How dietary intake methodology is adapted for use in European immigrant population groups – a review

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Immigrants comprise a noteworthy segment of the European population whose numbers are increasing. Research on the dietary habits of immigrants is critical for correctly providing diet counselling and implementing effective interventions. The aim of the present study was to identify the presently used methods and adaptations required for measuring dietary intake in European immigrant groups. A comprehensive review strategy included a structured MEDLINE search, related references and key expert consultations. The review targeted adults from non-European union (European union-15 countries) ethnic groups having the largest populations in Europe. As studies evaluating nutrient intake were scarce, papers evaluating intake at the level of foods were included. Forty-six papers were selected. Although Eastern Europe, Turkey, Africa (North, Sub-Saharan and Afro-Caribbean), Asia and Latin America represented the most numerous immigrant groups, papers on dietary intake were not available for all populations. Interview-administered FFQ and repeated 24 hour recalls were the most frequently applied instruments. Inclusion of ethnic foods and quantification of specific portion sizes of traditional foods and dishes in assessment tools as well as food composition databases were commonly identified problems. For FFQ, food list elaboration required particular consideration to reflect key ethnic foods and relative contribution to nutrient intake. Extra efforts were observed to overcome cultural barriers to study participation. Evaluating dietary intake of immigrant populations requires special attention to various methodological aspects (sampling, recruiting, instruments used, method of administration, food composition database, acculturation, etc.) so as to adequately address the range of socio-cultural factors inherent in these nutritionally at risk target groups.

Dietary intake: Methods: Ethnic groups: Immigrants: Europe

Immigrants and ethnic minority groups in Europe comprise a noteworthy segment of the population, which has been on the rise over the past decades. A recent review of selected European countries has shown that as a percentage of its total population, France had the largest ethnic minority populations (21·7%), followed by The Netherlands (19%), Germany (8·8%), Spain and Denmark (each with 8·5%), the UK (7·9%) and Italy (5·6%)1. The largest ethnic groups of non-European origin come from the following regions: Turkey; Africa (North and Sub-Saharan) and Afro-Caribbean; Asia and Latin America represented the most numerous immigrant groups, papers on dietary intake were not available for all populations. Interview-administered FFQ and repeated 24 hour recalls were the most frequently applied instruments. Inclusion of ethnic foods and quantification of specific portion sizes of traditional foods and dishes in assessment tools as well as food composition databases were commonly identified problems. For FFQ, food list elaboration required particular consideration to reflect key ethnic foods and relative contribution to nutrient intake. Extra efforts were observed to overcome cultural barriers to study participation. Evaluating dietary intake of immigrant populations requires special attention to various methodological aspects (sampling, recruiting, instruments used, method of administration, food composition database, acculturation, etc.) so as to adequately address the range of socio-cultural factors inherent in these nutritionally at risk target groups.

Abbreviation: 24HR, 24 hour recalls.


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higher prevalence of established CHD risk factors and overweight, respectively. Some affirm that, in accordance with the fetal origins of health theory, higher nutrition-related non-communicable diseases are linked to the more compromised status of ethnic minorities, as many come from countries where nutritional deprivation is still a reality. As such, malnutrition in the womb or during early childhood may be a precursor to pathologies in adulthood, particularly related non-communicable diseases. Predisposition to chronic diseases appears to be amplified by a variety of environmental factors such as diet, low physical activity, immune-inflammatory changes, stress of discrimination, poorer use and lower quality of care.

There has been growing attention on the influence of acculturation on diet and health in minority populations. Although results may vary due to the fact that the process is complex and multidirectional, acculturation has been linked with suboptimal dietary choices including not breastfeeding, low consumption of fruits and vegetables, and higher intakes of fats and sweetened beverages. In the same way, acculturation has been positively associated with lower physical activity, higher BMI and the likelihood of type 2 diabetes. However, findings have been inconsistent across ethnic groups and subgroups and nutrition outcomes of interest.

Apart from being at increased risk of nutrition-related non-communicable diseases, ethnic minority groups have also been documented to have inadequate intakes for several nutrients, of which vitamin D, Ca, Fe and folate predominate. Dental caries, parasites and suboptimal birth outcomes have also been cited, among others.

