ORIGINAL RESEARCH PAPER
Volume-6 | Issue-12 | December-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 93.98
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

SMART 4HEALTH - APPS AS HEALTH PROMOTION TOOL : AWARENESS OF FOOD (NUTRITIVE VALUE) APPS AND USAGE IN PURCHASING PRE-PACKAGED FOOD PRODUCTS AMONG CONSUMERS IN URBAN CHENNAI

Community Medicine

Sree T Sucharitha* Associate Professor, Community Medicine, Tagore Medical College and Hospital *Corresponding Author

S.Harinie 2rd MBBS, Community Medicine, Tagore Medical College and Hospital

R.Mathangi 2rd MBBS, Community Medicine, Tagore Medical College and Hospital

T.Madhumitha 2rd MBBS, Community Medicine, Tagore Medical College and Hospital

ABSTRACT

BACKGROUND: Food consumption practices and purchasing habits form a predominant life style in populations. The smart phone apps are designed to display the nutritive values of food items upon scanning of the barcode on pre-packaged food items and also suggest healthier alternatives to the consumers. Indian studies assessing the consumer behaviors on the awareness and usage of apps to aid healthier choices are very much needed to understand the potential of apps as health promotion tools.

OBJECTIVES: This study aims to 1. assess the awareness of food-nutritive value apps among consumers 2.determine the use and frequency of usage of food-nutritive value apps to make healthier food choices by consumers 3.ascertain the potential of food-nutritive value apps as health promotion tool

MATERIALS AND METHODS: This was a cross-sectional study conducted during February to March 2017 in ten supermarkets in urban residential area of Chennai, Tamil Nadu. A convenient sample of 200 consumers is decided due to paucity of such studies in Indian context. A one-on-one interview using a pre-tested questionnaire was conducted with consumers owning smart phones arriving at supermarkets with the intent of purchasing food products after obtaining written informed consent.

RESULTS: Among 200 consumers, 144 (72%) are aware of the food (nutritive value) apps. 100 (50%) consumers downloaded food (nutritive value) apps of which 52 (26%) are using the apps. 115(57.50%) of the consumers believe food (nutritive value) apps help them in making healthier choices.

CONCLUSIONS:A quarter 52 (26%) of the consumers were using nutritive value apps, though only 2 (1%) are using regularly. Consumers expressing their willingness to use the apps and believing their influence on purchase indicates food nutritive value apps potential for health promotion.

KEYWORDS

Smart phone applications-apps, health promotion tool, food choices, life style, consumer behavior

BACKGROUND

Of 56.4 million global deaths in 2015, 39.5 million (70%), were attributed to non-communicable diseases (NCDs)[1]. Most of the world's population live in countries where overweight and obesity kills more people than underweight[2]. The global prevalence of obesity more than doubled between 1980 and 2014.[2] In 2014, more than 1.9 billion adults (39%) above 18 years were overweight and over 600 million (13%) were obese. Also 41 million (0.9%) under the age of 5 were overweight or obese[2].

As India ranks third in the world's most obese countries list[3], interventionstargeting the prevention of NCD-related risk factors such as obesity are the need of the hour[4,5]. Globally, there has been an increased intake of energy-dense foods that are high in fat and an increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization[2]. Food consumption practices and purchasing habits form a predominant life style in populations.

Lack of knowledge about the nutritive values of food items is a barrier to access the healthier food options and can impact food choices. Consumer behaviors in food choices and purchasing of food products when positively changed can influence the burden of risk factors for non-communicable diseases. Food products we choose to consume at individual and family level directly influence the epidemic of obesity among children, adolescents, young adults and adults. Studies show that food labeling on packages help consumers understand the nutritional content of foods and help them make informed and healthier choices [6,7]

Smart phone, is a device with features to download apps which enables browsing as well as sharing of information along with internet usage[8] and have become an essential multi-purpose gadget in modern daily life. Among the recent phone acquirers 93% chose to purchase a smartphone[9]. Digital technologies and smart phone applications have penetrated the daily lives ubiquitously and thus have the unique potential to support healthier food choices by consumers. Earlier studies have evaluated the potential of smart phones on health outcomes in developing countries as transforming public health landscape tremendously[10]. A meta analysis study claimed that there are 7000 documented cases of smart health apps globally [10,11]. The latest apps are designed to display the nutritive values of food items upon scanning of the barcode on pre-packaged food items and also suggest healthier alternatives to the consumers. About two third of consumers visiting supermarkets own a smart phone and use of mobile apps is high among educated youth and adults in India.

