

Research paper

A systematic review of the methods and themes of health-related research on the Iranian diaspora: massive needs and opportunities

Abdolreza Shaghaghi BSc MSPH

PhD Student, University of Edinburgh, UK and Lecturer in Public Health, Tabriz University of Medical Sciences, Iran

Raj S Bhopal CBE DSc (Hon) BSc MBChB MRCP (UK) MPH MD FFPHM FRCP (Edin)
Bruce and John Usher Professor of Public Health, University of Edinburgh, UK

Aziz Sheikh BSc MBBS MSc MD FRCP FRCGP DCH DRCOG

Professor of Primary Care Research and Development, University of Edinburgh, UK

Farshid Namdaran MB ChB MSc (PH) MFPH

Retired Public Health Consultant

ABSTRACT

There is an increasing Middle Eastern diaspora, of which Iranian migrants are a major group. They are dispersed within the general population in the destination countries; this, together with the fact that many are political migrants, makes conducting population-based studies on this minority group challenging. UK policy mandates that we provide equal access to health and healthcare for them. The research evidence on which to base healthcare planning and provision decisions for the Iranian diaspora is, however, very limited.

This study aimed systematically to review methods used in population-based health research on Iranians to learn lessons to apply to future planned epidemiological research. Nine databases were systematically searched and the references of relevant articles were scrutinised. Researchers known to have particular expertise of working with Iranians were contacted to help locate additional unpublished work and research in progress. Quantitative and qualitative studies on Iranians living abroad, but not in institutions, published in English or Persian, that reported recruitment strategy, sampling and data-gathering technique were eligible for inclusion.

From 30 potentially eligible articles, 13 unique studies satisfied our inclusion criteria. There was

considerable diversity in the questions posed, methodologies used and findings of these included articles. The topics included dental health, cardiovascular risk factors, sex roles, cultural identity and research methods. The study sample sizes ranged from 10 to 413 participants. Participation rate with snowball sampling ranged from 19% (postal questionnaires) to 99% (telephone interview); with convenience sampling from 33% to 57%; and using random sampling from 21% to 68%. Responders tended to be of higher socio-economic status than non-responders. Commonly, information on translation and cross-cultural validity of questionnaires was not reported.

This is the first systematic review of methods in health studies of Iranians living abroad. We found only a few studies and considerable heterogeneity in the methods and findings of these included studies. Although there is a growing population of Iranians abroad and study of determinants of health in this ethnic minority group is vital, this review shows huge gaps in the evidence base.

Keywords: ethnic group, healthcare, Iran, migrant, research, sampling, studies

Introduction

In studying ethnic groups as discrete communities, researchers are endeavouring to contribute to improving health and reducing health inequalities. However, they often encounter difficulties, particularly in identifying and recruiting the planned number of participants. There are many potential explanations for this, including lack of knowledge about the socio-cultural features of each individual ethnic group. A rigorous look at recruitment strategies and socio-cultural attributes of potential participants is therefore extremely important in the planning phase of research on ethnic minority groups. Research on Iranian populations living abroad provides one example of the difficulties that researchers may experience, and forms the subject of this article.

There has been increasing migration from Iran in the last three decades, and Iranians now form one of the largest groups in a growing Middle-Eastern diaspora. Iranian migration accelerated with the Iranian revolution in 1979 and was given added impetus by an eight-year war between Iraq and Iran, which began in 1980. Those who left Iran were generally wealthy and educated people compared to both the remainder of the population and the existing minorities, such as African-Caribbeans, Bangladeshis and Pakistanis, in the countries to which they were migrating. According to the statistics given by official resources (Migration Policy Institute, 2004), 135 383 Iranians migrated to the US, Canada, Germany, Netherlands, UK, Sweden and Australia during 1996–2000. However, the actual number of migrants of Iranian origin is likely to be higher than these official reports suggest. Although sizeable Iranian communities are now to be found in many western European countries, the number of population-based health studies on Iranians abroad is small, possibly because they are dispersed within the general population in the destination countries and have no easily identifiable forenames or surnames. Iran itself is a multi-ethnic and multicultural country and this background diversity is reflected in the language, lifestyle and living conditions of Iranian migrants overseas. Conducting population-based studies on this minority group is therefore challenging. The lack of studies on the Iranian migrant population is believed by some researchers, including the first author, to reflect a lack of willingness on the part of some Iranians, particularly political migrants, to participate in research for reasons that include fear of being identified. There is, however, no reliable summary of the empirical literature to substantiate this assertion.

This article presents a review of those population-based studies that have been conducted about Iranians living abroad, in order to ascertain what lessons can be learned and to aid the planning and implementation

of future research. The review focuses on sample size and recruitment strategies and also assesses the range of topics covered, and hence both the range of themes already studied and those that remain unstudied. The main question of this review is how other researchers have reached and recruited Iranian migrants into population-based health studies. Ultimately the review aims to help treat Iranian origin minorities equally in relation to research and access to health and health-care. As far as we are aware, it is the first systematic study of this subject in this population of its kind.

