

CASE STUDIES

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EXPLORATORY PILOT STUDY ON DIABETES HEALTH LITERACY (DaHL) AMONG BANGLADESHI IMMIGRANTS IN THE UNITED STATES

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Abstract:

Background: South Asians in the U.S. are a diverse group, with significant health disparities, particularly in cardiovascular disease and diabetes. While much of the existing research focuses on Asian Indians, there is a lack of studies specifically targeting Bangladeshi immigrants. Addressing these gaps in health literacy is essential to improve health outcomes in this population.

Methods: We conducted a pilot study using an exploratory design to assess diabetes health literacy (DaHL) among Bangladeshi immigrants in the U.S. We developed a 44-item questionnaire, validated through expert consultation and pilot testing. The survey was distributed via social media, utilizing virtual snowball sampling to reach participants. Data were analyzed using descriptive statistics and Cronbach's alpha for reliability.

Results: More than half of the participants were categorized as overweight or obese according to Asian BMI standards. Nearly 28% had been told they were at risk for diabetes, and 16% had been diagnosed with high blood glucose or impaired fasting glucose. Physical activity levels were low, with 35% engaging in exercise less than once a week. Awareness of diabetes risk factors was moderate, with 84% identifying family history as a risk factor. However, there were knowledge gaps, particularly regarding hypertension and pregnancy as additional risks. Culturally specific barriers were also noted, such as 23% citing a lack of culturally appropriate exercise clothing and 15% resisting modifications to traditional diets. Additionally, only 40% of participants reported receiving diabetes information from healthcare providers, while 20% preferred health materials in their native language.

Conclusion: This pilot highlights significant gaps in diabetes health literacy among Bangladeshi immigrants and the need for culturally tailored interventions.

Keywords: diabetes, health literacy, Bangladeshi immigrants, South Asian health, chronic disease disparities

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BACKGROUND

South Asians in the United States (U.S.) are a diverse population with origins from Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka (1). The Immigration and Nationality Act of 1965 led to an increased influx of South Asians to the United States, mostly in high-skilled professional jobs (2). This, in turn, has often been associated with the model minority myth, primarily due to the higher socioeconomic status of Asian Indians; further masking several negative health outcomes within the population. Currently, over three million South Asians reside in the United States (1); and yet, limited research on the population exists as they are often aggregated as “Asian Americans” or “Other Asian”. Of the studies that do focus on the South Asian population, most empirical evidence highlights the increased burden of cardiovascular disease (CVD) and intermediate clinical risk factors, such as type II diabetes mellitus; though again, often limited to primarily those of Asian Indian background.

For example, results from the National Health Interview Survey (NHIS) in the United States have demonstrated that Asian Indians are more likely to report heart disease as compared to other Asian American subgroups (3), while a study in California further noted that proportionate mortality for coronary heart disease was highest among Asian Indians (4). Similarly, Mohanty et al. (5) further noted that Asian Indians were three times more likely to have type II diabetes, when compared to non-Hispanic Whites. The age of diagnosis of South Asians has also been shown to be significantly higher compared to non-Hispanic Whites (6); cumulatively demonstrating the increased burden of the disease among the population.

While similar comprehensive studies among Bangladeshi immigrants to the U.S. are lacking, and often can be attributed to the aggregation of data with other Asian identities (7,8), the limited body of literature nevertheless highlights low CVD health literacy among such a disparity group (9), as well as high rates of CVD risk factors (10). Further, while there remains a national call for improved health literacy (11) to alleviate premature disease and mortality, without such an assessment among the Bangladeshi population, interventions would do little to address existing health disparities. Given the rising burden of diabetes and pre-diabetes among South Asians, including Bangladeshis, as well as diabetes serving as a significant clinical risk factor for CVD prevention, we conducted an exploratory pilot study to: (1) assess the feasibility of reaching Bangladeshi immigrants through social media and (2) evaluate potential target areas to improve diabetes health literacy (DaHL) among the population through our pilot study (*dahl* is a culturally appropriate name for a common lentil dish across the South Asian subcontinent).

METHODS

Survey Development

We reviewed previous studies that assessed diabetes knowledge and noted that the majority were in the UK and found none in the U.S. for our target population, though some evidence exists on general health literacy assessment, which was then used in our instrument. By integrating core concepts found in studies focused on chronic disease knowledge among other minority groups, we developed our DaHL study questions with a focus on addressing risk assessment and factors associated with prevention. Our instrument was finalized with 44 questions, including demographics. The instrument includes a mixture of multiple-choice and multiple-answer questions, all conducted using the Qualtrics survey tool.

