

Research

Understanding Food Choice, Medication Use and Health from Lean and Non Lean Resident Perspectives in a Rural State

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Abstract

Diet-induced obesity is a leading cause of metabolic diseases. This study aimed to begin translating basic science research on obesity to humans via a social science approach. Study objective was to analyze the consumer perceptions on the role of food choices and medication use and their implications on the overall health status and wellness in a rural state. This article describes a qualitative analysis of food choices, medication use and health experiences of consumers in different age groups who were sub classified as lean and non-lean subjects in a rural state. Verbatim transcripts were created from the audio recorded interviews and the themes were organized and analyzed using qualitative analysis software NVIVO 10[®]. Key informant interviews of lean and non-lean residents of one town in a rural western state were conducted across different age groups to elucidate detailed information about consumer-centric issues, factors and perceptions around food choice and medication use and its effect on their health. Our study showed that most respondents were aware of the implications of the type of food on their health status but several were unable to understand how food choices could potentially diminish the need for or dosage of medications with positive improvement of health status. Also, the respondents could not reflect on the effect of medication use on wellness as clearly as that of food on health. While 94% of the lean respondents tended to better understand the relationship between food and health, some non-lean respondents found it hard to positively correlate food choices on their health. As for differences in the age groups, 36 % of the respondents that were 21-35 years old, had less experience with medication use and had used fewer over the counter supplements compared to older subjects (36-55+). Our study suggests that it is important for customers to make the connection how food choices could possibly obviate the need for chronic disease medications on resultant health conditions, especially obesity. Our study revealed the need for health care providers and pharmacists to counsel consumers on medication information, food choices, food-medication interaction, and the use of dietary supplements to reduce diet induced obesity and promote wellness.

Keywords: Obesity; Food Choice and Perceptions; Medication Use; Qualitative Analysis; Non-Lean And Lean; Health and Wellness

Introduction

Obesity is the hallmark of metabolic syndrome that predisposes to serious health complications such as diabetes, hypertension and myocardial infarction [1-5]. Although a combination of lifestyle changes, exercise, pharmacotherapy and surgical interventions help in obesity management, developing reliable therapeutic intervention to counteract obesity is very important [6]. Food choices affect health and wellness. From 1980 to the present, there is a gradual increase in the obese population from 15% to over 30% in Wyoming, USA. It is estimated that by 2030 adult obesity rate in Wyoming will rise to 56.6%. Such alarming increase in the adult obesity rate, including baby boomers [7], translates into high costs for treating illnesses related to the obesity and pose tremendous burden on healthcare system [8]. It is important to develop novel strategies [9,10], provide proper diet and exercise regimen [11] and follow food choices to combat metabolic diseases [12-14]. In order to analyze the implications of food choices and medication use in a rural population, this study collected qualitative data from the residents of Wyoming.

Food choice and its impact on nutrition and health has been studied extensively in specific areas such as eating motivations [15-

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18], preference differences between lean and obese women [19,20], international and cultural influences [21-24], eating disorders [25-29], stress [30-32], and obesity [33-35]. Our literature searches did not identify any studies that examined consumer perception of spicy food or the impact of food choice, portion size and especially medication use on health status. Understanding these perceptions and seeing if any differences in perceptions between lean and obese consumers would be invaluable in designing a dietary intervention study.

Information on the perceptions regarding food choice and its relationship to medications as well as health has also not been explored from a rural consumer perspective previous to this study. Food is an important aspect of health that is often neglected in treatment plan and health outcomes. Yet, not many large studies are performed to assess their health effect, because dietary food as a source of intervention is hard to control due to the variability of food content, availability of food, as well as patient preferences and habits.

Maintaining a net negative energy balance is a staple in obesity management, but following such a diet long term may be impractical for many patients. A review by Rebello, et al [36], indicates that research supports that food with high satiety may be a practical option to complement weight loss diet. Examples of such food are those in high protein, such as low-fat dairy products, eggs, legumes, and nuts. Sharkey et al., [37] studied the relationship of health-related quality of life as a function food security in rural and urban women. The results showed that food insecurity in rural settings was associated with fair-to-poor general health, but not in urban settings.

In a cross-sectional survey of adults living in rural southwest Georgia, Kegler et. al., [38] found that environment played an important role on healthy eating habits and obesity prevention. Neighborhood social cohesion was significantly associated with increased self-efficacy for healthy eating (consumption of fruits and vegetables, fewer fat items). Also, the role of proximity of food stores in rural and urban areas have been shown to be involved in the vulnerability of population to obesity and other chronic metabolic diseases [39,40].

