J Immigrant Minority Health (2011) 13:385–394
DOI 10.1007/s10903-009-9304-1

ORIGINAL PAPER

Explanatory Models of Health and Disease Among South Asian Immigrants in Chicago

Manasi A. Tirodkar · David W. Baker · Gregory T. Makoul · Neerja Khurana · Muhammad W. Paracha · Namratha R. Kandula

Published online: 4 February 2010

Abstract To identify concepts of health and disease as part of a study on designing culturally-targeted heart disease prevention messages for South Asians. We conducted qualitative, semi-structured interviews in English, Hindi and Urdu with 75 respondents from a federally qualified health center and at a community center for South Asian immigrants in Chicago, Illinois. Age ranged from 20 to 70 years; 60% were women; 60% held advanced degrees; 70% migrated to the US in the last 10 years; and 60% of the interviews were in Hindi or Urdu. Concepts of health and disease fell into four domains: behavioral, physical, psycho-social and spiritual. Muslim participants consistently evoked spiritual factors such as faith and prayer. Women more frequently included performing home duties and positive affect in their concept of health. Men more frequently cited behavioral factors such as smoking and drinking as the cause of disease. Many South Asians have a holistic conceptualization of health and disease, incorporating spiritual, physical and psycho-social factors. Health promotion strategies aimed at South Asians in the US should take into account this holistic model of health and disease, while also recognizing that variations exist within South Asians, by gender and religion.

Keywords South Asians · Immigrant health · Concepts of health · Concepts of disease

M. A. Tirodkar (✉)
National Committee for Quality Assurance, 1100 13th Street NW, Suite 1000, Washington, DC 20005, USA
e-mail: tirodkar@ncqa.org

D. W. Baker · N. R. Kandula
Institute for Healthcare Studies, Northwestern University Feinberg School of Medicine, Chicago, USA

D. W. Baker · G. T. Makoul · N. Khurana · N. R. Kandula
Division of General Internal Medicine, Northwestern University Feinberg School of Medicine, Chicago, USA

G. T. Makoul · N. R. Kandula
St. Francis Hospital and Medical Center, Hartford, CT, USA

M. W. Paracha
Asian Human Services Family Health Center, Inc., Chicago, IL, USA

Introduction

Over the past decade, South Asians (Asian Indians and Pakistanis) have had the fastest population growth rate of any Asian group in the United States [1]. There are few studies on the health of South Asian immigrants in the U.S., and even fewer interventions that address the health needs of this rapidly growing immigrant community. In light of the growing focus on patient-centered care and cultural competency in the medical arena [2–11], we sought to examine and describe South Asian immigrants' conceptual models of health and disease as a first step towards designing a health promotion program targeted to the South Asian community in the US.

Kleinman's [12] theory of explanatory models (EMs) proposes that individuals and groups can have vastly different notions of health and disease. EMs are "notions about an episode of sickness and its treatment that are employed by those engaged in the clinical process" (p. 105). Despite the fact that there is a move towards educating physicians in the biopsychosocial model which recognizes physical, behavioral and psychological aspects

of illness [13], physician's explanatory models of illness are still largely biomedical in that they emphasize the biological and physical aspects of disease etiology [14, 15]. However, patients or individuals who are experiencing illness may have different explanatory models. Studies that have explored variations in EMs have found that EMs are influenced by people's social and cultural contexts and prior experiences [16–18]. Even if patient's EMs are influenced by the biopsychosocial model, the emphasis on which aspects are most important may vary between patients and physicians [19, 20]. The type of explanatory model held by patients influences receptivity to health promotion messages [21, 22] and health behaviors [23], both preventive and treatment-seeking. Studies have shown that EMs affect not only what type of healer or doctor patients will visit, but also what course of treatment they will follow [24]. This entails following up with a physician or practitioner, medication adherence [25, 26], changing health behaviors [27] and the social or spiritual activities that might be believed to help in recovery [28, 29].

Many individuals, especially those from non-Western cultures, have been shown to have a "holistic" concept of health and disease that entails a spiritual aspect of disease causation [30], in addition to bio-psychosocial concepts. Ethnographic work in South Asia suggests that many communities are embedded in holistic explanatory models of health, illness, and natural processes such as childbirth and aging [31–37]. These works also suggest that colonization resulted in the modernization of medicine in South Asia thereby introducing a biomedical concept of health and illness, particularly an infectious disease model of health [28, 38]. However, despite the introduction of biomedical health and disease concepts, contemporary ethnographies demonstrate that many people in these countries still hold holistic concepts of health that incorporate spiritual factors in addition to physical and psychosocial factors [35, 39]. Ritual and prayer are deeply embedded in the social lives of the people these works describe, and the utilization of traditional healing systems is accompanied by these esoteric aspects of life. However, it is unknown whether these explanatory models persist after individuals from South Asia immigrate to Western countries.

