

Food-related Beliefs of Adolescent Girls Ages 9-13 and Their Mothers on O‘ahu, Hawai‘i

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Abstract

A number of factors contribute to the development of obesity in adolescents, including various dietary and lifestyle behaviors, and a host of social and environmental factors, such as socioeconomic status, parental education, and culture. Research examining beliefs about behaviors related to weight status in adolescents, such as food intake, can create a better understanding of risk factors for obesity. This study explored beliefs about behaviors related to weight status in 20 early adolescent girls aged 9 to 13 years and their mothers in O‘ahu, Hawai‘i. Semi-structured individual interviews were conducted to elucidate beliefs through discussion of food purchasing, feeding practices, portion control strategies, eating outside the home, and body size perception. Interviews were transcribed verbatim and examined using directed content analysis. Both mothers and daughters believed that diets should consist of fresh foods and be based on principles of variety, balance, and moderation, and had negative perceptions of school lunch. In describing ideal body size, mothers expressed greater concern for overweight, as well as ethno-cultural beauty standards, than daughters. Mothers believed daughters should have a positive relationship with food but also applied various portion control strategies with them. Findings reveal how mothers' and daughters' beliefs may influence daily food-related practices in adolescent girls. Future studies may seek to investigate the role these factors may play in determining weight status in adolescents in Hawai‘i, with findings to be used to inform health promotion programs.

Introduction

In 2011-2012, 27% of adolescents in Hawai‘i ages 10-17 were classified as overweight or obese.¹ Various dietary (eg, low fruit and vegetable intake, meal skipping) and non-dietary behaviors (eg, screen time, lack of physical activity) are associated with the development of obesity in youth, as well as low socioeconomic status, low parental education level, and racial/ethnic factors.²⁻⁴ Factors contributing to obesity must be acknowledged as health professionals work to develop interventions to impact the welfare of the affected populations.

Although a number of factors contributing to obesity in youth have been previously identified, information regarding the influence of beliefs on dietary intake and weight is lacking. Food-related beliefs can manifest in the frequency of food consumption, food preparation techniques, and the use of foods in meal patterns and cycles and may be further influenced by the availability of ingredients, cost, or convenience.⁵ A number of researchers have described the influence of beliefs regarding weight, diet and other factors on eating behaviors and food intake.⁵⁻⁹ The types and amount of food and beverages consumed, flavors, textures, food combinations, and traditional uses and meanings of food mark differences among ethnic groups and societies, convey symbolic meanings, create social interactions, and define pleasure and punishment.⁷ Concepts of how food relates to health, particularly with respect to which foods are considered harmful and protective, exist across population

groups.⁶ In youth specifically, it has been shown that food choices are markedly influenced by culturally based beliefs.⁹

Beliefs related to eating impact both how adults feed their children and how children are socialized to choose foods for themselves.⁷ Distinct perceptions of health may impact feeding practices in diverse groups,⁷ with parental concern about children's weight being one such influencing factor. The lack of perception that the child is overweight, or a perception that a normal weight child is underweight, may predispose to overfeeding.¹⁰ Being heavy does not necessarily damage self-esteem in some groups and may be viewed as a problem in some populations only when it is clearly linked to health problems.^{7,11}

As certain beliefs may influence food intake patterns and result in excess weight gain beginning in childhood and adolescence,⁷ it is necessary to understand views within the context of communities to develop appropriate programs and policies to address the current obesity epidemic.¹² In Hawai‘i, there is a need for research examining beliefs on behaviors related to weight status in adolescents, such as food intake, to create a better understanding of risk factors for adolescent obesity. Given the lack of information regarding views related to adolescent dietary behaviors, this study aimed to identify beliefs that may impact weight status in female adolescents ages 9 to 13 years on the island of O‘ahu, Hawai‘i.

Methods

This study was a qualitative exploration of beliefs that may impact weight status in 20 early adolescent girls aged 9 to 13 years and their mothers on O‘ahu, Hawai‘i. The Institutional Review Board at the University of Hawai‘i at Manoa approved the study.

Theoretical Framework Selected

The Six-Cs model, an ecological framework that acknowledges environmental and hereditary influences on obesity,¹³ was used as a theoretical framework to guide the study of beliefs. The framework contains six spheres of influence (cell, child, clan, community, country, and culture) organized by five zones addressing nutrition-related resources, practices, and personal attributes.¹³ Influencing factors in the child, clan, and culture spheres were examined to reveal information related to beliefs potentially impacting weight status.

