Psychosocial aspects of type 1 diabetes in Latino- and Asian-American youth

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Latino and Asian-Americans represent the fastest growing immigrant populations in the United States. We aimed to review the current knowledge on the psychosocial factors that influence type 1 diabetes (T1D) care, education, and outcomes in Latino and Asian-American youth immigrants in the United States, as well as culturally sensitive programs to address health disparities. We conducted a narrative, conceptual review of studies on T1D in Latino and Asian-American youth and relevant studies in type 2 diabetes and adults. Approximately 50% of both Latino and Asian-American youth with T1D are in suboptimal glycemic control. Socioeconomic status, literacy, English proficiency, acculturation, access to health care, family functioning, mental health, and nutrition influence T1D care and outcomes. However, the degree to which these complex, inter-related and dynamic factors affect long-term T1D outcomes is largely unknown. Culturally sensitive programs for Latino or Asian-American youth with T1D are scarce in the United States. Research is needed among Latino and Asian-American youth with T1D so that comprehensive, culturally sensitive diabetes education, and care programs can be developed to decrease disparities in the health burden of these groups.

Latino and Asian-American youth populations are increasing in the United States (1). Understanding the factors that are related to type 1 diabetes (T1D) education, care and outcomes among these groups will inform strategies to meet their needs within the existing health system.

This is a narrative, conceptual literature review on T1D outcomes among Latino and Asian-American youth. Although the focus is on T1D, due to the paucity of research, relevant findings on type 2 diabetes (T2D) and among adults are also included. We first describe demographics, socioeconomic characteristics, acculturation (i.e., the process of immigrants adapting to the host culture), and traditional values of Latinos and Asian-Americans in the United States. Next, the relationships of these characteristics with health are presented, followed by the health burden among Latino and Asian-American youth

with T1D. Particularly, socioeconomic status (SES), poverty, health care access, health literacy, English proficiency, acculturation, family functioning, mental health, and nutrition in the Latino and Asian-American groups in the United States in relation with T1D are reviewed. We finally examine initiatives on culturally sensitive health delivery to improve T1D outcomes.

“Hispanic” and “Latino” are terms commonly applied to the same population. The confusion between “race” and “nationality” led early authors to consider the term “Hispanic” to define a person from a country of Spanish origin, with “Latinos” in the United States originating from a Latin-American country in the Western Hemisphere only, reflecting nationality and not language, culture, or race (2). The US Census Report defines Hispanic or Latino as a person of Cuban, Mexican, Puerto Rican, South- or Central-American descent, or other Spanish culture regardless of race (3). Many studies use the terms interchangeably. In this review, we favor the term “Latino” except when referring to a particular study wherein the authors used the name “Hispanic”.

The 2014 US Census Reports indicated that 63% of Latinos were Mexican in origin (4), but also included Central-American (7.9%), South-American (5.5%), Cuban-American (3.5%), or Spanish-American (1.3%) origins, among others. This heterogeneity must be considered when interpreting results that aggregate these groups (3). “Asian”, which is considered a race category, is also diverse, including Chinese-, Indian-, Filipino, and Vietnamese-Americans, among many others (5). These large, fast growing and diverse populations deserve an informed and evolved approach to address health education and care, and ultimately reduce their health burdens.

LATINOS AND ASIAN-AMERICANS IN THE UNITED STATES

Demographics and Socioeconomics

In 2010, approximately 40 million people in the United States were foreign-born, accounting for ~13% of the US population (1). Substantial increases in Asian and Hispanic immigration occurred in recent decades, faster than other ethnic or racial groups (3,5). The Hispanic-American population grew at four

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times the rate of the overall US population from 2000 to 2010 (3). The Asian-American population increased by 43% in that time (5). In 2014, 21% of children in the United States were native to the United States with at least one foreign-born parent (6). Specifically, 16% native and 25% foreign-born Asian-American children; and 57% native and 41% foreign-born Hispanic children had at least one foreign-born parent (7).

Poverty disproportionately affects Hispanics and Asian-Americans, with 23% and 12% of these groups, respectively, being below the poverty level, compared with 10% of Non-Hispanic Whites (NHW) in the United States (8). In 2010, approximately 6.1 million of all poverty-stricken children in the United States were Hispanic and over one third were born of immigrant parents (9).