The majority of health studies on South Asian immigrants focus on specific disease risks and perceptions, rather than on general concepts of health and illness. These studies have found that cultural and social factors related to immigration, acculturation, and gender roles affect EMs of diabetes, depression, heart disease, and breast cancer among South Asians [17, 26, 40]. These EMs, in turn, can influence perceptions of disease risk, health behaviors, and treatment-seeking. For example, South Asian women in Canada who discussed breast cancer as a result of a Western diet seemed less likely to perceive themselves at risk if they maintained a traditional South Asian diet [41]. Similarly, in another study of South Asian women in Canada [42], women often expressed that they were not able to take care of their health because they were isolated from their extended family context and support networks in India. This was a direct result of their immigration to Canada and the loss of social context during the process of acculturation. As a result of immigration, there was a shift in these women's health concepts where they now had to rely on themselves for taking care of their health without being able to expect help from their family.

There have been increasing calls for developing culturally targeted health messages and interventions that incorporate patient's EMs [43–45]. However, to the best of our knowledge, there are no studies examining general concepts of health and disease among South Asian immigrants in the US. In this study, we use in-depth interviews to explore South Asian immigrant's perceptions and understandings of health and disease causation. We also discuss how concepts of health and disease differ by gender and religion, underscoring the heterogeneity of this community. The qualitative data from this study provides a foundation and framework for the design of targeted health promotion messages for a rapidly growing South Asian population in the US.

Methods

Research Setting

This was a qualitative study that used semi-structured interviews. Seventy-five participants were recruited from a federally qualified health center (FQHC; $n = 48$) and a community center ($n = 27$), both of which were located in the North side neighborhood of Chicago where 30% of the metro area's South Asians reside. Individuals were approached by staff at each site, and asked if they would be willing to participate in a 45 min interview about health and heart disease in the South Asian community.

Participants

Given the linguistic, religious, and cultural heterogeneity of South Asians, this study was limited to adults (20–75 years) who self-identified as Asian Indian or Pakistani and who spoke Hindi, Urdu or English. Hindi is the national language of India and is widely spoken by many who immigrate from India despite the fact that they might consider another regional language to be their native language. Urdu is the national language of Pakistan. Although this was a convenience sample, data on the number of

patients approached and refusal rate was recorded by project staff at both centers.

The Interview

Interviews were semi-structured and centered around the issues of interest to this project: respondents were first asked about concepts of health and disease in general and then were asked more specifically about concepts of heart disease etiology and prevention. The questions were open-ended so that the interviewer could probe more on particular concepts of interest to the study. Interviews lasted between 30 and 45 min and were conducted in English, Hindi and Urdu by the project coordinator who is fluent in all three languages. Hindi and Urdu interviews were later transcribed and translated into English.

The interview guide was first created and piloted in English. Following revisions and further piloting, the research team then translated the interview into Hindi. The translation was contextual rather than literal, meaning that questions were translated to convey the best meaning in colloquial spoken Hindi. Following a round of piloting with the Hindi interview guide, the questions were then back-translated to English to maintain consistency of meaning between the two versions. Urdu translation from the Hindi version was done with the help of Urdu-speaking staff at the community health clinic. A total of ten pilot interviews were conducted in English, Hindi and Urdu.

The interviewer first asked the participants their age, country of origin and preferred language for the interview to determine eligibility for participation in the study. All other demographic questions, including marital status, education, occupation, religion and insurance status were asked at the end of the interview.

We used several prompts to elicit concepts of health and disease. The following prompts were posed as open-ended questions and followed up with prompts for clarification at the discretion of the interviewers.

1. Are you healthy? What is the reason behind this thought of yours? [46]
2. What does "health" mean to you?
3. What things do you do to take care of your health?
4. What does a healthy person look like?
5. When you are not feeling well what is the first thing you do?
6. What does it mean to you to be sick?
7. What does a sick person look like?
8. What causes people to be sick?
9. How do you prevent getting sick?

Note: Questions 1 and 2 were drawn from [46, 47] and questions 3–9 were drawn from [48].

Data Analysis

The ten pilot interviews were used to create a comprehensive coding scheme using an open coding method [49, 50]. This means that themes were coded whenever they occurred in the transcript and not only in response to the above prompts. All 75 subsequent (non-pilot) interviews were coded using this scheme by the first author using qualitative analysis software, NVIVO 7.0. Twenty percent of the interviews were coded by NK to verify coding consensus and establish inter-coder reliability. Reliability coefficient was found to be 99% agreement between coders.

In addition to qualitative data analysis, descriptive statistics were calculated for the demographic characteristics of the participants.

Results

Sample Demographics

Table 1 shows a summary of demographics for the sample of 75 participants. There were equal numbers of men and women in the sample. We interviewed almost equal numbers of participants in English, Hindi and Urdu. The sample was stratified by age, with equal numbers of participants in the 20–39 and 40–59 age groups; despite attempts to recruit more older adults (60+), fewer participants were in this age group. The sample was highly educated with a total of 57.4% ($n = 43$) having a bachelor's degree or higher. Twenty percent ($n = 16$) of the sample had less than a high school education; most ($n = 12$) of these were women. Over half the respondents were uninsured and about a quarter were on public aid.

