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# From Morocco to Italy: How Women's Bodies Reflect their Change of Residence

**Fatima Maqoud, Eligio Vacca and Mila Tommaseo-Ponzetta**

University of Bari Aldo Moro, Department of Biology, Bari, Italy

**ABSTRACT**

*The body structure and nutritional status of Moroccan women who have immigrated to Italy are examined here in relation to changes in their alimentary behaviors and life-styles, and compared with those of women living in Morocco, who still retain a traditional rural life-style. It is known that the choice to migrate to a foreign country may not only lead to conflicting situations, when the people involved encounter socio-cultural contexts which are very different from those of their original countries, but such choices may also involve severe consequences for health and nutritional status, following changes in alimentary behaviors and life-styles. Among groups recently migrated to Italy, the Moroccan community is an appropriate reference to highlight these effects. The choice to examine women as the focus of this survey allows extension of observations of their nutritional behavior to the whole family group. According to the bio-indicators examined here, groups of immigrant women are quite different from those remaining at home. The former show a considerable increase in weight, as assessed by both anthropometric and impedentiometric parameters. More than one-third of Moroccan immigrant women are obese, to an extent well beyond that of women in Morocco. The cause of this difference is ascribed to quantitative and qualitative changes induced after migration. Migrant women tend to adopt a mixed diet, which includes both traditional food and that typical of the host country. However, there is a considerable increase in the use of prepared foods, such as pasta, among farinaceous products, and meat, although vegetables and fruit are also consumed. Moroccan women consider both their socio-economic status and alimentary behavior as very private matters – an attitude which makes it difficult to recruit them for this kind of research. Future interventions require their preliminary acceptance and involvement in research aims, to demonstrate its great importance in improving the health status of present and future immigrants.*

***Key words:*** *immigrant women, Morocco, Italy, nutritional status, dietary change*

## Introduction

Changes in living conditions may be considered true personal revolutions, to the extent that the integration of immigrants into a new socio-cultural context may result in conflict with their original life-styles. Within this ambit, changes in alimentary behavior may have a remarkable influence on both psychological and physical well-being[1,2]. In reality, food also represents culture, sociality and identity: all aspects which must be taken into account when the nutritional status and well-being of an immigrant population are examined[3–7]. Among recently migrated groups in Italy, that of Moroccans is an appropriate reference to highlight the effects of migratory choices on body structure and nutritional status. Choosing women as study subjects allows observations to be extended to their family groups[1]. Moroccan migration into Italy began in the 1970s, but it is only since the 1990s that it took on considerable dimensions[8]. After a first phase, when men were the main immigrants, later migratory flows were characterized by an increase of the numbers of women and progressive family stabilization[9,10]. At present, Moroccans are one of the most numerous foreign communities, with more than 400,000 people, of which women constitute about 40%[11, 12].

Our research aim was to evaluate the nutritional status and physical structure of immigrant Moroccan women, in relation to changes in their alimentary behavior and life-style, together with the effects of cultural, social and economic changes after the migratory process.

## Materials and Methods

Data collection was carried out in two steps. In Italy, 91 immigrant women were examined, aged between 20.2 and 59.0 years (mean=34.0, SD=9.9), coming from Mo-

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**TABLE 1**
ANTHROPOMETRIC AND IMPEDENTIOMETRIC DATA COLLECTED FOR IMMIGRANT MOROCCAN WOMEN LIVING IN ITALY AND THOSE LIVING IN MOROCCO. GROUP COMPARISONS PERFORMED WITH PARAMETRIC AND NON-PARAMETRIC TESTS