The previously mentioned factors underscore the need for obtaining reliable data on dietary habits and nutrient intake of these nutritionally vulnerable segments of the population. Various challenges to conducting dietary evaluations in ethnic populations include difficulties in assessing individual consumption in those eating from a shared serving dish/pot, understanding of food terms and concepts, scarce information on ethnic dishes and recipes, culture-specific foods and portion sizes, among others. Moreover, sound research on nutrient intakes of predominant immigrant groups is relatively limited and is critical for the correct provision of diet counselling, policy development and the implementation of effective interventions. The EUROPean micronutrient RECommendations Aligned (EURRECA) network of excellence financed by the European Commission aims to establish Europe-wide scientific consensus on the evidence on which micronutrient recommendations can be used, with special emphasis on nutritionally at risk population groups. A systematic review was conducted within this framework with the purpose of identifying the presently used methods and adaptations required for adequately measuring dietary intake of the principal ethnic minority groups residing in Europe.

Methods and materials
A comprehensive search strategy was conducted, which included a structured electronic database search, related references and key expert consultations. The final search strategy was derived from consultations with relevant EURRECA partners as well as external sources with key experts in the field coming from academic, research and government institutions. The review focused on adults from the non-European union ethnic groups (European union defined as those comprising the former European union-15: Austria; Belgium; Denmark; Finland; France; Germany; Greece; Ireland; Italy; Luxembourg; Holland; Portugal; Spain; Sweden; the United Kingdom) having the largest populations in Europe. The structured strategy included searching electronic databases (MEDLINE and COCHRANE) with key words and MeSH (medical subject headings) terms applied as follows:

- **Block A.** Descriptors of immigrants. MeSH term ‘immigrant’ (includes emigration and immigration, migration, foreigner, resettlement), ‘ethnic’, MeSH term ‘ethnicity’ (includes ethnic groups: African Americans, Arabs, Asian Americans, Gypsies, Hispanic Americans, Inuits, Jews; Indian: South, Central and North America and gypsies), MeSH term ‘minority group’, MeSH term ‘culture’ (includes acculturation, cross-cultural comparison, cultural diversity, multicultural, cultural characteristics, ethnicity), ‘refugee’, ‘internally displaced person’.
- **Block B.** Descriptors of dietary intake methods. MeSH term ‘nutrition assessment’ (includes nutrition survey, diet survey), ‘diet assessment’, MeSH term ‘dietary habits’ (includes food habits, diet modification), MeSH term ‘diet records’ (includes food diary), ‘24hour diet* recall’, ‘food frequency’, ‘food consumption’, ‘nutrient intake’.

**Search combinations.** [Block A] AND [Block B] AND [Block C].

Titles and abstracts were evaluated for inclusion and those without abstracts were not considered. Papers were excluded if the study was published before 1978, not conducted in human subjects, was realised outside of Europe or exclusively in the country of origin, applied rapid evaluation or qualitative methods. However, if data were lacking for a predominant ethnic group, studies from non-European countries with data on the relevant population were included. The scope of the present review was limited to the ethnic groups having the most numerous populations with open access studies. Due to the paucity of studies evaluating intake at the level of micronutrients, the review included research quantifying analysis at the level of macronutrients and food groups. A manual review of related references of selected papers was done to identify additional papers for possible inclusion, as well as realising further consultations with relevant key experts.

**Results**

**Ethnic groups analysed**

Based on the non-European union-15 ethnic groups having the largest populations in Europe, the analysis centred on studies evaluating the following migrant populations: Turks; Africans (North and Sub-Saharan, Afro-Caribbean);
South Asians; Central and Latin Americans; multiethnic studies. Although Central and Eastern Europeans (Polish, Romanian, Russian, Ukrainian, etc.) represent a substantial number of immigrants, very few studies were available for analysis due to a lack of specific dietary information (i.e. evaluation of health but not nutrition factors, etc.) or language access. East Asians (Chinese, Korean, Japanese) were not included as they had relatively lower numbers than the other groups, and the majority of studies available in English had been conducted outside of Europe (i.e. in North America). However, most ethnic groups in this category were represented in the multi-site studies selected for the multiethnic category (including whites of European or North American background, Blacks of North American or Caribbean background, Asians, South Asians and Hispanics). In contrast, Hispanics, who represent a relatively important segment of the immigrant population, were included as a target population for analysis even though there was a paucity of European data. In this case, non-European immigrant studies focusing on Latin and Central Americans were included if they reflected corresponding ethnic groups residing in Europe. The results of the selection process by ethnic group are illustrated in Table 1, with the 56 % (n 26) of the studies coming from Europe, as noted in the table.