Sixty-eight percent of the sample was Muslim, 21% were Hindu, and the rest were Christian or Sikh. Seventy percent immigrated to the US within the past 10 years (defined by the Census as a "recent immigrant" [51]). Our sample was similar in education, years in the US, gender, and country of origin to the South Asian community profile of the North side Chicago neighborhood drawn from the 2000 Census data [51].

Perceptions of Health

Before concepts of health and disease were elicited from participants, they were first asked "are you healthy?" to determine their perception of their general health. Overall 65% of the sample interviewed considered themselves to be healthy, 23% thought that they were not healthy, and the remaining 11% answered "maybe".

Table 1 Participant characteristics ($n = 75$)

	n (%)
Gender	
Male	38 (50.6)
Female	37 (49.3)
Age	
20–39	29 (38.6)
40–59	29 (38.6)
60+	17 (22.6)
Education	
Less than high school	16 (21.3)
High school	10 (13.3)
Some college	6 (8)
Bachelor's degree	31 (41.3)
Master's degree	12 (16)
Insurance	
None	41 (54.6)
Public aid	18 (24)
Private insurance	9 (12)
Don't know[a]	7 (9.3)
Language	
Urdu	28 (37.3)
Hindi	24 (32)
English	23 (30.6)
Years in US	
10 years or less	53 (71)
More than 10 years	22 (29)
Religion	
Muslim	51 (68)
Hindu	16 (21.3)
Other[b]	8 (11)

[a] Includes those who did not know whether they had insurance at all, or those who had a card but did not know what it was for

[b] Other religions include Sikh and Christian

Men tended to say either "no" or "maybe" more frequently than women. Hindu respondents were more likely to reply "yes" and Muslim respondents were more likely to say "no" when asked "are you healthy?"

Explanatory Model of Health

When participants were asked about their concepts of health four major themes emerged: behavioral, psychosocial, physical, and spiritual (see Table 2). Concepts of health were largely rooted in bio-psychosocial themes, with most participants ($n = 66$; 88%) mentioning all three aspects during the interview—psychosocial, behavioral, and physical concepts. Approximately one-third of the respondents had a holistic conceptualization of health, where they discussed spiritual factors, in addition to bio-psychosocial aspects of health.

Table 2 Summary of concepts of health

Health domains	Themes	*n*	%
Behavioral	Eat right	60	80
	Exercise	56	75
	Medication adherence	26	36
	Perform home/work duties	26	36
Physical	No symptoms	17	23
	Normal bodily functions	8	11
Psychosocial	Positive attitude	25	33
	Lack of stress	15	20
Spiritual	Prayer, ritual	15	20
	Presence of higher being	11	15

As responses could include multiple categories, percentages may sum to more than 100%

The most commonly mentioned behavioral theme was eating a proper diet ($n = 60$; 80%). The concept of a proper diet centered on eating in moderation, drinking water, eating healthy foods, and avoiding unhealthy foods. One woman expressed that she was healthy because, "right now, I am using fresh vegetables without greasy things. Like meat and all I take less, as much as body requires".

The second most frequently mentioned behavioral theme when asked about concepts of health was doing exercise ($n = 56$; 75%). Most participants recognized the need to do exercise as part of maintaining good health, feeling good, and staying fit. One participant said, "you should walk. By walking your health will stay fine, your brain will also stay fine". When asked to discuss what kinds of exercise they were doing, the majority of participants talked about daily activities such as house-work, walking to the grocery store or kid's school, or strolling for 10 min around the block as sufficient for maintaining their health. Six out of 51 Muslim respondents (12%) said that performing the daily ritual prayer, or *Namaaz*, was their main exercise.

Compliance to medication and performing household or work duties were the third most frequently mentioned behavioral themes when discussing concepts of health ($n = 26$ for each). Many of the participants who mentioned adherence to medications were already taking medications for management of chronic diseases such as blood pressure, cholesterol, and diabetes. "Household duties" were much more commonly mentioned by women while "work duties" were mentioned by men. Participants talked about household and work duties largely as a sign of good health and from a functional perspective. For example, the ability to perform household work was perceived as an indicator of good health, "because I perform everything nicely my house chores and I never feel tired".

Psychosocial factors in concepts of health were dominated by two themes: having a positive attitude ($n = 25$; 33%) and lack of stress ($n = 15$; 20%). Both of these themes were inter-related to form a strong basis for prevention of illness. One man said, "My philosophy is also is kind of different than average people and I do have a believe and I believe a very strong believe um because uh if you have a positive thinking you don't get sick much". Lack of stress was often linked to having a positive attitude. One participant expressed, "if they stay happy then they won't have much of a *stress*, if there is no *stress* then there won't be any sickness". Participants often used the English word "stress" even when they were speaking in Hindi or Urdu. Alternatively, people used the word "tension" to indicate stress. Throughout the interviews, stress emerged as a common theme; it was repeatedly mentioned as a barrier to healthy behaviors and as directly contributing to disease.

