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Consumer Knowledge and Awareness of Prebiotic and Probiotic Foods

Chingriyo Raihing and Uma Mageshwari S*

Research scholar, Associate Professor* Department of Food Service Management and Dietetics,Avinashilingam Institute of Home Science and Higher Education for Women, Coimbatore–641043, India.

ABSTRACT:

Food consumption pattern of consumers are changing rapidly. Understanding consumer attitudes, knowledge, perceptions, and behaviors can help food and health communicators tailor information that resonates with and motivates consumers to achieve optimal health through diet and lifestyle. The objective of the study is to assess awareness and knowledge of prebiotics and probiotics among population groups and to find out common prebiotic and probiotic foods consumed. Structured interview schedule was administered to 1000 consumers through personal interview to elicit information on the commonly consumed prebiotic and probiotic foods, frequency and mode of its usage and health conditions in which prebiotics and probiotics are used. Consumption pattern was studied using food frequency and 24hr recall record method. Wheat, onion, garlic and banana were natural prebiotics found to be highly consumed. Awareness of prebiotics and probiotics foods and its health benefits among the consumers were found to be dependent on gender, educational and occupational status of the consumers. The finding of this study is presented to elicit the consumption status of prebiotic and probiotic foods among selected population and the findings could be used as a baseline study.

KEYWORDS: prebiotics; probiotics; health benefits; awareness; consumers; socio-economic; Consumption pattern

***Corresponding author:**

Uma Mageshwari S*

Associate Professor* Department of Food Service Management and Dietetics,

Avinashilingam Institute of Home Science and Higher Education for Women, Coimbatore–641043,

India.

INTRODUCTION

Consumer interest in foods that provide health and wellness benefits or functional foods is thriving. Availability of health-promoting foods and beverages in the marketplace allows many consumers to take charge of their health through inclusion of healthy foods. It is important to consider the awareness of consumers on foods and beverages that promote health and improve their dietary habits. Food consumption pattern of consumers are changing rapidly. Understanding consumer attitudes, knowledge, perceptions and behaviors can help food and health communicators tailor information that resonates with and motivates consumers to achieve optimal health through diet and lifestyle. Poor diet and consumption of nutrient deficient foods have been implicated in the initiation and progression of degenerative diseases. Consumers are now more concern on optimizing their health through foods that provide functional benefits and alleviate diseases. Consumer attitudes are very positive regarding foods and beverages with added health and wellness benefits and prebiotic and probiotic foods as a functional food ingredient enhance health and well being. The term ‘‘functional food’’ itself was first used in Japan, in the 1980s for food products fortified with special constituents that possess beneficial health effects. The term ‘functional food’ is generally used to describe foods having the ability to deliver some health benefit beyond nutrition[1,2]. Probiotic is defined as “live microorganisms which when administered in adequate amounts confer a health benefit on the host”[3].

Lactic acid bacteria (LAB) and bifidobacteria, the most studied and widely employed bacteria within the probiotic field, are normal components of the intestinal microbiota and have a long tradition of safe application within the food industry[4]. Prebiotics are non-digestible food ingredients that beneficially affect the host by stimulating the growth and/or activity of one or a limited number of bacteria in the colon, thus improving host health [5]**.** Inulin and oligofructose, non-digestible fermentable fructans, are amongst the most studied and well established prebiotics

Consumer acceptance of the concept of functional foods and a better understanding of its health benefits is important for consumer-led product development and successful market orientation[6]**.**

The objective of the study is to assess awareness and knowledge of prebiotics and probiotics among population groups and to find out common prebiotic and probiotic foods consumed.

MATERIALS AND METHODS

A total of 1000 individuals were selected randomly with 453 males and 547 females belonging to different age groups namely adolescents, adults and elderly. The subjects were selected randomly from different urban areas of Coimbatore district, Tamil Nadu. The area was selected for the study due to easy accessibility and availability of subjects.

Knowledge and awareness of prebiotic and probiotic foods among the population was studied using the interview schedule. Awareness on commonly available prebiotic and probiotic foods, mode of usage and health condition in which it is used were recorded. A list of commonly available prebiotic and probiotic was administered to record the frequency of consumption of prebiotic and probiotic foods.

