RESEARCH ARTICLE

DEPARTMENT STORES AND ITS IMPACT ON MOROCCAN'S HEALTH AND GROCERY SHOPPING BEHAVIOUR (OVERWEIGHT)

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ABSTRACT

The last 15 years have seen a drastic change in the food retail space in Morocco, with the arrival and development of large department stores. These stores are increasingly gaining market share against traditional markets (souks) and grocery stores and are having a significant impact on Moroccan's diet and arguably their health. In this study, we analyse the relationship between grocery shopping behaviour and obesity.

INTRODUCTION

It is widely agreed that globalization has impacted significantly the food supply system, which is becoming uniform across very different cities and local differences are increasingly muted. In this system, supermarkets play a major role with other players gravitating around them: such convenience stores, open air markets and other full-service restaurants, franchised fast food, and limited service restaurants. (Morland& al., 2006;Ransley JK & al.2001). This rapid rise of modern supermarkets in many developing countries has been observed in low and middle North African countries as well. However, it is important to highlight that while 'the supermarket revolution', has taken 50 years in developed countries, the pace was much faster in some developed countries such as Morocco where the revolution was done in just one decade (Reardon & al., 2003;Codron& al.,2004).

It is not very clear whether the impact of the food supply revolution was positive or negative. Some studies on this subject (Morland& al., 2006; Zenk *et al.*, 2005; Tessier& al., 2008);suggest an improvement in the quality of diet thanks to the access to better quality products in supermarkets, while other studies(Stamoulis& al., 2004;Tessier &al., 2008) exhibited a negative impact,mainly due to the larger diffusion of manufactured food products with lower nutritional intake and higher fat, salt, and sugar content. While there is an obvious relationship between the type and quantity of food consumed and obesity, there are other factors such as socioeconomic status and shopping behaviour preferences which are less known; therefore, we aimed to focus on this subject taking Moroccanmegapolis, Casablanca as basis for this study.

PARTICIPANTS AND METHODS

Our study, a descriptive transversal survey conducted between April and Septembre 2013, has included 264 participants (131 men and 133 women, sex-ratio=0.98, mean-aged 35.5 ± 9.3 years-old), actives and living in Casablanca.

During a medical examination, participants were examined by a qualified staff. While being interviewed, they signed an informed consent and completed a questionnaire reporting socio-economical and demographical data; some elements for food supply (main locations and frequentation)(Morland& al., 2006)and their dietary habits; the clinical examination consisted in anthropometrical measures (weight, height and body mass index calculation according to standards protocols) and medical history.

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Statistical analyses

All data are expressed as mean ± standard deviation or frequency (%). Data were noted in Excel sheets, then analysed in PSPP version 0.8.3 for Windows. Comparison between frequencies has been done using Khi-Two Tests. Binomial logistic regression has been completed using R i386 version 2.15.0. Values of $p < 0.05$ were considered as statistically significant.

RESULTS

Table 1 summarizes baseline characteristics of the study sample, in general and according to the presence/absence of overweight (Table 1). Socio economical data analysis showed that most of our participants had not exceeded the second grade (97%), with a third that had no education at all (30.30%).The difference between overweighed and normal-weighed participants was significant ($p < 0.05$).

One half of our participants (54.55%) had transportation. There were more overweighed people owning transportation than normal-weighed (88.16% vs. 40.96%, $p < 0.0001$) (Table 1).

With regards to food purchase, we had noted that the type of food stores and the purchase frequency were significantly different between overweighed and normal-weighed participants ($p < 0.001$ and $p < 0.05$, respectively). Focusing on the type of food stores, we had observed that our participants do not use one type of food store, exclusively, but they mix between two or three: the most frequent combinations were supermarkets/ open-air markets with or without convenience store. In a matter of frequency, our participants shop in supermarkets once to twice per week (significant difference between overweighed and normal-weighed people, $p < 0.01$), while they go twice to four times per week to open-air markets and convenience store (no difference between both groups).