Methods

Types of studies

We used the MOOSE (Meta Analysis of Observational Studies in Epidemiology) guidelines to do this systematic review (Stroup *et al*, 2000). All epidemiological studies or qualitative studies or social surveys on Iranians living permanently abroad, thus excluding students and those living in institutions, were eligible if they were published in English or Persian and reported sample recruitment strategy, sample size and data gathering technique.

Systematic reviews of observational studies usually exclude qualitative studies. Although qualitative studies may not contribute to synthesis of quantitative epidemiological studies, in view of the suggestion that the lack of studies on the Iranian migrant population may reflect a lack of willingness on the part of Iranians to participate in research for reasons including fear of being identified, particularly among political migrants, we judged that qualitative studies on Iranians could be a rich source of understanding about their possible reluctance to participate in research, and highlight methodological barriers to recruiting Iranians overseas into population-based studies. Therefore, we included such studies. Further details about the types of data, outcomes and our search strategy are shown in Boxes 1–3.

Box 1 Types of data

The types of collected data included:

- demographic characteristics of studied sample (age, sex, status of residency and current place of living)
- sampling approaches in the eligible studies (sample size and recruitment strategy, sampling methods, sampling frame)
- study features (researcher, study subject and type, data-gathering technique and study implementation year)

Box 2 Types of outcome sought

Topics covered by studies were:

- number of studies on Iranians living abroad by country
- number of studies having good-quality information on methods (sample size, sampling method, sampling frame and recruitment criteria of subjects)
- type of recruitment strategies
- response rates
- main lessons from eligible studies that may help planning of future studies on Iranians abroad

Selecting studies

The review was limited to English and Persian language studies published between 1950 up to week 1, April 2006. Abdolreza Shaghghi checked the titles and abstracts of all retrieved records to distinguish relevant articles. Articles were excluded on initial screening if the title and the abstract showed that they were not reporting population-based studies on Iranians. When a title or abstract could not be rejected with certainty, the full text of the article was acquired

for further assessment. For those studies that were potentially relevant, full papers were secured. References of relevant articles were inspected. We also included studies recognised through serendipitous discovery. Researchers (Dr Sirous Momenzadeh, Dr Freidoon Khavarpour and Professor Haakon Meyer) well known to undertake research on Iranian populations were contacted for possible additional references. Reference Manager software was utilised, and duplicate entries were deleted. Studies were assessed for quality. A data-extraction sheet was used for summarising included studies (see Box 4).

Data extraction

The data were extracted into a customised data-extraction form. Descriptions of the problems encountered by the researchers in recruiting the study sample or recommendations to increase participation rate were also extracted.

Data presentation

Data were tabulated chronologically by country of study and presented in descriptive form. Response rate was calculated as a percentage of participants in the study in relation to the number required by the researcher.

Box 3 Search strategy

The following databases were searched:

- AMED (Allied and Complementary Medicine): 1985 to April 2006
- CINAHL (Cumulative Index to Nursing and Allied Health Literature): 1982 to week 5, March 2006
- EMBASE: 1980 to week 13, 2006
- Ovid MEDLINE(R):
 - 1950 to 1965
 - 1966 to 7 April 2006
 - in-process and other non-indexed citations, 6 April 2006
- CAB Abstracts: 1973 to March 2006
- Global Health: 1973 to March 2006
- Index to Theses (a comprehensive listing of theses with abstracts accepted for higher degrees by universities in Great Britain and Ireland since 1716): 1716 to 6 March 2006
- National Research Register (UK)
- International Bibliography of the Social Sciences: 1951 to week 1, April 2006.

The free texts and MeSH indexing terms were:

Iran or Iranian or Persian or Parsi\$ or Farsi\$ or Tehran\$ or Isfahan\$ or Shiraz\$ or “Fars province” or Ardabil\$ or Uromia\$ or Qazvin\$ or Tabriz\$ or Mashad\$ or Mashhad\$ or Khorasan\$ or Kerman\$ or Yazd\$ or Kermanshah\$ or Kordestan\$ or Zahedan\$ or Lorestan\$ or “Chaharmahal and Bakhtiari” or “Kohkiloieh va Boier Ahmad\$” or Gilan\$ or Mazandaran\$ or Zanjan\$ or Ahwaz\$ or Khozestan\$ or Sistan\$ or Bandarabbas\$ or Hormozgan\$ or Bushehr\$ or Golestan\$ or Semnan\$ or Markazi\$ or Hamadan\$ or Qom\$ or Qazvin\$ or Ilam\$) AND “ethnic groups” or ethnology or “Emigration and Immigration” or “Transients and Migrants” or “minority groups” or refugee\$ or abroad or “foreign country” or overseas.

Other electronic resources such as web pages of ethnicity-related organisations or official health organisations of countries known as having a fair number of Iranians and potentially pertinent internet sites (Google) were searched for unpublished materials.

Box 4 Quality criteria for assessment of internal and external validity

- Precise definition of study sample
- Clarity of data-gathering technique (e.g. application of original or translated questionnaires, language used in interviews)
- Referring to the location of data collection from study participants (e.g. home, office)
- Age, sex, state and length of residency in the host community
- Use of a representative sample of target group in the study
- Giving response rate for study

Results

The process by which 13 studies were included is shown in Figure 1 and described briefly below. Three-hundred and ten studies (including duplicates) were identified mainly from CINAHL (11 articles), EMBASE (83 articles), MEDLINE (109 articles), CAB (CAB abstracts database; 35 articles), Global Health (29

articles) and International Bibliography of the Social Sciences (42 articles). Review of the titles of these identified 70 potentially pertinent articles. Review of the abstracts led to 24 studies which apparently met the inclusion criteria, but the full texts showed 20 studies met the initial inclusion criteria.