The socio economic and background details of the selected subjects such as educational status, occupation, family income, and family size were elicited using an interview schedule.

The food intake pattern, dietary intake of the selected subjects was assessed using 24 hr recall method.

Education on prebiotic and probiotic foods were imparted to 50 sub-samples from each age group using power point presentations and other visual aids. The subjects were given information on the different prebiotic and probiotic food sources and their health benefits in the market. The subjects were provided with information on commercially available prebiotic and probiotic foods. The subjects were educated on the importance of inclusion of functional foods especially probiotics and prebiotics foods in their diet.

RESULTS AND DISCUSSION

A. Awareness on prebiotic and probiotic food concept

Awareness of prebiotic foods and probiotic food among the survey respondents is discussed in Table 1

Table 1: "Awareness on prebiotic and probiotic food concept"

DETAILS	Adolescents N=323				Adults N=358				Elderly N=319			
	Male (N=148)		Female N=175		Male N=158		Female N=200		Male N=147		Female N=172	
	N	%	N	%	N	%	N	%	N	%	N	%
Prebiotics												
Aware	51	34	47	27	38	24	45	22	14	10	15	9
Unaware	97	66	128	73	120	76	155	78	133	90	157	91
Probiotics												
Aware	105	71	110	63	43	27	77	39	111	76	58	34
Unaware	43	29	65	37	115	73	123	61	36	24	114	66

The table shows the awareness of prebiotic foods and probiotic foods among the selected population groups. It can be pointed out in the adolescent age group that awareness of prebiotic foods is more in the adolescent males (34 per cent) than the female adolescents (27 per cent), 66 and 73 per cent male and female adolescents were unaware of prebiotics. In the adult group, 24 percent adult male and 22 per cent adult female were found to be aware of prebiotic foods and 76 percent and 78 percent were not aware of prebiotic foods. Ninety and 91 percent of the elderly male and female subjects were found to be unaware of prebiotic foods while only 19 percent of selected elderly population was aware of prebiotics.

Awareness of probiotic foods was seen in 71 per cent of adolescent males and 63 per cent in female adolescents while 29 per cent and 37 percent of adolescent male and female respectively were unaware of probiotic foods. Among the adults, awareness of probiotics was found to be less with 73 percent adult male and 61 per cent adult female unaware of probiotic foods. Twenty seven per cent adult male and 39 per cent adult female were aware of probiotic foods. In the elderly group, the male subjects were more aware of probiotics (76 per cent) than the female subjects (34 per cent). Twenty four and 66 per cent elderly male and female were found to be unaware of probiotic foods.

B. 1. *Consumer's perception about the definition/meaning of the term prebiotic and probiotic foods*

Table 2 shows the perception of the consumers about the definition of the term prebiotic.

Table 2: "Consumer's perception about the definition of the term prebiotic foods"

Perception about definition of the term prebiotics	N=210*	
	N	%
Foods that promote health	185	88
Foods that stimulate the activity of the colon	nil	nil
Foods that are similar to probiotics	118	56
Non-digestible food ingredients that stimulate the growth of bacteria in the colon and promote health	43	20
Unsure/do not know	23	11

- consumers who are aware of prebiotics(multiple response)

The results from the above table show that 20 percent of the consumers had the correct perception of the prebiotic term which is 'Non-digestible food ingredients that stimulate the growth of bacteria in

the colon and promote health'. Eleven percent of the respondents who had a wrong perception of the term prebiotics which is 'foods that are similar to probiotics'.

Table 3 shows the perception of consumers about the definition of the term probiotic.

Table 3: "Consumer's perception about the definition of the term probiotic foods"

Perception about definition of the term probiotics	N=504*	
	N	%
Live microorganisms which confer health benefit on the host	104	21
Natural food ingredient which enhance health	65	13
Foods associated with gut health	285	57
Unsure/do not know	212	42

- Consumers who are aware of probiotics(multiple response)

Table 3 shows that 21 percent of the consumer had the correct perception of the probiotic term which is 'Live microorganisms which confer health benefit on the host'. Fifty seven percent associated the term with gut health while 42 percent of the respondents were unsure/did not know about probiotics.