The electronic database search yielded 2959 citations. Of these, 176 were selected after evaluating the title and abstract according to exclusion criteria, with a final selection of forty-six papers after full review of the papers.

Sampling and recruitment

Most studies utilised non-probability sampling methods, such as convenience or quota sampling with some using methods of surname analysis from a sampling frame to identify potential subjects. Ethnicity was frequently defined by place of birth, surname analysis from a sampling frame to identify potential subjects. Ethnicity was frequently defined by place of birth, surname analysis even though there was a paucity of European data. In this case, non-European immigrant studies focusing on Latin and Central Americans were included if they reflected corresponding ethnic groups residing in Europe. The results of the selection process by ethnic group are illustrated in Table 1, with the 56 % (n 26) of the studies coming from Europe, as noted in the table.

The electronic database search yielded 2959 citations. Of these, 176 were selected after evaluating the title and abstract according to exclusion criteria, with a final selection of forty-six papers after full review of the papers.

Diet assessment instruments and modes of administration

Fig. 1 shows the results of methods that were applied in the selected studies so as to evaluate dietary intake of targeted ethnic minority populations. FFQ were the most frequently applied diet assessment instrument used in twenty-seven (58·7 %) out of the forty-six studies, while ten (21·7 %) studies used 24-h recalls (24HR), four (8·7 %) studies used weighed food records, two (4·3 %) studies used diet histories and two (4·3 %) studies used estimated food records. FFQ were frequently used in multiethnic studies (85 % of the thirteen studies) as well as in African (North and Sub-Saharan, Afro-Caribbean) populations (71 % of fourteen studies). Of the ten studies applying 24HR, this method was carried out in 100 % of the Turkish populations v. 37 % of the Hispanic, 21 % of the African and 7·6 % of the multiethnic groups. Food records applied as the principle diet assessment tool (studies using this method as a form of validation were not considered) were found in only six studies (13 %), and were only applied in studies evaluating the South Asians. This last group demonstrated the greatest variety in terms of the types of dietary assessment instruments administered (Fig. 1).

The main form of administration was by face to face contact as seen in thirty studies (63 %) v. being self-administered in fifteen studies (32·6 %), the latter applied primarily in South Asian (in the form of estimated food records and weighed food records), followed by multiethnic (in the form of FFQ) studies (Fig. 1). One study used a telephone-based survey

Table 1. Results of systematic search and selection process by ethnic group

<table>
<thead>
<tr>
<th>Ethnic group</th>
<th>Citations</th>
<th>Abstract review + exclusion criteria</th>
<th>Full paper review + exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish</td>
<td>28</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic (Latin and Central American)</td>
<td>419</td>
<td>27</td>
<td>8*</td>
</tr>
<tr>
<td>Romanian</td>
<td>10</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>South Asian (Indian, Pakistan, Bangladesh, etc.)</td>
<td>359</td>
<td>35</td>
<td>9†</td>
</tr>
<tr>
<td>North African</td>
<td>23</td>
<td>5</td>
<td>4‡</td>
</tr>
<tr>
<td>Asian (Chinese, Japanese, Korean, etc.)</td>
<td>551</td>
<td>41</td>
<td>7</td>
</tr>
<tr>
<td>Turkish</td>
<td>70</td>
<td>6</td>
<td>2§</td>
</tr>
<tr>
<td>African (Afro-Caribbean, Sub-Saharan)</td>
<td>1355</td>
<td>30</td>
<td>10‖</td>
</tr>
<tr>
<td>Russian</td>
<td>49</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bulgarian</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multiethnic</td>
<td>91</td>
<td>29</td>
<td>13†</td>
</tr>
<tr>
<td>Total</td>
<td>2959</td>
<td>176</td>
<td>46**</td>
</tr>
</tbody>
</table>

* Data from USA. References[32–39].
† References[15,21,40–46].
‡ References[27,47–49].
§ References[27,50].
‖ Three studies from Jamaica and South Africa. References[28,51–59].
¶ Nine studies from North America. References[30,60–71].
** Excluding studies on Asians.
where diet was included as part of a more general health survey. Thirty-six studies (78%) utilised interviewers that were bilingual or from similar ethnic backgrounds to explain or administer the diet assessment instruments. By ethnic group, the multiethnic studies showed the lowest usage of bilingual or native staff, with only 46% of the studies providing such interviewers, whereas in other populations, this ranged from 78 to 100%. The lower rate of bilingual/native staff in multiethnic studies was due, in part, to their use of self-administered FFQ, which had been previously translated into the relevant language if required. Some used the same questionnaire for all ethnic groups in the study, while others had specific FFQ for each minority population.