A further 56 candidate articles were identified by reviewing the references of these 20 articles, and nine had potential for inclusion. One study resulted from serendipitous discovery of unpublished work presented in the Sixth International Conference on Preventive Cardiology (Meyer and Kumar, 2005). An internal report from the Institute for Social Anthropology in the University of Bergen, Norway (Kamalkhani, 1998) was not obtainable although the request was sent to the email address given on the Institute website. There was considerable diversity in both methodology and reported data in the potentially eligible articles. To learn every lesson about application of different methods in recruiting Iranian ethnic groups, we decided to exclude only those studies in which Iranians were not regarded as a separate group in the data analysis and reporting of the findings. We also excluded those studies in which it was not clear from explained methodology of the article whether the studied group

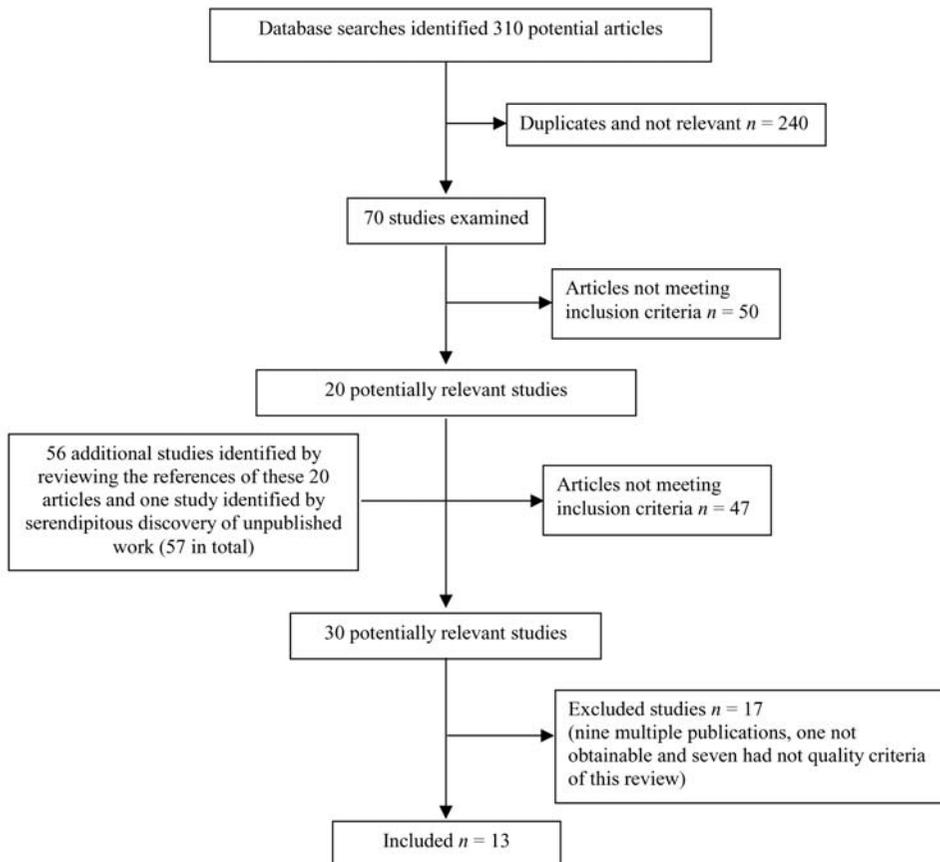


Figure 1 Study identification and selection process in the systematic review of the methods and themes of health related research on the Iranian diaspora

of Iranians settled in a permanent base in the host community. Furthermore, we considered the quality of included studies based on above-mentioned quality criteria in the results section.

In six studies (Meleis *et al*, 1992; Lindström *et al*, 2001; Lindström and Sundquist, 2001, 2002; Dawson *et al*, 2005; Lindström, 2005), Iranians were a part of the study sample, but as part of a group of 'immigrants from other countries', and were therefore not analysed separately. One article (Ghaffarian, 1987) was on college students but since it was not clear from the full text whether these Iranian students were spending a length of time at their place of study or had grown up in the host country, it was excluded (see Appendix 1).

Correspondence with other researchers did not add to the list of relevant studies. Of the 22 articles that met our criteria, seven (Hjern and Grindeford, 2000; Sundquist *et al*, 2000; Bayard-Burfield *et al*, 2001; Hjern, 2001; Hjern *et al*, 2001; Wandell *et al*, 2004; Wiking *et al*, 2004) were publications from the Immigrant Survey of Living Conditions in four minority groups of Sweden. Two studies from Australia (Khavarpour and Rissel, 1997; Rissel and Khavarpour, 1997), two from the Netherlands (Gerritsen *et al*, 2004, 2006) and two from Norway (Holvik *et al*, 2005; Meyer and Kumar, 2005) were publications based on data from one study. Since methodologies for sampling, recruiting and participation rate in different publications from same study are identical, we decided to include one sample study from each study. Thus, 13 studies, including three qualitative studies (Momenzadeh and Posner, 2003; Higgins, 2004; Barnes and Almasy, 2005), were the focus of this review (see Table 1).