Additionally, the successful use of over-the-counter drug orlistat to reduce body weight is often documented in literature. A recent clinical trial conducted by Yu, et. al., [41] agrees with previous findings. Yu's study focused on obese adolescents, and showed that orlistat improved endothelial function and reduced bodyweight. In Kushner's article [42] regarding weight loss strategies, these new pharmacologic agents are a possible next step of obesity treatment after lifestyle changes alone have failed.

The purpose of our study was to describe consumer perceptions

of the role of food choice on their medication use and health and wellness in a rural state. We also examined the data to understand if any difference in perceptions occurred in lean and non-lean consumers. This study also collected data from participants to understand if any difference in perceptions occurred amongst three different adult age groups 21-35 years, 36-55, and older than 55 years.

Methods

We conducted structured key informant interviews of lean and non-lean consumers in Laramie, Wyoming across different age groups (Table 1) to elucidate detailed information about consumer-centric issues, factors and perceptions around food choice and medication use and its effect on their overall health and wellness. Follow up questions were asked as needed to get detailed information or clarify answers.

Table 1: Study Overview

Age Groups	LEAN	Non-LEAN
21-35 years	12	12
36-55 years	12	12
55+ years	12	12

Recruitment was done through flyers posted by the student researcher at libraries, community pharmacies, medical and dental offices, grocery stores, places of worship, community recreation center and other places in the city. Student researcher helped with recruiting, screening and enrolling study subjects. Inclusion Criteria: English speaking, ambulatory adults willing to participate as indicated by written informed consent in this study. This study obtained exempt status approval from the University Institutional Review Board (IRB).

The purposeful sample of key informants that opted-in to participate in the study completed a digitally recorded, face-to-face interview of 30-35 minutes. Two investigators conducted this in their office or in a conference room. They used a Structured Interview Guide that has been created by literature search and based on advice from experts, who regularly conduct such interviews. The resulting de-identified data was used in identifying key insights and conclusions. Informed consent was obtained prior to interviews. An incentive of \$30 Amazon gift card was given to each study participant.

Twelve interviews were conducted per intersection of age and obesity level. This provided sufficient text for theoretical saturation, which is defined as the point of data collection till no new information emerges. Typically this is about 6-10 interviews but we did twelve per intersection to address the objective of this study as well allow for any incomplete data [43]. Had saturation not been achieved after the twelfth interview, the research team was prepared to conduct additional interviews until saturation

was reached in each age group of lean and non-lean subjects. Lean subjects were defined as those with body mass index (BMI) ≤ 24.9 or below. Non-lean subjects included those with overweight and obese BMI (25 and above).

The raw data (de-identified transcriptions of complete unabridged transcripts, digital recordings and context rich field notes) were analyzed utilizing NVIVO 10™ qualitative software where the collective insights were coded, discussed and thematically grouped until no new themes emerged. Study rigor and trustworthiness was maintained by two independent analyses by qualitative researchers and then cross check of themes by study authors.

Results

A total of 72 participants completed the structured interview. Most respondents in this study knew food affected their health but not all were able to understand how medications use may affect health or be affected by health status. Medication side effects or food-medicine interactions were considered during the interview but respondents could not associate how the need for a particular medication could be eliminated if they ate or didn't eat a certain type of food. While almost all (94%) lean respondents tended to understand the relationship between food and health much better, some non-lean respondents sometimes found it hard to describe positive consequences of food choices on their health status and wellness.

The average age of the study respondents was 44 years and ranged from 21 to 74 years as per study criteria. With respect to differences in the age groups, younger age group had less experience with taking medications for daily use as they used fewer over the

counter medicines and supplements. As one might expect, the number of participants who reported medical conditions increased with age and weight of the participants. Only 19 were males out of the 72 respondents, 8 of the 19 were non lean male subjects and of these one was Hispanic (lean). Considering the smaller number of males that participated in this study voluntarily we could not see differences in gender. This limitation needs to be addressed in future studies by recruiting more male participants. Table 2 contains detailed demographic information on all the study participants.

The next section describes the four major themes resulting from an in-depth analysis of the 72 interviews. Each of these themes is described in depth with text exemplars or participant quotes provided in Supplemental Data 1 and the Interview Guide is provided in Supplemental Data 2.

1. Healthy Food Choices are Energizing

Almost all (94%) respondents agreed that there was a strong relationship between food choices and health. A few (4 out of 72) mentioned that they thought of the two separately or “didn't know” of the connection. Of those that understood the relationship between food choice and their health, at least half found it hard to think of a positive consequence of food choice on health. A common positive consequence was ‘feeling more energetic on eating fruits and vegetables and lethargic on eating high fat foods’.

