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Measuring Food Literacy: The Survelliance of Elderly Teachers and Education Staffs' Food Literacy Level

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Abstract. The "food literacy" is increasingly used to describe knowledge, skills and behaviors needed to meet food needs. The aim of this survey research was to measure food literacy level among elderly teachers and education staffs. Methods: This surveillance using FLQ-EE(Food Literacy Questionnaires of Elderly teachers and Education staffs) which created by authors. The participants were 170 elderly teachers and education staffs selected by census population in Bangkok Province Centre of the Welfare Promotion Commission for Elderly teacher and Educational staffs which was overweight (BMI≥23.0). The data were analysed by percentage, average and standard deviation. Results: The participants were interactive level in food knowledge and nutrition. Food skills including Food selecting, Food planning and manage, Food preparing were functional level. Excepted Eating was Critical level. Conclusions: Mostly,food literacy level surveillance indicates that it's on a satisfactory level. Therefore, appropriate learning should be promoted further.

Key words: food literacy level, elderly teachers and education staffs, surveillance

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INTRODUCTION

The promoting appropriate dietary habits and healthy lifestyles is important for preventing the occurrence of various diseases. Caused by improper food intake which is currently a major public health problem in the world including Thailand. There should empowerment and development of people to have food potential, especially the elderly. Thailand will enter "Super aged society" in 2031. The report of the survey results of basic health conditions of teachers and educational staffs. Ministry of Education, 2012 [1] found that body mass index was high level 58.70 percentage and waist circumference higher than normal 39.20 percentage. The cause from the way of life for teachers and education staffs who have more free time than working age and financial stability. There were increased the likelihood of consuming inappropriate foods for the body that deteriorates with age. Food literacy that was systematic review literature by researcher including definition important components from institutions and academics around the world. The components was divided into 3 components: 1) Food and nutrition knowledge 2) Food skills including food selecting , food planning and manage, food preparing, eating and 3) Food behavior. Therefore, food literacy enhances the ability of a person to have knowledge and understanding of food skills to food selecting , food planning and manage, food preparing, eating in their own context. Food literacy promoting in elderly teachers and education staffs is development in the dimension of healthy food selecting. Healthy planning and management, healthy food preparation and healthy eating. By enhance food knowledge and nutrition, food skills leading to food behaviors which affects the behavior of food that was age-appropriate. Proper weight control and prevent disease. The research aimed to study food literacy level among elderly teachers and education staffs by using Food Literacy Questionnaires of Elderly teachers and Education staffs ; FLQ-EE. There were basis guidelines for creating a suitable food literacy enhancement program in elderly teachers and education staffs.

METHODS

Participants

This research uses survey research method. The participants were 170 elderly teachers and education staffs which was overweight (BMI≥23.0) in Bangkok Province Center of the Welfare Promotion Commission for Elderly teacher and Educational staffs selected by census population. The aim of this survey research was to measure food literacy level among elderly teachers and education staffs.