We hypothesize that the regular use of technology enhanced smart phone applications as health promotion tools will empower consumers to make informed decisions on their food consumption behaviors. Indian studies assessing the consumer behaviors on the awareness and usage of apps to aid healthier choices are very much needed to understand the potential of apps as health promotion tools.

OBJECTIVES

This study aims to

1. assess the awareness of food-nutritive value apps among consumers shopping at supermarkets
2. determine the use and frequency of food-nutritive value apps to make healthier food choices by consumers
3. ascertain the potential of food-nutritive value apps as health promotion tool

METHODOLOGY

A Cross-sectional study was conducted in the months February and March in fifteen different supermarkets (Grace world, More, Spencer's, Yesesi, MaharajaShopping- Tambaram, Nilgiris, Elahi Supermarket-Porur, Easy & Fresh, Reliance Heritage, Reliance Fresh, Wait Rose, SPAR, Murugan stores, Bombay general stores, Saravana super stores) in the residential area of Chennai, Tamil Nadu. The Supermarkets situated in urban residential area in Chennai city of Tamil Nadu are approached based on the convenience, with this study proposal. Management who were favorable and agreed for the conduction of the study among its consumers in shop premises were included in the study after getting an informed written consent from the manager or in-charge of the super market.

Consumers arriving at supermarkets, owning a smart phone, with the intent of purchasing food products are approached to participate in the study. Regular main shopper for the household, who is able to read and understand English, providing written consent thereby willing to participate in the study by answering the questionnaires were included in the study.

The questionnaire collected data on socio - demographic characteris tics of consumers, smart phone usage in duration and utility, awareness on the food (nutritive value) apps, consumers perception on the importance of food (nutritive value) apps. The data were entered in MS Excel sheet 2016 version and analyzed.

RESULTS

The results from the study, in which two hundred consumers were interviewed to assess the food (nutritive value) apps usage in Chennai were presented.

TABLE 1: SOCIO DEMOGRAPHIC CHARACTERICTICS OF THE CONSUMERS

*N = FREQUENCY
* % = PERCENTAGE
**Socio economic class according to Modified Kuppuswamy's socioeconomic status classification 2016

SOCIO DEMOGRAPHIC CHARACTERICTICS	Frequency (N)	Percentage (%)
GENDER		
MALE	79	39.5
FEMALE	121	60.5
AGE		
18-20 YEARS OLD	31	15.5
21-30 YEARS OLD	61	30.5
31-40 YEARS OLD	59	29.5
41-50 YEARS OLD	23	11.5
51 YEARS & ABOVE	26	13
EDUCATION		
PROFESSION COURSE	68	34
GRADUATE OR POST GRADUATE	100	50
INTERMEDIATE OR HIGH SCHOOL DIPLOMA	12	6
HIGH SCHOOL	13	6.5
MIDDLE SCHOOL	5	2.5
PRIMARY SCHOOL	2	1
OCCUPATION		
PROFESSION	112	56
SEMIPROFESSION	47	23.5
CLERICAL;SHOP OWNER;FARMER	17	8.5
SKILLED WORKER	2	1
SEMI SKILLED WORKER	9	4.5
UNSKILLED WORKER	5	2.5
UNEMPLOYED	8	4
FAMILY INCOME PER MONTH **		
≥42876	120	60
21438 – 42875	44	22
16078 – 21437	19	9.5
10719 - 16077	11	5.5
6431 – 10718	4	2
2165 – 6430	1	0.5
≤ 2164	1	0.5
SOCIO ECONOMIC CLASS ***		
UPPER CLASS	100	50
UPPER MIDDLE CLASS	86	43
LOWER MIDDLE CLASS	13	6.5
UPPER LOWER CLASS	1	0.5
LOWER CLASS	0	0