It is also important to note under this theme that Subject 55 (Lean, 61yrs.) provided a negative instance from her own personal experience wherein she had tried all kinds of dietary changes yet that never seemed to affect her cholesterol levels or her need for taking cholesterol medication.

Table 2. Descriptive statistics of the study population
N =72

Characteristic	N (%)
Gender	
Men	19 (26)
Female	53 (74)
Body Mass Index (BMI)	
< 25	36 (50)
25-29.9	14 (19)
>29.9	22 (31)
Education	
High School Diploma/GED	19 (26)
Associate's Degree- Community College	5 (7)
Bachelor's Degree- University	18 (25)
Graduate Degree –MS or PhD	30 (42)

2. "Food is NOT Medicine"

Consumers did not necessarily link food choices with their medication use. The sub themes on medication use were centered on use of the following:

- a. Prescription (Rx), supplements, and Over-the Counter (OTC).
- b. Food medication interactions

All of the respondents understood that certain medications could interact with certain food items and could give examples such as never use grapefruit with cardiac medications. However, only a couple of the respondents were able to reflect that certain food choices might obviate the need for medications. This relationship of need versus food choice was much better understood in case of supplement or multivitamin use where respondents used multivitamins only if felt they did not get enough from their diet. With regard to over the counter (OTC) medication use, most patients did not realize that there was a relation between using them and food choice or change in food choice. Quite a few consumers did not take regular prescription (Rx) medications but as far as relating food choice to use of medications or medication use due to food choices, the common example was need to take over the counter (OTC) heartburn medicines upon eating too spicy or fried foods. Use of caffeine was cited as a drug of choice to help with work but also something that caused few to take heartburn medications. Allergies and food connection was made by two respondents as well.

Less connection was made with side effects and OTC medication use than Rx use and even less so with supplement or vitamin use. The most common example with regard to prescription or Rx use was not eating grapefruit with anticoagulants based on a well-known and serious drug-food interaction. Usually in such cases, advice was given by health care providers and reinforced by pharmacists.

Almost all respondents in this study were taking supplements based on their personal judgment or from a recommendation from a friend or family member. Only rarely was this decision based on a recommendation from a provider. All the respondents' (35years and younger) used supplements without any consultation from a health care provider or pharmacist. In some participants, use of supplements was intermittent based on when or if they felt their diet on that day or week hadn't provided the needed nutrients or nutrition. In couple of cases, for example, regarding known or suspected iron deficiency, there was really no choice but to take the supplement since either the food did not provide enough iron or might not be easily absorbed. Younger participants tended to obtain their supplements from GNC® or other specialty stores rather than in pharmacies. When supplements were obtained

from pharmacies, most participants did not think of asking the pharmacist for advice. The reason for this was not explained by the participants. Therefore, data was not collected on why pharmacists' advice was not taken, this could be due to younger respondents not taking prescription drugs and hence not thinking of the pharmacist as a resource for supplement use as well.

Food and Weight Connection Understood (Consumers Generally Associated Food Choices with Weight Consequences)

Two, younger than 35 years old respondents reported that they currently were, or at some time in the past, had tried to gain weight. Only three respondents (2 males and 1 Female over the age of 35years) had not attempted to lose weight and they were eating or making food choices just to be healthy. The remaining participants reported that they wanted to lose weight and had done so mainly by eating healthy and non-processed foods and exercising. A couple of those mentioned specific diets such as weight watchers® or Atkins® or Zone® diet (but found it hard to stick to and expensive to use foods like cereal bars from these diets). Overall, reducing portion sizes and dietary sugar, having low fat, low salt and low calorie foods along with more fruits and vegetables were cited as other steps taken by study participants to lose weight. Some talked about changing their cooking habits, such as avoiding the frying of food or, alternatively, using less oil or grilling lean meats to lose weight in a healthy manner. Use of supplements for weight loss or weight gain included the use of protein shakes or protein powders.

Food Choices are based on Personal Preferences

Most respondents chose food items based on personal preferences rather than from advice of providers, friends, and family. About half the study participants stated that they ate fast food for sake of convenience and to save time. They shared that they made this decision even though they recognized that it was not a healthy decision. Overall, 90% participants had not been counseled by their physician or another health care professional to avoid making unhealthy food choices. Some (5 out of 72) mentioned that it was clear on the food label something had too much sugar but still consumed it because of the good taste. One participant described reading about something not being good for you like raw milk but not personally seeing any harm from drinking it growing up in rural Wyoming and so had continued that habit as an adult too. On the other hand like seen in the text example provided for this theme, while some changes might have been made due to physician advice, ultimately sticking to healthier options was still a personal choice. No differences were seen amongst lean and non-lean respondents in following professional advice and using personal preference instead. This seemed to be the norm for healthy and unhealthy food choices across different age groups as well.