Physical concepts of health were dominated by the themes of 'having no symptoms or diagnosis' ($n = 17$; 23%). Participants frequently mentioned phrases like "health is that a person doesn't get sick" to indicated the lack of symptoms as a concept of health. Many also talked about not having a diagnosis when discussing their concept of health: "I don't have no blood pressure, no um diabetes and that's lot of common for diseases now a day with the people and uh the guys in my age group I know lot of people have a blood pressure, high cholesterol, all those kind of things uh so that's why I am better than those people". Several respondents ($n = 8$) also talked about normal bodily functions as a concept of health. For example, "I believe that a person's *motion* [bowel movement] and stomach should remain fine only then a person can stay fine".

Spiritual concepts of health primarily revolved around active performance of prayer or rituals ($n = 15$, 20%) and acknowledging the role of a higher being in health and illness causation ($n = 11$; 15%). For many of the respondents that were Muslim, the mention of *Namaaz*, or regular prayer, was very common. One participant explained, "Normally I read those prayers that have been told to read so that I stay away from diseases for prevention". Many invoked God's name in talking about their own health. For example, "By grace of God I don't have any disease".

Sub-Group Differences for Explanatory Models of Health

Religion—There were many similarities in concepts of health among Muslim and Hindu participants; for example, both groups focused on behavioral factors such as diet and exercise, as well as avoiding psychosocial stress. However, a few differences were notable. When asked about their concepts of health, Muslim participants more frequently mentioned spiritual factors such as saying prayers or acknowledging God as part of maintaining good health. Twenty-two out of 51 Muslim respondents (43%) mentioned spiritual factors, whereas very few Hindus (2 out of 22; 12%) mentioned spiritual factors. In contrast, Hindu participants often mentioned performing household and work-related duties as part of their concepts of health.

Gender—Compared to women, men more frequently mentioned behavioral and physical concepts when discussing health such as eating well (87% men vs. 73% women), exercising (79 vs. 70%), not smoking or drinking (18 vs. 0%), and a lack of physical symptoms (19 vs. 16%). Women more often talked about performing their household duties when talking about their concepts of health (43% women vs. 26% men). There were no discernable differences between women and men in the frequency of mention of psychosocial factors and other spiritual factors such as prayer.

Explanatory Model for Disease

The major themes that emerged for concepts of disease mirrored the concepts of health with one exception—participants rarely talked about spiritual factors as part of disease causation. There was also a shift in emphasis; instead of behavioral themes being most prominent, psychosocial factors were mentioned somewhat more frequently as contributing to disease (see Table 3). The most often mentioned factors were stress ($n = 47$; 63%) and depression/negative thoughts ($n = 20$; 27%). One participant talked about stress causing sugar (diabetes), "Because your mind only controls your health. This brain is only controlling but if you take stress then you will have sugar and other diseases also because it's controlling everything". Stress and depression were often discussed in the context of acculturation and feelings of isolation associated with acculturation. One participant said, "I heard this case happens with many ladies that their husbands have settled somewhere else I am very tensed and I have headaches all

Table 3 Summary of concepts of disease

Disease domains	Themes	*n*	%
Psychosocial	Stress, tension	47	63
	Depression	20	27
Behavioral	Diet	44	59
	Lack of exercise	18	24
Physical	Symptoms	23	31
	Functional limitations	20	27
	Weakness	14	19
Other	Not caring about oneself	15	20

the time some say that kids don't listen to them, they are out of control because of that they have lot of problem and tension and because of this they fall sick".

Similar to behavioral themes about health, diet ($n = 44$; 59%) was most frequently mentioned as contributing to diseases. Specific dietary factors included eating excess food and eating "bad food". One participant said, "Some get sick by carelessness in food, sometimes eating a lot of food whereas sometimes eating very less food, stomach gets upset, everything gets upset". Prior work has found that South Asians often express that Western food is bad and considered to be a culprit in their bad health [41] particularly digestive problems [48]. It was notable that the respondents in this study did not very frequently talk about or criticize Western food. This may be because the participants in this study ate mostly Indian or Pakistani food, and rarely ate Western food. A common theme was that the Indian and Pakistani food was unhealthy because it was oily and spicy. Respondents often acknowledged that they either tried to stay away from oily and spicy food because they knew it was bad for their health, or that they persisted in eating these foods because of the obligations to eat at social functions, such as parties and when visiting with family and friends.

The second most frequently mentioned behavioral factor was "lack of exercise" ($n = 18$; 24%). Participants recognized that lack of exercise lead to physical health problems, such as obesity and other chronic diseases. For example, one respondent said, "they are lazy, they don't exercise, walk, they don't do anything, they don't do any movement, getting sick is more possible in lazy people". Additionally, respondents expressed that they often got more exercise in their home country than they did in the US. Sometimes this was because there was more access to gyms and the outdoors or because the weather was much better. For example, one woman said, "The main problem why people fall sick more often in America … here people use the car for going from here to there… There we used to walk so much we never used to come to know that how much we are walking".

