fortune Journals

Research Article

JOURNAL OF FOOD SCIENCE AND NUTRITION RESEARCH

ISSN: 2642-1100

Food Habits and Immigrants' Integration: A Study in Crete, Greece

Ioannis Sfendourakis[1], Nikoleta Ratsika[2], George A. Fragkiadakis[3], and Christos Lemonakis[4]

Abstract

The current study, which focuses on nutritional issues among immigrants in Crete, Greece, offers insights concerning food security and their overall integration. In a sample of 471 immigrants, we identified common tendencies and actual perceptions on their ability to adapt to Cretan food and cuisine. The most favorable food category by the immigrants was bread, cereals and flour, followed by eggs, milk, yogurt, and cheese. Fish was the least favorite food category. Depending on gender, age, country-of-origin, marital status, population size at place of residence, employment in the country-of-origin, and education level in the country-of-origin, the results show differences in the dietary habits of immigrants. The level of inclusion of Cretan products in their daily menus is high (46.5%), and the most popular traditional Cretan dish is lamb roast in a wood-fire oven (42.5%). Most respondents do not report to miss traditional dishes from their home country (58.6%). Testing on the "level of English language used", at a 5% significance level, we found a positive correlation; the better the English language level, the more they acknowledged the extent of change in their eating habits. A similar finding was recorded for the parameters: "educational level", and "monthly income in the country-of-origin". The study recorded significant adaptation of the immigrants to the new nutritional and social conditions. Our results may help relevant government and local self-administration policies, i.e. improving the language level of the immigrants and offering nutritional consultation will certainly help.

Keywords: Food habits; Nutrition; Social integration; Immigrants

Introduction

Immigration is the process by which persons become permanent residents or citizens of another country. The issue of immigrants' food integration, which is the adoption of new food practices and habits on food preparation and presentation, remains in conjunction with adaptation to their new living-environment [1,2]. Integration concerning food is a dynamic process that is influenced by immigrants' general perception of the host-country food, availability of their traditional food, language and communication etc. [3-5]. The bicultural approach to life represents man's ability to connect, and adapt to a new cultural environment. From another perspective [6], it highlights the fact that people who can adapt to a new cultural environment appear to eat higher quality and healthier diets. Immigration has been found to have a significant impact on the host society, primarily for the reason that it creates an evolving multicultural food landscape. According to Cavounidis [7], foreign immigrants are a driving force for the host country's economy. However, the immigration process is challenging as it involves adapting to a new and unfamiliar environment with uncertainties, including access to affordable and adequate

Affiliation:

[1]Department of Nutrition & Dietetics Sciences, School of Health Sciences, Hellenic Mediterranean University (HMU), Trypitos Area, 72300 Siteia, Crete, Greece

[2]Department of Social Work, School of Health Sciences, Hellenic Mediterranean University (HMU), 71004 Heraklion Crete, Greece

[3]Department of Nutrition & Dietetics Sciences, School of Health Sciences, Hellenic Mediterranean University (HMU), Trypitos Area, 72300 Siteia, Crete, Greece

[4]Department of Science Management and Technology, School of Management and Economics Sciences, Hellenic Mediterranean University (HMU), 72100 Agios Nikolaos, Crete, Greece

***Corresponding author:**
Ioannis Sfendourakis, Department of Nutrition and Dietetics Sciences, Hellenic Mediterranean University (HMU), Trypitos area, 72300 Sitia, Greece

Citation: Sfendourakis I, Ratsika N, Fragkiadakis GA, Lemonakis C. Food Habits and Immigrants' Integration: A Study in Crete, Greece. Journal of Food Science and Nutrition Research. 6 (2023): 117-126.

Received: July 21, 2023
Accepted: July 31, 2023
Published: September 14, 2023

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

food [8,9]. Crete is the largest island in Greece with an area of 8,450 km^2 and a population of approximately 617,360 people (304,372 men and 312,988 women), according to the 2021 census conducted by the Hellenic Statistical Authority [10]. People of different nationalities migrate to Greece and Crete, creating a unique mix of ethnicities, cultures, and food habits [11,12]. Combined information from national surveys and mass-media information indicate a number of about 35,000 immigrants in Crete. Migration processes pose important social problems and demand appropriate integration policies, and the contribution of immigrants to local economies [13], may be a necessity after all. While numerous studies have been conducted on the social, economic, and demographic impacts of immigration in Greece [7], there is a lack of detailed research that specifically addresses the food-security status of immigrants in Greece [14], and further more in the island of Crete. In due course, this study has two research objectives: i). to record and analyze the perceptions of immigrants regarding their dietary preferences; and ii). to identify the experiences and difficulties of immigrants, regarding what we may call the "food and nutrition integration" process. The findings of this study may be particularly useful for Greek authorities, including national and local policy-makers and non-governmental organizations (NGOs), in making informed decisions to promote social integration of the immigrants and protect their health.