| | Italy – N=91 | | | | Morocco – N=51 | | | | t test – df 140 | | U-Test – df 1 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | Min | Max | Mean | SD | Min | Max | Mean | SD | t | p | U | p |
| Height (cm) | 147.0 | 173.0 | 161.4 | 5.8 | 150.0 | 170.2 | 159.4 | 4.9 | 2.1 | 0.041 | 2744.5 | 0.071 |
| Arm circumf. (cm) | 21.8 | 40.0 | 30.5 | 4.2 | 21.4 | 38.0 | 26.7 | 3.8 | 5.3 | 0.000 | 3496.0 | 0.000 |
| Waist circumf. (cm) | 66.0 | 117.0 | 87.6 | 12.6 | 66.0 | 118.0 | 82.4 | 11.3 | 2.4 | 0.015 | 2839.0 | 0.027 |
| Weight (kg) | 45.2 | 102.1 | 70.8 | 13.7 | 43.6 | 93.1 | 63.0 | 11.2 | 3.5 | 0.001 | 3130.5 | 0.001 |
| BMI (kg/m$^2$) | 15.1 | 38.4 | 27.2 | 5.2 | 18.7 | 36.8 | 24.7 | 4.1 | 2.9 | 0.005 | 2946.0 | 0.008 |
| Body Fat (%) | 9.8 | 53.1 | 34.4 | 7.6 | 14.5 | 44.6 | 29.2 | 7.6 | 3.8 | 0.000 | 3165.0 | 0.000 |
| BMR (Kj) | 4472.0 | 7460.0 | 5886.3 | 667.2 | 4702.0 | 6652.0 | 5565.0 | 522.0 | 3.0 | 0.004 | 2967.5 | 0.006 |
| Metabolic age | 12.0 | 68.0 | 39.2 | 13.0 | 12.0 | 70.0 | 35.4 | 15.8 | 1.6 | 0.125 | 2640.5 | 0.173 |
| Body water (%) | 39.6 | 65.4 | 48.7 | 5.1 | 41.2 | 63.3 | 51.9 | 5.4 | –3.4 | 0.001 | 1568.5 | 0.001 |
| Visceral Fat Index | 1.0 | 13.0 | 5.5 | 2.9 | 1.0 | 13.0 | 4.4 | 2.8 | 2.0 | 0.052 | 2739.0 | 0.073 |
| Muscle mass (kg) | 33.3 | 56.2 | 43.3 | 4.8 | 32.5 | 49.2 | 41.3 | 4.2 | 2.5 | 0.015 | 2830.5 | 0.030 |

BMI – Body Mass Index, BMR – Basal metabolic rate

rocco or the nearby Maghreb areas, mostly leading an urban life-style. In Morocco, 51 women were examined, aged between 29.2 and 65.0 years (mean=37.8, SD=11.2), living in rural areas (province of El Jadida), with a largely traditional diet and life-style. Both research steps were carried out in 2012–13.

The immigrant women had lived in Italy for between one and more than 15 years (mean=8.5 years, SD=6.0).

Recruitment took place through personal contacts or with the assistance of associations and public corporations. A form was filled in for each subject, listing the most important anthropometric and impedentiometric data (height, weight, arm and waist circumferences, body fat, basal metabolic rate, metabolic age, % body water, visceral fat index, muscle mass). An information form was also filled in, with our assistance, regarding personal data, alimentary behavior and life-style.

Standard anthropometric equipment was used for body measurements, and an impedance balance (Tanita BC545) was employed to assess impedentiometric data[13,14]. Descriptive statistics and comparative analyses (t-test, Mann-Whitney U test) were carried out with common spreadsheet software. Data were also submitted to Principal Component Analysis[15], to highlight and characterize any relationships among data.

## Results and Discussion

Moroccan women living in Italy have average height (161.4 cm), which is higher than that of their compatriots living in Morocco (159.4 cm). This difference is just over the significance threshold of Student's t-test, but not significant according to the Mann-Whitney U-test (Table 1).

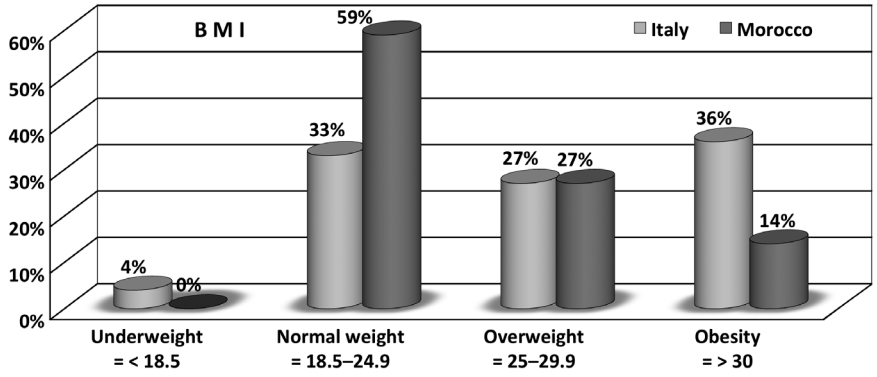


*Fig. 1. BMI comparison between immigrant Moroccan women in Italy and Moroccan women living in Morocco.*

The weight of the immigrant women living in Italy (70.8 kg) significantly exceeds that of Moroccan women at home (63.0 kg). Similar differences also appear in arm and waist circumferences, which are greater in the immigrant women. Consequently, the body mass index is also higher in the Moroccan women in Italy (although the latter are, on average, slightly younger).

