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AVAILABILITY OF HEALTHY FOOD IN DIFFERENT CATEGORIES OF MARKETS IN RIYADH

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Abstract:
Objectives: *To assess and compare the availability of healthy food, To compare the price of healthy food between supermarket, groceries and convenience stores, To assess the presence of section that only contains healthy food.*
Methods: *We divided markets into three categories (Supermarkets – Grocery stores – Convenience stores) And divided Riyadh into 4 regions to insure that the data represent the whole regions of Riyadh. Data were entered to Microsoft Excel 2010 then the data transferred to Statistical Package for the Social Sciences (SPSS), proportions used to assess level of availability of healthy food and Chi-square used to test for statistical difference in availability. Anova and Post Hoc Test used to assess the presence in difference of price of healthy foods.*
Results: *Availability of healthy food items differ based on the size of the stores, large stores contain more than small stores especially In vegetables and fruits groups. Only Drinks group showed no significant difference (p-value 0.465) with the highest percentage of availability among other groups while Miscellaneous group showed the least percentage of availability between different markets.The difference in price between the three different commercial outlets is not significant except in meats group.Healthy food sections was found in two out of seventy markets.*
Conclusion: *Availability of healthy food items increase with the increase of stores size. There is no price difference between different markets except meats group. Healthy food sections was found in two out of seventy markets*
Keywords: *Healthy food; healthy food Cost; less healthy food cost; nutrition*

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INTODUCTION:

Sedentary life style and Unhealthy food consumption are a major cause of obesity. Ministry of Health report that Obesity is a major contributor to many diseases include high blood pressure, diabetes, heart diseases and cancer. From 2010 to 2013 the prevalence of obesity increased in Saudi population from 11.8 to 24.1 in males and from 11.1 to 33.5 in females(1) .

According to World Health Organization (WHO) 39% of adults ages 18 years and over were overweight In 2014 and 13% were obese, overweight is a body mass index (BMI) greater than or equal to 25 and obesity is a body mass index greater than or equal to 30(2).

A systematic review studied published randomized controlled trails which assessed the relation between physical activity and healthier diet and their effect on type 2 diabetes and found that combination of physical activity and healthier diet reduced the risk of type 2 diabetes(3). In addition the prevalence of high blood glucose in Saudi population is 10% for males and 7.8% for females (4).

The worldwide prevalence of diabetes has been increase since 1980 to 2014 from 4.7% to 8.5% in adults over 18 years old(5). " All countries must act more decisively to prevent chronic diseases by supporting healthier diet and physical activity behaviors(6). About 1.7 million death in a year caused by inadequate amount of vegetables and fruits.

Given the studies mentioned above, healthy food can prevent such diseases. Three studies showed that there is increase in healthy food availability with increase store size another study found that the price of healthy food is lower in supermarkets compare to convenience stores and groceries although recent studies showed that healthy food is more often available in large markets compare to small markets a cross-sectional study showed that grocery stores contain more healthy food than convenience stores(7)(8)(9)(10).

In over 6 centuries a reviewed trials which used various strategies to improve the consumer knowledge and affect his choices using shelf labels, posters and increasing the availability of healthy food were conducted and found a significant effect by using shelf's, poster and increased availability of healthy food in improving consumer knowledge and dietary behaviors. Many studies showed the difference in availability of healthy food in different parts of the world but none were conducted in Saudi Arabia. Large sized stores is expected to have increased availability compared to small sized stores in Saudi Arabia with less price(7)[i]. In this study our aim is to compare the availability and price of healthy food also to assess the presence of healthy food sections in different commercial outlets.

Easier access to healthy diet is needed to control non-communicable diseases that caused by unhealthy food and increase the overall wellbeing of the community. The results of this study will help to identified if there are a shortage of healthy food items and variation in price among different commercial outlets that might influence access to healthy food items also help the government to increase healthy food and make it easily accessible.