Materials and Methods

Description of the study area

The survey, conducted from July 2021 to March 2022, was carried out in Crete, a major island in southeastern Greece. It examined the integration and dietary patterns among respondents from the four (4) different regional units in Crete: Chania, Rethymno, Heraklion, and Lasithi [15].

Data collection

In this quantitative study, a self-completed questionnaire was used as a research instrument. The survey sample consisted of immigrants residing throughout Crete and was randomly selected. However, an attempt was made to ensure a systematic representation of immigrants throughout the island. To create the questionnaire, a total of 30 questions were developed based on relevant literature review. The questions used in this study were a selective synthesis of questions from previous research on related topics [16-23]. Before administering the questionnaire, a pilot pretest was conducted with a group of twenty immigrants. The questionnaire content validity was checked as described [24], using five experts. The questionnaire was translated into two different languages, English and Albanian. The questionnaire was distributed to 600 immigrants through the 24 community centers and offices for immigrants located in the 24 different municipalities of Crete. The inclusion criteria for participants required residence in the Crete region for at least five consecutive years.

Data analysis and Questionnaire

The survey conducted for this study was divided into two main sections, each designed to collect specific types of information. Part 1 of the questionnaire, consisting of questions 1, 2, 3, 4, 5, 6, and 7, addressed respondents' daily consumption habits of various foods. These provide a snapshot of their current dietary habits concerning specific food categories and preferences [25,26] and offer direct insight into their eating habits. Part 2 of the questionnaire (questions 8-18) focused on the primary research-objective: exploring the integration of immigrants in Crete at the level of food and nutrition. Data were collected to assess the extent to which immigrants have adopted local food-habits, what foods from their original culture they still consumed, and what factors have influenced these choices. Various statistics, such as descriptive statistics, t-test, analysis of variance, correlation analysis and cross tabulation were utilized to interpret the results.

Results

The sample

A total of 471 immigrants completed the questionnaire. The characteristics of the participants are presented in Tables 1 and 2. In the analysis of gender, the percentage of men (54.4%) is slightly higher compared to that of women (46.6%). In terms of age distribution, those in their mid-thirties to mid-forties make up the largest part of the group (26.8%). The participants are mainly from Balkan countries, with a smaller part from Northern and Eastern European countries. Very few are from African or other countries. In terms of language use, many of the participants speak both their native language and Greek (41.6%). Most participants are married (68.4%). In terms of family size, two children are the most common group, followed closely by participants without children. Only a very small portion of the group has more than three children. In terms of place of residence, the majority lived in densely populated areas (>10.000, 59.2%). The fewest participants live in areas with lower populations. Regarding the level of education in their country-of-origin, most participants completed secondary school (38.2%), followed closely by those who completed only elementary school (27.4%). Regarding their income, most earned a lower income in their country.

Food habits

The survey of dietary habits in the sample group, is presented in table 3, and shows that almost half of the respondents do not consume delivered prepared-meals at all, while another 26.3% consume them rarely. A small proportion of respondents consumed delivered meals frequently or