B.2. Perception of consumers about the health benefits of prebiotic and probiotic food

Table 4 shows the perception of consumers about the health benefits of prebiotic and probiotic foods.

Table 4: " Perception of consumers about the health benefits of prebiotic foods"

Perceived health benefits of prebiotic foods	N=210*	
	N	%
Weight management	122	58
Diabetes management	85	40
Reduce cholesterol level	104	49
Prevent gastrointestinal infection	49	23
Reduce risk of cancer	41	19
Prevent osteoporosis	59	28

Consumers who are aware of prebiotics(multiple response)

Table 4 indicates that majority of the consumers perceived prebiotic foods as beneficial for weight management. Forty nine per cent associated prebiotics with reduction of cholesterol level whereas only 19 percent associated prebiotic foods with reduction of cancer.

Table 5: "Perception of consumers about the health benefits of probiotic foods"

Perceived health benefits of probiotic foods	N=504*	
	N	%
Improve gut health	430	85
Reduce risk of cancer	324	64
Improve Heart health	219	43
Improve Immune system	126	25
Diabetes Management	421	83
Reduce intestinal infection	311	62

**** consumers who are aware of probiotics(multiple response)***

It was observed that the perceived health benefits of probiotics as in improving gut health was highest among the subjects (85 percent) and 83 per cent associated probiotics with diabetes management. Forty three per cent associated probiotics with improved heart health.

C. Details on socio economic status

The socio economic status of the selected subjects is discussed below

Table 6: "Socio economic status"

Age (in years)		Male N=453		Female N=547	
		N	%	N	%
Adolescents	14 - 16	26	6	47	9
	17 - 19	122	27	128	23
Adult	20 - 30	79	17	88	16
	31 - 40	34	8	45	8
	41 - 50	45	10	67	12
Elderly	51 - 70	106	19	140	20
	>70	41	13	32	11

Females were maximum (55 per cent) among the target groups and were distributed among the younger age that is 14-19 years (32 per cent), the adult age that is 20-50 (36 percent) and the older age that is 51-70 years (20 percent)