Acculturation

Acculturation is the process by which an immigrant group adopts the cultural patterns of a host population (10). Cultural patterns can involve attitudes, lifestyle practices, relationships, values, and self-identification (10). Once thought to be unidimensional, acculturation has many dimensions, including practices (such as language, food or friend preference), values and self-identification (11). Immigrant children, who tend to be more acculturated than their parents, can create a family “acculturation gap” (12). An acculturation gap may result in parents becoming overprotective of their adolescents to maintain cultural values (13), and/or parents being dependent on the adolescent to navigate through society (14). Similar findings have been reported among Asian-Indian and other Asian-American families (15,16). This cultural identity struggle may affect family dynamics and relationships, and cause parent-child value discrepancies, resulting in conflict, decreased communication, and depression (14,17–19).

The relationship between SES and acculturation is bidirectional and dynamic (20,21). Greater acculturation status tends to be associated with higher SES and, conversely, increased SES can intensify acculturation (22,23). However, these characteristics may change over time and thus, confound study measures (21,24,25).

Values and Family Dynamics in Latino and Asian-Americans

Hispanic cultural values include family closeness and loyalty (termed “familismo”), traditional gender association (in which the male tends to make family decisions, termed “machismo”, and the female runs the household, termed “marianismo”) and respect toward elders (termed “respeto”) (26), more so than NHW youth (27). “Familismo” has been further delineated into “supportive familismo” (i.e., family closeness and loyalty), “obligation familismo” (i.e., responsibility to other family members), and “referent familismo” (i.e., agreement between own and family’s traditions and expectations) (28). Acculturation is a complex, dynamic, and heterogeneous process that can modulate family values (29,30).

Similarly, the Asian culture tends to favor deference for parental authority, follow traditional gender roles and encourage family unity (17,31,32).

However, stereotyping should be avoided as not only racial, and ethnic groups are considerably heterogeneous, but there are also individual differences, and values and behaviors presented as associated with a culture are often not shared by many of its members. In addition, values and behaviors of Latinos and Asian-Americans can transform during the acculturative process.

FACTORS ASSOCIATED TO HEALTH AMONG LATINOS AND ASIAN-AMERICANS

SES, Health Care Access, Literacy, English Proficiency, and Acculturation

Children in poverty are at risk for environmental hazards, lack of adequate health insurance, lower physical, socioemotional, and cognitive well-being (33). US Census Reports show that approximately 19% of Hispanics lacked health care coverage in 2013 (34). Hispanic and Asian-American children were more likely to be uninsured as compared to Black youth (35). Access to health care and having a regular provider was lower among Asian-Americans and Hispanics than NHW (36–39). Limited English proficiency was particularly prevalent among Asian-American and Latino adults, as compared to NHW (40), which obstructs access to care in all racial/ethnic groups (37,41). Poor parental literacy was associated with worse health outcomes in their children (42). Hispanics had the lowest health literacy rate among all US racial/ethnic groups (43), and both Asians and Hispanics had lower health literacy than Whites (41). Individuals with a combination of low health literacy and limited English proficiency were the most vulnerable to adverse health outcomes (41).

The “Latino mortality paradox” states that, although the Latino population tends to have a lower SES, all-cause mortality rates are lower compared to NHW in the United States (44–46). This paradox has been attributed to immigrants being generally healthier than those who stay in their native country, thus lowering the mortality rate of this group in the United States (termed the “healthy migrant effect”), or to older Latinos returning to their native country before their death, decreasing their mortality rate in the United States (termed the “salmon bias”) (44,46). However, healthier behaviors could also play a role (47). Alcohol consumption and smoking were less frequent among Latinos than NHW after controlling for SES (44). On the other hand, acculturation may increase obesity, smoking, and alcohol consumption (44), possibly moderating the “Latino mortality paradox”. Immigrant Asians and Hispanics also had lower mortality rates than US-born Asians and Hispanics (48,49). This paradox has also been observed with “overseas born” ethnic groups from other countries (50).

