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Caregivers' Perceptions Towards Medical Nutritional Supplements

By

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Bachelor of Science, Nutrition & Dietetics, University of New Mexico, 2016

THESIS

Submitted in Partial Fulfillment
of the Requirements for the Degree of

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DEDICATION

This manuscript is dedicated to my husband and son. You are my inspiration forever and always.

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Caregivers' Perceptions Towards Medical Nutritional Supplements

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ABSTRACT

Children 2-5 years of age can be vulnerable to being underweight due to characteristics like selective eating. As a result, children may not be consuming essential nutrients from balanced meals and may have a reduction in the variety of foods they eat. Medical nutritional supplements are often recommended by healthcare professionals including physicians and registered dietitian nutritionists (RDNs). Parents/caregivers may not research how the medical nutritional supplement benefits their child's health and may not comprehend the meaning of the words "healthy growth". This study investigated the attitudes and the perceptions of caregivers of children 2-5 years of age toward liquid nutritional supplements prescribed for weight gain by a healthcare professional for their child. Caregivers whose children were enrolled in the Special Supplemental Food Program for Women, Infants, and Children (WIC) program in the State of New Mexico and were prescribed Pediasure were recruited and a total of 17 surveys were collected. The majority of participants selected Hispanic or Latino as their race/ethnicity (n=9; 53%) and most participants learned about the medical nutritional supplement through their child's pediatrician (n=9; 53%). Hispanics and Whites were more confident that their child's health had improved because of the medical nutritional supplement than other race/ethnicities. (P=0.03). Further qualitative research should be done to investigate differences in perceptions towards liquid supplements by race/ethnicity.

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Chapter 1

Introduction

In the United States, the prevalence of underweight in children 2-5 years of age is 2.8%.¹ Compared to the prevalence of obesity, the prevalence of underweight may not seem like a public health concern, but there are multiple negative health consequences that can arise from being underweight including micronutrient deficiencies, protein deficiency, and increased risk for infections.¹⁻² According to the Centers for Disease Control and Prevention (CDC), underweight for children 2-20 years of age is defined as a body mass index (BMI) below the 5th percentile for age and gender.³

Children 2-5 years of age can be vulnerable to being underweight due to characteristics such as selective eating. According to Klazine Van der Horst et al, selective eating is defined as the unwillingness to try new foods and consuming a limited type and amount of food.⁴ Children may also favor one type of food group for days or weeks known as food jag.⁴ Favoring one type of food becomes part of a food acceptance pattern that can develop in early childhood and may leave children vulnerable to nutrient deficiencies.⁴ As a result, children may not consume essential nutrients from balanced meals and may have a reduction in the variety of foods they eat.⁴ It is important to address selective eating among children in order to prevent limited intake of core food groups and to ensure the consumption of a sufficient amount of calories every day.

The development of food preferences begins in early childhood. As children develop their eating skills and habits, parents play a critical role in encouraging the child to taste different foods.⁴ In a study conducted by Klazine Van der Horst et al. favorite food consumption and food texture resistance were associated with selective eating behaviors.⁴ If children reject meals or eat the same foods every day, they may become vulnerable to underweight and/or malnutrition.⁴

Medical nutritional supplements are often recommended by healthcare professionals including physicians and registered dietitian nutritionists (RDNs). Medical nutritional supplements were originally formulated to support health needs of under and malnourished children.⁵ They also contain essential macronutrients, vitamins and minerals that may help underweight children gain weight and treat or prevent micronutrient deficiencies. Selective eating or food jag behaviors may exclude nutrient dense foods and therefore, it may be beneficial for a child to consume a medical nutritional supplement to prevent poor growth (falling under the 5th percentile on the CDC weight-for-age or weight-for-height growth chart). Medical nutritional supplements are intended to function as meal complements rather than meal replacements.⁵ Parents do not need a physician's prescription to purchase these as they may be purchased over the counter.

Liquid medical nutritional supplements are part of the global baby food market which was estimated at \$55 billion in 2015.⁵ Liquid supplements are increasingly marketed to parents of children with selective eating.⁵ A review article by Lampl et al. revealed that children who fall below the 5th percentile for weight-for-age were the target of the liquid-based supplement industry.⁵ Companies who manufacture and market these supplements claim they will help contribute to a child's health by achieving "healthy growth".⁵ Medical nutritional supplements are increasingly provided to children whose parents and caregivers are concerned about their small size or growth.⁵ Many parents believe that medical nutritional supplements are a healthier option than providing nutrient dense foods.⁵ Parents/caregivers may not research how the medical nutritional supplement benefits their child's health and may not comprehend the meaning of the words "healthy growth".⁵ Furthermore, parents often rely on family and friends for health information rather than healthcare professionals.⁶

The literature on the attitudes and perceptions of parents and caregivers towards liquid medical nutritional supplements consumed by their underweight children is limited. It is important that healthcare providers are aware of caregivers' perceptions of supplements to ensure proper use as a temporary/adjunct to diet intervention. If the supplement is given for an extensive period of time, the child may exclude nutrient dense foods and desire the medical nutritional supplement instead.⁵ The current study investigated the attitudes and the perceptions of caregivers of children 2-5 years of age toward liquid medical nutritional supplements prescribed for weight gain by a healthcare professional.