1. Education status

The education status of the selected subjects is given in the Figure 1

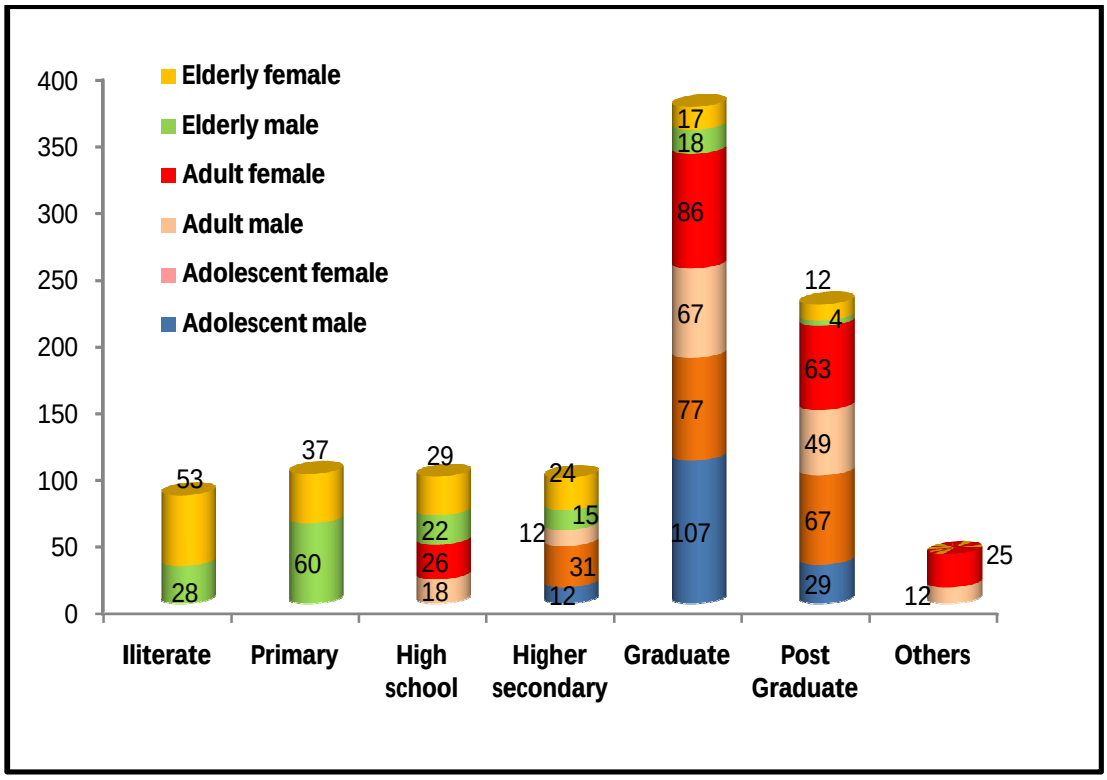

Figure 1 Education status

Literacy and education are important indicators in a society. Higher levels of literacy and education lead to better attainment of health and nutritional status. Among the adolescents 72 per cent and 44 per cent adolescent males and females respectively were graduates. Twenty one percent of the total adult population attained higher level of education compared to the other age groups. Effective literacy rate increased to a total of 74.04% with 82.14% of the males and 65.46% of the females being literate [7].

2. Occupation status

Figure 2 shows the occupation status of the selected subjects

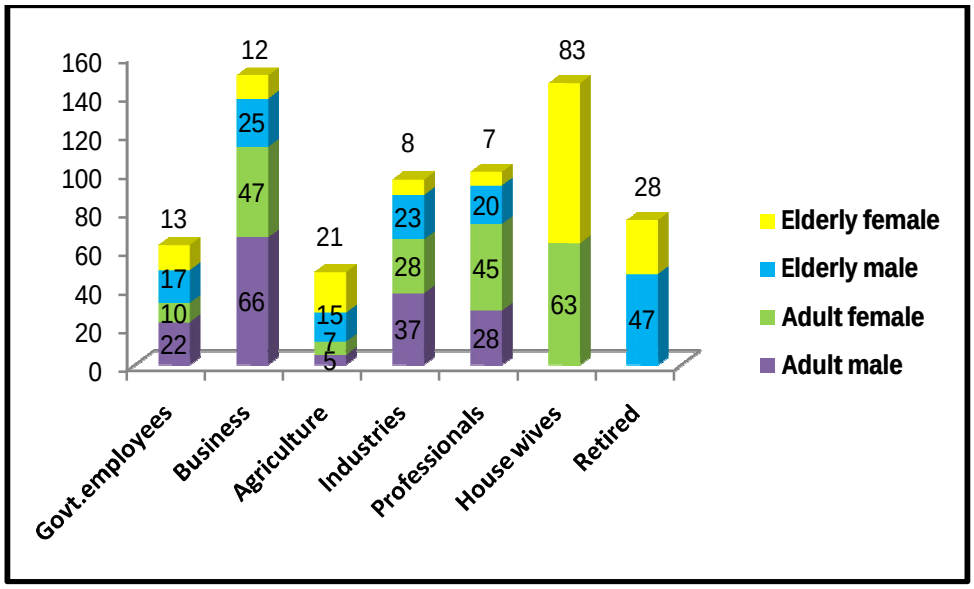

Figure 2 Occupation status

The occupation status of the selected population shows that 31.5 per cent of total selected adult subjects were engaged in business activities. Fourteen percent and five per cent of the adult male and female population were government employees. Thirty one and 47 per cent of the elderly women population were housewives. Agricultural farming and allied activities were taken up by 15 elderly male and 21 elderly female subjects while only six percent of the total adult populations were involved in agriculture. Eighteen percent of the elderly subjects were in professional jobs.

3. Family income

Social and economic environment are determinants of health. Table 7 shows the family income of the selected population Family income is an important factor influencing the food habits and thereby the nutritional status of the family. Families falling under middle income group with monthly drawing of 7500-14000 rupees per month were more dominant among the selected population.