Discussion

A majority (97%) of study respondents in this study agreed that eating more of non-processed foods such as fruits and vegetables made them feel better, energetic whereas eating processed foods left them feeling lethargic. Following studies showed that some food items may have clinical benefit that may warrant further research. A study published Mansour et. al. [16] studied the effects of ginger in overweight men. When the subjects received ginger powder dissolved in warm water, there were no metabolic change compared to control, yet there was a significantly higher satiation and lower prospective food intake. This may be helpful in controlling binge eating disorder, and may help in weight management. Wu et. al. [17] performed a systematic review and meta-analysis of nuts their effects regards to cancer risks and Type 2 diabetes. The analysis showed that there was a significant association for reduced risk of colorectal cancer, endometrial cancer, and pancreatic cancer, but no association with diabetes. Our study points to some interest in use of food based supplements to control obesity especially for those who had side effects due to use of spicy foods. Overall, stressing the importance of educating consumers on effect of not only food but also medications on their health and weight is needed.

Limitations

This study examined food choice and its effect on health and medication use amongst a group of consumers residing in a rural state. While the study sample size was large compared to those usually using qualitative interviews, results should be interpreted with caution. The reason being that study participants were voluntarily engaged via a convenience sampling. So, consumers who may be more aware of their food and health connection might have approached the study investigators to participate. In addition, being a small town word of mouth and hence snowball sampling worked best to get study participants and higher educated sample was obtained as a result.

Conclusions

The results of this study show that it is important to make the connection between food choices and medication choices on health, especially obesity for the consumers. One way to achieve this would be to have health care providers and pharmacists proactively counsel and emphasize the fact that they are among the best resources for obtaining information on medications and health- not just regarding food drug interactions but also regarding best use of dietary supplements as well.

This study results indicate that overall consumers – irrespective of their health status are becoming more and more aware of the food choice and healthy weight management and maintenance. While respondents were aware that certain foods should be avoided with

certain medications, participants in this study did not show full understanding of the relationship between need for chronic disease medications and food choices and level of obesity. For instance, only one participant made a distinct connection between eating healthy, losing weight, and the subsequent normalization of his blood pressure without a need for medication and its associated risks of side effects.

This idea that if one ate healthier and lost weight then need for some medications may be reduced or eliminated is an important gap in consumer education that needs to be filled by pharmacists and possibly other health care professionals. One study planned by us is to examine the current state of knowledge and willingness to provide such education by pharmacists and pharmacy students. This formative study also provided ideas for future clinical and translational research in this area where there is a need to identify via larger observational studies a market for supplements for reducing the problem of diet induced obesity.

Supplemental Data

Supplemental Data 1: Text Exemplars of the 4 Main Study Themes

“Text Examples of Theme 1: Healthy Food Choices are Energizing”

“If I eat more fruits and vegetable, I feel more energetic. I feel that I have more energy and I am more able to get out and do the things that I enjoy doing..... I eat too much fatty food. I enjoy sitting in my chair, watching TV, rather than getting out and moving. (Subject 38, 62 yrs., Non Lean)

I have friends that will eat out every single night, and you can tell that they're just a little bit more sluggish just because [there are] more preservatives in it. When I was living at home, I found my lifestyle a lot [healthier] just because we were preparing a lot more food out of the garden, we were canning our own stuff, and I wasn't eating out a lot. Now that I've moved away from home I'm finding that I'm buying these canned foods, the preservatives from the store. I just feel like I'm getting bigger, I'm more like, I guess not obese, but you can just feel that you're more sluggish and your lifestyle is just kind of going a little bit downhill. (Subject 4, 21 yrs., Lean)

“Text Examples of Theme 2: Food is not Medicine”

“Well obviously the blood thinners would do more with the heart valve. I have to have my blood checked constantly to keep it in a certain range as far as, platelets I guess you call it. I have a heart range, so I have to avoid the real dark green vegetables.” (Subject 47, 74 yrs. Non lean)

“Yeah. My doctor told me that I really should back off on eating cheese because that affects my triglyceride. Consequently, my

cholesterol is up a little bit.” (Subject 5, 55 yrs., Non Lean)

I avoid all the herbal supplements, because I think that there’s too much variation in the products, from what I’ve read and so I don’t have a good background there to give their interaction between those over the counters and that. (Subject 46, 70 yrs., Non Lean)