Chapter 2

Literature Review

The objective of this literature review is to provide an overview of the current published research regarding the use of medical nutritional supplements by toddlers prescribed by their healthcare provider for the purpose of weight gain. The literature review will also investigate research assessing perceptions of caregivers towards supplements consumed by toddlers. The literature on the attitudes and perceptions of caregivers towards nutritional supplements prescribed to children, particularly medical nutritional liquid supplements, is limited.

Sato et al. examined dietary supplement use by preschool age children and the attitudes of parents towards supplement use by their children through a survey.⁶ Although there is no set definition for dietary supplement in Japan, the authors defined dietary supplement in the survey as those food substances that were in a tablet, capsule, powder, granule, extract, or chewable tablet form. A total of 2,125 parents of any age and socioeconomic status who had children attending a kindergarten or day-care center that was located through the seven districts in Japan were surveyed. The investigators used an anonymous survey that was distributed at the kindergarten schools and child-care centers. The survey included characteristics of parents and their children, parents' dietary supplement use, parents' attitude towards their child's diet, and the parents' attitude towards their child's dietary supplement.

The authors received 1533 completed surveys from parents. They found that 17.4% (n=25) of parents whose children were using supplements sought consultation from friends and family rather than healthcare providers. The authors reported that parents whose children used dietary supplements and were also taking dietary supplements, were 14 times more likely to give supplements to their children compared to parents who did not use them. The authors also

reported that the parents' knowledge and attitudes towards dietary supplements and nutrition had a strong effect on their child's use of dietary supplements because of the level of interest parents may have towards the nutritional balance and diet of their children. Failing to investigate ways for their children to consume nutrients through foods may lead parents to provide supplements to their children. The authors concluded that the parents surveyed had a misunderstanding of the purpose of dietary supplements and there was a lack of communication between healthcare providers and parents.

A cross sectional study conducted by Sato Y et al. examined factors associated with dietary supplement use among Japanese preschool children through a nationwide survey.⁷ An online questionnaire was given to Japanese mothers (age range 20-40 years) of preschool children who were members of a Japanese social research company; 2058 mothers completed the survey and were included in the final analysis. The questionnaire assessed dietary supplement use, lifestyle, and eating habits in both children and mothers, and eating awareness and source of health information among mothers. Authors reported the average age of a child who used dietary supplements was 3.6 years old but did not reveal the type or form of the dietary supplements. Eight percent (n=13) of preschool children who skipped breakfast were taking dietary supplements. The authors also found 72.1% (n=118) of mothers who used dietary supplements also had children who were supplement users and 73.3% (n=120) of mothers whose children used dietary supplements responded, "yes" to using numerous sources to access information about meals. The implication of these results is that children may be more influenced to use dietary supplements by mothers who use dietary supplements compared to mothers who do not use dietary supplements. Lastly, 20.6% (n=33) of mothers obtained health and diet information primarily from word of mouth and 56.4% (n=93) of mothers obtained information from the

media. The implication of these results is that parents may be misinformed about food related health information because they are referencing “numerous sources to access information about food meals” rather than seeking accurate health information from a healthcare professional. Seeking nutrition information through the media or word of mouth could lead parents to over or underestimate nutrient content of foods consumed and possibly add an unnecessary dietary supplement to their own or their child’s diet.

The authors concluded that the mothers had increased concerns about their child’s health when they saw their child skip a meal and obtained health and diet information from the media. The implications of these conclusions are that parents may be concerned about their child’s health if their child skips a meal and possibly seek dietary supplements as an alternative method to compensate for the skipped meal. In addition, parents were seeking inaccurate sources for health information, which can lead to the consumption of dietary supplements without the consultation of a healthcare professional.

A study conducted by Kim H et al. examined the prevalence of dietary supplement use and explored factors associated with dietary supplement use among preschool age children.⁸ The authors surveyed 935 mothers (30-39 years of age) of preschoolers who visited a pediatrician in five primary and secondary clinics within three cities in Korea. The survey contained questions on demographics of children and parents, society and health related factors, dietary habits and trends, health status of the child from the mother’s point of view, reasons they provided supplements to their child, and major sources participants received information about dietary supplements.

The authors found 59.4% (n=248) of children took a dietary supplement once daily. Of those, 94 (22.4%) were taking liquid supplements. Mothers who frequently checked nutrition

labels before purchasing foods and took dietary supplements themselves showed significantly higher dietary supplement intake among their children ($p < 0.001$). Nearly half (48.2%; $n = 198$) of mothers reported their sources for dietary supplement information came from family members or friends; 6.1% ($n = 25$) of mothers followed physician recommendations for dietary supplements. Nearly one-third (31.7%; $n = 133$) of mothers chose “help growth” and “nurturing for children” for reasons they provided dietary supplements to their children. Lastly, 92.6% of mothers who provided dietary supplements to children responded they viewed their child’s health as “healthy” or “normal”.