Table 7: Family income

FAMILY INCOME (in Rupees)*	Adolescents N=323				Adults N=358				Elderly N=319			
	M N=148		F N=175		M N=158		F N=200		M N=147		F N=172	
	N	%	N	%	N	%	N	%	N	%	N	%
Less than 3,300 EWS	22	15	23	13	14	9	24	12	10	7	23	13
3,300-7,500 LIG	45	30	55	31	43	27	69	34	38	26	39	23
7,500-14,000 MIG	47	32	59	34	63	40	66	33	68	46	59	34
>14,000 HIG	34	23	38	22	38	24	41	21	31	21	51	29

* (MHUPA –working group on urban housing, 2007-2012, 11th five year plan, government of India).[8]

D) Consumption pattern of prebiotic and probiotic foods

D.1 Consumption pattern of prebiotic foods

The consumption pattern of prebiotic foods among selected population is discussed in Table 8

Table 8: "Consumption pattern of prebiotic foods"

PREBIOTIC FOODS*	Adolescents N=323		Adults N=358		Elderly N=319	
	N	%	N	%	N	%
CEREALS						
Wheat	311	96	358	100	319	100
Oats	285	88	350	98	293	92
Barley	nil	nil	63	18	61	19
Flaxseed	nil	nil	14	4	15	5
LEGUMES						
Soya bean	318	98	325	91	242	76
VEGETABLES						
Tomato	323	100	358	100	305	96
Onion	323	100	358	100	319	100
Garlic	323	100	358	100	319	100
FRUITS						
Berries	13	4	9	3	8	2
Banana	320	99	357	99.7	319	100

The table shows that wheat and tomato were consumed highest in all the selected age groups. Oats is consumed highest by the adults and elderly group. Four percent of selected adult population and five percent of the elderly population consumed flaxseed. Barley was consumed by 18 percent and 19 per cent of the adult and elderly group respectively. The consumption of soybeans was higher in adult and elderly subjects. Onion, Garlic and banana were consumed by all the selected subjects. Berries such as strawberries were consumed least by four, three and two percent of the adolescents, adult and the elderly group respectively.