During the collection of healthy food items we faced difficulties finding them. Sections that only contain healthy food items will save consumer's time and might influence their choice.

Without the availability of healthy food, a healthy diet is out of reach. Furthermore, improved sales of healthy food within groceries will give an incentive to companies to invest more in making healthy food available.

Study design:

This type of study is a quantitative, observational cross-sectional study.

Study setting:

This study has been conducted for the first time during CMED 305 course

in Riyadh, Saudi Arabia from September 2016 to March 2017. Target

three different commercial outlets (groceries, convenience stores and

well-known supermarkets).

Inclusion, Exclusion criteria:

We included the healthy food and excluded the less healthy food based

on the amount of sugar, calories fibers, salt and fat. Food items were

classified into 6 groups, fresh meats were included while processed meats

were excluded, low fat Dairy product were included and full fat Dairy

product were excluded, Brown and bran grains were

included and white

bread and rice were excluded, fresh fruits with low sugar were included

while fresh fruits with high sugar and canned fruits were excluded, fresh

vegetables were included and canned vegetables where excluded, Oats

chocolate bars snack and Wheat date mammal were included and

Chocolate-based products, cookies, nuts, and chips snacks were excluded.

Sampling:

Using Google map, we divided Riyadh into 4 regions, North West, North East, South West, and South East. Due to the lack of convenience stores population data in Riyadh, the sample has been chosen conveniently.

- The sample size required : 70

$$n = \frac{Z^2 * P(1-P)}{d^2}$$

- Where n = sample size
- Z = level of confidence (2 sided 95% confidence interval= 1.96)
- P = expected percentage for healthy food from previous study[2]
- d = precision (15%)

Data collection:

We designed questionnaire form to assess the availability, price of healthy food items and presence of healthy food sections. The questionnaire was carried out by 5 trained investigators by inspecting the availability, price of healthy food items and presence of healthy food sections . We divided Riyadh into 4 regions, North West, North East, South West, and South East and Each investigator was assigned to a specific region to insure that the data represent the whole regions of Riyadh. Data were entered to Microsoft Excel 2010 then the data transferred to Statistical Package for the Social Sciences (SPSS).

Statistical methods of analysis:

Proportions used to assess level of availability of healthy food in different outlets. Chi-square used to test the statistical difference in availability within different categories of outlets. Anova test and Post HOC test used to assess the presence in difference of prices of healthy foods within the three comparison groups

Ethical consideration:

There was no informative human participant therefore no violation of human rights was expected. There was no conflict of interest and no funding source. Ethical approval to conduct the study was provided by the ethical committee of the College of Medicine at King Saud University, Riyadh, Saudi Arabia.

RESULTS:

A total of 49 healthy food items were classified into 8 groups to assess the availability and price of healthy food items and presence of specific healthy food sections within three different commercial outlets, supermarket, groceries and convenience stores as shown in Table1.

Table2 compares the availability of healthy food items and showed that healthy food is more available in large markets compare to small markets. There was a statistically significant difference between the availability of healthy food among the three different commercial outlets, indicating that there are a shortage of healthy food items among different commercial outlets especially In vegetables and fruits groups. The study showed presence of vegetables among supermarkets was 91.3%, groceries 49.4% and convenience stores was 2.5% (p-value 0.00000000001). Additionally presence of fruits within supermarkets was 92.5%, groceries 37.9% and 2.5% for convenience stores (p-value 0.00000003500) . Only Drinks group showed no significant difference (p-value 0.465) with the highest percentage of availability among other groups, 100.00% supermarket, 90.9% groceries and 97.5% convenience stores. Miscellaneous group showed the least percentage of availability between different markets, 55.6% supermarket, 0.0% groceries and 2.5% convenience stores.

Healthy food sections was available in two markets only.