Studies reporting data

The topics included dental health, cardiovascular risk factors, sex roles, cultural identity and acculturation, healthy behaviour, mental health, vitamin deficiency and research methods. Eight studies (Hanassab, 1991; Chaichian, 1997; Rissel and Khavarpour, 1997; Mahdi, 2001; Momenzadeh and Posner, 2003; Yavari *et al*, 2005; Barnes and Almasy, 2005; Daryani *et al*, 2005) were implemented by authors with Iranian names. The studies took place in six countries: Australia with two (15.4%), Canada with one (7.7%), Netherlands with one (7.7%), Norway with one (7.7%), Sweden with two (15.4%) and US with six (46.1%). In the Canadian study, methods for creating a list of Iranians through linking specific surnames and given names were described. Sample size among the other 12 studies was in the range of 10–413 participants. Convenience sampling (Hanassab, 1991; Chaichian, 1997; Higgins, 2004), snowball sampling method (Lipson, 1992; Rissel and Khavarpour, 1997; Momenzadeh and Posner, 2003; Barnes and Almasy, 2005), inclusive sampling

(Holvik *et al*, 2005) and random sampling (Hjern and Grindeford, 2000; Mahdi, 2001; Daryani *et al*, 2005; Gerritsen *et al*, 2006) methods were used. Participation rates in studies that used snowball sampling ranged from 19% with postal questionnaires to 99% with telephone interview. Participation rates were 33.3–57% in studies that used convenience sampling methods, 21.3–68.1% in studies with random sampling methods and 38.8% where inclusive sampling was used (Holvik *et al*, 2005).

The data-gathering technique, study site, use of translated or original questionnaires and language in the interview are provided in Table 2.

Postal questionnaire and face-to-face interview were used simultaneously in three studies (Hanassab, 1991; Lipson, 1992; Chaichian, 1997; 25%). In five studies (41.7%) only face-to-face interviews were used (Hjern and Grindeford, 2000; Momenzadeh and Posner, 2003; Higgins, 2004; Barnes and Almasy, 2005; Gerritsen *et al*, 2006). Telephone interviews were used in one study (Rissel and Khavarpour, 1997; 8.3%). Self-administered questionnaires along with clinical examination and para-clinical tests were applied in two studies (Daryani *et al*, 2005; Holvik *et al*, 2005; 16.7%). In one study (8.3%), only a postal questionnaire (Mahdi, 2001) was used.

The place for data gathering, among eight studies using face-to-face interview, was not reported in two (25%) articles (Lipson, 1992; Chaichian, 1997), it was the participants' homes in four studies (50%) (Hjern and Grindeford, 2000; Momenzadeh and Posner, 2003; Barnes and Almasy, 2005; Gerritsen *et al*, 2006); while in two studies (25%) both participants' homes and researchers' offices were used (Hanassab, 1991; Higgins 2004).

In two studies (16.7%), clinical data were collected (Daryani *et al*, 2005; Holvik *et al*, 2005). Of six studies (50%) where postal or self-administered questionnaire were used (Hanassab, 1991; Lipson, 1992; Chaichian, 1997; Mahdi, 2001; Daryani *et al*, 2005; Holvik *et al*, 2005), three (50%) did not refer to translated questionnaires (Hanassab, 1991; Chaichian, 1997; Mahdi, 2001). In the remaining three studies (Lipson, 1992; Daryani *et al*, 2005; Holvik *et al*, 2005) translated questionnaires were used.

Telephone or face-to-face interview was reported in nine (75%) studies (specifically or in combination with other methods). In three (33%) studies (Lipson, 1992; Hjern and Grindeford, 2000; Higgins, 2004) both original and translated set of questions (optional) were used; and in one (Momenzadeh and Posner, 2003; 11%) only an English version of a questionnaire was used during interviews. To answer interview questions, interviewees in one (11.1%) study used Persian (Momenzadeh and Posner, 2003), in four (44.4%) Persian and English (Lipson, 1992; Rissel and Khavarpour, 1997; Higgins, 2004; Barnes and Almasy, 2005), in one (11.1%) Persian

