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Eating out-of-home and associated nutritional status of an adult population from Rabat-Salé-Kenitra region of Morocco

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Abstract
This study focuses on the determinants of out-of-home eating (OHE) and its association with nutritional status. A survey was carried out in the region of Rabat-Salé-Kenitra in Morocco, on 400 adults of both sexes, recruited using the two-stage sampling method. The results showed that the majority of the population resides in urban area, with an average age of 39 ± 13.2 years old, and average body mass index (BMI) of 25.5± 4.
The data analysis showed that age group, male gender, urban environment, high education level and low socio-economic level, are factors determining taking meals away-from-home. The data analysis revealed also that OHE location namely dairies and fast foods restaurants are associated with BMI.

Keywords:out-of-home eating, fast foods, food imbalance, BMI, Morocco

1. Introduction
During the last decades, a change in the dietary pattern has been associated with the increase in nutritional and metabolic diseases such as obesity and cardiovascular risks worldwide [1,2]. The changes in the food consumption trend are also associated with growing eating services [3] and poor-quality food intake [4]. In parallel with these changes, an increase of out-of-home eating (OHE) is reported to be a driver of increased obesity [5,6,7,8]. Indeed, OHE is an emerging trend worldwide, and it is growing with economy and the number of food services and fast food [3]. The location, the frequency and the food quality of the OHE affect nutritional status [9]. In developed countries the growth of OHE is associated with increased energy intake and obesity [10].
Morocco is a country suffering from the double burden of malnutrition with persistent undernutrition and nutrients deficiencies in addition to emerging problems of obesity and associated chronic diseases. Indeed, the country is undergoing a nutrition transition [11, 12] accompanying the shift from a traditional to modern way of live including changes of the type of work activity and the eating location with an increase of out-of-home catering [13]as well as its associated effect on the expenses proportion [14].According to the National Household Consumption and Expenditure Survey of 2014, the share of out-of-home food expenditure in the household budget, doubled in 2014 compared to 1985, passing from 3.2% to 6.5%. Although the same trend is observed in both areas of residence, this change is mainly characteristic of the urban environment, where the share of such expenditure increased from 4.2% to 7.5% during the same period[14].
Many determinants of OHE are cited such as young age, urbanization, gender, educational attainment and socio-economic level[15, 16, 17].Considerably, the development of food services, agrifood industry and the growing emergence of fast food restaurants as well as the lifestyle changes related to urbanization, are also involved. In parallel, in association with the out-of-home eating food quality,anincrease of overweight, obesity, high blood pressure and other cardiovascular risks was also reported [18,19,20]. In fact, out-of-home catering in general and fast food in particular, have repercussions on health. These are accentuated by the offered large portions of food s which are furthermore highly energy dense [15, 18]. Added to this is the richness of the proposed menus in saturated fats and their low content in vitamins and minerals [15, 16,21].
The location of away-from-home eating is a determinant of food nutritional quality. Nevertheless, and although the criterion of a healthy diet is taken into consideration by many consumers, it is rather the will to a new location that guides the consumer choices than searching for food of good nutritional quality and healthy offered by these locations [22, 23]. Contrarily to developed countries, data on eating out-of-home are scarce in developing countries.
The aim of the present research is therefore, to examine the factors of out-of-home eating and its association with nutritional status in adults from the Rabat-Salé-Kenitra Region in Morocco.

2. Materials and Methods
A cross-sectional study was carried out in 2018 on an adult population from Rabat-Salé-Kénitra (RSK) region in Morocco.

2.1 Sampling
The survey covered seven prefectures and provinces in the study region (RSK), namely, the prefectures of Rabat, Salé, Skhirate-Témara and the provinces of Kenitra, Khemisset, Sidi Kacem and Sidi Slimane. Using the two-stage random sampling method, a representative sample of 400 people was randomly selected from 28 localities in urban and rural areas.The Table 1 shows the distribution of the study sample by the geography, area of residence, gender, sex and age.

Table 1: Representativeness test (n=400)

Characteristic	Percentage in the sample	Percentage in the population [14]	P**
Geographical distribution*			0,6 NS
- Kenitra	23%	23%	
- Khemisset	12%	12%	
- Rabat	13%	13%	
- Salé	21%	21%	
- Sidi Kassem	11%	11%	
- Sidi Slimane	7%	7%	
- Skhirate-Témara	13%	13%	
Age strata*			0,1NS
- [18 to 34 years]	44%	40%	
- > 34 years	56%	60%	
Gender*			0,8 NS
- Male	49%	48%	
- Female	51%	52%	
Area of residence*			0,6 NS
- Urban	69%	69,8%	
- Rural	31%	30,2%	

Note : * = Values are expressed as percentage, ** Chi-square test (the mean difference is significant at the 0,05 level), NS= not significant difference between sample and population.