Figure 1 shows BMI distributions. The greatest difference is seen in the „normal weight" class, which includes 59% of the women living in Morocco, against 33% of the immigrants; the percentage of „obesity" is more than double of that of the Moroccan sample (36% versus 14%). In any case, the percentage of „overweight" women, which includes 27% of the women, both immigrant and those living in Morocco, should not be disregarded.

Alzemat et al.[16] in their study on Moroccan population reported mean female BMI values (normal weight, 56%; overweight, 26% and obesity 11%), similar to those of El Jadida sample.

Impedentiometric and anthropometric data are consistent with each other[17]. The percentage of fat mass of the Moroccan women in Italy (34.4%) exceeds standard national and international values, whereas the value for the women living in Morocco (29.2 %) remains within reference standards. Other structural and metabolic values – with the exception of „muscle mass" – reveal the unfavorable situation of the immigrant women[18]. Both groups have good hydration levels, although here too the values are better in the women living in Morocco.

Table 2 Lists the results obtained from Principal Component analysis. The first component (var%=68.7) is associated with most of the variables, both anthropometric and impedentiometric; the second component (var%=18.0)

**TABLE 2**
PRINCIPAL COMPONENT ANALYSIS; FIRST 3 COMPONENTS, LOADINGS AND PERCENTAGES OF EXPLAINED VARIANCE

| PCA | Component Loadings | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Weight | 0.953 | 0.183 | 0.019 |
| Waist circumf. | 0.918 | −0.067 | 0.198 |
| Visceral fat | 0.914 | −0.282 | 0.092 |
| Arm circumf. | 0.906 | −0.096 | 0.116 |
| Body water % | −0.883 | 0.328 | 0.291 |
| Body fat % | 0.879 | −0.252 | −0.324 |
| Metabolic Age | 0.855 | −0.326 | −0.092 |
| BMR (kj) | 0.786 | 0.568 | 0.152 |
| Muscle mass | 0.735 | 0.608 | 0.250 |
| Stature | 0.153 | 0.840 | −0.474 |
| Variance % | 68.729 | 18.019 | 5.692 |

BMI – Body Mass Index, BMR – Basal metabolic rate

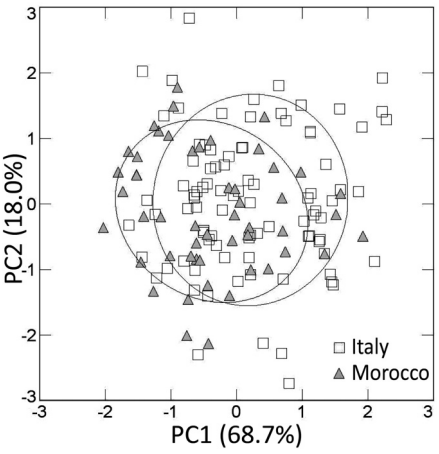


*Fig. 2. Principal component analysis, scatterplot of first and second components, subjects distribution (confidence ellipse, p=0.683); squares, Moroccan women in Italy; triangles, women in Morocco.*

is associated with height, muscle mass and, partially, basal metabolic rate.

In short, as can be noted from the graphic concerning scores distribution (Figure 2), the analysis confirms the presence of different structures in the two groups examined.

Medical information on the women's health status showed that almost all of them do not report particular pathologies, except for some allergies. This confirms the so-called „healthy migrant" effect, according to which the choice to migrate is made by people in relatively good health, who tend to go back to their original countries if they are affected by severe pathologies[19,20].

In both samples (immigrant women and those living in Morocco), the mean age at menarche was 13.0 years (SD=0.9); for Italy, a mean value of 12.4 (SD=1.3) years has been reported[21].

Married immigrant women have slightly fewer children (mean=2.0, SD=1.2, N=58) than women living in Morocco (mean=2.4, SD=0.9, N=43), although the difference is not significant (p =0.064).

Analysis of the life-styles of immigrant women showed a high level of sedentariness, with little or no participation in sports. Instead, the group of women in Morocco stated that they had a very active, mostly rural life-style, associated with heavy physical work.