Specific adaptations for dietary assessment of immigrant groups

Table 2 summarises the key components addressed in the adaptation of study instruments and methodologies to target ethnic populations. Identifying commonly consumed ethnic foods and dishes, portion sizes, recipes and preparation methods was observed and achieved in various ways, with some studies applying several methods to attain a range of objectives (i.e. development of instruments, expanding food composition tables, etc.). Thirty-two (69.6%) of the studies consulted directly with the target ethnic groups by collecting 24HR or food records or via in-depth semi-structured interviews or focus groups; nineteen studies (41.3%) sought advice from experts. In certain studies, specific information on recipes was obtained by referring to cookbooks or the Internet. For those studies using FFQ, twenty-one (77.8%) derived information directly from target immigrant groups and/or from experts for the elaboration of food lists and/or for determining weighting factors to assign average nutrient values for multiple foods listed per line item (data not shown).

The quantification of ethnic-specific portion sizes and the inclusion of ethnic foods and traditional dishes in assessment tools as well as food composition databases were the commonly identified problems. For portion size assessment, a known source of measurement error for intake studies in general, thirty-one (67.4%) of the studies utilised visual aids, and twenty-three (50%) applied previously identified serving sizes specific for the target ethnic group instead of commonly used household measures used by the autochthonous population. In reference to food composition databases, thirty-two (69.6%) of the studies analysed expanded their database with additional information on specific ethnic foods or dishes. Studies varied in how they obtained this information, ranging from 24HR interviews, weighed food records or estimated food records and focus groups to expert consultations, cookbooks and internet sources.

Although the target population was consulted to verify content for the development of instruments, only twenty (64.5%) of the eligible studies conducted feasibility testing to assess comprehensibility, ease of administration, completeness and appropriateness with the ethnic groups in question (data not shown). Even fewer studies (n = 5, 17.2%) complied with the recommended process of forward and back-translation, when applicable (data not shown). Thirty-two (86.5%) of the studies included some measure of acculturation, ranging from the length of time in the host country to primary language spoken, self-identified ethnicity or degree of integration in social circles. Twenty-two (77.4%) of identified papers had conducted correlation (validation) studies for the diet assessment instrument applied (FFQ validated by weighed food record or 24HR). The variation in methods applied and nutrients evaluated in these correlation studies make comparability difficult and is beyond the scope of the present review.
Discussion

The present review confirms that the evaluation of dietary intakes in immigrant populations requires adaptations that not only take into account the intake assessment tools but also study methodologies such as the sampling frame and recruitment measures.

The studies included in the present review used a variety of methods to ensure adequate response rates, while obtaining the most representative samples possible. To reduce obstacles to participation, such as illiteracy, language barriers, apprehension, distrust, etc., recruitment methods required extra efforts and could also vary between ethnic groups. Outreach staff was frequently of the same ethnic background and the involvement of key community leaders was solicited. Such initiatives are often required to overcome typically low response rates commonly observed with immigrant populations (40-43,64,71).

Another factor relating to the importance of appropriate sampling and recruitment methods is that within the same ethnic group, socio-economic and geographical differences can also impact on representative participation and thus study results (38,43,45,56). A clear example of this is in Kassam-Khamis’s (42,43) work that shows important variations in South Asian dietary habits as they encompass Indian (Gujarati Hindus, Punjabi Sikhs), Pakistani, Bangladeshi and East African Ismailis and as such, reflect not only religious but also geographical diversity. They even went so far as to verify the food frequency checklist under development for Pakistani subjects in three other locations as the sample from the original site (Southall, London) did not represent the majority of Pakistanis living in Britain (43). Finally, if sampling is not directed or purposive, those subjects participating in a study may only reflect more educated or motivated individuals, and thus often under-represent the ‘true’ target population (72,73).