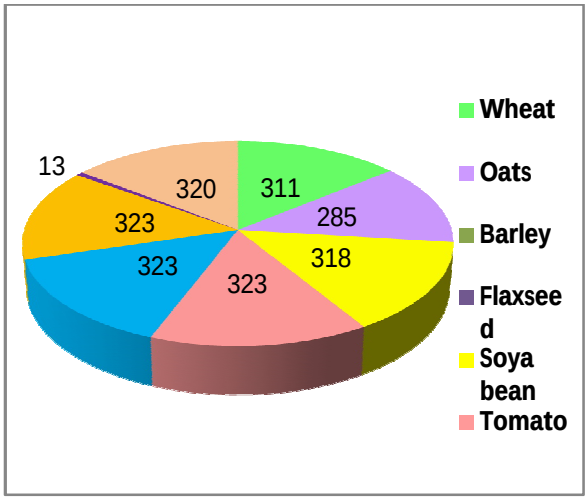

FIGURE 3
Consumption pattern of prebiotic foods among adolescents

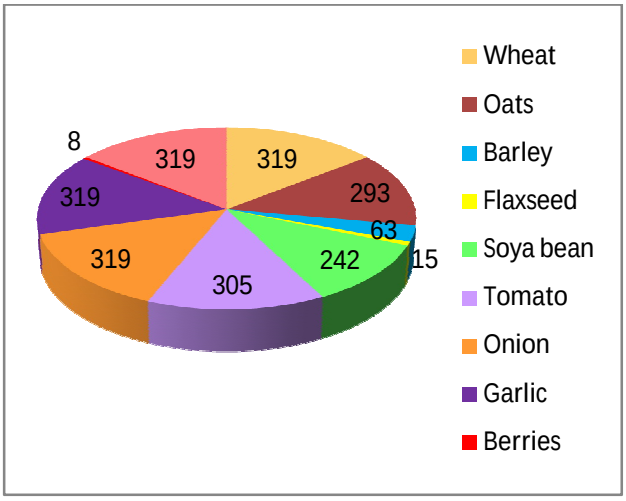

FIGURE 4
Consumption pattern of prebiotic foods among adults

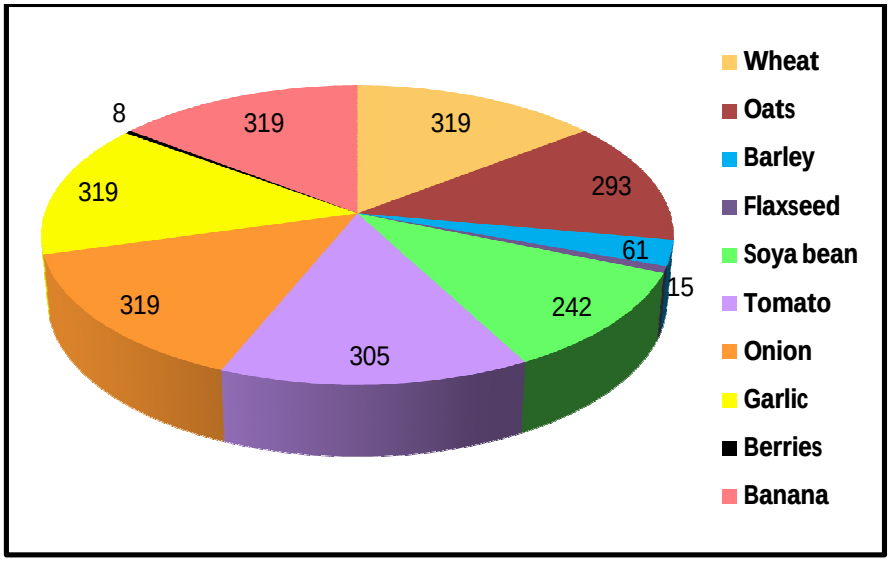

FIGURE 5 Consumption pattern of prebiotic foods among elderly

Table 9: "Consumption pattern of probiotic foods"

D. 2.

PROBIOTIC FOODS*	Adolescents N=323		Adults N=358		Elderly N=319	
	N	%	N	%	N	%
Curd	323	100	358	100	319	100
Yoghurt	82	25	53	15	44	14
Cheese	260	80	137	38	112	35
Yakult	nil	nil	10	3	16	5

Consumption pattern of probiotic foods

The consumption pattern of prebiotic foods among selected population is discussed in Table 9.