Physical factors as part of concept of illness and disease primarily included having symptoms/diagnosis ($n = 23$; 31%), physical limitations ($n = 20$; 27%), or weakness ($n = -14$; 19%). Participants usually mentioned minor symptoms such as "sickness means having fever, having cough, you have headache" as being an indication that a person was sick. Others mentioned actual diagnoses from medical professionals as being the reason they knew they were sick. When people mentioned physical limitations, they usually talked about weakness or trouble moving: "by looking at his face you will come to know, he will have difficulty in talking, he will have difficulty in movement even from his face you come to know and from his talking also you come to know, if he has weakness then from his moving around also you will come to know".

Another factor also frequently mentioned as contributing to disease but not included in any of the thematic categories above was that of "not caring about one's health" ($n = 15$; 20%). This theme was notable because it encompassed the notion of personal responsibility in staying healthy and that people who ignored their health and did not take care of symptoms would have a sickness. When asked what causes sickness, one participant mentioned, "They don't care much of their health, don't care about themselves".

Sub-Group Differences for Explanatory Models of Disease

Religion—While Muslims and Hindus were similar in their emphasis of unhealthy diet as a factor in causing disease, Muslims more than Hindus emphasized the behavioral factors of not going to the doctor (29 vs. 13%) and lack of daily routine (24 vs. 0%) as contributing to disease. In contrast, Hindus tended to emphasize lack of exercise (38 vs. 24%). Hindu participants also talked more frequently about depression (31 vs. 14%) as leading to illnesses.

Although very few respondents ($n = 6$) talked about spiritual factors in contributing to disease, all those that did were Muslim. One respondent said, "Sickness comes from God and goes also from God".

Gender—Men mentioned diet (66% men vs. 51% women), smoking/drinking (18 vs. 0%), stress/tension (71 vs. 54%) and physical symptoms (42 vs. 19%) more frequently than women, when talking about their concepts of disease. Women spoke more about feeling weak or tired as a sign of disease (30% women vs. 8% men), and fate as being a cause of disease (11 vs. 4%).

While both men and women talked about bad diet causing disease, men talked more about junk food and eating out in restaurants as the problem in bad diets. One man said, "I'm eating in restaurant like three times a week in lunch time so I don't know how old it is, meaning if I eat I get food disease or maybe vomiting". In contrast, women talked about nutrition and timing of food such as, "Those who are careless, every time eating is very bad, they keep on eating all the time, so I understood that eat good and eat little, as much as body needs".

As in the concepts of health, it appeared that men talked about smoking and drinking alcohol as significant behavioral factors in causing disease more than women because the prevalence of these behaviors is very low among South Asian women. When asked to elaborate on why smoking and drinking were bad for health, one man said, "The smoke in *cigarette*, when a person inhales that then that smoke damages your lungs. [Interviewer: And why is alcohol bad?] There is lot of acid in alcohol… Mostly

alcohol is not used in India and Pakistan, mostly; it's used more in this country".

Discussion

In this study, we found that South Asian immigrants' EMs for health and disease were largely conceptualized within a bio-psychosocial framework. However, it is notable that one third of the participants (the majority of whom were Muslim participants) endorsed a holistic model of health that also encompassed spiritual factors. The presence of spirituality as a concept of health is significant and is in contrast to the concepts of health that were found in a 2002 population-based telephone survey of U.S. adults that used the prompts, "Are you healthy and how do you know? [46]". In that study, only five percent of people mentioned psychosocial factors and only 1% of people mentioned spiritual factors. To the best of our knowledge, this is the first published study to conduct an in-depth exploration of how South Asian immigrants in the U.S. conceptualize health and disease. These results can be used to develop targeted health messages to the South Asian immigrant community and to subgroups within that community.

In contrast to their concepts of health, concepts of disease were predominantly bio-psychosocial among our respondents. South Asian immigrants rarely mentioned spiritual factors when talking about their concepts of disease. Our findings, which show that South Asian immigrants' EMs of health and disease diverge, mirror other contemporary work that suggests that similar patterns of mixed concepts exist in both urban and rural areas in South Asian today [39, 48, 52]. Unlike classic ethnographic literature, that focuses on the nature of the South Asian psyche as embedded in holistic explanatory models of health, illness and everyday living [32, 35], our results suggest that South Asian immigrants have a largely bio-psychosocial model of health and illness, and that even those who hold a holistic model have an understanding of the bio-psychosocial factors contributing to health and illness.

Even in this heterogenous group of South Asians, we found many common themes that largely placed health and illness within the contexts of individual behaviors (such as diet and exercise) and psychosocial factors. The frequency of a healthy diet as a concept of health was not surprising given the importance of dietary principles in preventing and treating illnesses in traditional systems of health, such as Ayurveda and Unani, in South Asia [53, 54]. The most common themes that came through during discussions of stress and depression were generational conflict, acculturative stress, social isolation, and economic stress. Unlike studies done in other immigrant populations, none of our respondents talked about stress related to discrimination [55–58] or problems communicating or speaking English with healthcare providers [59]. Psychosocial stress was often implicated as the cause of chronic diseases, including diabetes, high blood pressure, and heart disease. This finding has implications for the design of health messages for the South Asian community; messages may need to acknowledge the importance of psychosocial factors in this community, while also reinforcing the importance of individual behaviors and risk factors, such as diet, exercise, and treatment of risk factors.