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

Table 1: Sample's characteristics

Sample's characteristics	n (%)
Gender	
Male	256 (54.4%)
Female	215 (45.6%)
Age (Binned)	
18-24	35 (7.4%)
25-34	70 (14.9%)
35-44	126 (26.8%)
45-54	109 (23.1%)
55-64	77 (16.3%)
>65	54 (11.5%)
Country of Origin (Binned) (*)	
Balcan Countries (BC)	278 (59.0%)
Northern & Eastern European Countries (NEEC)	87 (18.5%)
Asian Countries (AsC)	65 (13.8%)
Central & Western European Countries (CWEC)	29 (6.2%)
African Countries (AfC)	8 (1.7%)
Other Countries (OC)	4 (0.8%)
Languages used (**)	
Native & Greek language (NG)	196 (41.6%)
Greek language only (GLO)	153 (32.5%)
Native language only (NLO)	73 (15.5%)
English language only (ELO)	27 (5.7%)
Native & English language (NEL)	13 (2.8%)
Native, Greek & English language (NGEL)	7 (1.5%)
Native, Greek, English & more languages (NGRML)	2 (0.4%)
English Language level	
Lack of knowledge-quite low	289 (61.4%)
Low-medium	66 (14.0%)
Good	45 (9.6%)
Very good	30 (6.4%)
Excellent	41 (8.7%)
Marital status	
Married	322 (68.4%)
Single	149 (31.6%)
Number of children	
No children	130 (27,6%)
1 child	81 (17.2%)
2 children	170 (36.1%)
3 children	67 (14.2%)
>3 children	67 (14.2%)
MS	2 (0.4%)
Population range concerning the place of residence	
Up to 2.000	98 (20.8%)
2.001-10.000	94 (20.0%)
>10.000	279 (59.2%)
Geographical dispersion by Regional Unit	
R.U. of Chania	85 (18.0%)
R.U. of Rethymnon	15 (3.2%)
R.U. of Heraklion	116 (24.6%)
R.U. of Lasithi	255 (54.1%)
Occupation in country-of-origin	
Employee	88 (18.7%)
Civil servant	15 (3.2%)
Freelancer	53 (11.3%)
Worker	200 (42.5%)
Other	115 (24.4%)
Educational level in country-of-origin	
Primary school	129 (27.4%)
Secondary school	180 (38.2%)
University	80 (17.0%)
Other	82 (17.4%)
Monthly income in country-of-origin	
0€-400€	293 (62.2%)
401€-800€	43 (9.1%)
801€-1200€	7 (1.5%)
1201€-1600€	6 (1.3%)
>1.600€	16 (3.4%)
MS	106 (22.5%)
Monthly income in host country	
0€-400€	91 (19.3%)
401€-800€	206 (43.7%)
801€-1200€	77 (16.3%)
1201€-1600€	16 (3.4%)
>1.600€	5 (1.1%)
MS	76 (16.1%)
Way of transport in host country	
Bus	64 (13.6%)
Motorcycle	48 (10.2%)
Bicycle	25 (5.3%)
Car	250 (53.1%)
Other	3 (0.6%)
No use	81 (17.2%)

Where:

(*) BC = Balcan Countries, NEEC=Northern & Eastern European Countries, AsC = Asian Countries, CWEC = Central & Western European Countries, AfC = African Countries, OC = Other Countries, MS = Missing Sample

(**) NG = Native & Greek, GLO = Greek language only, NLO = Native language only, ELO = English language only, NEL = Native & English language, NGEL = Native, Greek & English language, NGEML = Native, Greek, English & more languages.

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

very frequently (6.8%, and 2.5%, respectively). Fruits and vegetables were consumed often or very often by the majority of respondents (31.6%, and 22.3%, respectively). Eggs, milk, yogurt, and cheese were included in the diet of the immigrants, with 35.0% and 20.6% of respondents consuming them often and very often, respectively. Bread, cereals, and flour were the most often consumed foods (39.5%). The highest percentage of respondents consumed meat often (27.0%), while fish was not consumed by 29.1% of the immigrants. The data in table 4 provide insight concerning the integration of immigrants in Crete at the level of food and nutrition. The survey revealed that most respondents (37.4%) reported a significant change in their diet after immigration, with a moderate change (38.0%). Many respondents identify themselves as Muslim (49.0%), a parameter which possibly influences their dietary habits and preferences. Most respondents consume more food originating from the host country Greece (62.2%). The perceived similarity between Cretan and their indigenous cuisine is relatively high (31.8%), with 95.3% of the immigrants using olive oil for cooking. The level of inclusion of Cretan products in the daily menus is high (46.5%), and the most popular traditional Cretan dish is lamb roast in a wood-fire oven (42.5%). Most respondents do not report to

Table 2: Sample's Country-of-origin

Country of origin	n	%	Country of origin	n	%
Albania	210	44.6	**Norway**	3	0.6
Bulgaria	58	12.3	**Holland**	3	0.6
Pakistan	44	9.3	**Poland**	3	0.6
Great Britain	25	5.3	**Austria**	2	0.4
Georgia	20	4.2	**Afghanistan**	2	0.4
Romania	14	3	**Denmark**	2	0.4
Germany	11	2.3	**China**	2	0.4
Russia	11	2.3	**Latvia**	2	0.4
Syria	11	2.3	**Tunisia**	2	0.4
Ukraine	6	1.3	**Ireland**	1	0.2
Serbia	6	1,3	**Egypt**	1	0.2
France	4	0.8	**Ethiopia**	1	0.2
North Macedonia	4	0.8	**Switzerland**	1	0.2
USA	4	0.8	**India**	1	0.2
Morocco	4	0.8	**Iraq**	1	0.2
Armenia	3	0,8	**Belarus**	1	0.2
Cyprus	3	0.6	**Sweden**	1	0.2
Moldova	3	0.6	**Turkey**	1	0.2
			Total	471	100%