Interview Guide Development

The interview questions were developed by three researchers (MM, JB, TD) based upon existing literature, the theoretical

concepts selected from the Six-Cs model, and the research questions of interest. They were designed to extract information on beliefs that may impact adolescent weight status, including food purchasing practices, parental feeding practices, norms for portion sizes, and body size perceptions. The wording of the questions was determined and revised based on discussion among the research team. The organization scheme of the interview topic and sub-topic questions is presented in Figure 1, and examples of questions posed under each topic heading are presented in Table 1.

Recruitment

A convenience sample was recruited in an ongoing manner from various community organizations and youth activity

programs in urban O’ahu, such as the YMCA and the Boys and Girls Club, through the use of snowball sampling. We sought to recruit across racial/ethnic groups and income levels given that we wished to examine a range of beliefs that may impact weight, either positively or negatively. In order to be included, both mother and daughter had to agree to participate. Recruitment was continued throughout the data collection period until saturation of conceptual categories occurred, or to the point at which no new concepts were observed in the data.¹⁴ This point of saturation was determined by the trained interviewer and study PI, who reviewed the data during the period of collection.

Data Collection

Informed consent and assent were obtained from mothers and daughters, respectively. Data collection was conducted between May and July 2014. Each participant (mother and daughter) attended a separate face-to-face individual interview held at the university, a community center, or her personal home. Demographic information was collected via written survey. The trained interviewer conducted interviews using the interview guide. Interviews were recorded using an audio recorder, and data were transcribed verbatim.

Data Analysis

Means and frequencies were calculated for demographic data using STATA SE software version 13.0 (StataCorp, College Station, TX). Mothers and daughters who identified with two or more racial groups were categorized as ‘Mixed’; those who identified as full Japanese, Chinese, or Korean were categorized as ‘Asian’; and those who identified as Marshallese or Chuukese were categorized as ‘Micronesian’.

NVivo software (QSR International, Inc., Burlington, MA [Americas]) was used for coding, text retrieval, and content analysis. Qualitative data analysis was performed during the ongoing process of data collection.

Data were examined using directed content analysis.¹⁵ This involved developing a list of startup codes derived from the literature. Operational definitions were determined for each startup code, and the interviewer coded the first transcript. The research team reviewed the coded transcript and revised the coding scheme accordingly. The interviewer coded the remaining transcripts, periodically discussing with the team about coding and revising the codes as needed.

Ensuring Reliability and Validity

Various strategies were used to ensure that reliability and validity were maintained throughout the analysis. Four of the 41 interviews were coded independently by two investigators (MM, JB) who met to review the coding and compare consistency of results to ensure reliability.¹⁶ Reliability was further maintained by multiple rounds of reading transcripts by the same investigator (MM).¹⁶ Validity of the findings was ensured by describing exception cases and integrating them into the discussion of the results and comparing the findings with similar qualitative studies to identify consistencies and discrepancies.¹⁶

Food purchasing	Child feeding practices	Perception of body size	Family leisure activity	Physical activity
Foods purchased regularly	Dietary intake	Normal body shape/size	Leisure norms	Exercise practices
Food availability at home	Beliefs on healthy /unhealthy foods	Cultural beauty standards		Parental encouragement of activity
Barriers to purchasing	Goals for feeding and strategies used	Concerns about growth or weight		Encouragement of activity by other individuals
	Snacking practices			
	School lunch			
	Norms for portion sizes			
	Parent encouragement of healthy eating			

Figure 1. Organizational scheme of interview guide questions.

Topic Area	Examples of Questions Posed
Food Purchasing	What do you usually buy for your family to eat on a regular basis? Are these foods easy to find?
Child Feeding Practices	What are the kinds of things that are important to you when it comes to feeding your daughter?
Perception of Body Size	Do any groups you identify with view a certain body shape or size as being “better” or “normal” compared to others?
Family Leisure Activity	Does your family participate in activities together? Are there certain reasons you participate in these activities?
Physical Activity	Is your daughter involved in sports? Who encouraged her to play this/these sport(s)?

Table 1. Examples of questions posed in interviews with mothers (n=20) on O’ahu, Hawai’i.