Table 1 Studies by country: type, title, sampling and response rate

Author(s)/type/year of study	Title of study	Study sample/frame/size	Sampling method	Response rate
Sweden Hjern and Grindeford (2000), quantitative	Dental health and access to dental care for ethnic minorities in Sweden	Residents (males and females) from four minority groups living in Sweden aged 27–60 years, born in Chile ($n = 548$), Turkey ($n = 495$), Poland ($n = 534$) and Iran ($n = 312$) with Swedish-born matched adults ($n = 2452$)	Random sampling from Sweden's Register of The Total Population	68.1% (for Iranians) and 80.6% for Swedish
Daryani <i>et al</i> (2005), quantitative	Risk factors for coronary heart disease among immigrant women from Iran and Turkey, compared to women of Swedish ethnicity	First-generation immigrant women born between years 1933 and 1962 from Turkey ($n = 90$), and Iran ($n = 90$) residing in Uppsala for at least three years compared with Swedish-born matched women ($n = 90$)	Random sampling from Swedish Statistical Agency Register	79% for Iranian and 54% for Swedish women
US Hanassab (1991), quantitative	Acculturation and young Iranian women: attitudes toward sex roles and intimate relationships	Iranian young migrant women aged 17–32 years residing in Los Angeles ($n = 77$)	Convenience sampling	Not stated
Lipson (1992), quantitative	The health and adjustment of Iranian immigrants	Iranian migrants (interview with 35 persons and sending of a questionnaire by post to 200 persons) residing in three San Francisco Bay area counties	Snowball sampling	Not stated for those invited for interview, and 19% for postal questionnaire
Chaichian (1997), quantitative	First-generation Iranian immigrants and the question of cultural identity: the case of Iowa	First-generation Iranian immigrants (males and females) aged 18 years and older ($n = 70$) who reside in a 30-mile radius of Iowa city	Convenience sampling	57%
Mahdi (2001), quantitative	Perceptions of gender roles among female Iranian immigrants in the US	Iranian migrant females residing in the US ($n = 158$)	Random sampling from one cultural and two scholarly associations	21.3%

Table 1 Continued

Higgins (2004), qualitative	Interviewing Iranian immigrant parents and adolescents	Iranian families residing in Santa Clara County who have school-aged adolescents ($n = 101$)	Convenience sampling	About one-third of eligible families
Barnes and Almasry (2005), qualitative	Refugees' perceptions of healthy behaviour	Adult refugees (males and females) aged 19–71 years, from Cuba ($n = 10$), Bosnia ($n = 11$) and Iran ($n = 10$)	Snowball sampling	91% (overall)
Australia				
Rissel and Khavarpour (1997), quantitative	An application of 'snowball' sampling among a small dispersed migrant population for health research	Iranian-born migrants (males and females) aged over 18 years living in Sydney ($n = 413$)	Snowball sampling	99%
Momenzadeh and Posner (2003), qualitative	Iranian migrants' discourses of health and the implications for using standardised health measures with minority groups	Iranian migrants (males and females) residing in Australia aged 25–60 years ($n = 31$)	Snowball sampling	Not stated
Netherlands				
Gerritsen <i>et al</i> (2006), quantitative	Physical and mental health of Afghan, Iranian and Somali asylum seekers and refugees living in The Netherlands	Asylum seekers (residing in The Netherlands) and refugees (residing in three municipalities of Arnhem, Leiden and Zaanstad) born in Afghanistan, Somalia and Iran ($n = 410$)	Random sampling from population register	53% for Iranian refugees
Norway				
Holvik <i>et al</i> (2005), quantitative	Prevalence and predictors of vitamin D deficiency in five immigrant groups living in Oslo, Norway: the Oslo Immigrant Health Study	Migrants aged 31–60 years born in Turkey ($n = 87$), Sri Lanka ($n = 155$), Pakistan ($n = 94$), Vietnam ($n = 47$) and Iran ($n = 108$) living in Oslo	Inclusive sampling (random sampling for Pakistanis)	38.8% for Iranians
Canada				
Yavari <i>et al</i> (2005), quantitative	Methodology to identify Iranian immigrants for epidemiological studies	NA	NA	NA

NA, not applicable.

Table 2 Studies by country: title, data collection and language

Title of study/author(s)/publication year	Data-collection technique	Data-collection place	Language of questionnaires	Language in interviews
Sweden				
Dental health and access to dental care for ethnic minorities in Sweden. Hjertn and Grindefjord (2000)	Face-to-face interview	Participants' homes	Translated version of (Persian) and Swedish on request	Persian in 10% of cases, Swedish in 90% of cases
Risk factors for coronary heart disease among immigrant women from Iran and Turkey, compared to women of Swedish ethnicity. Daryani <i>et al</i> (2005)	Self-administered questionnaire, clinical examination and paraclinical tests	Participants' homes and research site	Translated version (Persian)	NA
USA				
Acculturation and young Iranian women: attitudes toward sex roles and intimate relationships. Hanassab (1991)	Postal questionnaire or face-to-face interview	Participants' home or researcher office	Not stated	Not stated
The health and adjustment of Iranian immigrants. Lipson (1992)	Face-to-face interview and postal questionnaire	Not stated	Translated (Persian) and non-translated (English) version	Persian on request and English
First generation Iranian immigrants and the question of cultural identity: the case of Iowa. Chaichian (1997)	Postal questionnaire or face-to-face interview	Not stated	Not stated	Not stated
Perceptions of gender roles among female Iranian immigrants in the United States. Mahdi (2001)	Postal questionnaire	NA	Not stated	NA
Interviewing Iranian immigrant parents and adolescents. Higgins (2004)	Face-to-face interview	Participants' home, place of work and coffee shops or researcher's office	Translated (Persian) and non-translated (English) versions	Almost all in Persian
Refugees' perceptions of healthy behaviours. Barnes and Almasry (2005)	Face-to-face interview	Participants' home	NA	English and Persian on request