Table 3: Sample's food preferences

Food preferences (7 questions)	
(Q1) How often do you consume delivered prepared-meals per week?	
Not at all	226 (48.0%)
Rarely	124 (26.3%)
Remotely	77 (16.3%)
Often	32 (6.8%)
Very often	12 (2.5%)
(Q2) How often do you consume fruits and vegetables per week?	
Not at all	18 (3.8%)
Rarely	83 (17.6%)
Remotely	116 (24.6%)
Often	149 (31.6%)
Very often	105 (22.3%)
(Q3) How often do you consume eggs, milk, yogurt and cheese per week?	
Not at all	16 (3.4%)
Rarely	69 (14.6%)
Remotely	124 (26.3%)
Often	165 (35.0%)
Very often	97 (20.6%)
(Q4) How often do you consume bread, cereals, and flour per week?	
Not at all	29 (6.2%)
Rarely	41 (8.7%)
Remotely	94 (20.0%)
Often	186 (39.5%)
Very often	121 (25.7%)
(Q5) How often do you consume legumes and nuts per week?	
Not at all	33 (7.0%)
Rarely	81 (17.2%)
Remotely	117 (24.8%)
Often	178 (37.8%)
Very often	62 (13.2%)
(Q6) How often do you eat meat per week?	
Not at all	37 (7.9%)
Rarely	87 (18.5%)
Remotely	121 (25.7%)
Often	127 (27.0%)
Very often	99 (21.0%)
(Q7) How often do you eat fish per week?	
Not at all	137 (29.1%)
Rarely	150 (31.8%)
Remotely	105 (22.3%)
Often	59 (12.5%)
Very often	20 (4.2%)

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

Table 4: Immigrants experiences concerning Dietetic Integration

Immigrants' experiences concerning Dietetic Integration	**n(%)**
Question 8: How do you judge your adaptation to the new nutritional conditions?	
No adjustment at all	15 (3.2)
Small adjustment	77 (16.3)
Moderate adjustment	135 (28.7)
Big adjustment	176 (37.4)
Very big adjustment	68 (14.4)
Question 9: To what extent have your dietary habits changed, during your stay in Crete?	
No change at all	48 (10.2)
Small change	105 (22.3)
Moderate change	179 (38.0)
Big change	108 (22.9)
Very big change	31 (6.6)
Question 10: Do you prefer to eat traditional food from your country-of-origin, food from Cretan cuisine or a combination of both?	
Traditional food from the country-of-origin	56 (11.9)
Cretan cuisine	77 (16.3)
Combination of both	338 (71.8)
Question 11: What is your religious preference?	
Muslim	231 (49.0)
Christian	124 (26.3)
Other	116 (24.7)
Question 12: Which country's food do you consume the most during your stay in Crete?	
Food from the country-of-origin	178 (37.8)
Food from the host country	293 (62.2)
Question 13: How similar do you think Cretan cuisine is to the cuisine of your homeland?	
Not even close	86 (18.3)
A little close	129 (27.4)
Relatively close	150 (31.8)
Very close	94 (20.0)
Great similarity	12 (2.5)
Question 14: Do you use olive oil when preparing food?	
Yes	449 (95.3)
No	22 (4.7)
Question 15: To what extent have you included Cretan products in your daily diet? * Cretan products considered: Cretan specialty rusk (Dakos), olives, traditional sour milk curd (Xygalo), Cretan cheese (Graviera)	
Not at all	10 (2.1)
To a minimum grade	42 (8.9)
To a moderate extent	111 (23.6)
To a high degree	219 (46.5)
To a very high degree	89 (18.9)
Question 16: Which of the specific Cretan traditional dishes, would you choose as the tastiest?	
Traditional roast lamb cooked in a wood-fire oven	200 (42.5)
Cretan specialty rusk with tomatoes & feta cheese	95 (20.2)
Snails cooked in a Cretan way	41 (8.7)
Chicken cooked with okra	74 (15.7)
Other	44 (9.3)
(Missing Sample) MS	17 (3.6)
Question 17: Would you say that you miss traditional dishes/food from your country-of-origin?	
Yes	195 (41.4)
No	276 (58.6)
Question 18: To what extent do you agree with the following statement: 'food preparation procedure in homeland is different than Cretan's'	
I absolutely disagree	19 (4.0)
I partially disagree	104 (22.1)
I neither disagree/neither agree	159 (33.8)
I agree	153 (32.5)
I strongly agree	36 (7.6)

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

miss traditional dishes from their home country (58.6%). The majority of respondents also disagree with the statement that food preparation is different in their home country compared to Crete.