Validation Process and Data Analysis

We utilized the validation process consistent with the literature (12). First, content analysis of the existing literature was employed to develop the draft 50-item questionnaire, followed by consultation with experts on face validity. This resulted in 44-item questionnaire, which was pilot tested online. Next, the DaHL study questions were pilot tested among participants who self-identified as South Asians (including specific country of origin) residing in the U.S. and who were at least 18 years of age. For this study, we intentionally oversampled Bangladeshi immigrants in order to address the gap in the current body of literature.

Upon Institutional Review Board approval, one of the researchers (ES) posted the DaHL survey on a social media platform (with repeat posts made approximately every two weeks). Participants were asked to re-post the survey on their “page,” thus employing virtual snowball sampling to reach the target group.

All data were downloaded in Excel and then transferred to SPSS for statistical analyses. Similar to methods noted in the literature on instrument validation (12), we conducted descriptive statistics to identify total sample size, missing data, and population characteristics, and responses to each of the diabetes literacy assessment item. We also used Cronbach’s alpha to assess internal consistency for reliability of each section of the literacy assessment.

RESULTS

A total of 50 participants were included to the present pilot study, which is consistent with the sample size of pilot studies. Of them, a majority (87.83%, $n = 43$) were Bangladeshi and thus selected for further analysis (an additional six were Asian Indian only and one did not identify their nationality).

Table 1 shows the characteristics of the pilot study participants. A higher portion of the participants were aged 45 years or older (39.2%), followed by those aged 35–44 years (37.2%). A majority were also female (51.2%), had been married (88.4%), had at least a Bachelor’s degree (53.5%), had an annual household income of \$60,000 or more (74.4%), and had resided in the U.S. for 15 or more years (72.1%). Further, when assessing language and food preferences, a majority preferred both their native language and English equally for reading (51.2%) and a majority preferred both nationality-based and American/western food equally (48.8%). Nearly 77% reported fasting for religious or cultural reasons, with all noting Ramadan as the primary reason.

Table 2 shows the health and behavioral characteristics of the pilot study participants. Using the Asian body mass index categorization, a majority (51.2%) were overweight or obese. Further, nearly 12% reported healthcare-diagnosed diabetes, while another 28% noted pre-diabetes, and 16% related symptoms. Finally, nearly 26% reported healthcare-diagnosed hypertension. A majority also reported no barriers to obtaining care, though insurance was noted as a barrier by a little over a quarter of participants (25.6%). Further, nearly 26% of participants reported never being tested for diabetes and most reported some frequency and form of exercise, with the most common types being walking or jogging (79.1%). Finally, a majority of participants reported average or fair physical (69.8%) and mental/emotional (51.2%) health status.

Table 3 shows the results of the DaHL survey. When evaluating participants’ knowledge of risk factors, a majority identified family history (83.7%), followed by overweight or obesity (81.4%), and lack of exercise (65.1%). Some participants also identified high blood pressure (34.9%), pregnancy (39.5%), and aging (37.2%) as risk factors as well. A small portion (~11%) believed that everyone gets diabetes. Further, nearly seven in ten participants recognized the value of prevention and early screening in lowering the risk of complications.

When assessing factors that may serve as barriers to prevention, none of the participants cited that cost of screening or finding a place for screening were barriers. However, the two most commonly reported barriers were lack of time to exercise and lack of exercise clothing appropriate for their cultural or religious norms. Approximately 15% of the participants reported that if they stopped eating or serving sweets, it would negatively affect their cultural activities. Further, approximately 20% of the respondents also noted that while they wanted to improve their healthy eating habits, they were unsure how to do so, and another 23% noted they would participate in exercise if it were culturally appropriate.

We also conducted a sub-assessment on sources of information, and thus, although not part of the literacy assessment, it provides information for health educators on the best scope of intervention. As shown in Table 4, 46.5% of the respondents noted that a family member or friend had spoken to them about diabetes, while nearly 40% reported such discussions with a healthcare provider. Another 14% noted they have looked up diabetes information themselves and nearly 19% preferred such information in their own language.

DISCUSSION

This pilot study provides valuable insight into the diabetes-related health literacy, behaviors, and challenges of the Bangladeshi immigrant population in the U.S. Although this is an exploratory effort, several key issues and needs have emerged that are essential for guiding future public health interventions and research.

