the condition in the said AW kitchen was found to be at par in relation to other AW kitchens. It could also be a model AW kitchen equipped with the best operations and facilities. Cleaning aids were stored in separate shelves, however the same was not labelled. Suggestions were given for proper labelling of cleaning aids. Color coded dustbins were available with proper lids. All records and certificates were available and up to date with the supervisor. The vehicle in which the food was kept for transportation was found to be clean. The female handlers were using jewellery as well as nail paints which can contribute to source of contamination in the food preparation area. However, some of the handlers were not using nail paints. The food handlers/workers were found to be keen learner and desired to get a training on food safety, hygiene and sanitation. Suggestions were given to supervisors to have separate registers for visitors and inspections. Overall, the kitchen was found to be excellent in its all operations.

The kitchen with code 04K42020 has received a food safety score of 37 means an average food safety score means, most of the things in the said kitchen are in place but some improvements are required. The paints in the kitchen area and ceiling were becoming flaky. There was no window provided in the kitchen. Under facilities and equipment, there were no proper sinks for washing purpose, the same was being done in a room. There were no closed shelves available in the kitchen. The shelves were open which can easily attract dust particles. The kitchen does not have good drainage facility. Lids were not present in the dustbin. Dusters were found to be dirty. Under the theme water facilities, it was found that no purifier was installed in the kitchen. The supply of water was MCD which is not safe to drink. There was no provision for testing of water at regular intervals as reported by the supervisor. Under the theme, receiving of raw material to transportation of cooked food, raw material was not properly labelled in the storage area. The vehicle in which the food was kept for transportation was not found clean. Under the theme, Personal hygiene of AW workers/cooks, pest control and record keeping, the female handlers were using jewellery as well as nail paints which can contribute to source of contamination in the food preparation area. The food handlers/workers were

not provided any food safety training as reported by the cooks and handlers.

The kitchen with code 05K52019 has received a food safety score of 55 which implies, most of the things in the said kitchen are in place but some improvements are still required. Insectocutors were present in the kitchen. The fire extinguishing system was installed in the kitchen. Under water Facilities, the kitchen was equipped with proper running water facilities. Water purifier was installed in the kitchen. The food handlers/workers were not given any food safety training as reported by the cooks and handlers.

### Conclusions

Although operational guidelines for food safety and hygiene in ICDS have been issued by the Ministry of Women and Child Development, Govt. of India for effective food handling at all stages of food production from farm to fork. The kitchen with code 01K12019 and 02K22020 has received a score of 28 and 30 which suggests that the food safety in these anganwadi kitchens is compromised in one or the other food safety parameters and it could also rise to food safety incidents in these anganwadis. The current findings indicate how a good food safety score of a kitchen helps in reducing the number of food safety issues and illnesses among the children in anganwadis. A good food safety score is directly related to number of food borne outcomes among the beneficiaries. The current findings indicate a need to review the effectiveness of current food safety management systems at place in various anganwadi kitchens and further stress on a food safety protocol that needs to be revised by the department periodically. A proper food safety audit system has to be in place by the individual kitchen or by the third parties. More and more studies are required to look into the factors that inhibit the transfer of knowledge into food safety behaviour in anganwadis so that an effective food safety policy can be put in place. The high rate and cost of food borne illness highlights the need for health professionals to develop and implement more effective food safety educational programs that result in safer food handling practices of food handlers at all stages of food preparation. Since FSSAI is a regulatory body for ensuring availability of safe, hygienic and nutritious food in the country, a deeper collaboration between Food safety departments with Department of Women and Child Development would be considered more beneficial so that regular inspection, testing and surveillance can be ensured in ICDS kitchens.

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