Nutrition and Obesity

In 2012, approximately one third of US children were classified as overweight or obese, as defined by BMI between 85th–94th percentiles, and >95th percentile, respectively (51). Obesity is more prevalent among Hispanics (21.9%) than NHW youth (14.7%) (52), highlighting the need for further

research on biological and sociocultural factors (53). Second and third generation immigrant Latino and Asian-American youth, compared with their first generation peers, in addition to those who are more acculturated, had higher prevalence of less healthy diets (less fruit, vegetables, and grains) and higher prevalence of obesity or overweight (54,55). A plausible explanation for this observation is that children of immigrants, compared to their parents, may be raised in an environment with easier access to food and more sedentary behaviors, thus promoting obesity (56). Racial/ethnic minorities tend to have lower education levels and income, which can affect their comprehension of nutrition requirements and ability to purchase healthier and more expensive food (57).

Cultural values/status may also play a role. Some Latino parents consider that providing food for their children is an important aspect of good parenting (58–60), but this value can promote childhood obesity. A study among Latino women at risk for diabetes reported that improved economic conditions since immigration facilitated access to “high status foods” but, unfortunately, a less healthy diet as well (61). Lower acculturation (as measured by linguistic status) in Latino mothers was associated with increased BMI in their children (62). Among Asian-Americans, lower maternal acculturation increased the risk of elevated BMI in the child (63). It has been speculated that food insecurity (i.e., lack of access at all times to enough food for an active and healthy life) (64) in their native country may lead to unrestricted and thus, unhealthy eating patterns in the host country (65). Bilingualism in parents, which has been used as a marker for higher SES and/or acculturation, facilitates access to nutritional information and food resources, ultimately leading to healthier lifestyles for their child (66). Other studies have not found acculturation (as indicated by language use and generational status) related with probability of being overweight among Asian, Hispanic, and NHW adolescent females (67). Heterogeneity within Asian groups also needs to be considered; a study found that Korean-, Japanese-, and Filipino-American youth had greater obesogenic practices than South Asian- and Chinese-American youth (68).

The relationship between parenting styles and obesity may vary by ethnic group. The authoritative parenting style has high expectations for child behavior and high responsiveness to the child, while the authoritarian parent has high expectations for child behavior and low responsiveness to the child. Among US NHW families, authoritative parenting promotes healthy eating behaviors and BMI but, among racial/ethnic minorities, authoritarian parenting is associated with normal BMI, and high parental control protected against overweight and obesity. A potential explanation for this discrepancy is that the motivation for tight authoritarian parental control that tends to be practiced by Asian families may be concern for their children's well being, thus leading to healthy eating behaviors (69). However, in contrast, a pressure to eat due to parental control (70) may lead to overfeeding and obesity (71). Unfortunately, cultural issues with obesity and feeding practices are addressed less often than desirable during pediatrician visits (72).

FACTORS RELATED TO T1D EDUCATION, CARE, AND OUTCOMES IN LATINO AND ASIAN-AMERICAN YOUTH

T1D in Latino and Asian-American Youth

T1D is the most prevalent form of diabetes among Hispanic- and Asian-American youth (73,74). After adjusting for SES, Hispanic-American and Asian youth with T1D had significantly worse glycemic control than their NHW counterparts (75–78). Glycemic control was marginal to poor in 50% of Hispanic children with T1D aged 0–9 y, and 65% among patients 15 y and older (74). Similarly, over 50% of Asian-Americans youth with T1D were in suboptimal glycemic control (73). No differences were found in frequency of diabetic ketoacidosis, hospitalizations, age at T1D diagnosis or mean insulin dose between Hispanic and NHW (75).

Poverty, Healthcare Access, Health Literacy, and English Proficiency

Barriers to diabetes care among youth with T1D are cost of care, poor access to care, and communication with health care providers (79,80), which are interrelated with inadequate health insurance, low health literacy, English proficiency, and SES. SES, rather than race or ethnicity, was the major contributor to higher hemoglobin A1c (HbA1c) among Latino children (75). Both low SES and minority race/ethnicity were independent, negative predictors of continuous subcutaneous insulin infusion (insulin pump) use (81), which is associated with better glycemic control than other insulin delivery modalities (82). Greater material and social deprivation indices, but not race/ethnicity, were associated with worse HbA1c in children with T1D (83). Food insecurity predicted hospitalization in children with insulin-dependent diabetes (84). Poverty, non-White race, government insurance and young age were predictors of prolonged hospital stay in children with T1D (85). Poverty is a risk factor for readmission after T1D diagnosis (86).