The implications of these findings are children whose mothers regularly check nutrition labels and consume dietary supplements may be more likely to take a dietary supplement. It may be common for children to consume dietary supplements daily, despite not consulting a healthcare professional. In addition, mothers were receiving dietary supplement information from family members rather than healthcare professionals. The authors concluded that counseling on appropriate diet behaviors and dietary supplement use for preschool age children by healthcare professionals is needed.

A cross-sectional study conducted by Leung SY and Lum CM, investigated the beliefs and behaviors of parents whose children were in kindergarten towards nutritional health supplements.⁹ The authors used a self-administered questionnaire and the target population included parents who had children enrolled in kindergarten in Hong Kong. The authors approached parents who had children enrolled in kindergarten and parents were given one week to fill out the survey and return the survey to their child’s kindergarten. A total of three kindergartens were selected among different regions. The authors operationally defined nutritional supplements as any orally consumed health product intended to improve health, gain

weight, control weight, or improve body shape. The questionnaire obtained demographic information of the parents and children and assessed parents' beliefs and attitudes towards their child's health supplements.

A total of 951 questionnaires were distributed by the school administration to parents and 730 (77%) questionnaires were included in the final analysis. Of the parents who completed surveys, 81% were female and 83% were within the 34-41 years of age group. Non-Chinese parents were excluded from the study. The authors reported that parents who gave their children health supplements believed the supplement was useful/important for normal child development (79%), improvement of immune function (84%), intellectual development (64%), and for improving behavior (38%). In addition, 81% (n=310) of parents who gave their children nutritional supplements agreed "health supplements are good substitutes to good eating habits" which was statistically significant ($p < 0.001$) compared to parents who did not give their children supplements. Furthermore, 84% of parents who gave their children nutritional supplements also agreed with the statement of "the more the supplements provided, the healthier the child" which was also statistically significant ($p < 0.001$) compared to parents who did not give their children supplements. The authors concluded that the parents in the study had inaccurate beliefs related to health supplements which included improving growth and body immunity in their normal growing children. The authors also concluded that there was a need for attention towards health supplement advertisements showing eating habits can be managed by health supplements. Instead parents need to be encouraged to focus their attention on creating a balanced diet for their child.

The common findings among the published research in this literature review included that all of the studies were conducted outside of the United States and the studies involved a variety

of forms of nutritional supplements including chewable, liquid, or tablet form. None of the studies solely focused on liquid supplements similar to Pediasure. Thus, there appears to be a gap in the published research literature on parents and caregivers' attitudes and perceptions of liquid medical nutritional supplements. There is limited research on liquid medical nutritional supplements which are marketed and advertised and frequently prescribed to preschool age children.⁵ Two studies mentioned that parental dietary supplement use was associated with supplement use among children and furthermore; three of the studies reported that parents were receiving information about supplements from family or friends rather than healthcare providers.

These common findings reveal the importance of future research on the perceptions of caregivers towards their child's liquid medical nutritional supplement because it appears that parents misunderstand the purpose of their child's supplement. In addition, many seek information about these products from non-reliable or credible sources. The consequences of parents seeking dietary supplement information without proper consultation from a healthcare professional may possibly decrease the nutrition quality of their child's diet and overlook the vast nutrients they are receiving from foods. In particular, there is a need to conduct research on the perceptions of parents whose preschool age children are underweight and are drinking a liquid supplement, such as Pediasure, to assist with weight gain and/or adequate growth. It is critical that parents understand that liquid supplements are a temporary intervention. The current study fills this literature gap by evaluating the perceptions of parents towards a liquid medical nutritional supplement and assessing if parents have an adequate understanding of the purpose of incorporating such a product into their child's diet.

Chapter 3

Methods

Study Design

This cross-sectional study was conducted from January 2019 to December 2019. The target population was Spanish and English speaking caregivers of children 2-5 years of age enrolled in the Special Supplemental Food Program for Women, Infants, and Children (WIC) in the state of New Mexico (NM) and whose children were prescribed Pediasure by a healthcare provider for the purpose of weight gain.

Recruitment flyers in English and Spanish and a description of the study were emailed to all NM WIC clinics by the state WIC Director. The flyers included eligibility requirements and contact information for the Student Investigator (SI). WIC staff in all 33 counties in NM were encouraged to print flyers and display in clinic lobbies. WIC staff also screened potential participants by personally approaching caregivers in the clinic before or after their appointment with the healthcare provider. Paper copies of consent forms were also printed in both English and Spanish at WIC clinics and distributed by WIC staff to potential participants. Furthermore, the SI contacted select WIC clinics weekly by telephone to remind them of the study details and recruitment.

Instrument and Tools

The SI created a 20-question data collection questionnaire which was reviewed by three RDNs and faculty members in the Nutrition Program at the University of New Mexico (UNM). Data collected included: subject demographics, attitudes towards the use of Pediasure by their child, and perception of the purpose of Pediasure. Basic demographic data included ethnicity/race, gender, and level of education of subjects. The questionnaire also assessed the

manner in which the subject became aware of Pediasure, the level of concern about their child's weight and eating habits, the length of time the child consumed Pediasure and the frequency of consumption per day. The questionnaire was developed and administered through UNM's survey tool, Opinio. Opinio is a questionnaire tool available for faculty and students conducting research, gathering customer feedback, or service evaluations. After permission was granted from the UNM Information Technology (IT) Department to utilize Opinio for research purposes, the online survey was created by the SI. Paper copies of the survey were also available at WIC clinics.