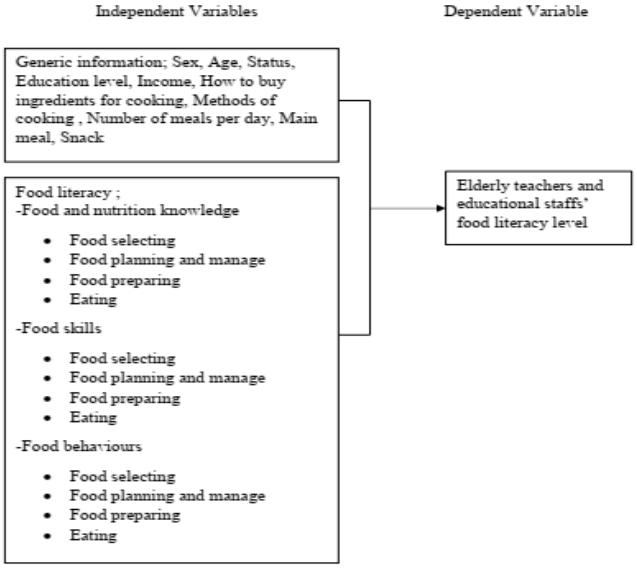

Figure 1. Conceptual framework

Data Collection Tools

The data collection tools was the Food Literacy Questionnaires of Elderly teachers and Education staffs ; FLQ-EE which created by researcher and the tools qualities was proven(Content validity index = 0.87, Reliability index = 0.91, Discrimination index= 0.46- 0.78). There was studied from components indicators and related research articles which was systematic literature review method . In order to get a conceptual framework for food literacy and data for creating a food literacy assessment. There was interview five expertise to enhancing elderly food behavior which semi-structure interview and analytic induction for obtain information and knowledge about suitable food in Thai society and guidelines for developing food literacy questionnaires. The FLQ-EE was developed from various assessments and food literacy concepts such as A short of food literacy questionnaire; SFQL [2] , The Health Literacy Level assessment of Palumbo et al. (2017) [3] who developed individual Food Literacy skills that was Italian Food Literacy Survey (IT-FLS), Food Concept of Sorensen et al. (2013), Definitions and concept food literacy model of Vidgen and Gallegos. (2014) including the results of interviews with experts as a guideline for questioning development. For the dimensions of food literacy level assessment was applied Nutbeam in year 2001 and 2008. There was divided into 3 level including Functional literacy, Interaction literacy and Critical literacy. It was a framework for creating FLQ-EE consists of 4 important skills: food selecting, food planning and manage, food preparation, eating and relevant indicators that are appropriate for the Thai elderly people context in Table 1.

We used important skills and indicators that developed questionnaires. It was reflected food literacy situation of elderly teachers and education staffs. Validation of the FLQ-EE and food literacy level assessment also. The FLQ-EE including seventy-four questions were divided two sections. The general information was the first section with twelve questions. The second section was Food literacy that sixty-two questions. We divided answering questions in 2 parts 1) multiple-choice questions include twenty food and nutrition knowledge and twenty-one food behaviors 2) answering questions subjective included twenty-one food skills divided into six food selecting, five food planning and management, five food preparation and five eating. The food literacy level assessment followed that components under food skills. The components ; 1) Food and nutrition knowledge was closed-end query question and multiple choice 2) Food skills was opened-end query question. The questions is everyday situations. Answer questions by writing answers and express opinions independently. The criteria was scoring rubrics with analytic rubrics 3) Food behaviors was closed-end query question and multiple choice with Rating scale by four Likert scale included practice every time (four points),

often (three points) Infrequently (two points) Inoperative (one point). The criteria setting affected to food literacy level in Table 2.

Table 1 Components and Indicators of Food literacy in Thai Elderly

Components/iIIndicators	1. Food and nutrition knowledge	2. Food skills	3. Food Behaviors
A Food Selecting	A1.1 Read nutrition label	A2.1 Analyse nutrition label	A3.1 Consistency in analyse nutrition label
	A1.2 Describe the basic principles of food and food exchange	A2.2 Provide food resources to be able to access appropriate information	A3.2 Consistency in provide food resources to be able to access appropriate information
	A1.3 Describe the contaminants in food	A2.3 Evaluate quality and product reliability	A3.3 Consistency in evaluate quality and product reliability
	A1.4 Able to basic self-assessment	A2.4 Suitable food selecting for your health and family	A3.4 Consistency in suitable food selecting for your health and family
	A1.5 Seek production or a place to buy their own safe food and sharing with others	A2.5 Buy their own safe food quality and sharing with others	A3.5 Consistency in buy their own safe food quality and sharing with others
B Food Planning and manage	B1.1 Describe suitable food items for yourself and family.	B2.1 Meal plan and suitable raw materials for yourself and family	B3.1 Consistency in meal plan and suitable raw materials for yourself and family
	B1.2 Manage enough money for the food they need	B2.2 Seek healthy food according to the food list with available time and budget	B3.2 Consistency in seek healthy food according to the food list with available time and budget
	B1.3 Evaluation of suitable food items for oneself in various situations	B2.3 Able to plan food list in unfamiliar situations	B3.3 Consistency in manage food list in unfamiliar situations
	B1.4 Describe the preservation of food that maintains its nutritional value.	B2.4 Preserved food that maintains its nutritional value	B3.4 Consistency in preserved food that maintains its nutritional value
	B1.5 Sharing with others	B2.5 Sharing with others	B3.5 Consistency in sharing with others
C Food preparing	C1.1 Describe washing your hands with proper hygiene	C2.1 Washing your hands with proper hygiene	C3.1 Consistency in washing your hands with proper hygiene
	C1.2 Describe the proper hygienic preparation of raw materials in the kitchen	C2.2 Proper hygienic preparation of raw materials in the kitchen	C3.2 Consistency in proper hygienic preparation of raw materials in the kitchen
	C1.3 Prepare ingredients in order to be ready for cooking	C2.3 Prepare food by modifying menu according to the available ingredients	C3.3 Consistency in prepare food by modifying menu according to the available ingredients
	C1.4 Describe safety ingredients for health	C2.4 Able to cook food by controlling the sweet and salty taste	C3.4 Consistency in cook food by controlling the sweet and salty taste
	C1.5 Sharing with others	C2.5 Sharing with others	C3.5 Consistency in sharing with others