Inadequate health insurance restricts access to quality care. Diabetic ketoacidosis, a life-threatening acute complication of T1D was more frequent in children without private health insurance (87). Frequency of self-monitoring of blood glucose, which is positively associated with diabetes control, was limited by certain insurers (88) and was lower among uninsured patients (89). Among uninsured children with T1D, cost of care is an important barrier to quality diabetes care (79). Children with T1D who are underinsured were more likely to require hospital admission after the diagnosis (90).

Language can be a barrier to quality health care (91,92) but native language materials alone did not produce adequate health literacy among parents' caregivers (93). Besides foreign language educational materials, emotional support, understanding of family dynamics and cultural values are necessary for effective culturally sensitive diabetes care in youth. Among English and Spanish speaking adults with T2D, low health literacy was a barrier to tight glycemic control (HbA1c < 7.2%) (94). Among adolescents with T1D, parent health literacy (specifically, reading comprehension) was positively associated with adolescents' adherence to intensive insulin regimens (95).

In addition, reading skills and, in particular, numeracy among parent caregivers improved HbA1c among their children with T1D (96,97). Paradoxically, among Hispanic adults with diabetes, low health literacy was linked to greater physician trust, treatment adherence, and self-efficacy in their diabetes care, which can improve glycemic control (98,99).

Chinese-American adults with T2D and lower English language proficiency were less able to complete daily diabetes tasks due to limited communication with their health care provider (100). Receiving nutritional information and emotional support in their native language improved their daily diabetes management and a bilingual Chinese health care provider who was both an expert in the medical field and emotionally caring was preferred (100). Language barriers were also noted among South Asian adults with T2D (101).

Vietnamese adolescents' ability to speak their native language enhanced communication with their families and improved family functioning (102). Hispanic youth with T1D reported more problems with communication and contextual care (consideration of daily family and child circumstances) compared with NHW youth (79). Unfortunately, few qualitative T1D pediatric studies address cultural issues in provider-patient communication.

Acculturation, Family Functioning, and Mental Health

Among Hispanic youth, blood glucose monitoring was performed with less frequency but with more parental supervision compared to NHW youth (75). Less acculturated (measured by recent generational status) Hispanic adolescent T1D youth participated less in their own diabetes care but their strong family support facilitated adherence to diabetes-related responsibilities, ultimately achieving better glycemic control than other groups (103). Conversely, Hispanic-American youth with more independent responsibility and less family support for their diabetes management appeared to be less adherent (103). It could be speculated that the Hispanic value of "familismo" may promote family involvement, or a sense of obligation toward authority (in this case, health providers), improving adherence to diabetes management (103). However, "familismo" may also cause delays in medical decision making, as family must be consulted first (104). Importantly, although family involvement in diabetes care is important for glycemic control (105,106), the benefit of encouraging adolescent autonomy and independence during transition to diabetes self-care has also been demonstrated (103,107).

Authoritative parental involvement and more communication were related to better adherence and improved HbA1c among youth with T1D (108,109). Since this is not the parenting style that has been traditionally associated with Asian families (110), more research is needed to understand how acculturation influences T1D adherence and glycemic control in Asian-American youth. Irrespective of ethnicity, psychosocial factors profoundly affect diabetes care in people with T1D. Parental involvement in blood glucose monitoring and insulin administration led to increased frequency of blood glucose monitoring, which significantly enhanced glycemic control

among youths with T1D (105,106). Youth from families in which feelings were expressed openly, communicated more on diabetes management, had lower levels of family conflict and greater coordination among all family members (not just parents), achieved better metabolic control (109,111). Adolescents with discordance between autonomy for their diabetes care and their maturity level to manage these independently developed problems in daily diabetes management and experienced increased risk of adverse events (112). Immigrant families and youth possessed diverse levels of "social competence" (i.e., competence in school and peer relations) (113,114). Low social competence was associated with poor diabetes adherence among adolescents with T1D (115). Generally, psychosocial factors and family dynamics become established soon after diagnosis, but follow a deteriorating trajectory (116). Thus, establishing optimal family routines and social skills for diabetes care is vitally important early in the disease course.

