

Hospitals' Food Safety Management Model in Thailand

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Abstract: Hospitals are clinical places where service daily mass catering for patients and hospitals' staffs, hospitals' food safety management is highly important and necessary for administrators and people who are responsible in the area of nutrition at hospitals. Now-a-days, there is still no appropriate safety to be used as a guideline in hospital's food management to be highly safe for consumers. This research has a propose to develop hospital's food management to be safety which the integrated models of qualitative, quantitative and operative researches research method has been used as research's methods, the example groups were 306 government's hospitals where under management of Thai Ministry of Public Health, the used statistics for analysis were relation model of linear structure and analysis of confirmative composition, regression and causal effects. The research result found that hospitals food safety management model is concluded of 3 most important aspects of food safety management which are food safety control, sourcing of safe raw materials and factors in food safety managing to be succeeded in both aspects of administrator's policy and support and hospitals food safety development team which all the said 5 aspects cause hospitals food a safety directly and indirectly and the experimental results of food safety management model operation was experimentally used with 2 interested hospitals and found that there is capability to produce food safety administration in the various aspects which causing hospitals catering to be more safer. This kind of research model is able to be constructed as guideline instruction for hospitals application in order to produce food safety service that is friendly to visitors health and importantly makes more reliability on hospital's food services.

Key words: Hospital, food safety, food management, food control, food safety model, public health

INTRODUCTION

Every day at the hospitals, there are mass catering services for patients and staffs with their expectation in food safety but in contrast hospitals food are risky of contamination in food chain due to the fact that there are various risky factors such as chemicals and germs that could possibly be infected from inner and outer hospital (Hancock, 1999), 70% of food contamination at hospitals was caused from heath control in appropriate time period for food preservation and seasoning and another 30% was caused from germs contamination which normally comes from kitchen's cleanliness, chefs hygiene (Hartwell *et al.*, 2006) hands washing, containers washing and cooking tools are not clean enough (Bas *et al.*, 2006). Furthermore, hospitals do not have an operative standard of food safety and the related staffs in catering area are lack of knowledge and have not received an appropriate knowledge of food safety operation and standard which easily cause the hospital's food a risk of contamination (Tokuc *et al.*, 2009).

Food management for consumers safety needs to be importantly developed in the areas of Food Safety Policy, Resources Support in many aspects of personnel, budget, tools, training of food safety management, setting up a responsible department, planning and specifying future activities that need to be developed, standard selection, processes control, standard assessment and operative parts improvement.

Food safety management that caused from the development of a safe production by controlling time and temperature that used in food production process has to be appropriate, shortest time usage in food preparation and distribution in order to reduce contamination and bacterial growth in foods (Doninia *et al.*, 2008).

Food safety management that caused from the food safety standard control, cleanliness and safety inspection which helps to monitor a risk that may be contaminated, adjusts the errors and reduces hospital's food contamination (Angelillo *et al.*, 2001). Development of hospital's food to be clean and safe needs to control the standard from the beginning of raw materials selection throughout food production (Hamprecht and Daniel, 2005)

and raw materials standard control needs to be connected and developed together in between the local participation from raw materials consumers, producers, standard controllers and inspectors which help to improve a safer raw materials (Hunt *et al.*, 2005).

An achievement in food safety development is still being caused from the important factors which are Food Safety Policy in the levels of local and government policy, the Quality Assurance Policy of food safety (Manning *et al.*, 2006) to use Health Promotion Hospital Policy as a machinery in food safety improvement for consumers.

The development must have participation from the related departments in both of inner and outer hospital (Bravo *et al.*, 2008), the supported factors that make food safety development to be achieved is caused from leaders who have their great viewpoints for developments of food safety, policy and operative strategy in every steps of process as well as promotion of administrators' resources support (Manning *et al.*, 2006) and setting up a departments' food safety team, training for staffs in order to be capable in improving hospital's food safety activities and constructing organization's culture in working as a part of team, improving leadership for team members and helping hospitals to achieve in operation (Savic and Pagon, 2008).