Results

Participant Demographics

Table 2 presents participant characteristics (with one mother having two daughters of qualifying age who participated). Most mothers (n=20) identified as White (40%), followed by Asian (30%), Mixed (20%), and Micronesian (10%). Daughters (n=21), in contrast, identified mostly as Mixed (42.9%), followed by White (33.3%), Asian (14.3%), and Micronesian (9.5%). The majority of mothers completed four-year college/university level education or higher (75%) and were employed for wages (70%). Most households had an annual income at or above \$100,000, while two had an annual income below \$10,000.

Demographic Characteristic	State Population ^a (%)	Mothers (n=20)	Daughters (n=21)
Age (mean±SE), y		42.9±1.5	11.2±0.3
Race, n (%)			
Mixed (includes Native Hawaiian)	23	4 (20.0)	9 (42.9)
Asian alone	39	6 (30.0)	3 (14.3)
Micronesian	2.5	2 (10.0)	2 (9.5)
White alone	25	8 (40.0)	7 (33.3)
Mother's Education Level, n (%)			
High school or less	38	3 (15.0)	
Some college	32	2 (10.0)	
Graduated 4-year college/university	20	6 (30.0)	
Completed or attended graduate school	10	8 (40.0)	
Other form of education		1 (5.0)	
Annual Household Income, n (%)			
Less than \$10,000	3	2 (10.0)	
\$10,000 to \$49,000	25	3 (15.0)	
\$50,000 to \$100,000	35	3 (15.0)	
\$100,000 or higher	37	12 (60.0)	

^aUnited States Census Bureau. American Community Survey. 2014.

Interview Findings

Interviews findings are presented by themes determined by the directed content analysis (denoted by bold, italicized headings). The specific sub-themes that emerged within each broader theme are denoted by regular, italicized subheadings. Overall themes and specific sub-themes, along with exemplifying quotations, are shown in Tables 3 through 7.

Beliefs Related to Food Purchasing

Mothers discussed food purchasing practices in terms of types of foods purchased (eg, fruits, vegetables, meats, seafood, snacks) and sources of food accessed. They mentioned purchasing their food from several outlets in order to obtain everything they need – bulk stores (eg, Costco or Sam's Club), grocery stores (eg, Safeway or Foodland), and local markets for specialty

items, such as manapua [steamed buns], Chinese dumpling skins, and taro. Daughters were typically not given funds to purchase food independently.

Fresh Foods Preferable to Processed

Mothers emphasized the importance of purchasing fresh food items, but also relied on processed or canned foods. This reflected the belief that processed foods are not as good as fresh foods, but are sometimes necessary in order to provide food for the family. In some cases, they made reference to importation of food affecting the freshness of items.

Value Placed on Hard-to-Access Food Items

When purchasing food for their families, mothers often placed value on particular food items that they had grown up eating that might be difficult to access. As O'ahu, Hawai'i is a diverse island with a large population of immigrants, many mothers expressed the desire to purchase foods that are not as readily available on the island.

Table 3 presents exemplifying quotes for sub-themes related to food purchasing.

Overall themes and sub-themes	Exemplifying quotes
Beliefs related to food purchasing	
Fresh foods preferable to processed	(Mother) I really, I like to cook so I don't buy, umm, prepackaged foods a lot. I mean, there's snack foods for the kids for school...I try to really limit the processed stuff and really try to eat more natural-based foods. (Mother) Sometimes it's not very, you know, like fresh, you know, it depends... 'cause I know that it's been like on a, you know, boat or plane or whatever...it travels for very long distances. (Mother) I try to buy as little processed as possible, but I am not a big freak out about processed food. I know that, I know, to be honest, for it to stay fresh enough here in Hawai'i, I have to have it, some processed.
Value placed on hard-to-access food items	(Mother) I do remember growing up with, like, really fresh corn on the cob and you don't really get that around here unless you drive to somebody's roadside stand. (Mother) So actually...my husband goes to California for business on like a regular basis and there's this German butchery in a place where he goes to work. He goes there, he freezes it [the sausage] in the hotel freezer, gets on the flight, and by the time he arrives it's just about defrosted and ready to eat.

Beliefs on Child Feeding Practices

Both mothers and daughters discussed eating breakfast at home in the morning, with dinners being prepared at home most evenings. Discussion of the composition of these meals reflected various beliefs about diet and specific foods (Table 4).