I think what’s as always been explained to me is they’re trying to heal my digestion through food, food being a healing medicine too and then adding supplements on top of that to help my adrenal glands and thyroid and digestion by probiotics, things like that. I’ve been doing that about a year. (Subject 9, 55 yrs. Non lean)

I wonder. I had heard that if you eat local honey it’s supposed to help your allergies so I do have honey in my tea but I haven’t noticed it being helpful for my allergies. The Flonase® was a miracle drug for me. I used to have allergies so bad in the summer I used to ... I still hate summer because of the connotation with my youth and having such bad allergies in the summer. Then I got introduced to Flonase® one year and it just ... I could breathe through the summer. It was awesome! I don’t know. I could I love that drug. (Subject 45, 60 yrs. Lean)

“Text Examples of Theme 1: Healthy Food Choices are Energizing”

I haven’t actively wanted to gain or lose weight, but I would assume that if I adopted a diet full of processed food, I guess I would assume I would probably gain weight and I think I have been able to stay slim and healthy partly, a lot because of my food choices. And you know, I signed up for all kinds of Facebook sites and different websites, having to do with people who would Whole foods, plant based diets and you know, sometimes there [are] testimonials about people who lost a bunch of weight when they only ate plant based foods that are not processed. And it seems really believable and when I took the [school name] plant based nutrition course, you know, there were lectures who talked about studies that showed people eliminated their diabetes medications or heart disease medications because they went whole foods plant based. And that was really credible at that. So that kind of influences me to continue with that diet. (Subject 15 Lean, 41 years)

Yeah. I think everybody does, right? We think, “Oh, I can’t have that dessert.” Gain or lose weight. I think it was probably 12 years ago. We looked at the South Beach Diet. My husband and I both looked at it and we have reduced pastas and breads in our family and we feel better fortunately. I think we can [do] more. We try to have two or three vegetables at dinner and meat and sometimes gluten free pasta but yeah, we look at stuff to lose weight but not focusing a whole bunch. I like the flavor of stuff more than worrying about diet, worrying about losing weight. (Subject 27, 42yrs., Lean)

I eat a lot of fat to gain weight. My son [.....]. I weigh the same as I did when I got out of high school. But I work my [___] off. I

run ultra-marathons. I run 8 miles sometimes every day or every other day in the mountains, just because I like it, for kicks, and to de-stress. Nobody ever told me ... I was raised in a family where nobody told [inaudible]. I have a wife now, though, who lets me know, but I’ve never been advised by anybody, and I never really thought about ... I actually tried different things in the last year as far as [.....] save money, and/or maybe I’ll have better fuel if I, say, eat hot breakfast cereal for breakfast. That burns out about 9:30am for me if I eat it [inaudible], so it’s better for me to protein up, if that means eggs and beans, a couple pieces of toast with a few slabs of butter each morning. (Subject 44, 61 years, Lean)

Yes. One, I stopped all frying. I just don’t fry. I made choices maybe in how I prepared food. I would have a count that you would have to have five vegetables a day. I didn’t really necessarily limit what I was eating as long as I made sure that first I ate the vegetable and then I ate something else. When I went to college, I gained your typical 15 pounds. What I discovered is, I was not eating what I was craving and so I would eat everything else, and then still end up eating what I was craving. When I finally just started eating what I was craving, but in smaller amounts, I lost 15 pounds. I started realizing that what I was craving was something I needed and that really helped me out a lot. (Subject 18, 48 yrs., Non Lean)

“Text Example of Theme 4: Food Choices are Personal”

Yes. When I was pregnant with my third child, I had gestational diabetes. So I talked with a nurse. She had to tell me all the things I can’t eat. Then they put me on drugs and it sucked.

So yes, I’m fully aware of all that. No white bread, no white rice, no white sugar. The little things we have still incorporated. We don’t tend to eat white rice. We tend to eat brown rice. We don’t tend to eat white pastas. We eat brown pastas or wheat pastas. I still do a lot of baking with white sugar so not that part. (Subject 71, 34 years, Non Lean)

Supplement Data 2: Structured Interview Guide

“Food Choices and Health and Well-Being”

1. What is the relationship between your food choices and your overall health?
2. Do you think about the consequences (positive or negative) of food choices and your health? Can you give an example?
3. Have you made food choices that you believe or have been advised to be unhealthy? Please describe an instance.
4. Have you chosen food items to help you lose weight? Please describe.

“Food Choices and Medication Use”

1. Is there any relationship between your food choices and use of medications? Please describe.

2. Please give examples of a time that you may have been counseled or advised regarding the impact (positive or negative) of food choices on your medication use, prescription or over the counter?

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