The group of Moroccan women living in Italy reported large-scale consumption of processed and prepared foods, with large amounts of sugars (cakes and sweets). Instead, the women in Morocco maintain a diet based on non-industrial/non-processed traditional food and local products. Alcohol and cigarette smoking are nearly absent in the group of Moroccan women in Italy, and totally absent among those living in Morocco.

The alimentary behaviors documented here can obviously be extended to their family groups living at home or in the host country.

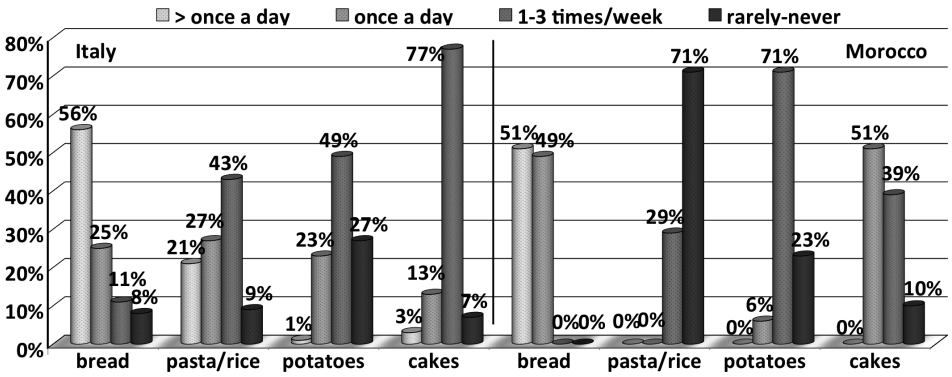


*Fig. 3. Consumption of bread, rice, potatoes and sugars: comparison between immigrant Moroccan women in Italy and women in Morocco.*

The amount of bread eaten daily was higher in Morocco, where in 100% of cases bread is consumed „once a day or more" (Figure 3). Among Moroccan women in Italy, bread consumption is also high, but at least 11% eat it „1-3 times a week" and 8% „rarely or never".

The consumption of „pasta-rice" is quite different in the two groups: 48% of Moroccan women in Italy say they eat pasta or rice „once a week or more", whereas those in Morocco say they never eat such food „once a day or more", 29% consume it „1-3 times a week" and 71% „rarely or never".

The situation is similar – although less evident – in the case of potatoes, which are consumed „1-3 times a week" by 49% of the women living in Italy, and by 71% of those interviewed in Morocco. However, potatoes are eaten „at least once a day" by 23% of the Italian sample as opposed to 6% of the Moroccan women.

The level of sugar products (cakes and sweets) consumed „once a day" and „1-3 times a week" is similar in the two groups (90%), but 51% of women living in Morocco say they eat them at least „once a day", against the 13% of Moroccan women living in Italy.

The most remarkable difference therefore appears in the higher consumption of foods labelled as „pasta" among the migrant women in Italy, although the qualitative elements of these differences are not specified: for instance, there are no details about what types of flours or sugars are used, compared with those – not greatly refined – consumed in Morocco.

Another element concerns eating foods of animal origin (Figure 4). A diet combining high levels of meat proteins and carboydrates is indicated among the causes of increasing obesity[22,23]. The number of times that red meat (usually beef) is eaten „1-3 times a week" moves from 31% for Moroccan women at home to more than double that figure (63%) among Moroccan women in Italy. Similarly, the consumption of poultry moves from 49% to 70%, as confirmed by the specular values of beef eaten „rarely or never" in 65% of cases in Morocco, and only 18% in Italy. As regards poultry, there is only a very small difference between Moroccan women in Italy (19%) and in Morocco (22%), who state that they eat poultry „rarely or never".