***Family Income per month according to Modified Kuppuswamy's socioeconomic status classification 2016

In our study consisting of 200 consumers, 79 (39.5%) are males and 121 (60.5%) are females. There were 31 (15.5%) consumers between the age group 18 – 20 years, 61(30.5%) consumers in 21 – 30 years, 59 (29.5%) consumers in 31-40 years, 23 (11.5%) consumers in 41-50 years, and 26(13%) consumers in 51 years and above age group. Educational qualification of our consumers varied from professional course to primary school. About 68(34%)consumers belong to professional course, 100(58%) were graduate and post graduates, 12 (6%) had intermediate or high school diploma, 13 (6.5%) were in high-school, 5(2.5%) middle school and 2(1%) with primary school educational qualifications. In our study, 112(56%) participants were professionals, 47 (23.5%) were semi-professionals, 17(8.5%) belong to clerical, farmer & shop owners category, 2 (1%) were skilled workers, 9 (4.5%) were semi skilled workers, 5 (2.5%) were unskilled workers, 8 (4%) were unemployed. Majority of our consumers 120 (60%) were having monthly income more than or equal to Rs.42876, 44 (22%) consumers between [Rs 21438 – Rs 42875], 19(9.5%) between [Rs 16078 – Rs 21437],11 (5.5%) in the range of [Rs 10719 - Rs16077], 4 (2%) were in the range between [Rs 6431 – Rs10718], 1 (0.5%) between [Rs 2165 – Rs 6430] and 1 (0.5%) were earning family income less than or equal to Rs.2164. According to Modified Kuppuswamy's socioeconomic status classification 2016, 100(50%) of the consumers belonged to upper class, 86(43%) upper middle class, 13 (6.5%) lower middle class, 1 (0.5%) upper lower class and none of them belonged to lower class.

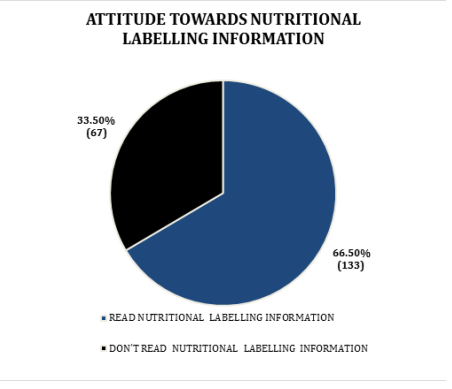
TABLE 2 : DURATION OF SMART PHONE USAGE AND HEALTH APPS USAGE BY CONSUMERS

DURATION OF SMART PHONE USAGE	Frequency (N)	Percentage (%)
Less than 1 year	21	10.5
1-2 years	53	26.5
More than 2 years	126	63
HEALTH APPS* USAGE BY THE CONSUMERS		
YES	64	32
NO	136	68

*Health apps means fitness, food and meditation etc

Twenty one (10.5%) study participants were using smart phone for less than one year, 53(26.5%) were using for 1 – 2 years, 126(63%) for more than 2 years. Of 200 consumers surveyed 64 (32%) consumers were using health apps related to fitness, food and meditation etc and 136 (68%) consumers were not using any kind of health apps.

FIGURE 1 : CONSUMERS ATTITUDE TOWARDS READING NUTRITIONAL LABELLING INFORMATION ON THE COVERS OF PRE – PACKAGED FOOD PRODUCTS



Of the 200 consumers 133(66.50%) have the habit of reading nutritional labeling information and 67(33.50%) consumers were not in the habit of reading the nutritional labeling information.