One of the major findings from this study is the relatively high level of awareness of common diabetes risk factors among participants, such as family history, obesity, and lack of exercise. However, there were significant gaps in identifying clinical factors, such as hypertension and pregnancy. Further, despite some awareness of the importance of early screening and prevention, there remains a general lack of clarity on how to implement lifestyle changes that could reduce these risks. As such, traditional health education initiatives that only focus on knowledge dissemination may not be enough for this target group. While such measures can reinforce comprehensive knowledge about risk factors, culturally tailored health education that focuses on practical guidance, especially related to culturally appropriate foods and exercises, is necessary to enable individuals to take actionable steps towards healthier lifestyles. In a systematic review of community-based culturally tailored education (CBCTE) programs among Black communities that highlights the importance of such culturally appropriate interventions in reducing health disparities. The review found that CBCTE programs, which targeted conditions like diabetes and hypertension, showed positive outcomes in areas like health literacy, medication adherence, and physical activity (13). Such strategies for cultural tailoring, including using community resources, respecting cultural practices, and delivering content in the community's language, can in turn be applied to Bangladeshi immigrants, given that in our study, cultural barriers to exercising and dietary preferences were identified as key factors in managing diabetes among the target group.

Furthermore, while participants in our study reported willingness to engage in health-promoting activities such as exercise and diet, many cited unique barriers to actively participating in such activities. In particular, lack of culturally appropriate exercise clothing, combined with concerns about the appropriateness of dietary changes (e.g., avoiding sweets during cultural celebrations), further reflects the need for health interventions that respect and accommodate cultural practices. Additionally, the importance of fasting, especially during Ramadan, was notable. This in turn may pose specific challenges to managing diabetes and pre-diabetes, particularly in maintaining balanced nutrition and monitoring blood sugar levels during fasting periods. There is a need for culturally sensitive interventions that provide guidance on how to manage chronic conditions during religious observances without compromising religious practices. A study from New York highlighted the feasibility of such programs. Researchers, when aiming to improve diabetes management among Bangladeshi patients with type II diabetes, found that using a culturally adapted community health worker-led intervention led to a significant decrease in A1C at 6 months, as well as improvements in diabetes knowledge, exercise, and self-efficacy in management (14).

Interestingly, our study also found unique community-reported barriers. For example, respondents noted that time constraints were a factor in exercising, in turn suggesting that interventions should focus on making exercise more accessible and practical, especially by providing options that fit within participants' cultural norms and daily routines. Moreover, since many participants reported engaging in walking or jogging, these activities could be further promoted through community-based programs that emphasize their cultural acceptability and health benefits. This has been shown to be effective among other Asian populations. For example, a study focusing on older Chinese Americans found that a culturally tailored walking intervention was both feasible and acceptable, leading to increased social engagement and improved physical activity levels (15), and thus it can be culturally tailored to Bangladeshi immigrants to assess potential ways of improving physical activity.

Another key finding from this study is the mixed preference for how participants receive health information. For example, 60% of the population did not have a discussion related to type II diabetes with their healthcare provider, while 47% had such a discussion with family/friends. This highlights the importance of health communication, not just through healthcare professionals, but also through informal networks like family and friends. Additionally, nearly 20% of respondents preferred health information in their native language. This suggests that multilingual educational resources, as highlighted by the National Culturally and Linguistically Appropriate Standards (16), are necessary to ensure that health messages are accessible to individuals who may have limited English proficiency. Future healthcare interventions should consider providing health materials in multiple languages and engaging community members as health ambassadors to ensure information reaches all segments of the population.

This study also assessed the feasibility of using social media to reach the target population, and the results suggest that this approach can be effective. The use of virtual snowball sampling through social media platforms provided access to a specific immigrant group, showing the potential of these platforms for health outreach in hard-to-reach communities. However, further research is needed to determine the best strategies for utilizing social media to foster engagement and promote behavior change. It may also be useful to examine the role of other platforms or community-based apps that could offer tailored support for chronic disease management, lifestyle changes, and culturally relevant health education. For instance, a study in Ontario, Canada, successfully recruited participants using social media platforms and found that newcomer women actively engage in social support on these platforms (17). This aligns with our findings that social media can be an effective tool for reaching immigrant communities, such as the Bangladeshi population. By leveraging social media, we can foster engagement and promote behavior change, though further research is needed to explore optimal strategies for using these platforms for health outreach and chronic disease management.

This study is not without its limitations. In its exploratory pilot state, the results cannot establish any causal associations. The reliance on self-reported data also presents a risk for bias. There remains a plethora of other factors that can influence participants' knowledge or perceived barriers that were not assessed in this study, as the goal was to identify the factors we can implement interventions for immediately. Further assessment of socio-ecological determinants of diabetes literacy is needed.

