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Application of Method Study to Improve Work Flow Process in a Dietary Facility of a Medical College

KEYWORDS: Dietary service, method study, process flow, staff fatigue

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ABSTRACT *Objectives: To improve efficiency of work processes in a dietary facility of a medical college by application of method study "Work Process flow" technique.*

Method: An observational and descriptive study was carried out in a dietary facility of a medical college over a period of four weeks. During this period techniques of work process flow was adopted by identifying and recording the activities through a graphical portrayal. The activities were classified as operations, transportations, inspections, delays and storages each being represented symbolically. Each activity was critically examined for the purpose, place, sequence and means and improvement measures were recommended.

Results: The recording of the process flow resulted in identifying 58 activities. The graphical portrayal revealed duplicate activities and inefficient work processes including improper layout and flow patterns. The recommended improved flow led to a 23 % reduction of activities 58 to 45 in the mess which open new possibilities and opportunities to bring in efficiency in the service. This included opportunities in reduction of costs, reducing mess staff fatigue, developing flows for segregation of traffic and appropriate waste management. Recommendation for pedestrian traffic, keeping of ration in store room and non mixing of clean and dirty traffic were also made to make the flow process more qualitative.

Conclusion: The present study utilises scientific technique to increase the efficiency and productivity of an operating unit by reorganisation of work normally involving little capital expenditure, improving working conditions and developing safer and hygienic methods of performing operations.

Introduction

Dietetics is the combined science and art of feeding individuals and groups under different economic and health conditions according to the principles of nutrition and management. According to Turner (1959), it includes consideration for planning of meals together with selection, storage, preparation and serving of foods with due emphasis on social and psychological factors [1].

A Medical College in Pune recognised for medical and paramedical training manages five staff kitchens. Over a period of time the training capacity in the institution has been significantly enhanced and the staff kitchens planned over 50 years back are currently over-subscribed. One staff kitchen had recurrent service related issues. The mess infrastructure initially built to serve approximately 40 members per day, currently serves 107 members which include 66 trainees and 41 permanent staff members.

After a feedback from the clientele it was identified that the kitchen had issues of suboptimal service delivery. The clientele and staff highlighted the issues of inadequate and poorly maintained equipment, insufficient staff, poor service, inadequate space, more time for service delivery and poor waste management practices.

Modern scientific management techniques can be applied in health care facility settings to improve work processes. The problem issues listed above are an apt organisational environment to implement these practices and bring efficiency and economy. Work study is one of the common modern scientific management techniques utilised to bring an improvement in work practices, through the systematic examination of the methods of carrying on activities, improve the effective use of resources and establish standards of performance for the activities being carried out [2]. Work study embraces the techniques of method study and work measurement.

Method study focuses on systematic recording and critical examination of ways of doing things in order to make improvement without compromising efficiency. Method study includes eight steps namely; **Selecting** the work, **Recording** the relevant facts by direct observation, **Examining** the job being performed and challenging its purpose, place, sequence and method of performance, **Developing** a practical, economic and effective method, **Evaluating** different alternatives, **Defining** the new method, **Install** the method as a standard practice and **Maintaining** by introducing control measures [2].

The dietary kitchen problem in the medical college lent itself to critical examination and the application of method study in order to bring an improvement in the service delivery. Preliminary assessment to establish objectives, scope, formulate a study design and identify technique for implementation was conducted.

Material & Methods

The study setting identified was the paramedical staff kitchen of a medical college serving 110 members as detailed above. The study was conceived as an observational and descriptive study of the dietary services. Method study technique utilised in the study is "Work Process flow" technique as per International Labour Organisation (ILO) criteria. The study was conducted over a period of four weeks, which included observations and data collection

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The methodology applied for the study included a preliminary examining of the processes & informal interview with kitchen staff members and clientele, preparing flow process charts and training observers for method study, identifying and recording the activities through a graphical portrayal, examining bottlenecks in process flows, developing alternatives and implement the changed process. The graphical portrayal was done by classifying the activities as operations, transportations, inspections, delays and storages each being represented symbolically.