Components/iIIndicators	1. Food and nutrition knowledge	2. Food skills	3. Food Behaviors
D Eating	D1.1 Describe the amount of food that should be consumed	D2.1 Evaluating food that should be consumed	D3.1 Consistency in evaluating food that should be consumed
	D1.2 Describe the portion of food on the healthy plate	D2.2 Able to eating to planned	D3.2 Consistency in eating to planned
	D1.3 Able to tell various media reliable source	D2.3 Have method to access health information source	D3.3 Consistency in access health information source
	D1.4 Able to tell healthy food social group	D2.4 Able to join healthy food social group	D3.4 Consistency in join healthy food social group
	D1.5 Sharing with others	D2.5 Sharing with others	D3.5 Consistency in sharing with others

Data collection

We explained and clarified the research objectives to the participants. The collection of data is subject to the consent of the participants . And willing to continue participating in activities in the program. The FLQ-EE with answer questions. The data were analysed by descriptive statistic to distribute frequency, average, percentage, standard deviation.

Statistical analysis

The data were analysed by percentage, average and standard deviation. To study the characteristics of the participations and the distribution of the research variables. The statistics used in crosstab analysis. For food skills were opened-end query question. The questions is everyday situations. Answer questions by writing answers and express opinions independently. The criteria was analytic scoring rubrics.

RESULTS AND DISCUSSION

The data analysis was presented in two parts, consisting of part 1) the generic information of participants (Table 3) and part 2) the results of the analysis of food literacy among elderly teachers and education staffs using the FLQ-EE questionnaire. (Table 4 and Table 5)

The generic information of participants

Table 3. Frequency and percentage of generic information's participants (n=170)

List	Elderly teachers		Education staffs	
	frequency	percentage	frequency	percentage
1. Workplace before retirement				
Elementary level	9	5.29	3	1.76
High school	14	8.24	0	0.00
College, vocational	2	1.18	0	0.00
Hospital	1	0.59	0	0.00
Other	1	0.59	3	1.76
Not specified	92	54.12	45	26.47
2. Sex				
Male	24	14.12	14	8.24
Female	95	55.88	37	21.76
List	Elderly teachers		Education staffs	
	frequency	percentage	frequency	percentage
3. Age				
55 – 59 years	16	9.41	4	2.35
60 – 69 years	90	52.94	41	24.12

List	Elderly teachers		Education staffs	
	frequency	percentage	frequency	percentage
70 – 79 years	6	3.53	2	1.18
80 – 89 years	1	0.59	4	2.35
4. Marital status				
Single	33	19.41	19	11.18
Married, couple	68	40.00	27	15.88
Widowed, divorced, split	18	10.59	5	2.94
5. Education level				
Diploma, Vocational Certificate	1	0.59	4	2.35
Bachelor's degree	50	29.41	27	15.88
Master's degree	67	39.41	19	11.18
Doctoral degree	1	0.59	1	0.59
6. Routines with the main income after retirement				
Have the main income	39	22.94	14	8.24
No main income	80	47.06	37	21.77
7. How to choose to buy ingredients for cooking				
Choose to buy yourself	109	64.12	43	25.29
Someone chooses to buy	10	5.88	8	4.71
8. Cooking methods				
Buy food to eat throughout every meal.	20	11.76	7	4.12
Self cooking for every meal	18	10.59	11	6.47
Self-cooking 2 meals	30	17.65	20	11.76
Self-cooking 1 meal	34	20.00	8	4.71
By themselves family members	17	10.00	5	2.94
9. Number of main meals to eat per day				
1 meal	2	1.18	2	1.18
2 meals	26	15.29	6	3.53
3 meals	91	53.53	41	24.12
4 meals	0	0.00	2	1.18
10. Main meals that focus on eating				
Breakfast	74	43.53	38	22.35
Lunch	25	14.71	9	5.29
Dinner	18	10.59	3	1.76
Other meals, such as late night meals	3	1.76	1	0.59
11. Eating snack				
Have a snack	60	35.29	29	17.06
Did not eat a snack	59	34.71	22	12.94
12. Eating snack time				
Late	39	57.65	25	27.65
Afternoon	4	2.35	0	0.00
Night	16	9.41	4	2.35
Not specified	1	0.59	0	0.00