Notwithstanding these limitations, the results of our study serve as an important starting point for understanding the diabetes health needs of Bangladeshi immigrants, especially as such a group is often aggregated with other Asian populations in the empirical body. Further, it also highlights the need for more targeted interventions aimed at improving diabetes-related literacy among Bangladeshi immigrants that should focus on culturally tailored strategies, addressing the unique barriers posed by religious and cultural practices, and improving access to practical resources like exercise programs that align with cultural norms. Collaborations with community leaders, healthcare providers, and digital platforms will be essential to ensure these interventions are effective and widely accessible.

CONCLUSION

This pilot study underscores the need to address diabetes health literacy within the Bangladeshi immigrant community in the U.S. While there is a base level of awareness, significant gaps in knowledge and cultural barriers to disease prevention persist. To reduce health disparities, public health efforts must be culturally sensitive, incorporate religious and social factors, and leverage both traditional and digital outreach methods. By better understanding and addressing the unique needs of this population, we can work towards improving their health outcomes and reducing the burden of chronic diseases like diabetes.

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Table 1. Pilot study population characteristics	
	Percent (%)
Age (years)	
18-24	11.6
25-34	14.0
35-44	37.2
45 or more	39.2
Sex	
Male	48.8
Female	51.2
Currently employed (full-time)	60.5
Education level	
Bachelor's degree or less	53.5
Master's degree or less	46.5
Annual household income of \$60,000 or more	74.4
Ever been married	88.4
Lived 15 or more years in the U.S.	72.1
Language preference for reading	
English only	41.9
English and native language (Bangla) equally	51.2
Other	7.0
Food preference	
Food from own nationality	41.9
American/western food	7.0
Both equally	48.8
Fasting for religious or cultural reasons	76.7
Communication of diabetes	
A family member or friend has spoken to me about diabetes	46.5
A doctor or another health care person (nurse, physician assistant, others) have spoken to me about diabetes	39.5
I would like diabetes information to be available in my own language	18.6
I have looked for diabetes information by myself	14.0

Table 2. Health and behavioral characteristics of pilot study population characteristics	
	Percent (%)
Health status	
Overweight or obese (Asian BMI standard)	51.2
Ever been told by a doctor to have type II diabetes	11.6
Ever been told by a doctor to have pre-diabetes or borderline diabetes	27.9
Ever been told by a doctor to have impaired fasting glucose, impaired glucose tolerance, high blood glucose, or high blood sugar	16.4
Ever been told by a doctor to have hypertension or high blood pressure	25.6
Frequency of 30 minutes day of exercise per week	
Rarely or less than once a week	34.9
1-3 times a week	41.9
4 or more times a week	23.2
Types of exercise	
Walking or jogging	79.1
Running	18.6
Weightlifting	20.9
Aerobics	14.0
Insurance affected ability to obtain healthcare	
Yes	25.6
No	67.4
Ever been tested for type II diabetes	
Yes	67.4
No	25.6
Don't remember	7.0
Self-rated physical health	
Excellent or good	27.9
Average or fair	69.8
Poor or very poor	2.3
Physical mental/emotional health	
Excellent or good	44.2
Average or fair	51.2
Poor or very poor	4.7

Table 3. Results of DaHL Survey	
Risk factor knowledge (Cronbach alpha = .730)	Percent (%)
South Asians nationality	4.7
Asthma	0
Broken bones	2.3
Getting older	37.2
Pregnancy	39.5
Low blood pressure	9.3
High blood pressure	34.9
Not exercising	65.1
Overweight or obese status	81.4
Family history	83.7
Everyone	11.6
Benefits of prevention *	
Screening diabetes early can lower my risk of heart disease	69.8
Preventing diabetes early can lower my risk of heart disease and death	67.4
Barriers to prevention (Cronbach alpha = .750)	
Diabetes screening can be expensive	0.0
There is no place I can go to get screened	0.0
I find it difficult or uncomfortable to talk to others about diabetes	2.6
Exercising is difficult because there is no place for it	7.7
Exercising is difficult because I don't have much time	30.8
The standard American exercise clothes are not ok for my culture or religion	30.8
If I stopped eating or serving sweets, I will not be able to participate in cultural activities	15.4
I want to eat healthy, but I don't know how to	20.5
I would participate in exercising if it was related to my culture	23.1

* Cronbach alpha not conducted due to only two items.

Table 4: Diabetes communication factors	
	Percent (%)
A family member or friend has spoken to me about diabetes	46.5
A doctor or another health care person (nurse, physician assistant, others) have spoken to me about diabetes	39.5
I would like diabetes information to be available in my own language	18.6
I have looked for diabetes information by myself	14.0
I don't know where to find information for diabetes prevention or management	4.7