Variety, Balance, and Moderation

With regard to diet, both mothers' and daughters' comments generally reflected the belief that eating should be in line with the general principles promoted in the dietary guidelines. They believed the diet should be healthy, varied, and balanced, with snacks and sweets enjoyed in moderation. While participants did not cite MyPlate¹⁷ as a guide for healthy eating, they in some cases referenced the food guide pyramid.¹⁸

Beliefs about specific foods

When mothers and daughters discussed the foods they consume on a regular basis, various attitudes about specific foods emerged. Both mothers and daughters mentioned keeping carbohydrate intake to a minimum. Daughters also agreed that fruits and vegetables are healthy foods, and considered high-sugar foods to be unhealthy.

Positive Relationship with Food

Mothers also wanted their daughters to have a positive relationship with food and stated that eating well should not be an obsession. Mothers mentioned that they do not want food to be an emotional part of their daughters' lives and that food should be thought of as fuel.

Beliefs About Portion Size

Despite the desire for daughters to have a positive relationship with food, mothers usually determined the portion size of food presented to their daughters. Mothers typically did not encourage their daughters to clean their plates, as they did not want to place unnecessary pressure to do so. They did, however, express the desire for daughters to finish certain foods, such as vegetables, first. In some cases, mothers stated that daughters were "expected" to finish such foods and could not have other items such as dessert until the expectation was met. Table 5 presents exemplifying quotes for the portion size theme.

Beliefs About Eating Outside the Home

In the school setting, school lunch was generally available either from the school or a catering service. In the case of only two participants who attended private school, no school lunch was provided. Whether available or not, the majority of girls mentioned preparing their lunch at home, generally because they did not like school lunch and considered it unhealthy, a belief which mothers also shared. Girls typically packed leftovers from dinner the night before, or fruit, a sandwich, and snack crackers, and sometimes shared with friends.

Outside of school, mothers and daughters mentioned occasionally dining at restaurants. Fast food restaurants and convenience stores, such as McDonald's, 7-Eleven, and Jamba Juice, were

Table 4. Themes and exemplifying quotes related to beliefs about child feeding practices that emerged from the directed content analysis of interviews in adolescent girls ages 9-13 (n=21) and mothers (n=20) on O'ahu, Hawai'i.

Beliefs on child feeding practices	
Variety, balance, and moderation	<p>(Mother)...that would be to always make sure to have, like, one protein, one carbs, and also, um, a green or, um, like a variety of the colors. Like a rainbow of colors, which she's always also telling me, like, "Mommy, I learned that, you know, it's supposed to have the rainbow color."</p> <p>(Daughter) Because like when I think of a...cheeseburger, I think of the food pyramid, which has grain, protein, dairy, and, and those are healthy foods, right? And then, I think of the apples, which I eat the apples as well and I also eat the French fries, but I only have a small amount so...I always think of the food pyramid and how it will help me better.</p>
Beliefs about specific foods	<p>(Mother) So, she could eat more carbs. She would go for the bread and the potatoes first if she could. So, I just try to get her to eat the protein first...keeping her carbs to a minimum.</p> <p>(Mother) And I try to make it here's your vegetable and there's your meat and here is your starch after you have eaten that. So, it's kind of like the filler at the end if you're still hungry.</p> <p>(Daughter) I eat a lot of rice and people tell me um it's not that healthy...and I'm gonna get fat, but apparently I'm not fat yet.</p> <p>(Daughter) ...if you have too much carbohydrate, something, I don't know...it's just not good for you, like your body.</p> <p>(Daughter) ...basically fruits and vegetables [are healthy foods], everyone knows that.</p> <p>(Daughter) ...lots of bread...really greasy stuff and un-colorful things [are unhealthy] because they have a lot of sugar and if you don't exercise then they will just turn into fat.</p>
Positive Relationship with Food	<p>(Mother) I want her to like eating, I want her to eat because she enjoys it, and also 'cause she's hungry, not 'cause she's bored. I want her to see food as fuel, you know, she loves to be active and she's very, um, energetic and she does lots so we talk a lot about food giving you energy and what food can give you...and I want her to see food that way.</p>

typically frequented for snacks on the way home from school or on the way to sports activities. Some daughters mentioned that during occasions such as birthdays or sleepovers, food was different than what was typically served at home. Table 6 presents exemplifying quotes regarding beliefs on eating outside the home.