2.2 Data collection
A questionnaire was used to collect data on age, gender, environment, educational attainment, socio-economic level, as well as the frequency and location of meals eating. In addition, the body weight and height were measured and the body mass index (BMI) of the study subjects was calculated. The questionnaire was translated into the Moroccan dialect and tested before it was administered to the respondents.

2.3 Study variables
In the literature, there is no clear definition of "out-of-home or away-of-home eating". In fact, this latter could mean taking meals outside the home, whether they are prepared or not at home, or taking meals prepared outside the home, regardless of where they are consumed [16]. As a result of this lack of definition, we have retained the second meaning according to which, out-of-home catering includes all meals prepared outside the home regardless of their place of consumption (at home or outside the home) and thus excluded, meals prepared at home and consumed away from home.

Types of OHE locations include dairies. In Morocco, the name dairy" locally called "Mahlaba" in Arabic is attributed to the places where food and food preparations such as cheeses and curd milk are served manufactured in an artisanal way (non-industrialized); mixed fruits with milk, fermented milk, yogurt, fresh fruit juices, various traditional Moroccan breads; sandwiches with eggs/ canned fish and other grocery products such as cookies, …

WHO Body mass index (BMI) (in kg/m^2) categories are used as follows[24], BMI<18.50 for underweight, BMI ≥18.50 and <25 for normal weight; ≥25 and <30 for overweight and finally BMI ≥30 kg/m2 for obesity. In this work, we classify the subjects as with normal BMI when BMI< 25 kg/m2 or with High BMI if it is≥25 kg/m2.

The indicators used for the variable "socio-economic level" categories are, 1) poor, 2) average, 3) rich [25,26].

2.4 Statistical Analysis
The data collected was processed using the version 21 of SPSS software for Windows (Statistical Package for the Social Sciences). The descriptive statistical analysis was carried out to describe the characteristics of the population studied and the univariate analysis was used to check associations between variables. The statistical significance threshold was set at p value of 5%.

2.5 Ethics of the study
An authorization to collect the study data was issued by the competent authorities, in this case, the Regional Directorate of Health in the Rabat-Salé-Kénitra region. In addition, the fundamental ethical principles governing the conduct of research, including informing participants about the purpose of the study, volunteering, confidentiality and the right to interrupt their participation in the study at any time, were respected. A free and informed consent was also obtained from the participants.

3. Results
This study included 400 participants from the seven prefectures and provinces of the Rabat-Salé-Kenitra region of Morocco.

3.1 The study population characteristics
The majority of the population studied was over 34 years of age (56%) and resides in urban areas (69%). Gender is almost similar (49% for men and 51% for women), the majority of the population has no higher education (64%), a middle socio-economic level (42.5%) and about half of the population has high BMI (52.5%). In addition, among the study population, 16% are accustomed to out-of-home eating breakfast, 50.2% lunch and 11% dinner, at least once a week. Otherwise, the places frequented by the population studied at least once a week are fast foods (40.5%), specialized Moroccan restaurants (35%), places of work or training (26%), and dairies (18%) (Table2).

Table 2: Socio-demographic, socio-economic and OHE characteristics

Parameters	Value (n=400)
Age groups*	
- [18 to 34 years]	175 (44)
- > 34 years	225 (56)
Gender*	
- Male	195 (49)
- Female	205 (51)
Area of residence*	
- Urban	275 (69)
- Rural	125 (31)
Education level*	
- Low	256 (64)
- High	144 (36)
Socio-economic level*	
- Low	120 (30)
- Middle	170 (42,5)
- High	110 (27,5)
BMI*	
- < 25	190 (47,5)
- ≥ 25	210 (52,5)
Breakfast taken out-of-home*	
- < 1/wk	336 (84)
- ≥ 1/wk	64 (16)
Lunch taken out-of-home*	
- < 1/wk	199 (49,8)
- ≥ 1 /wk	201(50,2)
Dinner taken out-of-home*	
- < 1/wk	357 (89)
- ≥ 1/wk	43(11)