TABLE 3 : AWARENESS OF THE CONSUMERS TOWARDS THE FOOD (NUTRITIVE VALUE) APPS

Awareness on the food **(NUTRITIVE VALUE)** apps	Frequency (N)	Percentage (%)
Total number of consumers surveyed	200	100
Well informed about the food (nutritive value) apps	17	8.5
Moderately informed about the food (nutritive value) apps	64	32
Minimally informed about the food (nutritive value) apps	63	31.5
Not informed about the food (nutritive value) apps	56	28

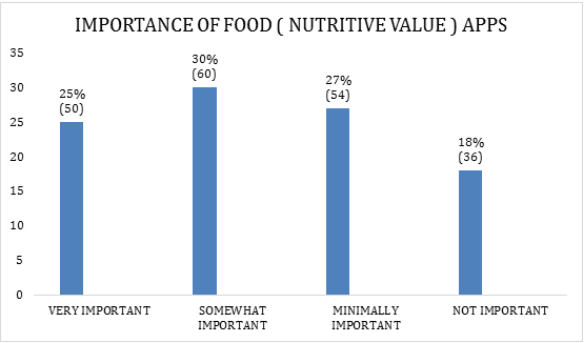
From the surveyed consumers, about 17(8.5%) of the consumers were well informed about the food (nutritive value) apps, 64(32%) were moderately informed, 63(31.5%) consumers were minimally informed and 56(28%) of the consumers were not informed about the apps.

TABLE 4 : ATTITUDE AND APTITUDE OF THE CONSUMERS TOWARDS FOOD (NUTRITIVE VALUE) APPS

Food **(NUTRITIVE VALUE)** apps usage	Frequency (N)	Percentage (%)
Total number of consumers surveyed	200	100
Total number of consumers interested to download and use the food (nutritive value) apps in future	50	25
Total number of consumers not interested in food (nutritive value) apps	50	25
Total Number of consumers already downloaded the food (nutritive value) apps prior to study	100	50
Number of consumers downloaded the food (nutritive value) app & use regularly	2	1
Number of consumers downloaded the food (nutritive value) app & use most of the times	10	5
Number of consumers downloaded the food (nutritive value) app & use occasionally	40	20
Number of consumers downloaded the food (nutritive value) app & not using at all	48	24

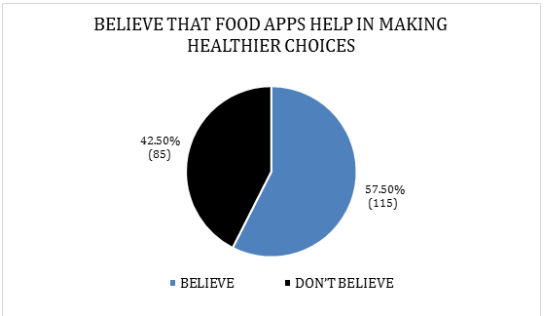
Among the surveyed consumers of 200, 100(50%) have downloaded the food (nutritive value) apps, 50(25%) have stated that they were not interested in the food (nutritive value) apps, 50(25%) have mentioned that they were interested and will download the apps and use it in future. Of the 100(50%) consumers who have downloaded app 2(1%) use it regularly, 10(5%) use it most of the times, 40 (20%) use the app occasionally, 48(24%) have downloaded but not using the apps.

FIGURE 2 : CONSUMERS PERCEPTION ON THE IMPORTANCE OF FOOD (NUTRITIVE VALUE) APPS IN MAKING HEALTHIER FOOD CHOICES



The consumers perception on importance of the food (nutritive value) apps is that 50(25%) consumers feel apps are very important, 60 (30%) consumers feel apps are somewhat important, 54(27%) consumers felt minimally important and 36 (18%) consumers felt as not important.

FIGURE 3 : BELIEF OF CONSUMERS ON THE INFLUENCE OF FOOD (NUTRITIVE VALUE) APPS HELP ON MAKING BETTER HEALTHIER CHOICES



Among 200 consumers in our study, 115(57.50%) of the consumers believe apps help them in making healthier choices and 82(42.50%) of the consumers do not believe that apps help them in making healthier choices.

DISCUSSION

In this this study, we assessed the awareness, use, frequency and potential of smart phone food nutritive value apps as a health promotion tool.

Though smartphone apps are invading our daily life widely since a decade, in our study only 32% of the study participants were using some kind of health related apps. A European study stated that apps are suitable as monitoring tools for both dietary intake and physical activity [14]. In US among mobile phone owners 58.23% had downloaded a health related mobile app of which fitness and nutrition were the most common category of health apps used[15]. The Pew survey found that 19% of the mobile phone users had at least one health app which is less than our study[16]. This shows distinctive gap in usage of apps as tools for enhancing life between developed and developing nations.