Adaptation of the immigrants, to the new nutritional conditions

In Table 5 the most significant characteristics regarding immigrants' adaptation to new eating habits, depending on their demographic parameters, are presented. The adaptation of immigrants to the new eating habits was found to depend on the following demographic parameters: (a) On the basis of "age", there is a positive correlation at the 5% significance level. This means that adaptation to the new eating habits is an element associated with the maturity of immigrants. As the age of the immigrants increases, the degree of their adaptation to the new eating habits increases. (b) Based on the "level of English language used," there is a positive correlation at the 5% significance level. This means that the adaptability to new eating habits is affected by the level of communication with the social and work environment. (c) Concerning the "marital status" (1=married, 2=single), a negative correlation at a 5% significance level is shown in relation to the immigrants' adjustment to the new dietary conditions. This indicates that a married one adapts more easily to the new eating habits. (d) Concerning the "population of place of residence" (1= up to 2,000 population; 2= 2,001-10,000 population and 3= > 10,000), there is a negative correlation at the 1% level of significance. This means that immigrants who live in a place with up to 2,000 inhabitants are the ones who can more easily adopt new eating habits. (e) Concerning the "education level", there is a positive correlation at a 5% significance level. This indicates that participants with a higher level of education are more likely to adapt to the new eating habits. (f) Testing on the "income in the country-of-origin", at a 5% significance level, there is a negative correlation. This means that participants with a lower income in the country-of-origin are more easily adapted to the new eating habits.

Adaptation of the immigrants' food habits as perceived by them

The analysis of the results concerning the question "To what extent have your eating habits changed during your stay in Crete?" produced the following results (Table 6): Testing on the "level of English language used", at a 5% significance level, we found a positive correlation; the better the English language level, the more they acknowledge the extent of change in their eating habits. A similar finding was recorded for the parameters: "educational level", and "monthly income in the country-of-origin". Concerning the question "Do you prefer to eat traditional food from your country-of-origin?" (Table 7): When testing on the basis of the "level of English language used", there is a negative correlation at the 1% level of significance, while the same stands when testing for the "monthly income in the host country".

Table 5: Adaptation to the new nutritional conditions

		Age (Binned)	English language level	Marital status	Population range concerning the place of residence	Educational level in country of origin	Monthly income in country of origin	Do you use any kind of transport in Crete?
Question 8. How do you judge your adaptation to the new nutritional conditions?	Correlation coefficient	0.094*	0.078*	-0.128**	-0.109**	0.095*	-0.086*	-0.114**
	Sig. (2-tailed)	0.012	0.049	0.002	0.005	0.031	0.04	0.007

Table 6: Dietary habits change

		English language level	Educational level in country of origin	Monthly income in country of origin
Question 9. To what extent have your dietary habits changed, during your stay in Crete?	Correlation coefficient	0.087*	0.080*	0.093*
	Sig. (2-tailed)	0.026	0.038	0.026

**: Significance at 1% level
*: Significance at 5% level

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

Table 7: Do you prefer to eat traditional food from your country of origin?

		English language level	Monthly income in host country
Question 10. Do you prefer to eat traditional food from your country of origin, food from Cretan cuisine or a combination of both?	Correlation coefficient	-0.109**	-0.119**
	Sig. (2-tailed)	0.009	0.004

**: Significance at 1% level
*: Significance at 5% level

Table 8: How similar do you think Cretan cuisine is to the cuisine of your homeland?