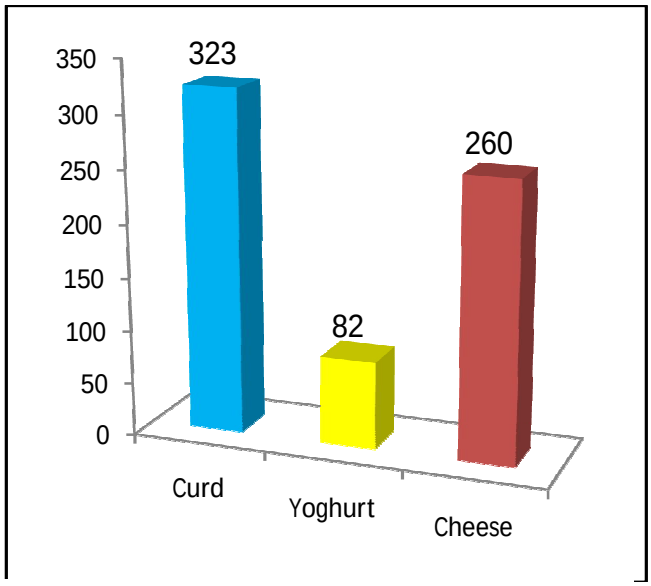

FIGURE 6 Consumption pattern of probiotic foods among adolescents

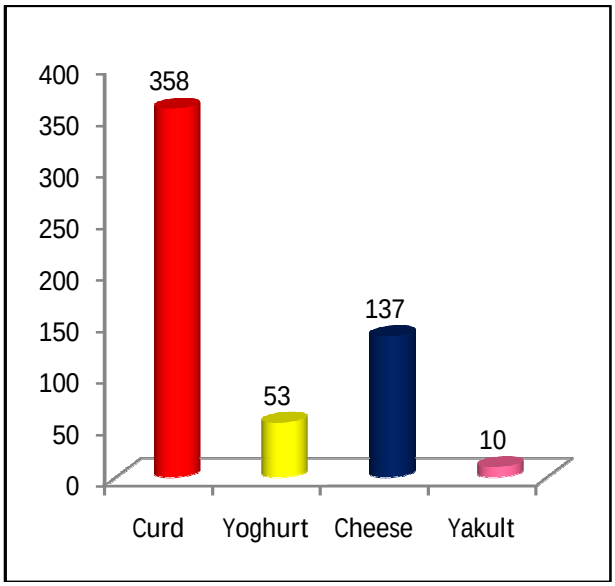

FIGURE 7 Consumption pattern of probiotic foods among adults

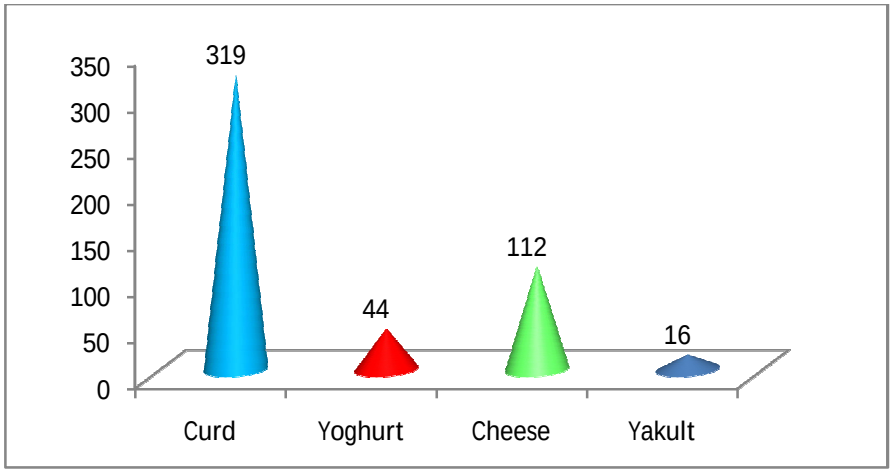

FIGURE 8 Consumption pattern of probiotic foods among elderly

D3. Frequency of consumption of prebiotic and probiotic foods

Table 10 shows the frequency of consumption of prebiotic foods

Table10 : "Frequency of consumption of prebiotic foods"

Prebiotics foods	Adolescents		Adults		Elderly	
	M N=148	F N=175	M N=158	F N=200	M N=147	F N=172
Wheat						
Weekly	**101**	**104**	**125**	**125**	**125**	**125**
Monthly	**47**	**59**	**33**	**75**	**22**	**47**
Oats						
Weekly	**47**	**54**	**74**	**96**	**71**	**54**
Monthly	**49**	**35**	**46**	**78**	**54**	**67**
Occasionally	**52**	**48**	**30**	**26**	**22**	**25**
Barley						
Monthly	**nil**	**nil**	**11**	**8**	**10**	**26**
Occasionally	**nil**	**nil**	**23**	**21**	**12**	**13**
Soyabean						
Weekly	**53**	**58**	**101**	**109**	**39**	**35**
Monthly	**62**	**55**	**47**	**68**	**81**	**87**
Flaxseeds						
Monthly	**nil**	**nil**	**nil**	**nil**	**8**	**6**
Occasionally	**nil**	**nil**	**nil**	**nil**	**7**	**8**
Tomato						
Daily	**nil**	**nil**	**99**	**148**	**135**	**125**
Weekly	**82**	**97**	**69**	**42**	**12**	**33**
Monthly	**51**	**45**	**nil**	**nil**	**nil**	**nil**
Occasionally	**15**	**33**	**nil**	**nil**	**nil**	**nil**
Onion						
Daily	**117**	**122**	**157**	**195**	**147**	**172**
Weekly	**31**	**58**	**2**	**4**	**nil**	**nil**
Garlic						
Daily	**109**	**166**	**97**	**85**	**139**	**170**
Weekly	**39**	**9**	**61**	**115**	**8**	**2**
Fruits						
Berries						
Occasionally	**9**	**4**	**6**	**3**	**8**	**nil**
Banana						
Monthly	**41**	**91**	**nil**	**74**	**43**	**3**
Occasionally	**20**	**3**	**15**	**41**	**nil**	**nil**