Table 1 Descriptive results of the population

General Deta	Genreral population (n=264)	Overweight		Purchase's Data	Genreral population (n=264)	Overweight	
		Yes(n=)	No (n=)			Yes(n=)	No (n=)
Marital status		N.S		**Purchasefrequency**		p<0.001	
Maried	57.20	64.47	54.26	Rarely-basis	22.35	10.53	27.13
SINGLE	42.80	35.53	45.74	Regular-basis	77.65	89.47	72.87
Divorcee	0.00	0.00	0.00	**Place of puchase**		p<0.05	
Veuf	0.00	0.00	0.00	supermarket	1.14	0.00	1.60
Place of residence		N.S		Grocery stores	0.38	0.00	
Urbain	73.48	71.05	74.47	Open air market	4.17	1.32	5.32
Peri-urbain	21.21	22.37	20.74	Trader ambulant and other	0.00	0.00	0.00
Rural	5.30	6.58	4.79	Supermarket/Grocery stores	1.14	1.32	1.06
Education level		p <0.05		supermarket / Open air market		24.62	26.32
No education	30.30	21.05	34.04	supermarket / Grocery stores / Open air market	52.65	65.79	47.34
First grade	35.23	46.05	30.85	GMS/Epicerie/ Open air market / Trader ambulant	1.52	2.63	1.06
Ssecond grade	31.44	32.89	30.85	Epicerie/marché traditionnel	14.02	2.63	18.62
Higher grade	2.65	0.00	3.72	GMS/Marché traditionnel/ marchands ambulants	0.38	0.00	0.53
A	0.38	0.00	0.53	**Time of purchase**		N.S	
Incomelevel		N.S		Morrning	28.74	23.37	31.35
<2000	37.12	39.47	36.17	afternoon	12.26	11.84	12.43
2000-5000	28.79	36.84	25.53	Evening	9.2	7.89	9.73
5000-10000	21.97	18.42	23.40	Morning/afternoon	24.52	31.58	21.62
>10000	12.12	5.26	14.89	Morrning/Evening	11.56	11.84	11.89
Housinglevel		N.S		afternoon /Evening	5.36	2.63	6.49
luxurious	3.03	0.00	4.26	Morning/afternoon / Evening	8.05	22.84	6.49
Moderne	14.77	6.58	18.09	**Time of purchase/Meals**		p<0.01	
Socio-economicalenvironement	42.42	48.68	39.89	Beformeal	45.53	53.42	42.39
Medina	12.50	15.79	11.17	Aftermeal	38.91	23.29	45.11
Shantytown	22.35	23.68	21.81	Befor/Aftermeal	15.56	23.29	12.50
Rural	4.92	5.26	4.79	**Frequencypurchasesupermarket**		p<0.01	
Transportation		p <0.0001		Rarely basis	21.59	7.89	27.13
Yes	54.55	88.16	40.96	Once aweek	31.06	36.84	28.72
No	45.45	11.84	59.04	Twice a week	28.79	32.89	27.13
Tabac		N.S		Third a week	10.98	9.21	11.70
Yes	68.94	68.42	69.15	4 and more than forth week	7.58	13.16	5.32
NO	30.30	31.58	29.79	**Frequency purchase Grocery stores**		N.S	
Overwight				Rarely	29.62	28.00	30.27
Yes	28.79	100.00	0.00	Once aweek	8.46	10.67	7.57
No	71.21	0.00	100.00	Twice a week	21.54	18.67	22.70
				Third a week	14.23	10.67	13.68
				4 and moreforthweek	26.15	32.00	23.78
				Frequency purchase Open air market		N.S	
				Rarely basis	4.17	0.00	5.85
				Once aweek	23.11	31.58	19.68
				Twice a week	19.70	17.11	20.74
				Third a week	32.20	30.26	32.98
				4 and more than forth week	20.83	21.05	20.74

Table 2 Binomial logistic regression Results

Risk of overweight		Bothgenders		Men		Women	
		OR	Interval	OR	Interval	OR	Interval
Approvisionnement GS		3,769[**]	1,62 - 8,73	18,581[**]	2,43 - 141,80	1,486	0,54 - 4,04
Statut marimonial	Single	0,654	0,37 - 1,13	0,451[*]	0,20 - 0,98	0,969	0,43 - 2,13
Place of residence	Outer-urban	1,130	0,59 - 2,16	1,224	0,49 - 3,04	1,045	0,41 - 2,65
	Countryman	1,440	0,46 - 4,49	1,360	0,31 - 5,85	1,655	0,26 - 10,42
Education level	First grade	2,414[*]	1,21 - 4,81	0,995	0,38 - 2,56	6,183[***]	2,14 - 17,80
	Second grade	1,724	0,83 - 3,54	0,843	0,30 - 2,32	3,417[*]	1,17 - 9,96
Incomelevel	2000-5000	1,322	0,70 -2,49	1,412	0,57 - 3,46	1,136	0,45 - 2,84
	5000-10000	0,721	0,34 - 1,51	1,150	0,42 - 3,13	0,426	0,140 - 1,29
	>10000	0,324	0,10 - 1,00			0,410	0,11 - 1,47
Housing environnement	Shantytown	4,129	0,47 - 35,97	2,824	0,28 - 27,52	-	-
	Medina	8,000	0,83 - 76,36	4,000	0,34 - 47,11	-	-
	Economique-social	-	-	1,333	0,12 - 14,38	-	-
	Socioeconomic housing environment	1,455	0,14 - 15,03	-	-	-	-
	Modern	1,333	0,12 - 14,86	-	-	-	-
Transportation	Yes	0,093[+]	0,04 - 0,19	0,068[+]	0,02 - 0,23	0,113[+]	0,04 - 0,29

* : $p <0.05$, ** : $p <0.01$; *** : $p<0.001$; + : $p<0.0001$.

Moreover, overweighed participants prefer to shop before meals, while normal-weighed people go after meals ($p<0.01$) (Table 1).