Screening

Interested participants emailed the SI and completed a screening process before participating. The screening process was an email message sent to the participant that included the following questions: Is your child enrolled in a WIC program in the State of New Mexico? Has your child been prescribed Pediasure by a healthcare professional? Has your child been diagnosed as underweight or inadequate growth? Once they were deemed eligible by meeting inclusion criteria, the SI sent the participant a link to the online survey through the email address provided. Participants provided consent by starting the survey. Consent signatures were not collected. Participants who completed the survey were emailed a \$10 gift card within one week of completing the survey. The SI then removed their email address from the database.

Caregivers who completed a hard copy of the survey were asked to complete the survey while they waited in the WIC clinic and returned their completed surveys to a WIC staff member. The surveys were kept by a Nutritionist Supervisor and the SI was notified by email from the Nutritionist Supervisor to pick up the completed surveys at the clinics. Paper surveys completed by eligible participants from WIC clinics in rural areas were scanned and then

emailed to the SI by the NM WIC Director. Screening questions were a part of the paper survey that confirmed the inclusion criteria of the study and were the same screening questions mentioned previously. Participants read the consent form before beginning the paper survey and demonstrated consent by returning their completed survey to a WIC staff member. Participants were not required to sign a consent form. Only those participants who met all of the inclusion criteria were included in the final data analysis and compensated with a \$10 electronic gift card. Surveys that contained any unanswered questions were deemed incomplete, not included in data analysis, and paper copies of the survey were shredded. All incomplete surveys were discarded by the SI.

IRB Approval

The original Institutional Review Board (IRB) application was submitted to the University of New Mexico Human Research Protections (HRPO) in November 2018 and IRB approval was granted in December 2018. The inclusion criteria and study timeline were modified in February 2019 and IRB approval of these items was granted in March 2019. In addition, certification and IRB approval was obtained for the Spanish surveys, Spanish flyers, and Spanish email recruitment form in March 2019.

Statistical Analysis

Descriptive statistics were calculated in Excel (frequency, percent). The responses for survey questions 1-20 were calculated and organized into frequency and percentages. For example, for level of education, each level of education listed was given a number and then entered into an excel sheet (some high school was assigned as 1, high school graduate assigned as 2, etc.). Frequency of each response and percent of respondents selecting each response were then calculated. This was done for all 20 questions and all percentages and number of responses

were placed into Tables 1, 2, and 3. Fisher's exact tests were calculated to examine differences in responses by demographic groups (gender, race/ethnicity, level of education). Race/ethnicity was collapsed into White, Hispanic, or other. Level of education was collapsed into high school graduate or GED, Associates degree/some college, or bachelor's degree or higher. A p-value <0.05 indicated statistical significance.

Chapter 4

Results

The NM WIC Director sent recruitment flyers via email to approximately 30 WIC clinics in New Mexico. According to the NM WIC State Director, all 30 WIC clinics posted the recruitment flyer in their clinic lobbies. The SI traveled to four WIC clinics to collect completed surveys. A total of 17 surveys were collected at the end of the study, none of which were completed electronically. Four Spanish surveys were collected, and 13 English surveys were collected. All surveys were complete with all questions answered.

Caregivers' Demographics

Demographic characteristics of study participants are presented in Table 1. Eleven (65%) of the participants were female and six (35%) of participants were male. The majority of participants selected Hispanic or Latino as their race/ethnicity (n=9; 53%), followed by White (n=5; 29%). The majority of participants reported completing some college credit but no degree (n=6; 35%) or received a high school diploma or equivalent (n=4; 24%). Three participants (18%) reported completing a bachelor's degree or higher. Age of participants was not collected.

Caregivers' Responses

Participants' responses to survey questions on medical nutritional supplements are summarized in Table 2. Most participants learned about the medical nutritional supplement through their child's pediatrician (n=9; 53%) or a TV commercial (n=4; 24%). When asked about their concern regarding their child's weight, the majority were somewhat concerned (n=8; 47%); two participants (12%) were very concerned while three (18%) were not concerned. The majority (n=10; 59%) were somewhat concerned about their child's eating habits. Regarding the level of

confidence participants had towards their knowledge of the medical nutritional supplement, seven (41%) selected “very confident” and six (35%) selected “somewhat confident”.

Participants were also asked the number of times their child preferred to drink the liquid medical nutritional supplement. Six (35%) participants selected “1 time/day” and five (29%) selected “other” and specified: “2-3 times per week”, “2 times per day”, “6 times”, “2-3 times per day”, and “just prescribed”.

Most participants agreed (n=8; 47%) or strongly agreed (n=4; 24%) that their child’s health improved because of the supplement. In addition, when participants were asked how long their child had been drinking the medical nutritional supplement, 41% (n=7) of participants responded “2 months”, 29% (n=5) of participants responded “> 3 months”.

Most participants were neutral (n=6; 35%) in response to the statement, “I become worried if my child does not drink the medical nutritional supplement at least once/day.” Most participants reported their child drinks the supplement in between meals (n=6; 35%). The majority (n=11; 65%) reported being happy about their child’s supplement.