According to Table 3, The status of elderly teachers and education staffs with no workplace before retirement was 54.12 percent. The majority of elderly teachers and education staffs were female 58.88 percent and 21.76 percent, respectively. The majority of elderly teachers and education staffs were aged between 60-69 years 52.94 percent and 24.12 percent, respectively. Elderly teachers and educational staffs most of them had married status at 40.00 percent and 15.88 percent, respectively. The majority of teachers had a master's degree 39.41 percent different from education staffs having a bachelor's degree at 15.88 percent and no main income after retirement 44.12 percent and 21.77 percent, respectively. Elderly teachers and educational staffs were a way to choose to buy ingredients for cooking themselves 64.12 percent and 25.29 percent, respectively. Twenty Percent of elderly teachers was self cooking for 1 meal while educational staffs was self cooking for 2 meals 11.76 percent. The most of them were number of main meals to eat per day 3 meals per day 91.00 percent. With an emphasis on eating breakfast 43.53 percent and 22.35 percent, respectively and eating snack 35.29 percent and 17.06 percent. Most were in the late time 57.65 percent and 27.65 percent, respectively.

Food Literacy analysis results

The results of food literacy average divided into 3 components ; 1.Food knowledge and nutrition, 2.Food skills and 3.Food behaviors.

Table 4. Full score ,Average and Standard deviation of food selecting, food planning and manage, food preparing, eating classified by the 3 components of food literacy (n=170)

Components of food literacy	Full score	$\bar{X}$	S.D.
1. Food knowledge and nutrition			
Food selecting			
1. Read nutrition label	1	0.59	0.49
2. Describe the basic principles of food and food exchange	1	0.71	0.45
3. Describe the contaminants in food	1	0.56	0.49
4. Able to basic self-assessment	1	0.44	0.49
5. Seek production or a place to buy their own safe food and sharing with others	1	0.67	0.47
Food planning and manage			
6. Describe suitable food items for yourself and family.	1	0.79	0.40
7. Manage enough money for the food they need	1	0.62	0.48
8. Evaluation of suitable food items for oneself in various situations	1	0.74	0.44
9. Describe the preservation of food that maintains its nutritional value	1	0.28	0.44
10. Sharing with others	1	0.41	0.49
Food preparing			
11. Describe washing your hands with proper hygiene	1	0.34	0.47
12. Describe the proper hygienic preparation of raw materials in the kitchen	1	0.61	0.48
13. Prepare ingredients in order to be ready for cooking	1	0.57	0.49
14. Describe safety ingredients for health	1	0.46	0.50
15. Sharing with others	1	0.67	0.47
Eating			
16. Describe the amount of food that should be consumed	1	0.47	0.50
17. Describe the portion of food on the healthy plate	1	0.58	0.49
18. Able to tell various media reliable source	1	0.91	0.29
19. Able to tell healthy food social group	1	0.82	0.38
20. Sharing with others	1	0.79	0.44

Components of food literacy	Full score	$\bar{X}$	S.D.
2.Food skills			
Food selecting			
1. Analyse nutrition label	1	0.38	0.48
2. Provide food resources to be able to access appropriate information	1	0.79	0.41
3. Evaluate quality and product reliability	1	0.76	0.42
4. Suitable food selecting for your health and family	1	0.78	0.41
5. Buy their own safe food quality	1	0.50	0.88
6. sharing with others	1	0.66	0.47
Food planning and manage			
7. Meal plan and suitable raw materials for yourself and family	1	0.52	0.50
8. Seek healthy food according to the food list with available time and budget	1	0.54	0.50
9. Able to plan food list in unfamiliar situations	1	0.80	