		Gender	Country of origin (Binned)	Marital status	Number of children	Monthly income in country of origin
Question 13. How similar do you think Cretan cuisine is to the cuisine of your homeland?	Correlation coefficient	0.083*	-0.261**	-0.083*	0.148**	-0.216**
	Sig. (2-tailed)	0.047	0	0.048	0	0

**: Significance at 1% level
*: Significance at 5% level

Adaptation of the immigrants to the Cretan cuisine and food

Concerning the question "How similar do you think Cretan cuisine is to the cuisine of your homeland (Table 8): Regarding the "gender" of the immigrants, there is a positive correlation at a 5% significance level; women consider, to a greater extent than the men, that the cuisine of the host country is very similar to the cuisine of the home country. Regarding the parameter "country-of-origin" there is a negative correlation at the 1% significance level; immigrants from the Balkans seem to recognize Cretan cuisine as being very similar to the cuisine of their country (data not shown). Regarding the "marital status" (1 = married, 2 = single), there is a negative correlation with a significance level of 5%; married immigrants recognize more similarity of Cretan cuisine to the cuisine of their home country compared to single participants. Concerning the parameter "number of children", there is a positive correlation at the 1% significance level. In other words; immigrants with more children believe that Cretan cuisine is very similar to the cuisine of their country-of-origin. In the contrary, concerning the "monthly income in the country-of-origin", there is a negative correlation at the 1% significance level. Concerning the question "To what extent have you included Cretan products in your daily diet?" (Table 9), we recorded the following results: On the basis of "age" there is a positive correlation with a significance level of 1%; older immigrants therefore seem to adapt more easily to the new eating habits of the host country. On the basis of "country-of-origin", there is a negative correlation at the 5% significance level; in practice, immigrants from the Balkans region appear to include a greater number of Cretan foods in their daily diet (data not shown). Concerning the "level of English language used", there is a positive correlation with a significance level of 5%; the better the English language level of the study participants, the more Cretan foods are included in their daily diet. Based on "marital status", there is a negative correlation with a significance level of 5%; married participants include Cretan foods in their daily diet to a greater extent than single participants. As far as it concerns the "number of children", there is a positive correlation at a 5% significance level; immigrants with more children include Cretan foods in their daily diet to a greater extent.

Missing traditional dishes/food from home country

The question "Do you miss traditional dishes/food from your home country?" provided the following results (Table 10): Based on the "country of origin" (1=Balkan, 2=Asian countries, 3=Central and Western Europe, 4=Northern and Eastern Europe, 5=African countries, 6=other countries), there is a negative correlation at the 5% significance level; immigrants from the Balkans estimate to a higher degree that they miss the traditional food of their home country compared to immigrants from other regional origins (data not shown). Based on the "monthly income in country of origin", there is a negative correlation with a significance level of 1%; participants with a lower income in the country of origin miss more the traditional food of their home country.

Changes in the food preparation procedures

Concerning the question "to what extent do you agree with the following statement: food preparation procedure in homeland is different from Crete (see Table 11): Based on the immigrants' "country of origin", there is a positive correlation at the 1% significance level. Based on the "level of English language used", there is a positive correlation at a 1% significance level; the better the English proficiency of survey participants, the more they appreciate that food preparation in their home country is different from that in the host country. Concerning the "number of children", there is a

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

Table 9: Cretan products in daily diet

Question 15. To what extent have you included Cretan products in your daily diet? *		Age (Binned)	Country of origin (Binned)	English language level	Marital status	Number of children
*Cretan products considered: Cretan rusks (dakos), olives, traditional sour-milk curd (xygalo), Cretan cheese (graviera)	Correlation coefficient	0.111**	-0.101*	0.086*	-0.144**	0.085*
	Sig. (2-tailed)	0.004	0.012	0.031	0.001	0.03

**: Significance at 1% level
*: Significance at 5% level

Table 10: Do you miss traditional dishes/food from your home country?

Question 17. Would you say that you miss traditional dishes/food from your home country?		Question 3. Country of origin (Binned)	Question 12. Monthly income in country of origin
	Correlation coefficient	-0.107*	-0.190**
	Sig. (2-tailed)	0.013	0

**: Significance at 1% level
*: Significance at 5% level

Table 11: Food preparation procedure in homeland is different than Cretan's.

Question 18. To what extent do you agree with the following statement: 'food preparation procedure in homeland is different than Cretan's'		Country of origin (Binned)	English language level	Number of children	Monthly income in country of origin	Do you use any kind of transport in Crete?
	Correlation coefficient	0.268**	0.165**	-0.134**	0.179**	0.104*
	Sig. (2-tailed)	0	0	0.001	0	0.014

**: Significance at 1% level
*: Significance at 5% level

negative correlation at the 1% significance level. In contrast, based on the "monthly income in the country-of-origin", there is a positive relationship at the 1% level of significance; participants with a lower income in their country-of-origin have a stronger perception that food preparation in their home country is different.