Participants’ perceptions of the impact the medical nutritional supplement has on their child’s health were investigated. Nine (53%) indicated “the supplement will help my child reach a healthy weight” and four (24%) indicated “the supplement contains everything my child needs to be healthy.” The majority (n=9; 53%) responded “neutral” to the statement, “I believe the medical nutritional supplement is a better source of nutrition for my child than food meals.”

Differences by Demographic Subgroups

Responses from the survey questions were examined by gender, race/ethnicity, and education level of caregiver. There were no significant differences in responses to questions by gender or education level of caregiver (data are presented in the appendices). Female caregivers

were, however, more concerned about their child's weight and eating habits compared to male caregivers.

Race/ethnicity was divided into Hispanic/Latino (n=9), White (n=4), or Other (n=4). Hispanics and Whites were more confident that their child's health had improved because of the medical nutritional supplement while other race/ethnicities were neutral (P=0.03). In addition, Hispanic participants were more worried if their child did not drink their medical nutritional supplement at least once/day while other race/ethnicities were neutral or disagreed (P=0.02). More Hispanic participants also selected "the supplement contains everything my child needs to be healthy" and "the supplement will help my child reach a healthy weight" compared to their counterparts though the difference was not significant (see Table 3).

Table 1. Demographic characteristics of participants (n=17)

Demographics of Subjects	n	%
Gender		
Female	11	64.7%
Male	6	35.3%
Education level		
Some High School, no diploma	2	11.8%
High School graduate, diploma or the equivalent	4	23.5%
Some College Credit, no degree	6	35.3%
Associate Degree	1	5.8%
Bachelor's Degree	2	11.8%
Master's Degree	1	5.8%
Doctorate	0	0%
Prefer not to answer	1	5.8%
Ethnicity		
White	5	29.4%
Hispanic or Latino	9	52.9%
Native American	1	5.8%
Asian/Pacific Islander	1	5.8%
Prefer not to answer	1	5.8%
Other	0	0%

Table 2. Caregivers' perceptions of their child's medical nutrition supplement (n=17)

Caregiver's responses	n	%
Discovery of Pediasure		
TV commercial	4	23.5%
Radio	0	0%
Newspaper/ad	1	5.8%
My Child's Pediatrician	9	52.9%
Other	2	11.7%
Answer left blank	1	5.8%
Level of concern towards child's weight		
Not concerned	3	17.6%
Somewhat concerned	8	47%
Concerned	4	23.5%
Very Concerned	2	11.8%
Level of concern towards child's eating habits		
Not Concerned	3	17.6%
Somewhat concerned	10	58.8%
Concerned	4	23.5%
Very Concerned	0	0
Level of confidence towards the purpose of Pediasure		
Not confident	2	11.8%
Somewhat confident	6	35.3%
Confident	2	11.8%
Very Confident	7	41.2%
Amount of times child prefers to drink the MNS		
1 time/day	6	35.3%
1 time/week	3	17.6%
1 time/month	3	17.6%
None	0	0
Other	5	29.4%
I am confident my child's health has improved because of the MNS.		
Strongly disagree	0	0
Disagree	1	5.9%
Neutral	4	23.5%
Agree	8	47.0%
Strongly Agree	4	23.5%
How long child has been drinking the MNS.		
1 month	1	5.9%
2 months	7	41.2%
3 months	3	17.6%
>3months	5	29.4%
Other	1	5.9%
I become worried if my child does not drink the MNS at least once/day.		

Strongly Disagree	3	17.6%
Disagree	3	17.6%
Neutral	6	35.3%
Agree	2	11.8%
Strongly Agree	3	17.6%
Time when child commonly drinks the MNS		
With Breakfast	1	5.9%
With Dinner	3	17.6%
In between meals	6	35.3%
Whenever my child asks for the supplement	0	0
With both breakfast and lunch	4	23.5%
With both lunch and dinner	2	11.8%
Other	1	5.9%
Choose the best answer that represents your feelings about your child's MNS.		
I am happy about my child's supplement	11	64.7%
I am confused about my child's supplement	0	0
I am angry about my child's supplement	0	0
I am concerned about my child's supplement	2	11.8%
I don't have much information about my child's supplement	4	23.5%
Choose the best answer that represents your feelings about how you think the MNS is helping your child's health.		
The supplement will help my child reach a healthy weight.	9	52.9%
The supplement contains everything my child needs to be healthy.	4	23.5%
The supplement is going to help my child grow taller.	1	5.9%
I am not sure how the supplement help's my child's health.	3	17.6%
The supplement won't help my child's health.	0	0%
I believe the MNS is a better source of nutrition for my child than food meals.		
Strongly Disagree	2	11.8%
Disagree	3	17.6%
Neutral	9	52.9%
Agree	3	17.6%
Strongly Agree	0	0