A lower increase is reported for fish, eaten „1-3 times a week" (47% in Italy, 33% in Morocco) and eggs (33% and 35% respectively). The percentage of women eating fish „rarely or never" is high, in both Italy (48%) and Morocco (57%). This may depend on different alimentary behaviors or costs (in the case of fish), but this cannot be the case of

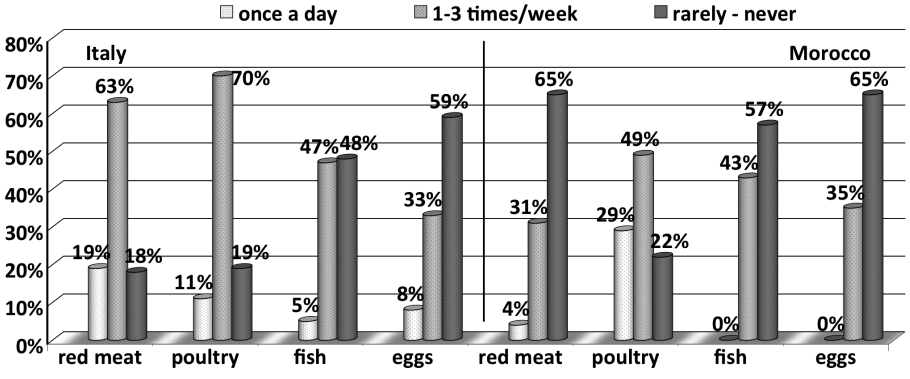


*Fig. 4. Consumption of red meat, fish and eggs: comparison between immigrant Moroccan women in Italy and women in Morocco.*

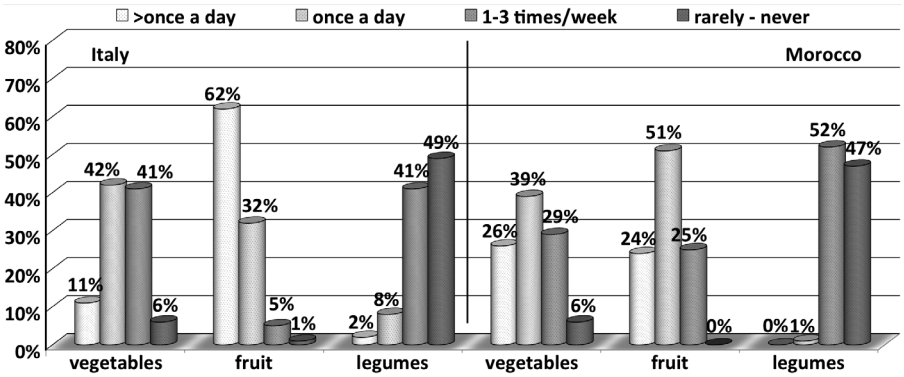


*Fig. 5. Consumption of vegetables, fruit and legumes: comparison between immigrant Moroccan women in Italy and women in Morocco.*

eggs, that are consumed „rarely or never" in 60% of cases in Italy and 65% in Morocco.

In general, immigrant Moroccan women in Italy – and by extension their families – have greatly increased their meat and poultry consumption. There is also increased consumption of fish, but to a lesser extent. The difference in egg consumption is less remarkable, although eggs are certainly one of the cheapest kinds of food among those examined.

Immigrant women do not consume many vegetables: in Morocco they are eaten „several times a day", whereas in Italy the frequency falls to 11% (Figure 5). However, consumption is high in Italy, as 83% of the immigrant women state they eat vegetables at least once a day, or in any case several times a week.

Instead, a remarkable increase is observed in the consumption of fruit, which is eaten „more than once a day" in Italy in 62% of cases, but in Morocco falls to only 24%; in any case, in Morocco, in 76% of cases fruit is consumed at least once a day or several times a week. In Italy, the higher consumption of fruit is explained by its continuous availability due to industrial scale agriculture or imports, even out of season. In Morocco, in the study area where the economy is mostly rural, fruit production remains seasonal.

Consumption of legumes in the two groups remains similar, 49% of the subjects in Italy and 53% in Morocco say they eat them once a day or at least several times a week.

It should be noted that traditional dishes, which are obviously consumed more often at home, present a mixed composition. such dishes are eaten less frequently by immigrant women and are often integrated with ingredients more easily found in the host nation.

## Conclusions

This research is an initial evaluation of the effects of changes in diet and life-style on the nutritional status of a group of Moroccan women who have immigrated to Italy, compared with a population living in Morocco, leading largely rural lives.

According to the nutritional indicators examined here, the group of Moroccan women in Italy is quite different from those living in Morocco. They show a great increase in weight, as documented by both anthropometric and impedentiometric parameters. According to BMI values, more than one-third of Moroccan women in Italy are obese (36%), a value which is far higher than that of women living in Morocco (14%), although the percentage of women classified as overweight is the same (27%). These differences are also highlighted by associated parameters such as the percentage of fat mass (34.4%) of Moroccan women in Italy, which exceeds standard international values. The reasons of these differences may be found in the nutritional quantitative and qualitative parameters, in turn due to the environmental and socio-cultural changes deriving from the choice to emigrate.