Tables 3 compares the price of healthy food items. The difference in price between the three different commercial outlets is not significant except in meats group. There was a statistically significant difference at the < 0.05 Post-hoc comparisons using the LSD test indicated that the mean score for group Supermarket (M = 33.5157 , SD = 24.91421) was significantly different from group Convenience store (M = 12.3690 , SD = 2.85217) and the mean score for Groceries (M = 24.6050 , SD = 29.04590) was significantly different from Convenience store (M = 12.3690 , SD = 2.85217) . Group Groceries (M = 24.6050 , SD = 29.04590) did not differ significantly

from group Supermarket (M = 33.5157 , SD = 24.91421).

DISSCUSION & RECOMMENDATION:

Consumption of unhealthy food plays a major role in increase body weight, According to ministry of health report that obesity is a major risk factor to many diseases include high blood pressure, diabetes, heart disease and cancers(2). Obesity In increasing dramatically in Saudi Arabia population from 11.8% males to 24.1 and 11.1 to 33.5 in females(1).

The finding of this research indicate that availability of healthy food items varied base on size of the stores. Large markets have easier access to healthy food items while small markets have limited access to healthy food items or may not exist. This variation is likely to contribute to consumers' choice and might influence access to healthy food items depending on different commercial outlets, Based on these we expect that people who lives near to supermarkets may have better dietary intake which will improve their well-being. During our data collection we faced difficulties finding healthy food, presence of healthy food sections will save consumers' time and effort.

Price of Healthy food items were not different between large or small markets except meats group, Supermarket have higher price compare to convenience stores in addition groceries have higher price compare to convenience stores while supermarkets didn't differ from groceries stores.

This study will serve as evidence for the government to support retailers in providing healthier choices in small markets especially fruits and vegetables. People use small markets on a daily basis which play a major concern that is why healthy food should be present more in small markets.

Many previous studies showed difference in availability of healthy food items based on stores size. Three studies indicate increase in availability of healthy food items with increase stores size(10)(8)(7). A US study(8) showed healthy food items were substantially higher at supermarkets and grocery stores. Presence of healthy food items were between 75% to 100% In supermarkets and groceries while 4% to 29% in convenience stores. Price of healthy food items were higher in supermarkets and (11)groceries than convenience. Another study conducted by Raquel F. Pereira showed that healthy food items were found to be more available in groceries stores compared to convenience stores except for milk. Similarity, another study found that fresh fruits and vegetables were present in grocery stores more than convenience stores(10).

The current study indicate that availability of healthy food were more often in supermarkets then grocery stores after that convenience stores. Further investigation should include specialized markets that provide only healthy food items also school canteen should be included as well. A survey should be conducted to assess the level of awareness about healthy food items. To our knowledge, this study is the first of its kind were conducted in Saudi Arabia. Population of convenience stores is lacked which forced us to use convenient sampling as sampling method.

CONCLUSION:

Healthy food items availability and price are the two main parameters on which guide consumers' choice.

Availability of healthy food items differ based on the size of the stores, large stores contain more than small stores, while price of healthy food doesn't except meats group, supermarkets and groceries have higher price compare to convenience stores.

Healthy food sections was found in two out of sixty markets.

The finding of this study indicate the need to improve the availability of healthy food items in small markets to increase healthful eating.

Since small markets are visited more by locals, health promoters primary focus should be on these small markets.

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TABLES:

Table.1 Summary of healthy food items.

Groups	**Examples**
Meats	Fresh meats (E.g., chicken, lamb, veal, camel, fish, shrimp)
Dairy Product	Low fat dairy products (for example, laban, milk, labnah, ayran)
Grains	Bran based grains (bread, and corn flicks)
Snacks	Oats chocolate bars
Grains	Bran based grains (bread, and corn flicks)
Fruits	Fresh fruits with low sugar contents (E.g., orange, apple, lemon, and so forth)
Vegetables	Fresh fruits with low sugar contents (E.g, orange, apple, lemon, and so forth)
Drink	Diet 7UP
Miscellaneous	Sweeteners