Kitchen processes included in the study were the preparation of food, serving of food to clientele, clearing and cleaning processes and waste disposal. Processes for procurement, receiving and accounting of rations were excluded from the scope of the study.

Observation and Discussions

Location. The identified mess is located within the campus of medical college near residential accommodation. It is a two floor building with messing on the ground floor and sitting and recreational area on the first floor. The ground floor is divided in two distinct elements – kitchen and dining area. The Mess kitchen has four zones based on the function; Zone 1 where reception, inspection, storage and issue of raw food materials is conducted, Zone 2 where preliminary preparation of food, peeling, cutting of vegetables and washing procedures are carried out, a Zone 3 for cooking area and Zone 4 as waste disposal area.

Human Resources. The Kitchen staff includes one cook, two food members, four mess boys and one house keeping staff. The job descriptions for the cook is cooking for the three meals, the food handlers do the preliminary preparation and assist the cook in meals cooking, mess boys deliver food to the dining tables and wash utensils. In addition the staff includes one mess secretary who supervises all the mess activities and a clerk for accounting.

Kitchen & Meal Timings. The operational times for the mess services includes kitchen, pantry and dining timings. The kitchen is operational from 0500h to 0800h for breakfast, 1030 h to 1330h for lunch and from 1600h to 2000h for dinner. The dining room times when meals are served if from 0700 to 0830 hrs for breakfast, 1300 to 1430 hrs for lunch and 1900 to 2100 hrs for dinner. The pantry timings include 0600h to 0900h in morning, 1200h to 1500h in afternoon and 1830h to 2130h in evenings. The timings include all processes carried out in the area. Effectively the mess is thus functional from 0500h to 2100h with a 1 hour break each in morning and afternoon before closing for the night.

Service Process. A critical examination of the work processes was undertaken identifying the various activities in the process. Broadly the processes undertaken were preparation of food, dining room service and cleaning and upkeep. The activities undertaken under the respective processes included

Preparation of Food. The activities undertaken under the process were fetching of dry, fresh and perishable ration from store room, inspection of ration, chopping & washing of vegetables, kneading of dough, cooking of food, shifting of cutting table, preparation of chapattis and transport and storage of food in pantry.

Dining Room Service. Dining Room service identified the following activities; transport of food to warmer in dining room, service, dirty plates collected and transferred to wash area in pantry and transport of left over food to pantry.

Cleaning & Upkeep. Cleaning and upkeep of the activities included washing of plates and utensils in wash area, transport of clean plates to stacked area and storage, transport of clean kitchen utensils and storage, transport of waste disposal to waste bin through kitchen, retrieving of cleaning material and cleaning of kitchen and dining room, storage of cleaning material and inspection of kitchen.

Preparing the Flow Process Chart for Service Process

As a first step in developing the work process, we transferred the mess activities including preparation of food, dining room service and cleaning and upkeep to a standard flow process chart. The activities were identified as operation, transport, delay, inspection and storage. The recording team took readings at 10 minute intervals to identify the activities being conducted in the kitchen during the operational timings of the mess.

The flow of activities was transferred to a flow process chart. The standard flow process chart of the dietary facility in the medical college is depicted in **Figure 1**. The left hand side of the chart depicts the flow process and the activities which were undertaken by the mess staff. The examination of flow process chart showed there are 17 operations, 26 transport, 5 delay, 3 inspection and 7 storage activities.

Each activity was critically examined for the purpose, place, sequence and means of carrying the activity. Critical questions (What, Why, Where, When, How, Else) were asked for each activity. The critical examination of the flow process chart in conjunction suggested that there was considerable room for improvement. As an example while analysing the collection of ration (dry, fresh and perishable) the first "Why?" which came to mind is: "Why ration is stored in three different rooms? " Why is there need of repeating same step three times? "The answer almost certainly was: "Can it be undertaken in one step". If ration is stored in same area with considerable amount of space then three activities can be reduced to one which saves time for other activities. A separate question which arose while examining the chapatti activity was : "Why is the cutting table used for preparing chapatis?" followed, after by the key questions: "What else can be there for chapattis?" On a similar note an important parameter which arose was "Why is there mixing of clean and dirty traffic in the pantry?" "Why waste food is taken from kitchen when separate area is available?"