Depression and low quality of life in youth with T1D adversely affect glycemic control (117). The Hispanic/Latino and Asian youth population experience higher rates of depressive symptoms than other racial/ethnic groups (118–120). Latinos, who tended to have more family support, revealed lower utilization of professional mental health services, perhaps due to the constructive support they receive, or due to the fear of family stigmatization (121). Several Latino cultural values influence the risk of depression, often in contradictory fashion. Referent and support "familismo" may protect against depressive symptoms (122) but obligation "familismo" is associated with increased depression among adults, although not in adolescents (122). Perhaps the latter have not yet assumed possibly overwhelming family obligations that could contribute to depression (122). Symptoms of depression increased with acculturation (123), possibly due to impaired family functioning or deviation from protective Latino cultural values of family unity and decreased conflict (123,124). "Fatalismo" (i.e., the belief that there is little individual control over life's negative events) was related to higher family conflict, which may contribute to internal conflict and depression among Hispanic youth (30).

Traditional Latino gender roles also affect mental health and thus diabetes outcomes. "Machismo" can have detrimental effects (e.g., dominance over family affairs and spouse) and positive effects (e.g., males exhibit independence, protect the family, and promote seeking health services) (104,125). Among Mexican-American adolescents, traditional gender roles can protect females, but predispose males to risky behavior (29). Similarly, traditional gender values may modulate mental health behavior, and family roles in adherence to therapy (29,125).

In contrast to Latinos, less acculturated Asians had higher rates of stress and emotional distress (126), under-utilized mental health services (121) and were more likely to be uninsured compared to NHW (34,127). Among Asian adolescents, the degree of intergenerational discrepancy (which can cause family conflict) predicted depressive symptoms (128). Less acculturated Asian-American youth experienced a greater

risk for depression and suicide when faced with family conflict, possibly due to distress over traditional values of humility and parental control (128). Acculturation also changes parental roles that may disrupt familial harmony and cohesiveness, affecting rates of depression. A study showed that Asian-American parents tended to employ authoritarian parenting (110), which may lower self-esteem and increase depression risk (129,130). Authoritative parenting style was associated with lower adolescent depression scores, and higher adolescent self-efficacy and self-esteem than the authoritarian parenting style (131).

Nutrition and Obesity

The rate of overweight and obesity has tripled since the 1980s among children and adolescents with T1D, and is now over 34% (132,133), being the highest among Hispanic- and African-American youth (132,134). Up to 44% of Hispanic-American youth with T1D and over 30% of Asian-American youth with T1D aged 0–19 y were overweight or obese (73,74). Obesity negatively affects T1D outcomes as it increases the risk of poor glycemic control (78), cardiovascular disease, and micro-vascular complications, possibly through insulin resistance and higher levels of inflammatory adipokines and cytokines (135). In addition, obesity may precipitate the clinical onset of T1D (136) through lower insulin sensitivity as suggested by the finding of greater beta cell function at diagnosis (137). Insulin sensitivity was lower among Hispanic youth without (138) and with (139) T1D compared to their NHW counterparts, although contradictory studies exist (140). Dyslipidemia, another cardiovascular risk factor, also associated with diet and obesity, was prevalent in Hispanic adolescents aged 15–19 y with T1D, with hypertriglyceridemia; and elevated LDL cholesterol levels in 30% and 48% of them, respectively (74).

CURRENT CLINICAL INITIATIVES

Culturally sensitive clinical programs take into consideration a racial/ethnic group's traditions, values, and practices while maintaining the quality of education and care provided. Cultural competence of a health care institution to interact with patients from another culture involves improvement at various levels: organizational (more diverse leadership), structural (availability of translators), and clinical (more cultural competence among health care providers) (141). Unfortunately, these culturally competent initiatives are scarce for Latino or Asian-American youth with T1D. A small study showed improvement in HbA1c in Hispanic T1D youth at a "Spanish-only" clinic (142).