The greater utilisation of FFQ seen in the present review may be due to their use in multiethnic (mostly North American) and African (mostly British) studies, whose subjects from varying ethnic backgrounds had longer times of residence in the host country. Some showed mean lengths of residence ranging from 18 to 25 years (data not shown) (30,57). Studies whose subjects were recent migrants or with limited literacy or language skills relied on the use of (repeated) 24HR for diet assessment. The extensive utilisation of previously trained ethnic interviewers or interpreters shows the importance of not only knowing the target population’s language but also the specific details and context of their food culture, which enhances the accuracy of dietary data collection (33,74).

For the transformation of dietary information into quantified nutrient estimates, the food composition database should include commonly consumed ethnic foods and dishes, of which data are often lacking. Detailed recipe information must be obtained to determine ingredients and preparation techniques. Acquiring recipes from cookbooks or the internet is unadvisable as the source of information may not reflect procedures, ingredients and quantities actually used. One study conducting correlation analysis for content validation had to readjust recipes and weights for foods in FFQ line items as 24HR data revealed that subjects’ recipes were much simpler than the internet recipes initially utilised (39).

Table 2. Adaptation of study instruments and methodologies

<table>
<thead>
<tr>
<th>Content validity sources</th>
<th>Portion size assessment</th>
<th>Target pop</th>
<th>Ethnic group (n studies)</th>
<th>Portion aids, cookbook, internet</th>
<th>Visual aids, ethnic specific</th>
<th>Portion size assessment tools</th>
<th>FCDB adapted, validated</th>
<th>Acculturation</th>
<th>Ethnic adaptation</th>
<th>FCDB, Food Composition Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>(food portions, recipes, etc.)</td>
<td>(foods, portions, recipes, etc.)</td>
<td>Portion size assessment</td>
<td>Target pop</td>
<td>Ethnic group (n studies)</td>
<td>Portion aids, cookbook, internet</td>
<td>Visual aids, ethnic specific</td>
<td>Portion size assessment tools</td>
<td>FCDB adapted, validated</td>
<td>Acculturation</td>
<td>Ethnic adaptation</td>
</tr>
<tr>
<td>Experts</td>
<td>Cookbook</td>
<td>Internet</td>
<td>Visual aids</td>
<td>Ethnic specific</td>
<td>Portion size assessment tools</td>
<td>FCDB adapted, validated</td>
<td>Acculturation</td>
<td>Ethnic adaptation</td>
<td>FCDB, Food Composition Database</td>
<td></td>
</tr>
<tr>
<td>Africa – North, Sub-Saharan and Afro-Caribbean (4)</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>96</td>
<td>69</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Central and Latin America (8)</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>South Asia (9)</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Turkey (2)</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Multiethnic (13)</td>
<td>96</td>
<td>2</td>
<td>9</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>31</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Total (46)</td>
<td>32</td>
<td>19</td>
<td>9</td>
<td>1</td>
<td>31</td>
<td>23</td>
<td>67</td>
<td>4</td>
<td>67</td>
<td>4</td>
</tr>
<tr>
<td>%</td>
<td>69·6</td>
<td>41·3</td>
<td>19·6</td>
<td>2·2</td>
<td>67·4</td>
<td>50·0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Total number of applicable studies = 37.
†Total number of applicable studies = 31.

J. Ngo et al.

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The present review highlights the need for further rigour in this area as fourteen (31%) of the studies reviewed had incomplete descriptions of the methodology applied to adapt food composition databases. Apart from the need to compile recipes for commonly consumed ethnic dishes, information on the effects of prolonged cooking and reheating practices is also an issue to consider (13).

Content validation is a critical step for determining the kinds of food eaten, frequency of consumption, meal patterns, preparation of ethnic dishes, ethnic-specific portions and household measures and whether terminology used is familiar to the study population. Similar foods may be called by different names depending on the geographical origins of the target ethnic group (i.e. beans/pulses have at least four different Spanish translations depending on geographical origin). Moreover, the difficulty of conceptualising food intake according to an unfamiliar classification system (i.e. food groups based on macronutrient content) needs to be addressed as how foods are grouped may contribute significantly to the classification of individuals based on their intake (55). This can be addressed by probing into culture-specific food group categories with the target populations. Other methods have grouped foods by those most consumed to those least consumed (55) or applied a classification system consisting of main dishes, side dishes, snacks and desserts (76).