Components of food literacy	Full score	$\bar{X}$	S.D.
			0.40
10. Preserved food that maintains its nutritional value	1	0.51	0.50
11. Sharing with others	1	0.69	0.46
Food preparing			
12. Washing your hands with proper hygiene	1	0.34	0.47
13. Proper hygienic preparation of raw materials in the kitchen	1	0.25	0.43
14. Prepare food by modifying menu according to the available ingredients	1	0.64	0.48
15. Able to cook food by controlling the sweet and salty taste	1	0.30	0.46
16. Sharing with others	1	0.59	0.49
Eating			
17. Evaluating food that should be consumed	1	0.65	0.47
18. Able to eating to planned	1	0.69	0.46
19. Have method to access health information source	1	0.85	0.36
20. Able to join healthy food social group	1	0.81	0.39
21. Sharing with others	1	0.82	0.38
3. Food behaviors			
Food selecting			
1. Consistency in analyse nutrition label	4	3.38	0.69
2. Consistency in provide food resources to be able to access appropriate information	4	2.95	0.73
3. Consistency in evaluate quality and product reliability	4	3.38	0.62
4. Consistency in suitable food selecting for your health and family	4	3.42	0.61
5. Consistency in buy their own safe food quality and sharing with others	4	3.26	0.70
6. Sharing with others	4	2.86	0.70
Food planning and manage			
7. Consistency in meal plan and suitable raw materials for yourself and family	4	3.21	0.70
8. Consistency in seek healthy food according to the food list with available time and budget	4	3.26	0.63
9. Consistency in manage food list in unfamiliar situations	4	3.27	0.61
10.Consistency in preserved food that maintains its nutritional value	4	3.32	0.61
11. Consistency in sharing with others	4	2.82	0.74
Food preparing			
12. Consistency in washing your hands with proper hygiene	4	3.64	0.51
13. Consistency in proper hygienic preparation of raw materials in the kitchen	4	3.71	0.51
Components of food literacy	Full score	$\bar{X}$	S
14. Consistency in prepare food by modifying menu according to the available ingredients	4	3.41	0.59
15. Consistency in cook food by controlling the sweet and salty taste	4	3.28	0.67
16. Consistency in sharing with others	4	2.89	0.71
Eating			
17. Consistency in evaluating food that should be consumed	4	3.24	0.65
18. Consistency in eating to planned	4	3.16	0.65
19. Consistency in access health information source	4	3.18	0.69
20. Consistency in join healthy food social group	4	2.57	0.96
21. Consistency in sharing with others	4	2.80	0.78

According to Table 4, The participants were average of food knowledge and nutrition at the baseline level less than 40 percent including describe the preservation of food that maintains its nutritional value 28 percent and describe washing your hands with proper hygiene 28 percent. The average of food skills were at the baseline level less than 40 percent including food selecting in analyses nutrition label 38 percent. Food

preparing skill in washing your hands with proper hygiene 34 percent, Proper hygienic preparation of raw materials in the kitchen 25 percent and able to cook food by controlling the sweet and salty taste 30 percent. Food planning and manage and the most Eating skills had a score of more than 41 percent. In addition, it was found that food behaviors score more than 81 percent in all of the above. Except to sharing with others about food selecting, food planning and manage, food preparing and Eating. They were 41 to 80 percent. For food literacy analysis results when Foundation Level Interaction Level Critical Level analysing classified by components its know the level of food literacy to be information for creating programs in the next. (Table 5)

Table 5. Food Literacy Level Classified by the components of food literacy

Food Literacy Components	Functional Level		Interaction Level		Critical Level		Total	
	frequency	percentage	frequency	percentage	frequency	percentage	frequency	percentage
1. Food and nutrition knowledge								
Elderly teachers	12	7.06	93	54.71	14	8.24	119	70.00
Education staffs	23	13.53	25	14.71	3	1.76	51	30.00
Total	35	20.59	118	69.41	17	10.00	170	100.00
2. Food skills								
Food selecting	121	71.18	21	12.35	28	16.47	170	100.00
Food planning and manage	132	77.65	13	7.65	25	14.71	170	100.00
Food preparing	144	84.71	14	8.24	12	7.06	170	100.00
Eating	78	45.88	15	8.82	77	45.29	170	100.00
Total	107	62.94	61	35.88	2	1.18	170	100.00
3. Food Behaviors								
Total	71	41.80	99	58.20	0	0	170	100.00

According to Table 5, The most food knowledge and nutrition of elderly teachers were in interaction level 54.71 percent and educational staffs 14.71 percent that overview 69.41 percent. Food skills found that most food selection was on functional level 71.18 percent. Planning and manage was on functional level 77.65 percent. Preparing was on functional level 84.71 percent and Eating was on 45.88 percent. In conclusion the participants were food skills on functional level while food behaviors found that the most of participants were on interaction level 58.20 percent. Followed by the functional level 41.80 percent which didn't found food behavior in critical level. There were opportunity to create Food Literacy Program and develop to food behaviors to a critical level from participating in the program.