Nutritional labeling as we know now was introduced in 1990's as *Nutrition Labeling and Education Act (NLEA)* in America. Every packaged food article for the domestic use in India has to be labeled in accordance to the related Indian Food Law i.e. Food Safety and Standards (Packaging and Labelling) Regulations, 2011, notified by Food Safety and Standards Authority of India (FSSAI)[17]. In our study, 33.50% of study participants self-admitted that they read nutritional labeling information. In Ireland study one quarter of the consumers (253/1021) said that they always consult food labels when shopping for food whereas in our study it is just more than a quarter about 32%(67) [18].This is still a very small percentage of population reading food labels by Indian consumers.

Smart phone apps which display nutritional information are first introduced in 2011 and since then have been health information tools for digital consumers[19]. In our study, about 8.5% of the participants reported that they are well-informed, 32% moderately informed, 31.5% minimally informed (72% were informed, overall) about nutritive value apps. In a study conducted in Tamil Nadu on FoodSwitch app, which is designed to help consumers make healthy food choices[20], 98% of the consumers were not aware of FoodSwitch app. Though this may be explained that this app was released in India only in December 2015 and the study was conducted in 2016. Also among the consumers in our study who actually downloaded (100, 50%) a nutritive value app, only one percentage of them use it regularly. This reflects that either the consumers were well aware of the nutritive value of the food products they buy regularly or else they do not feel it necessary to use the app information in making food product choices. This is confirmed when only 25%(50) of study participants reported that nutritive value apps were very important to make healthier food choices. Whereas in Ireland study, it is stated that food labelling information do influence the purchase choice as two third of their respondents said that they would be inclined to buy food products labelled with a nutrition claim[18]. Also, in US in relation to health apps mostly of fitness and nutritive type, participants stated that they used them regularly[15]. This highlights the non-availability of similar studies in Indian population to make context similar comparisons and hence it is more relevant for us to document this study findings.

In this study, 57.50% of the study participants admitted that they do believe that smart phone based nutritive value apps help in making healthier food choices. In a study in Chennai, about (54%) of the study participants reported that FoodSwitch app was helpful in making healthier food choices which is also similar to our study [20]. This is less when compared with other studies.[21,22&23]. In our study, about 50% have already downloaded the apps and further more 25% of the consumers have stated to download and use the app in future. This could reflect a positive trend and shows the willingness among consumers that if given adequate awareness, the consumers may be motivated to utilize the technology available in their smart phones and make healthier food choices. This points to the fact that there is a scope to create interest for use of apps among consumers and therefore for recommendation of using mobile apps[24]. Hence we conclude the food nutritive value apps have potential for health promotion among the consumers when adequately educated.

CONCLUSION

Study findings show poor awareness and usage of food (nutritive

value) apps among consumers .We believe that raising awareness and adding better features such as low data usage emerging technologies such as image recognition, diet information system that connects dietitians and the public in the Food (Nutritive value) apps will enhance the consumer's abilities in choosing healthier food choices, and this study is an attempt towards this.

ACKNOWLEDGEMENT

We would like to sincerely thank the following:

1. Department of Community Medicine, Tagore Medical College and Hospital, Chennai.
2. Supermarket managements.
3. Consumers at supermarket.