Discussion

This study on immigrants' food habits and social integration in Crete reveals several trends in immigrants' acts and perceptions. Within a sample size of 471 immigrants and depending on gender, age, country-of-origin, marital status, population size at place of residence, employment in country-of-origin, and education level in country-of-origin; the results show differences in the dietary habits of immigrants. Most immigrants reported a significant or moderate change in their diet after immigration. How interactions take place with the food environment are not well understood, specifically the interactions between immigrants, the food environment in the host countries and their potential impact on acquisition of food [27]; more importantly, we need to focus on the most vulnerable and how they can be protected and supported through this process. Interestingly, almost half of the immigrants do not consume delivered prepared-meals at all. Although it is possible that the COVID-19 pandemic fostered the use of these services among a broader population, due to factors such as widespread restaurant-closures and broad concerns about virus transmission through in-person food-shopping experiences, the potential influence of their use on dietary behaviors and public health [28] remains an open issue. In general, the immigrants' choosing a home meal-preparation appears positive in the first place, since they keep control of the meal constituents and quality. The perceived similarity between Cretan and the immigrants' indigenous cuisine is relatively high (31.8%), with 95.3% of the immigrants using olive oil for cooking. The level of inclusion of Cretan products in the daily menus is also high (46.5%). These are encouraging findings, since a negative association between Cretan cuisine/diet and mortality is described and attributed to the protective effect of its components containing an ample source of molecules with antioxidant and anti-inflammatory actions, among which omega-3 fatty acids, oleic acid, vitamins B6, B12, C, E, folic acid and phenolic compounds, dietetic fibers etc. [29]. The adaptability of the immigrants

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

to new eating habits is affected positively by the level of communication with the social and work environment. In addition, concerning the "education level", immigrants with a higher level of education are more likely to adapt to the new eating habits. These are in accordance with the relevant literature, as reported [30] "a lower level of acculturation has been found to be associated with a higher BMI, mainly if both parents were of low educational level, potentially explained by the fact that unhealthy eating behaviors and sedentary habits are more often observed in children from low educational level families". The exploration of personal, communal, collective, and institutional experiences concerning culinary traditions [31] and transitions among immigrants may help us understand and potentially facilitate the formation of their sense of community in the host countries; always respecting the sensitive balance between the ethnic identity and the social integration in the new environment.

Conclusions

Our findings can help the development of strategies and policies to help immigrants integrate more smoothly. Understanding their notions and preferences can help governments, non-profit organizations, and community groups, to develop programs that address them, potentially improving health outcomes and overall well-being. In addition, these insights can be used by the food industry to adapt to the evolving food market in regions with high immigrant populations. Beyond identifying potential barriers and facilitators to social integration, further research and action is necessary in this area. In example, it is clear that interventions to improve the communication skills as well as nutritional counselling of the immigrants are actions of choice, to facilitate the integration of the immigrants and protect their health.

Acknowledgements

The authors are grateful to the immigrants, who participated and facilitated the work on the field, and administrative health and community authorities for their assistance.

Funding

No funding was received for conducting this study.

Conflict of interest

The authors declare that they have no conflict of interest regarding the publication of this article. The research presented in this manuscript was conducted in an unbiased manner, without any financial, personal, or professional relationships that could potentially influence the content or interpretation of the findings. The authors have no affiliations, financial or otherwise, with any organization or entity that has a direct or indirect interest in the subject matter discussed in this article.

References

1. Patil CL, Hadley C, Nahayo PD. Unpacking dietary acculturation among new Americans: Results from formative research with African refugees. Journal of Immigrant and Minority Health 11 (2009): 342-358.
2. Satia-Abouta J, Patterson RE, Neuhouser ML et al. Dietary acculturation: applications to nutrition research and dietetics. Journal of the American Dietetic Association 102 (2002): 1105-1111.
3. Colby SE, Morrison S, Haldeman L. What changes when we move? A transnational exploration of dietary acculturation. Ecology of Food and Nutrition 48 (2009): 327-343.
4. Garnweidner LM, Terragni L, Pettersen KS, et al. Perceptions of the host country's food culture among female immigrants from Africa and Asia: Aspects relevant for cultural sensitivity in nutrition communication. J Nutr Educ Behav 44 (2012): 335-342.
5. Terragni L, Garnweidner LM, Pettersen KS, et al. Migration as a Turning Point in Food Habits: The Early Phase of Dietary Acculturation among Women from South Asian, African, and Middle Eastern Countries Living in Norway. Ecol Food Nutr 53 (2014): 273-291.
6. Peterman JN, Silka L, Bermudez OI, et al. Acculturation, education, nutrition education, and household composition are related to dietary practices among Cambodian Refugee women in Lowell, MA. Journal of the American Dietetic Association 111 (2011): 1369-1374.
7. Cavounidis, J. Migration and the Economic and Social Landscape of Greece. South-Eastern Europe Journal of Economics 11 (2013): 59-78.
8. Bucaj A, Sourtzi P, Galanis P, et al. Dietary habits of Albanian immigrants living in Greece in comparison to Albanians living in their country. Mediterranean Journal of Nutrition and Metabolism 6 (2013): 39-44.
9. Renzaho A, Swinburn B, & Burns C. Pediatric highlight Maintenance of traditional cultural orientation is associated with lower rates of obesity and sedentary behaviours among African migrant children to Australia. International Journal of Obesity 32 (2008): 594-600.
10. Hellenic Statistical Authority Census (2021).
11. Tramountanis A, Linardis A, Mouriki A, et al. Humanitarian assistance and social protection responses to the forcibly displaced in Greece (2022): 1-77.
12. Baldwin-Edwards M, & Kyriakou G. Statistical data on immigrants in Greece: An analytic study of available data and recommendations for conformity with European Union standards. November (2004): 1-80.