Binomial logistic regression results are presented in the table 2. We noticed an increase in overweight risk according to supermarket use (OR : 3.77 ; 95% IC : 1.63-8.74, p=0.002), particularly in men (OR : 18.58 ; 95% IC : 2.44-141.80, p=0.005); before meals shopping (OR : 2.44 ; 95% IC : 1.28-4.67, p<0.01), mainly in women (OR : 3.92 ; 95% IC : 1.61-9.52, p<0.0001); and in people who reached the first grade of education, as compared to those with no education (OR : 2.41 ; 95% IC : 1.21-4.81, p=0.012), mostly in women (OR : 6.18 ; 95% IC : 2.15-17.81, p<0.001). The risk of developing overweight was reduced in single men (OR : 0.45 ; 95% IC : 0.21-0.98, p<0.045); in case of regular-based shopping in supermarkets, as compared to those who never go to supermarkets (OR : 0.23 ; 95% IC : 0.09-0.56, p<0.0001), specially in men (OR : 0.06 ; 95% IC : 0.01-0.43, p<0.01); and in absence of transportation in both genders (both genders OR : 0.093 ; 95% IC : 0.044-0.20, p<0.0001; Men OR : 0.068 ; 95% IC : 0.02-0.24, p<0.0001 and women OR : 0.11 ; 95% IC : 0.04-0.30, p<0.0001) (Table 2).

DISCUSSION

Our study shows that depending on other factors, the use of supermarket can be positive or negative vis a vis the development of obesity: when used exclusively and on a regular basis, there is a protective action against obesity. On the other hand, it is associated with a higher risk of overweight, when taken as part of a mix of food stores.

Looking at socioeconomic factors, a lower education and the availability of transportation lead also to higher risk of overweight. Indeed, participants with low socio-economic level (First grade of education and lower income)have a higher risk of being overweight. Our results are in accordance with many studies (Kenny & al.,1995; Centers for Disease Control and Prevention [CDCP], 1999; USDHHS [U.S. Department of Health and Human Services], 2001; Eberhardt& al., 2001; Flegal& al., 2001;Lopez, 2004; Morland& al., 2006; Chaix& al., 2012):

The RECORD Study had demonstrated that the association between shopping in a hard discount store and BMI was markedly stronger for lower education levels. The presence of transportation was also a risk factor of overweight. This can be explained by the fact that participants in high sprawled areas may drive more; which decreases the opportunity for a physical effort (Lopez, 2004).Moreover, low-income and/or lack of steady income is known to be not only associated with lower purchasing power but also with less frequent ownership of consumer durables such as cars to provide access to supermarkets (Cowie&Eberhardt, 1995).

Our data showed that food shopping in supermarkets, and before meal, increased the risk of developing overweight. Regular users of supermarkets are more immune from developing obesity. This is inline with other studies which predict a reduction of obesity prevalence with an increase in supermarket availability(Laraia& al., 2004; Figuie& Nguyen, 2006; Morland& al., 2006; Tessier & al., 2008).While the availability of supermarkets is associated with a decreased prevalence of obesity and overweight, the availability of grocery stores and convenience stores is associated with an increased prevalence of overweight and obesity among residents. With respect to association with diet, Tessier and al. had shown that diet quality was slightly improved with regular supermarket use (Tessier & al., 2008).The associations found in Laraia *et al*.'s study between food store availability and overweight were consistent with earlier findings that link healthful food consumption patterns with food stores availability(Laraia& al., 2004).

Evidence has been raised that the effect of access to food stores varies with the types of stores: larger food stores and chain supermarkets were more likely to stock healthful food than smaller stores and nonchain supermarkets(Sallis& al., 1986;Chung & Myers, 1997; Mantovani& al., 1997; Jetter&Cassady, 2006;Powell & al., 2007).On the contrary, the use of supermarket as part of a mix (supermarket/ grocery/ open-air market) leads to a higher risk of overweight, since the frequency of food purchase at supermarket decrease, which is consistent with the RECORD Study (Chaix& al., 2012). This can be explained by the fact that eating patterns may be different, depending on the availability of alternative choices

sets for food shopping, which is likely the reason for the the double-faced impact of supermarket use(Powell & al., 2007).According to the ARIC Study, the association of the local food environment with obesity is consistent with earlier work showing that it is associated with reported dietary intake (Morland& al., 2006).

This is also in line with the findings from a study conducted in Tunis: in Greater Tunis, supermarkets seem to have a positive effect as they offer a greater variety of good quality products. However, the opposite is observable when supermarkets spread to the poorer social classes. Then, supermarkets offer characteristics that can have potential consequences on diet and may highlight the reason why their regular frequentation is slightly beneficial and also appeals to more welloff consumers (Tessier& al., 2008).

CONCLUSION

Our study shows that the impact of using supermarket on obesity can be positive or negative and has to be considered in light of other factors namely: socio economic conditions and shopping behaviour preferences. The use of supermarket can be positive when used as an exclusive and regular food shopping source by a more educated, health conscious population, while it is associated to a higher risk of overweight when used occasionaly. Moreover, we had noticed that the use of supermarket has not yet spread yet to the whole population. Then, further investigation is needed on the nutritional composition of food purchased from supermarkets and its long-term effect on health, taking into consideration the labelling of food products, the motivation and the first shopper characteristics.

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