Developing the Improved Work Method& Process

There is an old saying to the effect that to ask the right question is to be half way to finding the right answer. Once the questions have been answered, first step was identification of duplicate/unproductive activities and inefficient process flows. An improved process flow method was developed and recorded on the flow process chart so that it can be compared with the original method. The right hand side of the flow process chart depicted in **Figure 1** details the improved method recommended after the exercise was undertaken and implemented.

Opportunities existed for identifying inefficient flow pro-

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cesses, duplication of activities, redundancy etc The **Table 1** below outlines the summarised processes which were utilised in formulating the new improved method.

Table 1
Key Activity Observations and Improvement Measure

S No.	Activity Serial No.	Activity Element	Observation	Improvement measure
1.	2, 3, 6, 7, 10, 11	Purpose - Storage of Rations Place - Three different room in different locations for dry, fresh & perishable Sequence - Repetition of activities Means - Manual retrieval	Inefficient layout Duplication of activities Increase travel time utilisation	Modification in layout by combining stores to reduce number of activities
2.	29,30	Purpose - Use of single table for chopping vegetables and preparing chapattis Place - Preparation and cooking area Sequence - Shifting of table from preparation to cooking area and vice versa Mean - Manual work	In appropriate layout Additional activities Increase manpower utilisation	Modification in layout to enable activities in preparation and cooking area
3.	39, 41,42	Purpose - Serving and & winding up Place- Pantry and dining hall Sequence - Service from Pantry and Used plates, left over back to pantry Means - Manual work for both clean service and dirty flow	Mixing of clean and dirty traffic Additional activities Inefficiency in flows Inappropriate layout	Separate flow for clean and dirty traffic to improve processes
4.	53, 54	Purpose - Disposal leftover food/Waste Place - Through Pantry and kitchen Sequence - Dirty flow through Pantry & kitchen in each activity Means - Manual	No dedicated path for waste Mixing of clean and dirty traffic	Developing segregated path for waste

The improved method was able to bring a considerable reduction in the number of activities by combining activities deleting "unproductive activities" and modifying the process flows. The number of "Operations" has been reduced from 17 to 14 by the elimination of unnecessary repetition of collection of ration and cleaning of cutting table. "Transports" have been reduced from 26 to 19 and "Delays" from 5 to 2 by the elimination of repetition of transfer of ration three times and shifting of cutting table. **Table 2** below summarises the identified activity groups as per the old processes and modified processes. A total number of 58 activity groups were performed as per the old process. When the process was modified the same was reduced by 13 activities to a total of 45 activity group.

Figure 1
Flow process chart – Current & Improved Methods in Dietary Kitchen

	Current Method Studied		Proposed Method	Remarks
1	Instruction on Menu plan	1	Instruction on Menu plan	
2	Go to store areas	2	Go to store areas	
3	Collect Dry Ration	3	Collect Dry Ration	
4,5	Transport Dry ration to kitchen	4	Collect Fresh ration	
6	Go to Fresh store areas	5	Collect Perishable Ration	
7	Collect Fresh Ration	6	Transport Ration to kitchen	
8,9	Transport to kitchen	7	Inspect Ration	
10	Go to Perishable store areas	8	Vegetables to wash areas	
11	Collect Perishable Ration	9	Peeling, washing, soaking	
12,13	Transport Perishable to kitchen	10,11	Transport to cutting areas	
14	Inspect Ration	12	Chopping of vegetables/ meat	
15	Go to wash areas	13	Cut Vegetables stored	
16	Peeling, washing, soaking	14	Transport of water	
17,18	Transport to cutting areas	15	Knead Dough	
19	Chopping of vegetables/ meat	16	Store Dough	
20	Cut Vegetables stored	17	Retrieve utensils for cooking	
21	Transport of water	18	Cook Vegetables	
22	Knead Dough	19	Transport to Pantry	
23	Store Dough	20	Store Cooked Food	