Certain foods that are used as a part of traditional diet are probiotic in nature such as curd is consumed by all age groups. Probiotic yogurt and cheese were also found to be consumed least by the

elderly subjects when compared with the other age groups with only 14 percent consuming yoghurt and 35 percent consuming cheese. Commercially available fermented milk product such as yakult was consumed by three percent of the adult subjects and five percent of the selected elderly subjects Prebiotic foods such as onions garlic and banana were consumed daily by 239,275 and 19 adolescent subjects respectively. Adolescents did not consume barley while it was consumed more by elderly females. Among the prebiotic foods, onions, garlic wheat and fruits like berries and banana were consumed most by adolescents. The adult subjects were found to consume more of oats and soyabeans than the other subject groups. Flaxseeds was observed to be consumed only by the elderly subjects.

D.4. Frequency of consumption of probiotic foods

Table 11 depicts the frequency of consumption of probiotic foods

Table 11: "Frequency of consumption of probiotic foods"

Probiotics foods	Adolescents		Adults		Elderly	
	M N=148	F N=175	M N=158	F N=200	M N=147	F N=172
Curd						
Daily	102	122	132	91	132	91
Weekly	46	53	26	109	26	70
Yogurt						
Monthly	25	20	12	20	12	15
Occasionally	18	19	21	nil	17	nil
Cheese						
Occasionally	85	83	25	37	20	32
Yakult						
Occasionally	nil	nil	3	7	9	7

Daily consumption of curd was seen among all the age groups. Probiotic yogurt and cheese were consumed mostly by the adolescents and the adult age groups. Twenty five males and 20 females adolescents consume yogurt on monthly basis . Cheese is consumed occasionally maximum by 168 adolescents. Elderly subjects 9 males and 7 females were found to consume more of commercially fermented milk such as yakult.

CONCLUSION:

Food consumption pattern of consumers are changing rapidly. Poor diet and consumption of nutrient deficient foods have been implicated in the initiation and progression of degenerative diseases.

Consumers are now more concern on optimizing their health through foods that provide functional benefits and alleviate diseases. Prebiotic and probiotic foods as a functional food ingredient enhance health and well being. Consumer awareness on such foods is not well documented.

Awareness and knowledge of prebiotic foods and probiotic foods go a long way in protecting population groups to prevent non communicable diseases.and imparting awareness and knowledge on prebiotics and probiotics among consumers is important.

Knowledge and awareness of prebiotics and probiotics and its health benefits among the consumers were found to be dependent on gender, educational and occupational status of the consumers. The findings of this study are presented to elicit awareness of prebiotic and probiotic foods, the consumption pattern among selected population and the findings could be used a baseline for other more indepth study in the same area.

REFERENCES

1. Frewer L, Scholderer J, Lambert N Consumer Acceptance of Functional Foods: Issues for the Future. Bri. Fd. J. 2003; 105: 714-73
2. World Health Organisation , Diet, nutrition and the prevention of chronic diseases, WHO Technical Report No. Series 196. Geneva, Switzerland; 2003.
3. FAO/ WHO. Guidelines for the Evaluation of Probiotics in Food. Joint FAO/WHO Working Group ReportLondon, Ontario, Canada, April 30 and May 1; 2002.
4. Kociubinski, G., Salminen, S. Probiotics: Basis, state of the art and future perspectives. Functional food network general meeting, Finland March 8-10; 2006.
5. Gibson G.R. , Probert H.M, Jan Van Loo, Rastall R.A and Roberfroid M.B., Nutrition Research Reviews 2004; 17: 259–275.
6. Ares, G. and Gambaro, A 'Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods' Science Direct Journal, Appetite, . 2007; 49, 148-158.
7. Indian states census 2011 Census organization of India,2011: Available from Http://censusindia.gov.in/2011, 2013.
8. MHUPA –working group on urban housing, 2007-2012, 11th five year plan, government of India.