As regards alimentary behavior, although immigrant women tend to adopt a mixed diet, in a style between their traditional one and that typical of the host nation, they still eat significant/ non- negligible quantities of transformed, processed or ready-to-eat foods, while Moroccan women mostly eat traditional local foods, i.e., not produced on an industrial scale or processed.

The introduction or increase in the consumption of foods such as pasta in the group of Morocco women in Italy is remarkable, as is the consumption of red meat and poultry. The consumption of vegetables is high in both groups, but is lower in Italy where, conversely, increased fruit consumption is reported.

These elements, accompanied by substantial differences in life-styles, may explain the differences observed in nutritional status. The displacement towards higher percentages of overweight or obesity in women is a phenomenon which requires appropriate information and educational interventions from the first school years onwards.

This research was difficult to undertake and complete, especially during the sampling phase. This was because, in spite of the high number of contacts, only a few women agreed to answer our questions. This difficulty was largely due to the reluctance of Moroccan women to take part in research involving details of their personal lives[24]. Im-

migrant Moroccan women are generally reserved with foreigners, and also believe that their socio-economic situation and nutritional behavior are very personal matters. Unlike the case in Italy, in Morocco it is considered impolite to ask people what kinds of food they eat and how much. For this reason, it was difficult to persuade even those subjects who had agreed to take part in the research to answer the questionnaires.

Future research will require more preliminary information on the aims of the research, so that importance in improving the state of health of present immigrants and future generations can be made much clearer to participants.

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*E. Vacca*

*University of Bari Aldo Moro, Department of Biology, Via E. Orabona 4, 70125 Bari, Italy*
*e-mail: eligio.vacca@uniba.it*

## OD MAROKA DO ITALIJE: KAKO ŽENSKA TIJELA ODRAŽAVAJU NJIHOVU PROMJENU PREBIVALIŠTA

## SAŽETAK

Cilj ovog rada je usporediti strukturu tijela i nutritivni status marokanskih žena koje su emigrirale u Italiju u odnosu na promjene u svojem prehrambenom ponašanju i životnom stilu, kao I u odnosu na žene koje žive u Maroku, I koje I dalje žive tradicionalnim seoskim stilom života. Poznato je da je izbor za useljenje u stranu zemlji ne samo da može dovesti do konfliktnih situacija, kada su ljudi koji su uključeni susreću socio-kulturnom okruženju koji su vrlo različiti

od onih njihovih izvornih država, ali takve odluke mogu također uključivati ozbiljne posljedice za zdravlje i nutritivni status, nakon promjene u prehrambenom ponašanju i životnim stilovima. Među skupinama koje su nedavno preselile u Italiju, marokanska zajednica je prikladna referenca za isticanje ovih efekata. Izbor da se žene uzmu kao fokus ovog istraživanja omogućuje produljenje promatranja njihovog prehrambenog ponašanja na cijelu obiteljsku zajednicu. Sudeći prema bio-pokazateljima ovdje ispitanih, skupine imigrantskih žene su sasvim drugačije od onih koje su ostale u Maroku. Skupina doseljenih pokazuje značajno povećanje težine što se vidi iz antropometrijskih i impedentiometrijskih parametara. Više od trećine marokanski migrantica je pretilo, što je značajni porast u odnosu na žene u Maroku. Uzrok te razlike se pripisuje kvantitativnim i kvalitativnim promjenama izazvanima nakon migracije. Migrantice nastoje usvojiti mješovitu prehranu, koja uključuje i tradicionalnu hranu i hranu tipičnu za domaćinsku zemlju. Međutim, tu je i značajan porast u korištenju pripremljene hrane kao što su tjestenina i meso, no povrće i voće se također konzumiraju. Marokanske žene smatraju njihov socio-ekonomski status i prehrambeno ponašanje kao vrlo privatnu stvari – stav zbog kojeg je teško pronaći voljne ispitanike za ovu vrstu istraživanja. Buduće intervencije zahtijevaju njihovo prethodnu prihvaćanje i sudjelovanje u ciljevima istraživanja, kako bi se mogla pokazati veliku važnost ovakvih podataka u poboljšanju zdravstvenog statusa sadašnjih i budućih imigranata.