Table2. Availability of health food items

			Availability		P-value
			yes	no	
Meats	Supermarket	N	47	16	0.000016
		%	74.6%	25.4%	
	Groceries	N	19	58	
		%	24.7%	75.3%	
	Convenience store	N	42	238	
		%	15.0%	85.0%	
Dairy Products	Supermarket	N	50	13	0.000178
		%	79.4%	20.6%	
	Groceries	N	49	28	
		%	63.6%	36.4%	
	Convenience store	N	145	135	
		%	51.8%	48.2%	
Grains	Supermarket	N	24	12	0.000029
		%	66.7%	33.3%	
	Groceries	N	17	26	
		%	39.5%	60.5%	
	Convenience store	N	43	117	
		%	26.9%	73.1%	
Snacks	Supermarket	N	12	15	0.000152
		%	44.4%	55.6%	
	Groceries	N	8	25	
		%	24.2%	75.8%	
	Convenience store	N	13	107	
		%	10.8%	89.2%	
Drinks	Supermarket	N	9	0	0.465
		%	100.0%	0.0%	
	Groceries	N	10	1	
		%	90.9%	9.1%	
	Convenience store	N	39	1	
		%	97.5%	2.5%	
Fruits	Supermarket	N	99	8	0.00000003500
		%	92.5%	7.5%	
	Groceries	N	50	82	
		%	37.9%	62.1%	
	Convenience store	N	12	468	
		%	2.5%	97.5%	
Vegetables	Supermarket	N	115	11	0.00000000001
		%	91.3%	8.7%	
	Groceries	N	76	78	
		%	49.4%	50.6%	
	Convenience store	N	14	546	
		%	2.5%	97.5%	
Miscellaneous	Supermarket	N	5	4	0.00000484456
		%	55.6%	44.4%	
	Groceries	N	0	11	
		%	0.0%	100.0%	
	Convenience store	N	1	39	
		%	2.5%	97.5%	

ANOVA[a]

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9937.061	2	4968.531	11.725	.000
Within Groups	44916.170	106	423.737		
Total	54853.232	108			

a. type = Meats

Post Hoc Tests

Multiple Comparisons[a]

Dependent Variable: Price

LSD

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Supermarket	Groceries	8.91074	5.49569	.108	-1.9850	19.8065
	Convenience store	21.14670*	4.37089	.000	12.4810	29.8124
Groceries	Supermarket	-8.91074	5.49569	.108	-19.8065	1.9850
	Convenience store	12.23595*	5.59248	.031	1.1483	23.3236
Convenience store	Supermarket	-21.14670*	4.37089	.000	-29.8124	-12.4810
	Groceries	-12.23595*	5.59248	.031	-23.3236	-1.1483

*. The mean difference is significant at the 0.05 level.

a. type = Meats

ANOVA[a]

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4306119.876	2	2153059.938	1.946	.145
Within Groups	263257279.963	238	1106123.025		
Total	267563399.840	240			

a. type = Dairy Products

ANOVA

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20.624	2	10.312	.244	.784
Within Groups	3464.638	82	42.252		
Total	3485.262	84			

a. type = Grains

ANOVA[a]

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.363	2	1.182	.194	.825
Within Groups	182.967	30	6.099		
Total	185.330	32			

a. type = Snacks

ANOVA[a]

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.000	2	.000	.	.
Within Groups	.000	55	.000		
Total	.000	57			

a. type = Drinks

ANOVA[a]

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.816	2	2.908	.148	.862
Within Groups	3135.665	160	19.598		
Total	3141.481	162			

a. type = Fruits

ANOVA[a]

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	52.206	2	26.103	.730	.483
Within Groups	7225.512	202	35.770		
Total	7277.718	204			

a. type = Vegetables

ANOVA[a]

Price

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.211	1	6.211	.116	.751
Within Groups	214.103	4	53.526		
Total	220.314	5			

a. type = Miscellaneous