Table 2 Continued

Australia	Telephone interview	NA	NA	Persian in 90% cases, English in 10% of cases
An application of 'snowball' sampling among a small dispersed migrant population for health research. Rissel and Khavarpour (1997)				
Iranian migrants' discourses of health and the implications for using standardized health measures with minority groups. Momenzadeh and Posner (2003)	Face-to-face interview	Mostly at participants' home	English version	Persian
Netherlands	Face-to-face interview	Participants' place of living	Translated version of Persian	Persian or Dutch
Physical and mental health of Afghan, Iranian and Somali asylum seekers and refugees living in the Netherlands. Gerritsen <i>et al</i> (2006)				
Norway	Self-administered questionnaire, clinical examination and paraclinical tests	Study site	Not stated	Not stated
Prevalence and predictors of vitamin D deficiency in five immigrant groups living in Oslo, Norway: the Oslo Immigrant Health Study. Holvik (2005)				

NA, not applicable.

and Dutch (Gerritsen *et al*, 2006) and in one (11.1%) Persian and Swedish (Hjern and Grindefjord, 2000). In two (22.2%) studies (Hanassab, 1991; Chaichian, 1997) authors did not refer to the language of interview.

Studies on research methods on Iranians

Three studies (Rissel and Khavarpour, 1997; Higgins, 2004; Yavari *et al*, 2005) discussed methodological aspects of doing research on Iranians abroad, as summarised in Table 3. Rissel and Khavarpour (1997) referred to obstacles to using more reliable sampling methods among Iranian migrants, such as being a small dispersed community within the original population, not having easily identifiable names or surnames, and the sensitivity of the study subject such as sexual behaviour or illegal drug use. They recruited four bilingual interviewers born in Iran representing different subgroups of Iranians. These interviewers then contacted eligible persons via the telephone to encourage them to answer study questions and to give telephone numbers of up to four adult friends or relatives, not immediate family members, with a parent born in Iran. To avoid selection bias the number of contacts each participant could suggest was limited. The project was also publicised through the local Iranian radio station. The response rate was 99% (417/428). Interviews took place in Persian in 90% and the remainder in English. The sample was similar with regard to sex and age to that of residents born in Iran in the 1991 census of the Sydney Statistical Area. The snowball sampling method generated a more educated and wealthy sample than the population of migrants from Iran to Australia.

Higgins' (2004) review referred to studies that indicate high educational and economic status of Iranian migrants. She stated that residing in the same area does not guarantee researchers contact with Iranians and that the offer of paying people for their time is unlikely to increase participation. She reported that Iranians were suspicious of strangers asking questions and that only those with strong ties to the community can be successful in research on this ethnic group. She referred to studies that reflected participants' co-operation and eagerness to participate. Factors like appeals to national or ethnic pride, choice of language and place of interview were helpful in convincing Iranians to participate. She reported finding only one study where a formal informed consent procedure was followed. In several studies a tendency among Iranian migrants to present oneself, one's family and one's community in the best possible light had been observed.

Higgins used a list of Iranian families' names, phone numbers and addresses provided by school adminis-

trators or Iranian networks to send a letter or make a telephone call to recruit Iranians. She gained consent from 101 families who agreed to participate, which was only one-third of the eligible families. She permitted the study participant to choose the language of interview and between a non-Iranian and an Iranian interviewer. Most interviews were in the family home, but the interviewer's office, participants' place of work and coffee shops were also used. Participation rate was reported to be one-third of eligible families. Higgins concluded that Iranians were not over-sensitive, sceptical or cynical, and were typical of the Iranian community in the area. The commonest reason for refusal was lack of time. She recommended that personal contacts and snowball sampling were the most effective ways of recruiting Iranian migrants.

Yavari *et al* (2005) identified Iranians in British Columbia (BC), Canada. They listed common Iranian surnames and given names from a local residential telephone book and the Screening Mammography Program of BC database. They linked this list with the BC Cancer Agency to identify Iranians who had been diagnosed with cancer. Sensitivity of this approach to detect Iranians was reported to be up to 97% for surnames.

Population-based studies on Iranian minority group: additional key points from identified papers

In three studies (30%), only females were included (Hanassab, 1991; Mahdi, 2001; Daryani *et al*, 2005). Two studies (20%) were conducted among Iranian refugees and asylum seekers (Barnes and Almasry, 2005; Gerritsen *et al*, 2006). Iranians were combined in five studies with other migrants in a collective sample (Hjern and Grindefjord, 2000; Barnes and Almasry, 2005; Daryani *et al*, 2005; Holvik *et al*, 2005; Gerritsen *et al*, 2006).

Hanassab's (1991) study on Iranian women in Los Angeles, US, used a postal questionnaire. There was selection of better educated persons from higher socio-economic backgrounds. Socio-economic difference between respondents and non-respondents was also found to be a methodological limitation of the research by Wandell *et al* (2004). Hjern and Grindefjord (2000) reported that Iranians had the highest level of education among migrants. They identified the higher dropout rate in the minority sample as one of their study's limitations.