Culturally sensitive health interventions to improve T2D care and outcomes among the Latino and Asian adult populations have been tried, and shown to be effective, improving diabetes knowledge, self-efficacy, and glycemic control, while reducing the incidence of diabetic complications and controlling medical costs (143,144). Culturally sensitive diabetes interventions for Latinos and Asian Americans included bilingual educators, educational materials, and culturally identifiable focus groups (143,144). One study called "Every Little Step Counts: Diabetes

Prevention Program" utilized "promotoras" (i.e., community members trained in basic health education) to improve physical activity and weight status among high-risk Latino youths (145). More culturally sensitive interventions targeting Latino and Asian-American youth are needed.

It is unclear what characteristics make an effective intervention culturally sensitive. "Vida Saludable," a 9-mo behavioral program targeted at Hispanic mothers to promote healthy behaviors for their children, improved children's consumption of water and milk, reduced consumption of sugar sweetened beverages, reduced maternal BMI, and showed satisfaction with "promotora" support during the intervention, indicating the power of maternal influence on their children's healthy behaviors (146). However, "Hip Hop to Health," a culturally sensitive obesity prevention intervention targeting Latinos, was not successful (147) possibly due to insufficient parent involvement, consistent with previous studies demonstrating that level of physical activity correlates between parents and children (148). Most recently, an intervention named "SaludABLEOmaha" was applied to childhood obesity in the Latino community. This program included youth activism, community engagement through social media and marketing, and content based curricula, and was able to increase the readiness level of this community to improve childhood obesity. "Community readiness" is a stage at which a community (including a cultural group) is willing to address a health issue (149).

The White House Task Force on Childhood Obesity outlined interventions for targeting childhood obesity through the "Let's Move" campaign, which involves local and faith-based health initiatives for obesity (150). This program is largely based on the observation that early life risk factors, such as solid food introduction before 4 mo of age, sweetened beverage intake at 2 y of age, and fast food intake, are more prevalent among Hispanic than NHW children (151). The Racial and Ethnic Approaches to Community Health program, through the CDC National Center for Chronic Disease Prevention and Health Promotion, aids in carrying out culturally sensitive health programs with local agencies in various health care fields including T2D (152).

Diabetes initiatives targeting Latinos and Asian-Americans include the Joslin Diabetes Center's Latino Diabetes Initiative (153) and Asian-American Diabetes Initiative (AADI) which currently focuses on Chinese and Japanese Americans (154). Asian-American Diabetes Initiative's goals are to study diabetes in the Asian-American population and disseminate their research findings to provide culturally sensitive diabetes education, outreach programs, develop treatment strategies, and provide awareness to issues in diabetes relevant to Asian-Americans. This multidisciplinary initiative consists of physicians and dietitians who lead the Asian-American Diabetes clinic and provide culturally sensitive online tools for diabetes and nutrition care (154).

Current initiatives are also limited by the heterogeneity of Latino and Asian-American populations regarding essential characteristics such as SES. Future qualitative and quantitative

research on acculturation should differentiate heterogeneous Latino and Asian-American groups, adapt established acculturation measures within specific cultural populations, account for SES and other potential confounders, and comprehensively identify specific risk behaviors that affect diabetes care and adherence. The large and increasing number of Latino and Asian-American families in the United States underscores the significance of research on strategies to best address their health needs to reduce disparities.

CONCLUSION

Latino and Asian-Americans represent the fastest growing immigrant populations in the United States. Most Latino and Asian-American youth with T1D are in suboptimal diabetes control and therefore at high risk for the devastating acute and chronic complications of T1D. SES, access to health care, health literacy, English proficiency, acculturation, family functioning, mental health, and nutrition are intimately inter-related, have a complex effect on T1D and are largely understudied in these populations. Better understanding of the factors that influence T1D education, care, and outcomes will shed light on how to best accommodate the needs of these growing groups within the existing health system in the United States. Specific, clinical programs for Latino and Asian-American youth with T1D that take into consideration the racial/ethnic group's traditions, values, and practices while maintaining the quality of education are warranted to address health disparities. Research is needed among Latino and Asian-American youth with T1D, so that comprehensive, culturally sensitive diabetes education and care programs can be developed to decrease disparities in the health burden of these groups.

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