Beliefs on Ideal Body Size

Both mothers and daughters shared similar beliefs about ideal body size. Mothers and daughters agreed that people naturally

Table 5. Themes and exemplifying quotes related to beliefs about portion size that emerged from the directed content analysis of interviews in adolescent girls ages 9-13 (n=21) and mothers (n=20) on Oahu, Hawai'i.

Beliefs about portion size	<p>(Mother) I mean...at that point, it's not really like enjoyment, it's like...obligations, so I don't want to force her.</p> <p>(Mother) I would say only one time, "just eat a little bit more"...I probably only say it once, I don't wanna really like force her to eat.</p> <p>(Mother) I think it's fine [to leave food on the plate] as long as it's not the healthiest portion of the meal. If they want to leave rice, it's fine, but if they want to eat all of their rice and then leave broccoli, that's no good.</p> <p>(Mother) So it's not that I give her a huge serving of something and then she's stuffed and she can't finish it. I will put the occasional piece of broccoli on it and I will tell her I expect you to eat this and if she-the normal rule in our house for [my daughter] and her brother is if they don't want to eat up there's no dessert.</p>
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Table 6. Themes and exemplifying quotes related to beliefs about eating outside the home that emerged from the directed content analysis of interviews in adolescent girls ages 9-13 (n=21) and mothers (n=20) on Oahu, Hawai'i.

Beliefs on eating outside the home	<p>(Mother) ...to me, it's...it's just ludicrous that schools don't have decent food.</p> <p>(Daughter) My school, they, like, we have a really good salad bar, sometimes. But the food, sometimes it's really bad. Like, today I had home lunch 'cause I did not like the school lunch 'cause it was like, tacos, and like, really greasy tacos...Most of it is unhealthy, so I don't really get it.</p> <p>(Daughter) Like, if I go out with my family, we usually go to...like healthier places, 'cause like, my family is really healthy. And then, when I go out with certain types of friends...we get to go to like...fast food places. And I don't really like fast food.</p>
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come in different shapes and sizes, that a normal body size is a healthy body, and that a healthy body is not too skinny or too fat. Daughters described a healthy body as having healthy skin (or the absence of acne), hair, teeth, and vision. Mothers generally did not describe characteristics other than those that were weight-related.

Concerns for Overweight

When asked whether development of overweight was a concern with regards to their daughters, mothers generally did demonstrate some concern, which was often not expressed on the part of the daughters. Although daughters often did not express concern about becoming overweight, they did acknowledge that overweight is associated with health problems.

Concerns for Thinness

Mothers expressed even more concern for thinness, which

again, was not a personal concern daughters shared. Mothers stated that their primary concern regarding thinness would be the presence of an eating disorder in their child. Daughters did not associate thinness with eating disorders, but did express concern for performance in sports and activities if they became too frail or weak.

Being Healthy

When communicating with their daughters, mothers commented that they talk more about being healthy, instead of talking about body shape or size or how the body should look.

Size as Determined by Balance of Intake and Expenditure

Mothers and daughters both stated that being active is ideal and body size is determined by eating well and exercising regularly.

Ethnocultural Body Size Ideals

When discussing body size, mothers acknowledged various ethnocultural views. For example, some mothers noted that thinness is equated with beauty in Asian culture and that a larger body size is preferred in Polynesian culture. However, mothers often stated that these views were not congruent with their own in evaluating their daughters' body size. Daughters did not express ethno-cultural views regarding body size.

Table 7 presents exemplifying quotes for sub-themes related to beliefs about healthy body size.

Discussion

This study explored the food-related beliefs in 21 early adolescent girls aged 9 to 13 years and their mothers on the island of O'ahu, Hawai'i. Beliefs revealed hold important implications for interventions that address obesity prevention.

Regarding feeding practices, both mothers and daughters believed eating should be in line with the principles of healthy eating presented in the dietary guidelines. This finding reflects those of a recent literature review on perspectives on healthy eating revealing that adults associated healthy eating with idealized practices, often standards set by others, such as the government.¹⁹ Consistent with previous findings, daughters believed fruits and vegetables to be healthy and high-sugar foods unhealthy.²⁰ Mothers and daughters also held similar beliefs about specific food components, such as the importance of minimizing carbohydrate intake. Such findings may reflect the influence of the media, current dietary trends, and governmental guidelines, which recommend lower carbohydrate intakes for those who are less active.¹⁷