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24	Retrieve utensils for cooking		21	Inspect Cooked Food	
25	Cook Vegetables		22	Prepare Chapatis from Dough	
26	Transport to Pantry		23	Cook Chapatis	
27	Store Cooked Food		24	Store Chapatis	
28	Inspect Cooked Food		25	Transport Chapatis to Pantry	
29,30	Shift Cutting Table		26,27	Retrieve plates from Store	
31	Clean Table		28	Transport plates to Dining	
32	Prepare Chapatis from Dough		29	Transport food to Dining	
33	Cook Chapatis		30	Transport Left Food to Pantry	
34	Store Chapatis		31	Unclean plates to Wash area	
35	Transport Chapatis to Pantry		32	Washing plates & utensils	
36,37	Retrieve plates from Store		33,34	Utensils/plates for drying	
38	Transport plates to Dining		35	Transport of Plates	
39	Transport food to Dining		36	Storage of Plates	
40	Transport Left Food to Pantry		37	Transport of utensils	
41,42	Unclean dining plates to Pantry		38	Storage of utensils	
43	Left Food to kitchen		39	Retrieving cleaning material	
44	Unclean plates to wash area		40	Waste disposal of left over	
45	Washing plates & utensils		41	Transport left over to wastebin	
46,47	Utensils/plates left for drying		42	Cleaning of kitchen	
48	Transport of Plates		43	Transport of cleaning material	
49	Storage of Plates		44	Storage of cleaning materials	
50	Transport of utensils		45	Inspection of kitchen	
51	Storage of utensils				
52	Retrieving cleaning material				
53	Waste disposal of left over				
54	Transport left over to wastebin				
55	Cleaning of kitchen				
56	Transport of cleaning material				
57	Storage of cleaning materials				
58	Inspection of Kitchen				
	Number of Activities				

Table 2
Summary of Activity Groups

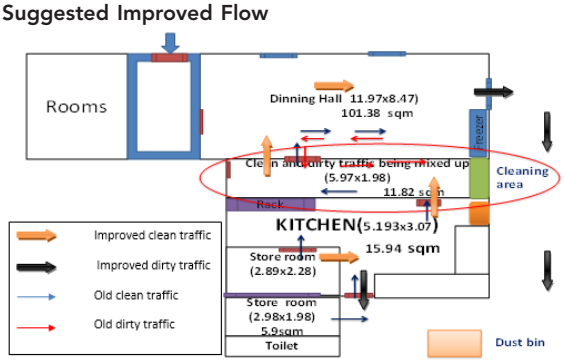
S No	Activity Group	Symbol	Old Process	Modified Process	Net Changes
1	Operations	○	17	14	(-) 03
2	Transport	⇨	26	19	(-) 07
3	Inspections	□	03	03	-
4	Delays	D	05	02	(-) 03
5	Storage	▽	07	07	-
	Total		**58**	**45**	**(-) 13**

Identifying Opportunities & Recommendations

The result, as seen from the process chart, is a reduction of over *23%* of activities in mess. Importantly the detailed critical analysis of the dietary service threw open new possibilities and opportunities to bring in efficiency in the service. This included opportunities in reduction of costs, reducing mess staff fatigue, developing flows for segregation of traffic and appropriate waste management.

With a view to make the flow process more qualitative, it is recommended that there should be no pedestrian traffic in receiving area ; ration should be kept in baskets/crates in a single storage space. Mixing of clean and dirty traffic must be prevented by separate flow [4]*. Last but not the least inspection activities should be done to improve efficiency and productivity. **Figure 2** below depicts the current and improved flows on account of the modifications/ changes

Figure 2
Suggested Improved Flow



Conclusion

Method study flow process chart is a means of raising the efficiency and productivity of a operating unit by the reorganisation of work which normally involves little or no capital expenditure on facilities and equipment [2]. The present study utilises this scientific technique to improve working conditions and develop safer and hygienic methods of performing operations. However, it must be remembered that the success of either system will depend on facilities and equipment, equitable distribution of workload, organization of duties and a good employee orientation.

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