Frequenting of dairies*	
- < 1/wk	327 (82)
- ≥ 1/wk	73 (18)
Frequenting of traditional Moroccan restaurants*	
- < 1/wk	258 (65)
- ≥ 1/wk	142 (35)
Frequenting of fastfoods*	
- < 1/wk	238 (59.5)
- ≥ 1/wk	162 (40.5)
Frequenting of place of work or training*	
- < 1/wk	296 (74)
- ≥ 1/wk	104 (26)

Note: * = Values are expressed as number (%) ; wk= week

3.2 Factors Associated with OHE meals

The factors associated with OHE breakfast, are the age group [18 to 34 years] (OR: 6,7 ; IC [3,5-12,8] ;p<0,001)), the urban environment (OR :3,2 ; IC [1,5 - 6,8] ; p=0,002) and the higher education level (OR : 3,7 ; IC [2,1-6,5] ; p<0,001); the factors associated with OHE lunch, are the age group [18 to 34 years] (OR : 15,6, IC [9,4-25,6], (p<0,001)), the male gender (OR: 2,2 ; IC [1,5-3,3] ; p<0,001), and the higher education level (OR :4,3 ; IC [2,7-6,6] ; (p<0,001); the factors associated with OHE dinner are the age group [18 to 34 years] (OR : 2,7, IC [1,4-5,17], (p=0,004), the male gender (OR:1,9 ; IC [0,9-3,6]; p=0,05), and the urban environment (OR : 022.3 ; IC [3-164] ; (p=0,002) (Table 3).

Table 3: Factors associated with OHE at least once a week (n=400)

Parameters	Breakfast taken out-of-home ≥ 1/wk			Lunch taken out-of-home ≥ 1/wk			Dinner taken out-of-home ≥ 1/wk		
	OR	IC 95%	P *	OR	IC 95%	P *	OR	IC 95%	P *
Age groups									
- [18 to 34 years]	6,7	[3,5-12,8]	<0,001**	15,6	[9,4-25,6]	<0,001**	2,7	[1,4-5,17]	0,004**
- > 34 years	-	-	-	-	-	-	-	-	-
Gender									
- Male	1,1	[0,7 - 1,9]	0,6 NS	2,2	[1,5-3,3]	<0,001**	1,9	[0,9-3,6]	0,05**
- Female	-	-	-	-	-	-	-	-	-
Area of residence									
- Urban	3,2	[1,5 - 6,8]	0,002**	1,4	[0,9-2,2]	0,09 NS	22,3	[3-164]	0,002**
- Rural	-	-	-	-	-	-	-	-	-
Education level									
- Low	-	-	-	-	-	-	-	-	-
- High	3,7	[2,1-6,5]	<0,001**	4,3	[2,7-6,6]	<0,001**	1,6	[0,9-3,09]	0,1 NS
Socio-economic level									
- Low	0,7	[0,3 -1,4]	0,3 NS	0,7	[0,4-1,2]	0,2 NS	0,8	[0,36-1,9]	0,6 NS
- Middle	0,8	[0,4 - 1,4]	0,4 NS	0,8	[0,5-1,3]	0,3 NS	0,9	[0,4-1,88]	0,7 NS
- High	-	-	-	-	-	-	-	-	-

Note :* =the mean difference is significant at the 0,05 level, ** = significant, NS= not significant; wk= week.

3.3 Associated factors to BMI

The Table 4 shows that the factors associated with BMI, are the higher education level (OR: 0.6, IC [0.37-0.83], (p=0,005),the low socio-economic level (OR: 2; IC [1.2-3.4]; p=0.009), frequenting dairies ≥1/week (OR: 2.5 ; IC [1.47-4.25] ; P=0.001) and frequenting fastfoods restaurants ≥ 1/week (OR : 0.6; IC [0.4-0.9] ; P=0.002).

Table 4: Factors associated with BMI (n=400)