Mothers believed daughters should have a positive relationship with food. Despite not requiring daughters to finish the food on their plates, they did employ rules such as requiring daughters to finish their vegetables, possibly undermining the desired relationship.²¹ Previous research has indicated that pressuring children to consume more fruits and vegetables is associated with lower intake of these items²² and also higher intake of fat.²³ Through adolescence, the parent is responsible

Table 7. Themes and exemplifying quotes related to beliefs about normal body size that emerged from the directed content analysis of interviews in adolescent girls ages 9-13 (n=21) and mothers (n=20) on O'ahu, Hawai'i.	
Beliefs on ideal body size	
Concerns for overweight	<p>(Mother) Last summer she had this eating spell where she just ate literally four...huge portions of white rice and, um, I did see the flab on her tummy grow and I couldn't help pointing it out to her. I realized I really didn't like that and I did point it out to her.</p> <p>(Daughter) I feel like I'll never really be that heavy 'cause usually...I found that no matter how much I eat I never get fat.</p> <p>(Daughter) Well lots of people say that um...you should have a healthy body because it's better and...you won't have much health problems...you shouldn't be fat because like if you are fat then you will have like more health problems, such as like, diabetes or cancer and any of that stuff.</p>
Concerns for thinness	<p>Interviewer: How do you feel about her becoming too thin?</p> <p>(Mother) Hell no! Too thin is too, you know what I mean? As a bulimic, all dat kine stuff, you know, there's no way. No, she needs to be just right for her height and her body structure. She get big bones, so she ain't gonna be like no 99-pounder, you know what I mean?</p> <p>(Daughter) If I was too thin, then...I wouldn't be very athletic...I would want to get more, umm, in shape instead of being really skinny.</p>
Being healthy	<p>(Mother) I don't ever talk about her body, I mean, it's just about being healthy, and we have to have a healthy heart and in order to have a healthy heart, we have to exercise, we all do. We don't ever use any derogatory words in our family. Hopefully they don't at school, but...we just talk more about what we need to do to stay healthy for our bodies.</p>
Size as determined by balance of intake and expenditure	<p>(Mother) I don't think they should look any certain way, except that they should be fit for their own body...as long as they are eating well, they will be the right size because it's basic science. Calories in, calories go out. Too many calories go in and not enough calories go out, you're going to be big. So as long as they have the right balance and they are living healthy lifestyles, then I am not really concerned about it.</p> <p>(Daughter) It's kind of like a combination 'cause if you have a healthy diet, but you don't exercise, you can still gain weight 'cause you don't burn off all the calories. And then, if you eat a lot of junk food and exercise, you may not get rid of all the calories, too, so, it's kind of like a combination.</p>
Ethnocultural Body Size Ideals	<p>(Mother) In Asian culture, you probably notice that...the slim, thin ladies are considered as beautiful or are considered to be beautiful or nice, right, but I, I don't agree with that...and then also white skin color, you know they prefer that white skin color instead of your healthy tanned color...I don't think that is necessarily true. I always think as long as...she has physical activity outside, and she may get tanned and, as long as that is a result of her healthy activity, I think that's a good thing.</p> <p>(Mother) [In Native Hawaiian culture] They used to say, the bigger they are, the more beautiful they are, but I think... if she balance her weight with being active, then that's the weight she should be, you know what I mean?</p>

for what, when, and where food is consumed, while the child is responsible for determining how much is consumed and whether or not to eat, rendering the practice of requiring youth to finish food items undesirable.²⁴ Nutrition educators, being aware of the contradictory nature of mothers' beliefs and practices might consider strategies to achieve mothers' feeding goals while permitting daughters to have a positive relationship with food. These may include engaging youth in family mealtimes, role modeling positive food practices and advising caregivers to allow youth to determine food intake.^{25,26}

Discussion of eating outside the home revealed that participants believed school lunch to be unappealing and unhealthy. Previous studies have also highlighted problems with student receptivity to school lunches, with students expressing limited willingness to consume foods such as fruit and vegetables.²⁷ Recent studies have reported considerable food waste in schools, reflecting lack of receptivity to school lunch.²⁷ This can have deleterious effects on nutrition and learning for children who rely on school lunch.²⁸ While lunches provided as part of the United States Department of Agriculture's National School

Lunch Program are required to meet standards for nutritional content,²⁹ food provided may not be as appealing as needed to encourage consumption. Further examination of healthy and palatable options for school lunch is warranted.