We discusses the objectives as follows: The generic information found that the majority was female with aged between 60 – 69 years. There were Bachelor's degree and Master's degree. Have less than 40 percent of food knowledge and nutrition especially, describe the preservation of food that maintains its nutritional value 28 percent and describe washing your hands with proper hygiene 34 percent. Reflecting that most of them have a great deal of food comprehension. But most of them are not enough to be able to sharing with other people. Indicates that it may add a means of learning online. Creating a healthy food learning group to gain more access to food information and interest. Increase the sharing about storage, hand washing, etc. While food skills were scored less than 40 percent include food selection skills on analyse nutrition label before buy food 34 percent. Food preparing on proper hygienic preparation of raw materials in the kitchen 25 percent, Able to cook food by controlling the sweet and salty taste 30 percent. For food planning and manage, Eating were 41 percent or more. Therefore, food skills should be promoted through practical training. Focus on sharing and learning experiences together for diverse options that can be applied to everyday life in their own context. There was able to develop the level of food literacy according to the process that started with awareness raising Pre-food knowledge and nutrition in line with Dee Fink's Taxonomy Significant Learning [5] which establishing foundation knowledge and assessment results of food knowledge and nutrition available at interaction level that can be developed to critical level.

We focus of food skills were self-evaluation that leading to prepare food by modifying menu according to the available ingredients which also emphasizes self and family analysis. These include weight, height, blood pressure, body mass index, percentage of body fat, waist circumference, subcutaneous fat level. These was to increase one's ability through the process of building a learning society. If the elderly have a high self-efficacy There will be an expression of good and appropriate health behavior.[6] Prepare food by modifying menu according to the available ingredients that flexible method if unfamiliar situations in their life. According to Significant Learning on Integration และ Human dimension its reflecting the result. In addition, it was found that more than 81 percent of all food behaviors were found, especially when it comes to sharing with others about food selecting. Food planning and manage, food preparation and eating found that most were in the score of 41 percent to 80 percent. Therefore, joint analysis should be emphasized in the group by implementing the group process and reinforcement. Evaluation of every food consumed and adhere to continuous consumption These section can implement empowerment evaluation as well as Group Process, highlighting what is still doing well. And things that can develop better food habits Including guidelines for their own good food habits. According to the empowerment process can lead to behavioral modifications to health at the individual level. [7]

4.2 Food Literacy analysis results showed that the most of participants were food knowledge and nutrition at Interaction Level. But there was a tendency to build more food skills because food selection, food planning and manage, food preparing and eating at functional level which reflects the food literacy development process leading to the creation of the program. Food behaviors was critical level. For food behaviors at that critical level. These may be due to the consistency in dietary behavior which is not due to the correct food literacy development process consistent with the results of the food skills assessment at functional level. In most food literacy levels was interaction level still requires more food knowledge and nutrition such as reading nutrition labels, Fostering food preparing skill. Proper hygienic preparation of raw materials in the kitchen and able to cook food by controlling the sweet and salty taste. As well as promoting the search for food information from various sources. Create a sharing information and experience. These will help to achieve food literacy from functional level to development in interaction level and critical level which according to Slater. (2013). [8] He gave a different meaning to food as a skill perspective. It addresses the knowledge of food and nutrition that builds personal skills, including decision-making and goal setting. To improve nutrition to be healthy. But Mary Gale Smith. (2009) [9] has a different perspective, it was the ability to share life experiences with an emphasis on engagement with others. To learn together and tells various life stories to explore the meaning of food while Vidgen and Gallegos. (2014) [10] emphasizes participation in shared consumption in society in line with Desjardins and Azevedo. (2013) [11] on the ability to share information and skills together.

CONCLUSIONS

Food Literacy analysis results showed that the most of participants were food knowledge and nutrition but still need to be promoted to access information and be able to sharing and learning. It also found that there was a tendency to build up food skills as well. There was reflected development process leading to the creation of the program. While food behaviors at critical level. These may be due to the consistency in dietary behavior which is not due to the correct food literacy development process consistent with the results of the food skills assessment at functional level.

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