MNS: Medical Nutritional Supplement

Table 3. Perceptions of Pediasure by Race/Ethnicity of Caregiver

Caregiver's responses	White (n=4)		Hispanic (n=9)		Other (n=4)		p-value
	n	%	n	%	n	%	
Level of concern towards child's weight							0.62
Not concerned	0	0.0	2	22.2	1	25.0	
Somewhat concerned	2	50.0	3	33.3	3	75.0	
Concerned	2	50.0	2	22.2	0	0.0	
Very Concerned	0	0.0	2	22.2	0	0.0	
Level of concern towards child's eating habits							0.21
Not Concerned	1	25.0	0	0.0	2	50.0	
Somewhat concerned	2	50.0	6	66.7	2	50.0	
Concerned	1	25.0	3	33.3	0	0.0	
Very Concerned	0	0.0	0	0.0	0	0.0	
Level of confidence towards the purpose of Pediasure							0.71
Not confident	1	25.0	1	11.1	0	0.0	
Somewhat confident	2	50.0	2	22.2	2	50.0	
Confident	0	0.0	1	11.1	1	25.0	
Very Confident	1	25.0	5	55.6	1	25.0	
I am confident my child's health has improved because of the MNS.							0.03
Strongly disagree	0	0.0	0	0.0	0	0.0	
Disagree	0	0.0	1	11.1	0	0.0	
Neutral	1	25.0	0	0.0	3	75.0	
Agree	3	75.0	5	55.6	0	0.0	
Strongly Agree	0	0.0	3	33.3	1	25.0	
I become worried if my child does not drink the MNS at least once/day.							0.02
Strongly Disagree	0	0.0	0	0.0	3	75.0	
Disagree	1	25.0	1	11.1	1	25.0	
Neutral	3	75.0	3	33.3	0	0.0	
Agree	0	0.0	2	22.2	0	0.0	
Strongly Agree	0	0.0	3	33.3	0	0.0	
Choose the best answer that represents your feelings about your child's MNS.							0.29
I am happy about child's my child's supplement	1	25.0	7	77.8	3	75.0	
I am confused about my child's supplement	0	0.0	0	0.0	0	0.0	
I am angry about my child's supplement	0	0.0	0	0.0	0	0.0	

I am concerned about my child's supplement	1	25.0	1	11.1	0	0.0	
I don't have much information about my child's supplement	2	50.0	1	11.1	1	25.0	
Choose the best answer that represents your feelings about how you think the MNS is helping your child's health.							0.07
The supplement will help my child reach a healthy weight	2	50.0	5	55.6	2	50.0	
The supplement contains everything my child needs to be healthy	0	0.0	4	44.4	0	0.0	
The supplement is going to help my child grow taller	0	0.0	0	0.0	1	25.0	
I am not sure how the supplement help's my child's health	2	50.0	0	0.0	1	25.0	
The supplement won't help my child's health	0	0.0	0	0.0	0	0.0	

MNS: Medical Nutritional Supplement

Chapter 5

Discussion

Liquid-based medical nutritional supplements are readily available to the general public and have become appealing “solutions” for parents of children who have a smaller body size or are not growing adequately.⁵ This study examined perceptions of caregivers towards their child’s liquid supplement, Pediasure, prescribed by a physician. The majority of participants were female, identified as Hispanic or Latino, and had completed some college credit but no degree. Most of the participants learned about their child’s medical nutritional supplement from their child’s pediatrician. Most participants were somewhat concerned about their child’s weight and eating habits, and most were somewhat confident about the purpose of the liquid medical nutritional supplement. Lastly, most participants perceived Pediasure as having a positive impact on their child’s health.

Responses from the survey questions were examined by gender, race/ethnicity, and education level of caregiver. Hispanics and Whites were more confident that their child’s health had improved because of the medical nutritional supplement while other race/ethnicities were neutral (p-value=0.03). This finding is similar to a previous study which reported 84% of caregivers who gave their children supplements agreed with the statement “the more supplements provided, the healthier the child” though differences by race/ethnicity were not examined.⁹ Furthermore, another study conducted by Kim et al. reported 31% of mothers chose the statement, “upgrade health” as a reason they gave their child supplements.⁸ These findings may be attributed to the appeal of supplements in promoting “healthy growth”.⁵ It may be helpful for healthcare providers to be aware of these perceptions towards medical nutritional supplements in order to educate parents about the health benefits of whole foods compared to

supplements and to provide proper supplement guidelines before recommending a liquid supplement.

This study also found Hispanics were more worried if their child did not drink their medical nutritional supplement at least once per day while other race/ethnicities were neutral or disagreed (p-value=0.02). Four (44%) of Hispanic caregivers also selected “The supplement contains everything my child needs to be healthy” compared to none of White or participants reporting another race/ethnicity. These findings are similar to a previous study conducted by Leung et al. that reported 49% of caregivers who gave their children supplements agreed with the statement of “I am worried my child’s development lags behind the others”.⁹ These findings highlight that Hispanics may resort to supplements daily to ensure their children receive key nutrients without relying on healthy and nutrient dense foods.^{1,7} It may be beneficial to educate Hispanic families that medical nutritional supplements are helpful to meet children’s nutritional needs acutely, but nutrient dense foods are a better long-term solution.