Parameters	OR	IC 95%	P *
Age groups			
- [18 to 34 years]	0,8	[0,53-1,17]	0,2 NS
- > 34 years	-	-	-
Gender			
- Male	0,8	[0,56-1,24]	0,4 NS
- Female	-	-	-
Area of residence			
- Urban	0,9	[0,58-1,36]	0,6 NS
- Rural	-	-	-
Education level			
- Low	-	-	-
- High	0,6	[0,37 - 0,83]	0,005**
Socio-economic level			
- Low	2	[1,2 – 3,4]	0,009**
- Middle	1,5	[0,95 – 2,5]	0,08 NS
- High	-	-	-
Breakfast taken out-of-home			
- < 1/wk	-	-	-
- ≥ 1/wk	1,6	[0,95-2,8]	0,07NS
Lunch taken out-of-home			
- < 1/wk	-	-	-
- ≥ 1/wk	1,06	[0,7 - 1,6]	0,8 NS
Dinner taken out-of-home			
- < 1/wk	-	-	-
- ≥ 1/wk	0,9	[0,45 - 1,6]	0,6 NS
Frequenting dairies			
- < 1/wk	-	-	-
- ≥ 1/wk	2,5	[1,47-4,25]	0,001**
Frequenting Traditional restaurants			
- < 1/wk	-	-	-
- ≥ 1/wk	0,9	[0,65-1,47]	0,9 NS
Frequenting Fastfoods restaurants			
- < 1/wk	-	-	-
- ≥ 1/wk	0,6	[0,4-0,9]	0,02**
Frequenting restaurants at work or training place			
- < 1/wk	-	-	-
- ≥ 1/wk	0,8	[0,51-1,24]	0,3 NS

Note :* =the mean difference is significant at the 0,05 level, *= significant, NS= not significant; wk=week.

4. Discussion

This research showed that among the three main meals, lunch was the meal the most often taken out-of-home by the study population. This could be explained by the continuous-basis work schedule adopted which would encourage an increase in taking lunch out of home. Indeed, according to a study carried out in France[18], changes in living conditions lead to an increase in the number of meals

taken outside the home, in particular lunch. In contrast to our results, a study carried out in a Belgian population, reported that lunch, like the other two meals, is, for the majority of the population consumed at home [27].

The study showed that the [18 to 34 years] age group is a factor associated with taking the three main meals away from home. This result agrees with a study reporting that the majority of people of 18 to 34 years old tend more than older people to take more frequently their breakfast and dinner out-of-home [27]. Indeed, the "young age" factor could encourage acceptance of globalization and its implications, including the taking meals away-from-home [17].In the same way, it has been reported in the literature that the factors leading to the modernization of food practices are related both to young age and urbanization [17, 20].

This study showed that the male gender is associated with having lunch and dinner out of home. This result is in accordance with some literature findings pointing out that men eat more often out of home than women [16,28]and are more likely than women to eat the three main meals outside their homes [27].

In relation to urbanization, our study data showed that urban environment is associated to taking breakfast and dinner out-of-home. Urbanization is indeed, at the origin of changes in dietary behavior resulting in the use of out-of-home catering and in food imbalance [20].

On the other hand, taking breakfast and lunch away from home is revealed to be associated with higher education. Similarly, a food consumption study, carried out in Belgium has reported that people with a tertiary education diploma take, more often their lunch away from home than people without a higher education[27].

The present study didn't, however reveal any significant association between the socio-economic level and OHE, which result is inconsistent with the literature indicating that eating more often outside the home was statistically associated with higher socio-economic status [15]. In addition, in Morocco, the 10% of the poorest Moroccans spend 2.8% of their budget on food and drinks outside the home, which is almost four times (10.6%) that spendby the richest 10% [14].

The association found here between the high levels of education with a high BMI is similar to that reported in another study showing a relationship between obesity and education [12]. This result could be explained by an insufficient level of physical activity in this category of education in this population. Since the latter was not measured in this study and since education is one of the criteria for socio-economic characteristics, this explanation is consistent with the result of this study, which revealed the association of a high BMI with a low socioeconomic status. This result is also consistent with that of a study which showed that socio-economic status is inversely associated with BMI [29].

Whatever the meal taken out of home, it is the location and the composition of food/meal that affect nutritional status. Indeed, our study did not reveal a significant relationship between eating breakfast, or lunch or dinner away from home and high BMI. The same result was found in one study reporting normal BMI in people who eat outside more often, more precisely at noon [27]. However, our study revealed that frequenting dairies is a factor associated with high BMI, probably because of the types of the offered food preparations often high in fat and carbohydrates. Similarly, the use of fastfoods has been also identified as a factor associated with high BMI. This finding is corroborated by results from other studies reporting that people who use fastfoods, are more likely to be overweight or obese [28]. The last finding is consistent with another study that noted that meals outside the home are associated with high calorie intake that promotes the onset of overweight and obesity [23].

5. Conclusion

This study showed that out-of-home catering is a fairly common practice in the Rabat-Salé-Kenitra region. Our results will help to guide nutrition education actions in the study area. However, a study incorporating other variables such as physical activity and, a larger sample size would yield more conclusive results.

6. References

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