In discussing normal body size, mothers and daughters referred to a healthy body as being not too skinny or too fat and that people naturally come in different shapes and sizes. Previous studies have shown that being too thin may be equated with illness, while being overweight may be considered problematic only when clearly linked to health problems.⁷ Data from both mothers and daughters in our study reinforce this belief that body size is linked to good and poor health. Further, mothers acknowledged ethnocultural beliefs regarding body size, particularly beliefs held by Asian and Native Hawaiian or other Pacific groups, but stated that they did not hold those beliefs. Daughters did not acknowledge these ethnocultural beliefs. While previous studies have illustrated that larger bodies may be valued among some racial/ethnic groups, such as Tongans and Blacks,^{30,31} ethnocultural beliefs about body size were not shared by all members of racial/ethnic groups in this study.

In considering beliefs related to ideal body size and other topics explored in interviews, the influence of the media will be important to examine in future studies in this population. Previous studies have noted the widespread objectification of women and girls in the American media.³² Other studies have shown that girls develop responses to objectified images of women that relate to their feelings about their own bodies,³³ and that the media conveys messages that result in high levels of body dissatisfaction among adolescents.³⁴⁻³⁶ Further research is warranted to determine the impact of media, including social media on beliefs of adolescent females in Hawai'i, which should be considered in developing interventions in this population.

Findings of the current study demonstrate the importance of periodically reevaluating contributing factors in existing models of obesity in youth. The culture sphere of the Six-Cs model, for example, specifies a positive bias toward a larger body type among vulnerable populations as contributing to child obesity.¹³ This factor, based on findings from studies in the mid-2000s and earlier, may not reflect current beliefs. Because food-related beliefs and the cultural contexts of those beliefs are dynamic and diverse, the model may need to be updated to reflect this dynamic observed for specific groups.

Results also illustrate the discrepancy between beliefs and practices. Mothers relied on locally-available and processed or canned foods to manage constraints, such as the high food costs and limited time for food preparation. As noted in previous studies, eating choices are typically made according to what is obtainable.⁵ The incongruence of beliefs and practices highlights the importance of addressing all levels of influence on behavior, particularly when referencing a theoretical model, and demonstrates the challenges mothers face in operationalizing their goals for feeding their daughters within the constraints of daily life. The social-ecological model illustrates the levels of influence on behavior, and posits that there are mediators within five spheres having an impact on practices.³⁷ These are intrapersonal (ie, beliefs, knowledge), interpersonal (i.e., social network), institutional factors (i.e., organization characteristics), community factors (ie, relationships among organizations), and public policy (ie, local, state and national laws).³⁷ Interventions seeking to change food-related behavior must address not only intrapersonal factors, but also those at a broader level to effect change in the environment.

To our knowledge this is the first investigation of food-related beliefs in adolescents and their mothers in Hawai'i. Findings are theoretically generalizable and provide information regarding the beliefs of this group. While findings may not be applied to populations outside of the group under study due to the nature of the sampling procedures, the theoretical concepts derived from the study may be used to contribute to theory development to address diet-related chronic conditions in adolescents in Hawai'i. Study participants were diverse in terms of race/ethnicity, with White, Asian, Pacific Islander, and Mixed individuals included. This made it possible to examine some of the weight-related beliefs across the racial/ethnic groups included.

There were also several limitations of the study. Participants did not mention several issues that may have potentially important impacts on behavior, such as intergenerational influences on dietary practices. Such topics could have been addressed more specifically in the interview guide to allow for an in-depth discussion. In terms of demographics, there was not as much variability in the sample regarding education and income as there was with respect to race/ethnicity. Greater representation of low-income participants in the sample would have allowed for further exploration of beliefs in this segment of the population. A follow-up study may focus on a low-income group to compare findings. In addition, information on weight status was not collected. To examine whether beliefs may translate into food behaviors and impact weight status, additional research should be conducted. Further, most of the study participants resided in urban areas; therefore rural representation in the data is lacking.

Conclusions

Study findings provide insight into food-related beliefs of multicultural adolescent girls and their mothers. Beliefs expressed regarding food purchasing, feeding practices, portion size, and body size can be further investigated to determine the role these beliefs may play in determining weight status of adolescents in Hawai'i. Findings may be used to inform health promotion programs and the development of additional studies on factors impacting weight status in adolescents.

Conflict of Interest

None of the authors identify any conflict of interest.

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