It may also be beneficial to educate specific demographic subgroups on the importance and purpose of supplements. For example, White participants and other race/ethnicities indicated they were not sure how the supplement helps their child’s health (50% and 25%, respectively) and that they don’t have much information on their child’s supplement (50% and 25%, respectively). Male participants were less likely to express concern towards their child’s weight, with 50% selecting “not concerned” compared to 0% of females selecting “not concerned” (p-value=0.08).

Most participants learned about their child’s medical nutritional supplement from their child’s pediatrician (n=9; 52%) which is in contrast with previously reported results by Kim et al and Sato et al.⁷⁻⁸ These studies report 48.2% of mothers received supplement information from

family members or friends and 20.8% of caregivers received supplement information from the media.^{7,8} Both of these studies were conducted in Southeast Asia (Japan, Hong Kong). This study did not include family members or friends as an option. Data suggest, however, that 50% of male caregivers reported discovering Pediasure through a TV commercial compared to only 9.1% of females, though this difference was not statistically significant (p-value= 0.31). In addition, those with less education were more likely to discover Pediasure through a TV commercial (50%) compared to those with an Associate's degree or Bachelor's degree or higher who discovered Pediasure through their child's physician (71.4% and 66.7%, respectively), though this finding was not statistically significant (p-value=0.35).

There were limitations to this study. The main limitation was the small sample size, 17 participants, limiting generalizability of results. In addition, only WIC participants (caregivers and children aged 2-5 years) were included in the study; results may only be applicable to this population. A strength of this study, however, was that perceptions of liquid nutritional supplements only were assessed, compared to previous studies assessing perceptions of supplements in various forms. Sato et al. examined factors associated with dietary supplements and parents' knowledge and attitudes towards their children's dietary supplements through a survey but a variety of forms of supplements were included such as chewable, granule, or tablet forms.⁶⁻⁷ Another strength of this study was surveys were translated to Spanish, a principal language in New Mexico, in order to capture the Spanish-speaking population. This study was able to collect a total of four Spanish surveys.

Conclusions

In conclusion, most participants perceived the medical nutritional supplement as improving their child's health. Hispanic and White participants were also more confident that their child's health had improved because of the medical nutritional supplement compared to their counterparts. Most of the participants learned about their child's medical nutritional supplement from their child's pediatrician and most participants agreed or strongly agreed that their child's health improved because of the supplement. Lastly, Hispanic participants were more worried if their child did not drink their medical nutritional supplement compared to their counterparts.

Further qualitative research is needed to investigate differences in perceptions towards liquid supplements by race/ethnicity. It is essential healthcare providers have a discussion with caregivers about liquid nutrition supplements to accurately educate families with children on supplements including purpose, dosing, and expected outcomes. It is also important that RDNs working for WIC programs are aware that families whose children are drinking liquid medical nutritional supplements may need further clarification on the purpose of these supplements.

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Appendix A

Responses by Education Level of Caregiver

Caregiver's responses	High School (n=6)		Associates (n=7)		B.S. or higher (n=3)		p-value ^a
	n	%	n	%	n	%	
Discovery of Pediasure							0.3547
TV commercial	3	50.0	1	14.3	0	0.0	
Radio	0	0.0	0	0.0	0	0.0	
Newspaper/ad	0	0.0	1	14.3	0	0.0	
My Child's Pediatrician	2	33.3	5	71.4	2	66.7	
Other	1	16.7	0	0.0	1	33.3	
Answer left blank	0	0.0	0	0.0	0	0.0	
Level of concern towards child's weight							0.8164
Not concerned	2	33.3	1	14.3	0	0.0	
Somewhat concerned	2	33.3	3	42.9	2	66.7	
Concerned	2	33.3	2	28.6	0	0.0	
Very Concerned	0	0.0	1	14.3	1	33.3	
Level of concern towards child's eating habits							0.4441
Not Concerned	0	0.0	3	42.9	0	0.0	
Somewhat concerned	4	66.7	3	42.9	2	66.7	
Concerned	2	33.3	1	14.3	1	33.3	
Very Concerned	0	0.0	0	0.0	0	0.0	
Level of confidence towards the purpose of Pediasure							0.7902
Not confident	1	16.7	0	0.0	1	33.3	
Somewhat confident	2	33.3	3	42.9	1	33.3	
Confident	0	0.0	2	28.6	0	0.0	
Very Confident	3	50.0	2	28.6	1	33.3	
Amount of times child prefers to drink the Medical Nutritional Supplement							0.8989
1 time/day	2	33.3	2	28.6	1	33.3	
1 time/week	2	33.3	1	14.3	0	0.0	
1 time/month	0	0.0	2	28.6	1	33.3	
None	0	0.0	0	0.0	0	0.0	
Other	2	33.3	2	28.6	1	33.3	