for their support and participation in conduction of this study

REFERENCES

1. WHO NCD mortality and morbidity;Global Health Observatory (GHO) data; http:// www.who.int/gho/ncd/mortality_morbidity/en/
2. WHO Obesity and overweight;Updated June 2016 http:// www.who.int/ mediacentre/ factsheets/fs311/en/
3. World Health Organization: Global status report on non-communicable diseases 2014
4. Kalpa Sharma. Burden of non-communicable diseases in India: Setting priority for action. Int J Med Sci Public Health. 2013; 2(1): 7-11. doi:10.5455/ijmsph.2013.2.7-11
5. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: A systematic analysis for the Global Burden of Disease Study 2013
6. Dunford E, Trevena H, Goodsell C, Ng KH, Webster J, Millis A, Goldstein S, Hugueniot O, Neal B FoodSwitch: A Mobile Phone App to Enable Consumers to Make Healthier Food Choices and Crowdsourcing of National Food Composition Data JMIR mHealth uHealth 2014;2(3):e37
7. Jason Gilliland, Richard Sadler, Andrew Clark, Colleen O'Connor, Malgorzata Milczarek, and Sean Doherty, "Using a Smartphone Application to Promote Healthy Dietary Behaviours and Local Food Consumption," BioMed Research International, vol. 2015, Article ID 841368, 11 pages, 2015. doi:10.1155/2015/841368
8. Techopedia ; (internet) available from www. techopedia.com/ definition/2977/ smartphone
9. Nielsen;Millennials are top smartphone users ; www.nielsen.com.
10. Kaplan W: Can the ubiquitous power of mobile phones be used to improve health outcomes in developing countries? Global Health 2006, 2: 9. 10.1186/1744-8603-2-9
11. Martinez AW, Phillips ST, Carillho E, Thomas SW, Sindi H, Whitesides GM: Simple Telemedicine for Developing Regions: Camera Phones and Paper- Based Microfluidic Devices for Real-Time, Off-Site Diagnosis. Analytical Chemistry 2008, 80: 3699–3707. 10.1021/ac800112
12. Harriet taylor ; apps powering the revolution in fitness ; CNBC ;published 10.04 AM ET Fri; 22 Jan 2016
13. Conroy DE, Yang CH, Maher JP. Behavior change techniques in top-ranked mobile apps for physical activity. Am J Prev Med. 2014 Jun;46(6):649–52. doi: 10.1016/j.amepre. 2014.01.010
14. Denise Jantine;MSc ; Wanda Jose Erika Bemelmans;PhD;and Joao Breda;PhD;Using mobile apps to promote a healthy lifestyle among adolscents and students : A Review of the Theorectical basis and lessons learned; JMIR mHealth and uHealth
15. Paul Krebs,PhD and Dustin T Duncan, ScD;Health App use among US Mobile phone owners : A National Survey ; JMIR mHealth and uHealth; www.mhealth.jmir.org
16. Fox S, Duggan M. Pew Research center . Washington, DC: Pew internet & American Life Project; 2012.Nov 08,(2015-04-23).webcite Mobile health 2012http:// www.pewinternet.org
17. Food Labelling requirements in compliance to Food Safety and Standards Act ; http://foodsafetyhelpline.com
18. Food safety authority of Ireland ;A research study into consumers' attitudes to food labelling ; December 2009
19. Gemma Breen; Food Labelling apps takes bite out of industry ; news home updated mon 5 sep 2011; 1:22 PM AEST ; www.mobile.abc.net.au
20. Sree T. Sucharitha, Jarasruthi M; FoodSwitch: Can a smart phone app help consumers switch to healthier food choices? A Pilot Study; NJRCM ; www.commedjournal.in
21. S. Arora, A. L. Peters, C. Agy, and M. Menchine, "A mobile health intervention for inner city patients with poorly con- trolled diabetes: proof-of-concept of the TExT-MED Program," Diabetes Technology & "Therapeutics, vol 14, no 6 pp 492-496 2012
22. P. Lappalainen, K. Kaipainen, R. Lappalainen et al., "Feasibility of a personal health technology-based psychological interven- tion for men with stress and mood problems: randomized controlled pilot trial," JMIR Research Protocols, vol. 2, no. 2 article el 2013
23. M.H.Moniz, S.Hasley, L.A.Meyn, & R.H.Beigi,"Improving in+uenza vaccination rate in pregnancy through text messaging: a randomized controlled trial," Obstetrics&Gynecology,vol. 121, no.4 , pp. 734-740 2013
24. Rodrigo Zenun Franco, MSc, Rosalind Fallaize, PhD, […], and Faustina Hwang, PhD; Popular Nutrition – Related Mobile Apps: A Feature Assessment ; JMIR mHealth and uHealth; www.mhealth.jmir.org