Furthermore, verifying information with the target group is needed to identify variation in recipes and cooking practices, among other factors (11,31). For example, substantial recipe variation has been documented among South Asians (40,43,77) due to differences in geographical origin, ingredient availability or method of cooking. As a result, the food list and food composition database developed in Kassam-Khanim’s study (43,45) work included forty-six composite dishes encompassing South Asian traditional dishes for meat, vegetables and pulses. Moreover, for thirty-one of these forty-six dishes, three to four different recipes per dish were included and data used for analysis was based on the subject’s region of origin, religious background as well as the type of fat used (i.e. ghee, vegetable oil), and whether onions or tomatoes were included. In another study, content validation with the target populations revealed discrepancies in the weights of fried plantain portions actually used (average of 30 g) vs. what was contained in the food composition database (74.5 g) (39). Although expert consultation may be suitable for verifying certain information, it is recommended to directly corroborate content with the target population, and some studies have combined the two approaches. As such, merely ‘adding’ new items to a previously validated instrument with minimal content validation for a certain ethnic group is not recommended and may jeopardise the validity of study results.

Table: Mean portion sizes (g) for selected foods and ethnic groups.

<table>
<thead>
<tr>
<th>Food</th>
<th>West Indian (UK)</th>
<th>Puerto Rican (USA)</th>
<th>White American*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice, plain</td>
<td>176</td>
<td>231</td>
<td>128</td>
</tr>
<tr>
<td>Banana</td>
<td>100</td>
<td>121</td>
<td>94</td>
</tr>
<tr>
<td>Non-citrus juice</td>
<td>148</td>
<td>222</td>
<td>169</td>
</tr>
<tr>
<td>Hamburger</td>
<td>75</td>
<td>251</td>
<td>160</td>
</tr>
<tr>
<td>Fried chicken</td>
<td>113</td>
<td>101</td>
<td>63</td>
</tr>
<tr>
<td>Soup</td>
<td>542</td>
<td>406</td>
<td>305</td>
</tr>
<tr>
<td>Dark bread</td>
<td>74</td>
<td>42</td>
<td>38</td>
</tr>
<tr>
<td>Cake, cookie</td>
<td>107</td>
<td>68</td>
<td>52</td>
</tr>
</tbody>
</table>

Fig. 2. Mean portion sizes (g) for selected foods and ethnic groups. * Sharma 2002, Tucker 1998.
monolingual post-translation testing, it is considered as the most complete instrument translation process\(^{84,85}\). Even though various methodologies can be applied to achieve this and there is presently no gold standard established, the results of the present review showed poor compliance and/or documentation (83% of twenty-nine studies utilising translated materials lacked this information) of meeting the minimum standard of back-translation with posterior monolingual (target population) testing. Better compliance was seen in the feasibility testing of instruments with target ethnic groups (only 35% of thirty-one applicable studies lacked this documentation). However, this highlights the need for increased efforts to assure that concepts and terminology are understood. Apart from the diversity of terms used for similar foods, culture-based perceptions on food groupings and portions may not coincide with the host country’s classification or even in the wording of questions. For example, screening for rice consumption requires additional clarification in those cultures habitually consuming rice in combination with pulses. ‘How often do you eat rice?’ for Latino and Afro-Caribbeans would be better stated ‘...as plain rice or as rice and beans/peas and rice?’ since each phrase has a different culinary connotation\(^{32,58}\).

Finally, the present review shows that further research is needed to fill knowledge gaps for certain immigrant groups (Central and Eastern Europe), with special emphasis on the Roma population as they are a markedly marginalised and hard-to-reach group as well as internally displaced persons and refugees\(^{96,37}\). European data on Central and South America as well as East and Southeast Asia (Chinese, Vietnamese, Filipinos) are also lacking as well as well-defined acculturation scales.

Conclusion

Evaluating dietary intake of immigrant populations requires that special attention be paid to various methodological aspects (sampling and recruiting, instruments used, method of administration, food composition database, acculturation, among others) so as to adequately address the ample range of socio-cultural factors inherent in these nutritionally at risk target groups.

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References