According to the said reason that is why Ministry of Public Health has to support hospitals in Thailand to improve food service quality to be safe in order to produce reliability for visitors.

The research's purposes:

- To educate food safety management process of hospitals
- To educate factors that lead to an achievement in managing hospital's food safety
- To develop hospital's food safety model

Hypothesis: Food safety production process, Food safety control, Safe raw material provision, Policy and promotion of leaders and hospital's food safety team which have an affect directly and indirectly for hospital's food to be safe.

MATERIALS AND METHODS

This research are an integrated research of quality, quantity and operation which were divided into 3 phases as following: Phase 1 qualitative research by educating hospital food safety management process and factors that cause an achievement in managing hospital's food safety management which the example group was 4 prototype hospitals of food safety (prototype hospital of food safety is a clinical place where greatly succeeded in food

safety development and have been approved from Ministry of Public Health to be the example of hospital's food safety development (Good practice) in the total number of 4 hospitals). The used research's instruments were questionnaire form, group memorandum form, observation form and gathered data by deeply questioning and group discussion. People who related with hospital's food safety development and gave data are presidents of hospitals, hospital's food safety team, hospital's food safety development supportive departments such as departments of agriculture, livestock, raw material safety producers' organization and Patients in the total number of 71 people and analyzed and concluded qualitatively by content analysis and developing to be a theme and relatively connected to the main conclusion in the causal form and being a part in explaining hospital's food safety management process and leading to achievement and the happened results (Denzin and Lincoln, 2005) and finally brought the qualitative research results to construct a questionnaire form for further phases of research.

Phase 2 quantitative research in order to analyze and experiment research hypothesis and hospital's food safety management models which the example groups were central hospitals, general hospitals and local hospital where under management of Thai Ministry of Public Health in the total number of 300 hospitals. And the used instruments in this research were questionnaire that has been developed from research's phase 1 which composed of 5 parts of general information of answerers about questionnaire, hospital's food services, hospital's food safety development activities, opinions that relating to food safety management and achievement factors of hospital's food safety management, opinions about hospital's food safety and the factors that is a limitation in developing hospital's food safety and continually testified instrumentals quality by specialists and researcher by taking the questionnaire to try-out with 30 hospitals in order to analyze reliability value with Alpha Coefficient of reliability value of questionnaire = 0.954 and reliability value of each sections = 0.6031-0.9377 and standard deviation value = 0.25-1.16, data collection and informative questioning at the 300 places of target hospitals which the people who gave information were the responsible departments of hospitals' catering and food safety development in the total number of 300 people. The used statistics for the analysis were linear structural relationships model, confirmative elements analysis, analysis of regression and causal effects, finalized by analyzing and concluding to get the hospitals' food safety management model.

Phase 3 operative research by applying hospital's food safety management model for the 2 interested hospitals and the used instruments in this research were the forms of questionnaire, observation, data collection

by deeply questioning hospital's presidents, food safety development team, safe raw material producers organization and the group of hospital's consumers in the total of 20 people and finalized with research content analysis descriptively in order to get research results.

RESULTS AND DISCUSSION

The elements analysis result of the food safety management model, the result that caused from qualitative analysis was found that food safety management and factors that leading to an achievement in hospital's food safety management has to be composed of the important variables that have an effect on the achievement of hospital's food safety in the total number of 26 variables and constructed the format of questionnaire for getting

opinions from people who are mainly responsible in hospitals' food safety development in the total number of 300 hospitals. There is a finding that all of the 26 variables have caused an effect on food safety in range of high level to the highest level ($\bar{x} = 3.65-4.45$) then researcher used the technique of Confirmatory Factor Analysis to gather all of the variables to be just one variable that composed of the high relationship and produced the new variable which is independent of each other in order to have an error reduction in defining the research results and concluding to be more correctly. After the group has been set up, food safety management model composes of the 5 variables that has an effect on food safety are policy factors and leaders' support (X1), factor of hospital's food safety development team (X2), food safety control (X3), safe raw materials procurement (X4) and food safety productive process (X5) as shown in the Table 1.