Iranian migrants residing around Iowa City, US, were sent a postal questionnaire or interviewed in a study by Chaichian (1997). The response rate to postal questionnaires was 57% and for interview was 17%. Iranians who participated were highly educated

Table 3 Studies on methodological issues when doing research on Iranians living abroad

Author(s)/year of the publication	Title	Study design	Study place	Main methodological issue
Rissel and Khavarpour (1997)	An application of 'snowball' sampling among a small dispersed migrant population for health research.	Population based	Australia	Sampling (snowball)
Higgins (2004)	Interviewing Iranian immigrant parents and adolescents.	Population based	US	Data gathering (interviewing)
Yavari <i>et al</i> (2005)	Methodology to identify Iranian immigrants for epidemiological studies.	Population based	Canada	Recruitment method (searching Iranian surnames and given names in the databases to make contacts)

compared to the larger urban concentrations of Iranians.

Mahdi (2001) mailed a questionnaire with 113 questions to a number of Iranian families residing in 41 states of the US. The study target group included Iranian females randomly drawn from address lists of one cultural and two scholarly associations in the US. The response rate in this study was 21% (excluding returned questionnaires due to incorrect addresses). The sample was biased towards a more educated and professional sample. Barnes and Almasy (2005) studied refugees' perceptions of healthy behaviours. Overall participation rate for the study sample (including Iranians) was reported as 91%. They suggested not including refugees from various parts of the world in one sample without separating the data according to the similarities and differences between groups.

In a qualitative study by Momenzadeh and Posner (2003), snowball sampling was used to recruit Iranians from different socio-economic backgrounds in Australia. An English version of the questionnaire was used but interviewees were asked to respond to questions in Persian. They concluded that snowball sampling can be effectively applied with Iranian minority groups in countries like Australia to locate potential study participants. They argued that the focus group method among Iranian migrants is a useful tool for data gathering if the interviewer builds up a good relationship with participants and knows how to manage social interactions existing in relationships in Iranian culture.

Lipson (1992) sent English and Persian (translated and back-translated) versions of a standard questionnaire to 200 selected Iranians of whom only 19% responded. She suggested that this poor response rate could have resulted from distaste for written surveys, a preference for face-to-face interview or mistrust of research among Iranians in the San Francisco area.

Discussion

This is the first systematic review of recruitment methods in health research of Iranians living abroad. We found relatively few studies, but considerable heterogeneity in the methodologies used. We found 30 relevant articles, of which 13 unique studies met our inclusion criteria. One reported linking two databases of names and surnames to find Iranians (Yavari *et al*, 2005). In four articles there was missing information about important aspects of the methodology. Place of data collection (Lipson, 1992; Chaichian, 1997) application of translated versus original questionnaires (Hanassab, 1991; Chaichian, 1997; Mahdi, 2001) and language of the interviews (Hanassab, 1991; Chaichian, 1997) had often not been declared.

The wide range of participation rates from 19% to 99% in these studies probably represents differences in both recruitment and study methods. No single method of recruitment can be considered a gold standard. Similar methods in varying circumstances lead to differing results. For example, a random sampling method to recruit Iranian women resulted in participation rates of 21% in one study (Mahdi, 2001) and 79% in another (Daryani, 2005). Snowball sampling was reported to be a successful way to recruit Iranians. To avoid selection bias where marginalised people are less likely to be nominated, researchers should limit the number of contacts each participant could introduce. Snowball sampling generated a more educated and wealthy sample than the general population of Iranian migrants in a number of studies. Participation rates where snowball sampling was used to recruit Iranian males and females (Lipson, 1992) were reported to be as low as 19% and as high as 99% (Rissel and Khavarpour, 1997). In the study by Hjern and Grindefjord (2000) the face-to-face interview method in the participants' home resulted in a participation rate of 68.1%, but in the study by Gerritsen *et al* (2006) the participation rate was 53%. Factors at play in these variations include time and place of study (country, city, district etc), migration status, level of education, subject of the research and measurements made in each individual study.

It is vital to understand the factors persuading or prohibiting participation by Iranians living abroad. Given the small number of studies on this ethnic minority and the diversity of methodologies, it is not possible to analyse these results statistically. However, we can conclude that Iranians have high levels of education and economic status in comparison with the other ethnic minority groups, that those participating have higher socio-economic status than those not doing so, and that useful studies are achievable for a variety of settings, countries and topics.

To increase participation by Iranians the suggestions discovered from this literature included: application of a multi-method approach to recruit Iranians; translation of the study questionnaire, brochure and consent form in the respondents' language; emphasising anonymity; choice of interviewer, language, time and place of interview; contacting of respondents by letter and in person; using an oral informed consent procedure; publicising the study through the local Iranian radio station; and giving financial incentives.

There was discussion in the literature about distaste for written surveys, strong suspicion of strangers asking questions among Iranian migrants and that only those with strong ties to the community can be successful in research on this ethnic group. One study avoided distributing a formal consent form to prevent participants being reminded of earlier confrontations with legal authorities, but in most studies no problems

were seen among Iranian migrants in giving consent. Overall, however, there was evidence reflecting Iranians' co-operation and eagerness to participate in research. Lack of engagement on the part of Iranians is thus unlikely to be a barrier to research; institutional barriers are likely to be far more important. Social networks and political processes in the host countries could also mediate Iranians' perceptions about ultimate objectives of health researches and their willingness to participate in such studies.