There were also some key differences in concepts of health and disease, by religion and gender. Most obvious was that Muslims tended to hold a much stronger holistic concept of health than Hindus and others by citing spiritual factors more frequently. This difference may be attributed to the regularity of prayer and strength of ritual practice in Islam [60]. This difference may also be because we did not specifically probe into spiritual factors. We speculate based on prior work [32] that if we had probed about spirituality, Hindu participants would have acknowledged more of a role for spiritual factors in health. Some people may not feel as comfortable raising spiritual factors when talking about health and disease because of social desirability and that it may be looked down on by the interviewer who represents a more bio-medical perspective. An additional factor that could have produced this social desirability factor is the fact that two-thirds of the participants were recruited from a health clinic and thus, their focus was on their health and body rather than other external factors.

South Asian women also had a more holistic concept of health and disease while men tended to focus on behavioral and physical factors for both health and disease. This result could come from the fact that women are often the bearers of culture, tradition and religion within immigrant families [61–63].

While both men and women talked about stress as an important psychosocial factor that affected their health, we were surprised to find that men spoke more about stress and tension than women in the development of disease. While much of the stress that women reported was related to difficulties with acculturation and social isolation, the stress that men talked about was most often related to being under-employed, unemployed, or having financial difficulties. Public health messages aimed at the South Asian immigrant community should take into account these subgroup differences, and messages may need to vary depending on which individuals are being targeted.

We are interpreting the results cautiously to suggest that not all of the members of this sample, or the South Asian immigrant population in general, will have this particular pattern of holistic and bio-psychosocial concepts of health. The relatively large sample size (for a qualitative study)

and stratified sampling design allows us to show differences between sub-groups that many other studies in this population do not allow [64].

There were several other strengths to this study that lead to reliable and valid results. Firstly, the stratified sampling strategy ensured diversity of religion, gender and age. Second, the community-based approach to recruiting participants, in addition to the qualitative research design, allowed for a richness of data not found in secondary data analyses [65]. And finally, interviews were done in the native language of the participants, rather than in English with an interpreter as other studies have done [42, 66]. This approach is ideal for the optimal comfort level of the interview. Additionally, the interview protocol and transcripts were translated contextually, rather than literally, to ensure the most accurate meaning of the language was conveyed.

Limitations

One of the limitations of this study was the selection bias that might have occurred while recruiting participants. Forty-five out of 75 respondents were recruited from and interviewed in a health clinic; these individuals may have been more aware of their health and may have been reluctant to talk about non-biomedical causes of disease. It is likely that those who are more conscious about their health would choose to participate in a study of this nature. These results are from an urban setting where the majority of participants were recent immigrants and were Muslim; therefore, our results may not be applicable to other South Asian communities who have a different demographic profile.

Implications

The results of this study suggest that South Asian immigrants in the U.S. have awareness of the bio-psychosocial risk factors contributing to health and illness, with some having an added dimension of spirituality. There has been growing interest in how religion and spirituality impacts the clinical encounter, and on how to elicit a spiritual history from patients [67, 68]. Clinicians should elicit South Asian patients EMs of health and disease and consider how to incorporate the patients' EM into the treatment plan. This approach may improve patient-provider communication and clinical care for South Asian patients. At the same time, the present study underscores the heterogeneity within this population and suggests that South Asians may hold multiple belief systems about health and disease. Culture theory posits that culture is not static [69]; therefore, effective health communication must encompass the fluidity of cultural change. Further research is needed to see if these results are replicable in other South Asian communities in the U.S. Until then, the results of this study can be used as a starting point to inform health promotion for South Asians in the U.S. Clinical treatment, health promotion messages and interventions for the U.S. South Asian population may be more effective if they take into account the added dimensions of spiritual and psychosocial concepts, the co-existence of multiple belief systems about health and disease, and the salient differences within sub-groups of the larger community.

Acknowledgments This study was funded by the National Heart, Lung, and Blood Institute (Career Development Award 5 K23 HL 084177, PI-Dr. Kandula). During the research and writing of this paper Dr. Tirodkar was a post-doctoral research fellow at the Institute for Healthcare Studies, Northwestern University Feinberg School of Medicine, supported by an Advanced Rehabilitation Research Training Award from the National Institute on Disability and Rehabilitation Research Grant (H133P980014). The authors thank Asian Human Services Family Health Center and Indo-American Center for assistance with data collection. The authors also thank Jason A. Thompson for statistical support.