Table 1: Hospital's food safety management model that has an effect on foods to be safe

Compositions	Variables that have an effect on food safety	\bar{x}	SD
Hospitals' policies and leaders' support (X1)	Hospitals' policies that support in causing a food safety management	4.24	0.73
	Ministry of Public Health's food safety policies	4.47	0.65
	The supports of hospitals' presidents such as budget, improvement on places and tools that use for food safety development activities etc	4.31	0.84
Hospitals' food safety development team (X2)	To constantly arrange food safety development activities	4.02	0.97
	To train and give people who operate in catering works an appropriate knowledge about food safety and cleanliness	4.32	0.81
	To set up a hospital's food safety development team which is in the form of neither committee nor hospital's food safety unit	4.11	0.37
	Intention and team work of hospital's food safety development team helps to produce hospital's food safety development activities	4.16	0.94
	Participation from the various departments in developing food safety such as nutrition, rooms inspection, operation, medical treatment, society, health support and sanitation units etc	4.30	1.01
Food safety control (X3)	The random inspection for operators who work with catering	4.26	0.75
	The random inspection for operative rooms such as raw materials, cooked food and food containers	4.58	0.61
	Tracking and assessing results of hospital's food services and get its results improved	4.31	0.74
	The annual health check for the related operators with catering works	4.77	0.46
	The application of food safety standard for hospitals such as HACCP, GMP, The standard of food sanitation and kitchen in the total of 30 sections which help hospital's food clean and safe	4.42	0.78
	Food contamination control that helps in monitoring the risky points	4.42	0.58
	The standardization and monitors for food safety which help to control hospital's food	4.36	0.71
Safe raw materials procurement (X4)	To produce a participatory network in between the organization of safe raw materials producers such as	3.65	1.18
	The helps of other departments such as agriculture, livestock etc which helps hospitals to find a source of safe raw materials	3.56	1.24
	Hospitals must change buying prices for example the buying process with the safe raw materials directly, the usage of pricing mechanism, payment process which help hospitals are able to buy safe raw materials	3.86	1.11
	The change of hospital's food menu to be suitable with safe raw materials which is an activity that helps food to be safe	4.23	0.80
	The hospital's sufficient budget support is able to buy safe raw materials and the operative room random inspection for operators who work with catering	4.42	0.79
Food safety productive process (X5)	The cooked food must be kept in a clean container with carefully covered with lids and preserved at appropriate temperatures	4.77	0.51
	The related operators who work with food must have a rightful sanitation such as hands washing very times before touching foods, covering nose as sneezing, wearing hand gloves or using tools very times picking up foods etc	4.72	0.64
	Cleanliness and environmental control of places where keep raw materials, kitchens, container storages and cooking tools in order to prevent and reduce food contamination	4.71	0.52
	Distribution of cooked food to patients must be contained in the isolated cabinet and use as quickest as possible in order to keep the appropriate temperature and time prevent food contamination during transportation	4.64	0.55
	Cleaning and preparing raw materials before cooking	4.61	0.52
	Heath and time period usage in cooking foods must be hot enough to kill germs	4.76	0.47

Table 2: The values of correlation coefficients and prediction coefficients of all 5 variables that have an effect on hospital's food safety

Potential variables	XX	X5	X4	X3	X2	X1
XX	1.00	-	-	-	-	-
X5	0.94	1.00	-	-	-	-
X4	0.57	0.49	1	-	-	-
X3	0.71	0.78	0.57	1	-	-
X2	0.61	0.61	0.75	0.76	1	-
X1	0.63	0.64	0.71	0.80	0.95	1
Prediction coefficients value			X5	X4	X3	XX
R ²			0.061	0.56	0.63	0.91