The limited data available suggest that the majority of Iranian migrants will speak the language of their adopted countries and relatively few will require translation services.

In this review we searched literature written in English or Persian language, but a sizeable number of Iranians are living in countries where other languages are used and articles or reports may be published in local languages (France, Denmark, Germany, Norway and Sweden). For this reason we probably missed some articles or reports from these countries. We limited ourselves to the websites written in English or Persian, while there are many other websites (non-English) in which one could find potentially relevant articles. In future, researchers should try to expand the search domain to include languages other than English and Persian.

There is now a considerable and growing population of Iranian migrants throughout the world; the revolution in 1979 and the eight-year war between Iraq and Iran were particular drivers for emigration to Europe, North America and Australia by mostly affluent Iranians. It is important to research the health of this migrant group and the quality and quantity of healthcare they require. An appreciable body of knowledge has been accumulated in recent years through conducting research about the health status of major ethnic groups in Europe and North America. This knowledge has helped us to achieve a better understanding about the population health needs in our societies, and accordingly to plan comprehensive public health programmes to try to address the needs of various subgroups of the population. This review shows that although clearly needed and feasible, such studies are uncommon on Iranians (none in the UK, for example). Our review shows that a wide span of topics can be studied. Heart disease, stroke, diabetes, cancer and mental illness are a few of the major health problems of Iranians overseas (and in Iran). We found no studies on diabetes, stroke and cancer, and meagre work on the other topics. In the interests of equity of healthcare, and in response to health policies and legislation promoting equality, research is mandatory. Thus, we call on the research community to take heed of the needs and opportunities identified here.

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CONTRIBUTORS

A Shaghghi, RS Bhopal, A Sheikh and F Namdaran conceptualised and designed the study; A Shaghghi conducted the systematic review and data extraction with helpful comments from A Sheikh; A Shaghghi and RS Bhopal interpreted the data and wrote the manuscript. A Sheikh and F Namdaran provided key comments on the manuscript. All authors approved the final manuscript.

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CONFLICTS OF INTEREST

None.

ADDRESS FOR CORRESPONDENCE

Abdolreza Shaghaghi, PhD student, Public Health Sciences, Division of Community Health Sciences, The University of Edinburgh, Medical School, Teviot Place, Edinburgh EH8 9AG, UK. Tel: +44 (0)131 6506964; fax: +44 (0)131 6506909; email: Reza.Shaghaghi@ed.ac.uk

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Appendix 1 Excluded studies by title and reason of exclusion

Title of study/author(s)/publication year	Reason for exclusion
The acculturation of Iranians in the United States. Ghaffarian (1987)	Not clear residency status (permanent versus temporary)
Iranian immigrants and refugees in Norway. Kamalkhani (1999)	Not obtainable
Ethnicity and health among five Middle Eastern immigrant groups. Meleis <i>et al</i> (1992)	Data from Iranian migrants combined with other minorities
Ethnic differences in self reported health in Malmö in southern Sweden. Lindström <i>et al</i> (2001)	Data from Iranian migrants combined with other minorities
Immigration and leisure-time physical inactivity: a population-based study. Lindström and Sundquist (2001)	Data from Iranian migrants combined with other minorities
Ethnic differences in daily smoking in Malmö, Sweden. Lindström and Sundquist (2002)	Data from Iranian migrants combined with other minorities
Ethnic differences in social participation and social capital in Malmö, Sweden: a population-based study. Lindström (2005)	Data from Iranian migrants combined with other minorities
The influence of ethnicity and length of time since immigration on physical activity. Dawson <i>et al</i> (2005)	Data from Iranian migrants combined with other minorities
Sweden	
Impact of ethnicity, violence and acculturation on displaced migrants: psychological distress and psychosomatic complaints among refugees in Sweden. Sundquist <i>et al</i> (2000)	Paper published from a study already included
Ethnicity, self reported psychiatric illness, and intake of psychotropic drugs in five ethnic groups in Sweden. Bayard-Burfield <i>et al</i> (2001)	Paper published from a study already included
High use of sedatives and hypnotics in ethnic minorities in Sweden. Hjern (2001)	Paper published from a study already included
Is there equity in access to health services for ethnic minorities in Sweden? Hjern <i>et al</i> (2001)	Paper published from a study already included
Country of birth and body mass index: a national study of 2000 immigrants in Sweden. Wandell (2004)	Paper published from a study already included
Ethnicity, acculturation, and self reported health. A population based study among immigrants from Poland, Turkey, and Iran in Sweden. Wiking (2004)	Paper published from a study already included
Australia	
Mental health status of Iranian migrants in Sydney. Khavarpour and Rissel (1997)	Paper published from a study already included
Netherlands	
Health and health care utilisation among asylum seekers and refugees in The Netherlands: design of a study. Gerritsen <i>et al</i> (2004)	Paper published from a study already included
Norway	
Cardiovascular risk factors among five major immigrant groups in Oslo, Norway. Meyer and Kumar (2005)	Paper published from a study already included