Sfendourakis I, et al., J Food Sci Nutr Res 2023
DOI:10.26502/jfsnr.2642-110000137

13. Vlahadi M, Mitoula R, & Salvati L. The Contribution of Immigrants to Urban Economies: Exploring Citizens' Opinions in Athens, Greece. Migration Letters 20 (2023): 453-463.

14. Chatzivagia E, Pepa A, Vlassopoulos A, et al. Nutrition Transition in the Post-Economic Crisis of Greece: Assessing the Nutritional Gap of Food-Insecure Individuals. A Cross-Sectional Study. Nutrients 11 (2019): 2914.

15. Includ-EU, Region of Crete.

16. Yeoh, JS. Food security and cultural identity of migrants in Tasmania. University Of Tasmania. Thesis (2015).

17. Gilbert PA, & Khokhar S. Changing dietary habits of ethnic groups in Europe and implications for health. Nutrition Reviews 66 (2008): 203-215.

18. Verbeke W, & López GP. Ethnic food attitudes and behaviour among Belgians and Hispanics living in Belgium. British Food Journal, 107 (2005): 823-840.

19. Odunitan-Wayas FA, Faber M, Mendham AE, et al. Food security, dietary intake and foodways of urban low-income older south african women: An exploratory study. International Journal of Environmental Research and Public Health 18 (2021): 1-14.

20. Vahabi M, Damba C, Rocha C, et al. Food insecurity among Latin American recent immigrants in Toronto. Journal of Immigrant and Minority Health 13 (2011): 929-939.

21. Jones AD, Ngure FM, Pelto G, et al. What Are We Assessing When We Measure Food Security? A Compendium and Review of Current Metrics 4 (2013): 481-505.

22. Godrich SL, Davies CR, Darby J, et al. What are the determinants of food security among regional and remote Western Australian children? Australian and New Zealand Journal of Public Health 41 (2017): 172-177.

23. Phami P, He J, Liu D, et al. Exploring the determinants of food security in the areas of the Nam Theun2 hydropower project in Khammuan, Laos. Sustainability (Switzerland) 12 (2020): 520.

24. Lawshe, C.H. A quantitative approach to content validity. Personnel Psychology 28 (2006): 563-575.

25. World Health Organization et al. Food Security and Nutrition in the World. In IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (2018).

26. FAO, Declaration of the world summit on food security (2009).

27. Berggreen-Clausen A, Hseing Pha S, Mölsted Alvesson H, et al. Food environment interactions after migration: a scoping review on low- and middle-income country immigrants in high-income countries. Public health nutrition 25 (2022): 136-158.

28. Robinson-Oghogho JN, Thorpe RJ, Jr, et al. Dietary Behaviors among New Users of Meal-Kit Services during the Early Months of the COVID-19 Pandemic. Nutrients 14 (2022): 3953.

29. Papandreou C. Traditional Cretan Diet and Longevity: Evidence from the Seven Countries Study. J Nutr Food Sci. 2 (2012): 9.

30. Dondi A, Piccinno V, Morigi F, et al. Food insecurity and major diet-related morbidities in migrating children: a systematic review. Nutrients 12 (2020): 379.

31. Parasecoli F. Food, identity, and cultural reproduction in immigrant communities. Social Research: An International Quarterly 81 (2014): 415-439.