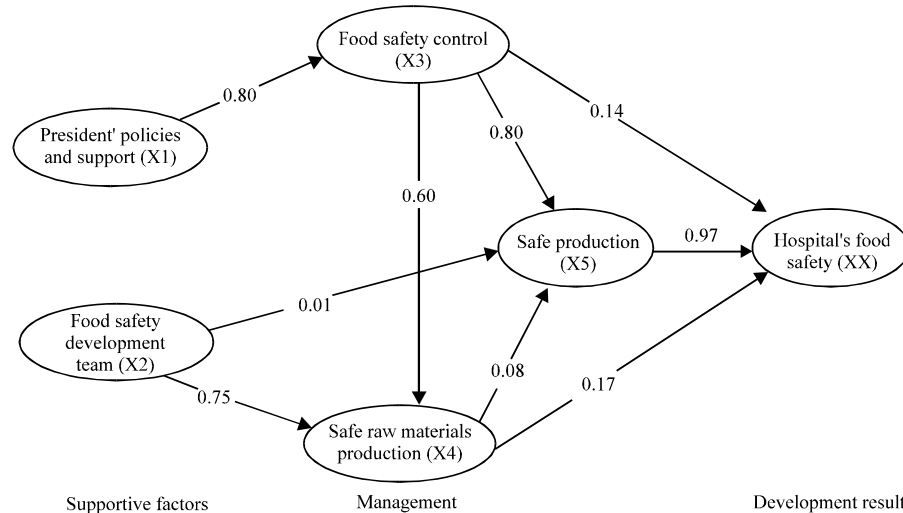


Fig. 1: Hospital's food management model

The results of analysis and hypothesis test of hospital's food safety management model by using statistic of linear structural relationships model to testify and found that food safety management model has an accordance with the empirical data which received from 300 hospitals are in the fine criterion ($\chi^2 = 340.05$, $df = 310$, $p\text{-value} = 0.012$, $\chi^2/df = 1.09$, $GFI = 0.92$, $AGFI = 0.91$, $CN = 338.06$, Standardized RMR = 0.04).

The analysis results of correlation coefficients value and prediction coefficients values were found that management and all 5 variables of supportive factors which are hospitals' policies and leaders' support (X1) hospitals' food safety development team (X2) food safety control (X3) safe raw materials procurement (X4) food safety productive process (X5), all these factors have an effect on hospital's food safety variables (XX) ($r = 0.57\text{-}0.94$) and prediction coefficients value of all variables are in the fine criterion of ($R^2 = 0.91$) this showed that all 5 variables in food safety management model are able to explain the variance of hospital's food safety in the percentage of 91% (Table 2).

The result of causal effects analysis was found that the variables that have a direct effect on hospital's food safety (XX) are food safety productive process (X5) food safety control (X3) safe raw materials procurement (X4)

and the variables that have an indirect effect are hospitals' policies and leaders' support (X1) by transferring through food safety control and food safety productive process and hospitals' food safety development team (X2) by transferring through safe raw materials procurement and food safety productive process as shown in Fig. 1.

CONCLUSION

Hospital's food safety management model is composed of 3 important aspects of food safety management which are the aspects of food safety productive process, food safety control and safe raw materials procurement and the supportive factors that cause food safety management an achievement in 2 aspects of policy and president's support and hospital's food safety development team which all the 5 aspects cause hospital's food a safety directly and indirectly. The result of operation at 2 hospitals has found that there are capability in producing various aspects of food safety management and hospitals' food are more safer, the hospitals where are interested in using the food safety management model should study its important conditions that cause an achievement in many aspects such as

attitude and interest of president, resources promotion, participation of related departments, standard selection of safe food, training for related operators, basic information about places of safe raw materials in the areas and readiness in changing hospital's management system to be flexible and supportive for food safety development activities in order to prepare and help hospital to receive achieving chances of food safety development.

The said model is capable of being a guideline instruction for hospitals and the Ministry of Public Health is able to specify policies for hospitals to use in order to cause a food safety services which is friendly to visitors' health and helpful for producing a reliability in hospitals' catering services and reputation also.

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