References

1. Jefferys K. U.S. legal permanent residents: 2006. Annual flow report, DHS office of immigration statistics. 2007.
2. Betancourt JR. Cultural competence—marginal or mainstream movement? N Engl J Med. 2004;351(10):953–5.
3. Carrillo JE, Green AR, et al. Cross-cultural primary care: a patient-based approach. Ann Intern Med. 1999;130(10):829–34.
4. Chachkes E, Christ G. Cross cultural issues in patient education. Patient Educ Couns. 1996;27(1):13–21.
5. Charles C, Gafni A, et al. Cultural influences on the physician-patient encounter: the case of shared treatment decision-making. Patient Educ Couns. 2006;63(3):262–7.
6. Dimou N. Illness and culture: learning differences. Patient Educ Couns. 1995;26(1–3):153–7.
7. Fox RC. Cultural competence and the culture of medicine. N Engl J Med. 2005;353(13):1316–9.
8. Herbert CP. The relevance of cultural diversity to patient education. Patient Educ Couns. 1997;31(2):3–4.
9. Meeuwesen L, Tromp F, et al. Cultural differences in managing information during medical interaction: how does the physician get a clue? Patient Educ Couns. 2007;67(1–2):183–90.
10. Schouten BC, Meeuwesen L. Cultural differences in medical communication: a review of the literature. Patient Educ Couns. 2006;64(1–3):21–34.
11. Schouten BC, Meeuwesen L, et al. Cultural diversity in patient participation: the influence of patients' characteristics and doctors' communicative behaviour. Patient Educ Couns. 2007;67(1–2):214–23.
12. Kleinman A. Patients and healers in the context of culture: an exploration of the borderland between anthropology, medicine, and psychiatry. Berkeley: University of California Press; 1980.
13. Engel GL. The biopsychosocial model and the education of health professionals. Ann N Y Acad Sci. 1978;310:169–87.
14. Astin J, Sierpina V, et al. Integration of the biopsychosocial model: perspectives of medical students and residents. Acad Med. 2008;83(1):20–7.

15. Weiner B. Difficult medical problems: on explanatory models and a pragmatic alternative. Med Hypotheses. 2007;68(3):474–9.
16. Blaxter M. The causes of disease. Women talking. Soc Sci Med. 1983;17(2):59–69.
17. Karasz A. Cultural differences in conceptual models of depression. Soc Sci Med. 2005;60(7):1625–35.
18. Pill R, Stott NC. Choice or chance: further evidence on ideas of illness and responsibility for health. Soc Sci Med. 1985;20(10): 981–91.
19. Baer RD, Weller SC, et al. A comparison of community and physician explanatory models of AIDS in Mexico and the United States. Med Anthropol Q. 2004;18(1):3–22.
20. Loewe R, Freeman J. Interpreting diabetes mellitus: differences between patient and provider models of disease and their implications for clinical practice. Cult Med Psychiatry. 2000;4(24): 379–401.
21. Kreuter MW, McClure SM. The role of culture in health communication. Annu Rev Public Health. 2004;25:439–55.
22. Milat AJ, Carroll TE, et al. Culturally and linguistically diverse population health social marketing campaigns in Australia: a consideration of evidence and related evaluation issues. Health Promot J Austr. 2005;16(1):20–5.
23. McGuire MB. Ritual health in suburban America. New Jersey: Rutgers University Press; 1988.
24. Farmer P. AIDS and accusation: Haiti and the geography of blame. Berkeley: University of California Press; 1993.
25. Arcury TA, Skelly AH, et al. Diabetes beliefs among low-income, white residents of a rural North Carolina community. J Rural Health. 2005;21(4):337–45.
26. Farooqi A, Nagra D, et al. Attitudes to lifestyle risk factors for coronary heart disease amongst South Asians in Leicester: a focus group study. Fam Pract. 2000;17(4):293–7.
27. Netto G, McCloughan L, et al. Effective heart disease prevention: lessons from a qualitative study of user perspectives in Bangladeshi, Indian and Pakistani communities. Public Health. 2007;121(3):177–86.
28. Arnold D. Colonizing the body: state medicine and epidemic disease in nineteenth-century India. Berkeley: University of California Press; 1993.
29. Turner V. The forest of symbols: aspects of ndembu ritual Ithaca. NY: Cornell University Press; 1970.
30. Shweder R, Much N, et al. The big three of morality (autonomy, community, divinity) and the big three explanations of suffering. Morality and health. A. Brandt and P. Rozin. New York: Routledge; 1997.
31. Desjarlais R. Body and emotion: the aesthetics of illness and healing in the Nepal Himalayas. Philadelphia: University of Pennsylvania Press; 1992.
32. Kakar S. Shaman, mystics and doctors. Chicago: University of Chicago Press; 1982.
33. Kurtz S. All the mothers are one: Hindu India and the cultural reshaping of psychoanalysis. New York: Columbia University Press; 1992.
34. Lamb S. White saris and sweet mangoes. Berkeley: University of California Press; 2000.
35. Langford J. Fluent bodies: ayurvedic remedies for postcolonial imbalance. Durham: Duke University Press; 2002.
36. Obeyesekere G. Medusa's hair: an essay on personal symbols and religious experience. Chicago: University of Chicago Press; 1981.
37. Van Hollen C. Birth on the threshold: childbirth and modernity in South India. Berkeley: University of California Press; 2003.
38. Joshi P, Islam S, et al. Risk factors for early myocardial infarction in South Asians compared with individuals in other countries. Jama. 2007;297(3):286–94.
39. Cohen L. No aging in India: Alzheimer's, the bad family and other modern things. Berkeley: University of California Press; 1998.
40. Lawton J, Ahmad N, et al. Contextualising accounts of illness: notions of responsibility and blame in white and South Asian respondents accounts of diabetes causation. Sociol Health Illn. 2007;29(6):891–906.
41. Johnson JL, Bottorff JL, et al. South Asian women's views on the causes of breast cancer: images and explanations. Patient Educ Couns. 1999;37(3):243–54.
42. King KM, LeBlanc P, et al. Gender-based challenges faced by older Sikh women as immigrants: recognizing and acting on the risk of coronary artery disease. Can J Nurs Res. 2006;38(1): 16–40.
43. Institute of Medicine (U.S.). Committee on Communication for Behavior Change in the 21st Century: Improving the Health of Diverse Populations. Speaking of health assessing health communication strategies for diverse populations. Washington: National Academies Press; 2002.
44. Institute of Medicine (U.S.). Committee on Assuring the Health of the Public in the 21st Century. The future of the public's health in the 21st century. Washington: National Academies Press; 2003.
45. Mensah GA. Eliminating disparities in cardiovascular health: six strategic imperatives and a framework for action. Circulation. 2005;111(10):1332–6.
46. Makoul G, Clayman ML, et al. Four concepts of health in America: results of national surveys. J Health Commun. 2009;14(1):3–14.
47. Crawford R. Healthism and the medicalization of everyday life. Int J Health Serv. 1980;10:365–88.
48. Tirodkar MA. Adaptations of contemporary Ayurvedic medical practice in urban India [unpublished dissertation]. Department of Comparative Human Development. Chicago: University of Chicago; 2005.
49. Miles M, Huberman M. Qualitative data analysis: an expanded sourcebook. 2nd ed. Thousand Oaks: Sage Publications; 1994.
50. Strauss A, Corbin J. Grounded theory in practice. Thousand Oaks: Sage Publications; 1997.
51. Rangaswamy P, Kalayil AL. Making data count: South Asian Americans in the 2000 Census with focus on Illinois. Chicago: South Asian American Policy and Research Institute (SAAPRI); 2005.
52. Tirodkar MA. Cultural conceptions of health and health outcomes: caste and gender differences in Orissa, India [unpublished MA thesis]. Department of Comparative Human Development. Chicago: University of Chicago; 2000.
53. Green G, Bradby H, et al. We are not completely westernised: dual medical systems and pathways to health care among Chinese migrant women in England. Soc Sci Med. 2006;62(6):1498–509.
54. Momenzadeh S, Posner N. Iranian migrant's discourses of health and the implications for using standardized health measures with minority groups. J Immigr Health. 2003;5(4):173–80.
55. Bradby H, Varyani M, et al. British Asian families and the use of child and adolescent mental health services: a qualitative study of a hard to reach group. Soc Sci Med. 2007;65(12):2413–24.
56. Facey ME. The health effects of taxi driving: the case of visible minority drivers in Toronto. Can J Public Health. 2003; 94(4):254–7.
57. Lauderdale DS, Wen M, et al. Immigrant perceptions of discrimination in health care: the California health interview survey 2003. Med Care. 2006;44(10):914–20.
58. Viruell-Fuentes EA. Beyond acculturation: immigration, discrimination, and health research among Mexicans in the United States. Soc Sci Med. 2007;65(7):1524–35.

59. Ngo-Metzger Q, Massagli MP, et al. Linguistic and cultural barriers to care. J Gen Intern Med. 2003;18(1):44–52.
60. Neusner J, Sonn T, et al. Judaism and Islam in practice: a sourcebook. London: Routledge; 1999.
61. Agarwal P. Passage from India: post 1965 immigrants and their children. Palos Verdes: Yuvati Publications; 1991.
62. Bacon J. Life lines: community, family, and assimilation among Asian Indian immigrants. New York: Oxford University Press; 1997.
63. Lessinger J. From the Ganges to the Hudson: Indian immigrants in New York City. Boston: Allyn and Bacon; 1995.
64. Kleinman A, Benson P. Anthropology in the clinic: the problem of cultural competency and how to fix it. PLoS Med. 2006;3(10): e294.
65. Mohanty SA, Woolhandler S, et al. Diabetes and cardiovascular disease among Asian Indians in the United States. J Gen Intern Med. 2005;20(5):474–8.
66. King KM, Thomlinson E, et al. Men and women managing coronary artery disease risk: urban-rural contrasts. Soc Sci Med. 2006;62(5):1091–102.
67. Curlin FA. Commentary: a case for studying the relationship between religion and the practice of medicine. Acad Med. 2008;83(12):1118–20.
68. Nagai C. Clinician's self-assessment of cultural and spiritual competency: working with Asians and Asian Americans. Community Ment Health J. 2008;44(4):303–9.
69. Shweder R, LeVine R, editors. Culture theory: essays on mind, self, and emotion. Cambridge: Cambridge University Press; 1984.