I am confident my child's health has improved because of the Medical Nutritional Supplement.							0.7479
Strongly disagree	0	0.0	0	0.0	0	0.0	
Disagree	0	0.0	1	14.3	0	0.0	
Neutral	1	16.7	1	14.3	2	66.7	
Agree	3	50.0	4	57.1	1	33.3	
Strongly Agree	2	33.3	1	14.3	0	0.0	
How long has your child been drinking the Medical Nutritional Supplement?							0.4016
1 month	0	0.0	1	14.3	0	0.0	
2 months	2	33.3	4	57.1	1	33.3	
3 months	2	33.3	0	0.0	1	33.3	
>3months	2	33.3	2	28.6	0	0.0	
Other	0	0.0	0	0.0	1	33.3	
I become worried if my child does not drink the Medical Nutritional Supplement at least once/day.							0.3802
Strongly Disagree	1	16.7	1	14.3	1	33.3	
Disagree	0	0.0	3	42.9	0	0.0	
Neutral	3	50.0	2	28.6	1	33.3	
Agree	0	0.0	1	14.3	1	33.3	
Strongly Agree	2	33.3	0	0.0	0	0.0	
My child commonly drinks the Medical Nutritional Supplement.							0.9745
With Breakfast	0	0.0	1	14.3	0	0.0	
With Dinner	0	0.0	2	28.6	1	33.3	
In between meals	2	33.3	2	28.6	1	33.3	
Whenever my child asks for the supplement	0	0.0	0	0.0	0	0.0	
With both breakfast and lunch	2	33.3	1	14.3	1	33.3	
With both lunch and dinner	1	16.7	1	14.3	0	0.0	
Other	1	16.7	0	0.0	0	0.0	
Choose best answer that represents your feelings about your child's Medical Nutritional Supplement.							0.6923
I am happy about child's my child's supplement	5	83.3	4	57.1	1	33.3	
I am confused about my child's supplement	0	0.0	0	0.0	0	0.0	
I am angry about my child's supplement	0	0.0	0	0.0	0	0.0	
I am concerned about my child's supplement	0	0.0	1	14.3	1	33.3	
I don't have much information about my child's supplement	1	16.7	2	28.6	1	33.3	

Choose the best answer that represents your feelings about how you think the MNS is helping your child's health.							0.3054
The supplement will help my child reach a healthy weight	3	50.0	5	71.4	0	0.0	
The supplement contains everything my child needs to be healthy	2	33.3	1	14.3	1	33.3	
The supplement is going to help my child grow taller	0	0.0	0	0.0	1	33.3	
I am not sure how the supplement help's my child's health	1	16.7	1	14.3	1	33.3	
The supplement won't help my child's health	0	0.0	0	0.0	0	0.0	
I believe the MNS is a better source of nutrition for my child than food meals.							1.0
Strongly Disagree	1	16.7	1	14.3	0	0.0	
Disagree	1	16.7	1	14.3	1	33.3	
Neutral	3	50.0	4	57.1	1	33.3	
Agree	1	16.7	1	14.3	1	33.3	
Strongly Agree	0	0.0	0	0.0	0	0.0	

^aFisher's exact test (p<0.05 indicates statistical significance)

Appendix B

Responses by Gender of Caregiver

Caregiver's responses	Females (n=11)		Males (n=6)		p-value ^a
	n	%	n	%	
Discovery of Pediasure					0.3125
TV commercial	1	9.1	3	50.0	
Radio	0	0.0	0	0.0	
Newspaper/ad	1	9.1	0	0.0	
My Child's Pediatrician	7	63.6	2	33.3	
Other	1	9.1	1	16.7	
Answer left blank	1	9.1	0	0.0	
Level of concern towards child's weight					0.0819
Not concerned	0	0.0	3	50.0	
Somewhat concerned	6	54.5	2	33.3	
Concerned	3	27.3	1	16.7	
Very Concerned	2	18.2	0	0.0	
Level of concern towards child's eating habits					1.0
Not Concerned	2	18.2	1	16.7	
Somewhat concerned	6	54.5	4	66.7	
Concerned	3	27.3	1	16.7	
Very Concerned	0	0.0	0	0.0	
Level of confidence towards the purpose of Pediasure					0.8982
Not confident	1	9.1	1	16.7	
Somewhat confident	4	36.4	2	33.3	
Confident	2	18.2	0	0.0	
Very Confident	4	36.4	3	50.0	
Amount of times child prefers to drink the Medical Nutritional Supplement					0.4813
1 time/day	4	36.4	2	33.3	
1 time/week	1	9.1	2	33.3	
1 time/month	3	27.3	0	0.0	
None	0	0.0	0	0.0	
Other	3	27.3	2	33.3	

I am confident my child's health has improved because of the Medical Nutritional Supplement.					0.4299
Strongly disagree	0	0.0	0	0.0	
Disagree	1	9.1	0	0.0	
Neutral	3	27.3	1	16.7	
Agree	6	54.5	2	33.3	
Strongly Agree	1	9.1	3	50.0	
How long has your child been drinking the Medical Nutritional Supplement?					0.3524
1 month	1	9.1	0	0.0	
2 months	6	54.5	1	16.7	
3 months	1	9.1	2	33.3	
>3months	2	18.2	3	50.0	
Other	1	9.1	0	0.0	
I become worried if my child does not drink the Medical Nutritional Supplement at least once/day.					0.3564
Strongly Disagree	1	9.1	2	33.3	
Disagree	3	27.3	0	0.0	
Neutral	4	36.4	2	33.3	
Agree	2	18.2	0	0.0	
Strongly Agree	1	9.1	2	33.3	
My child commonly drinks the Medical Nutritional Supplement.					1.0
With Breakfast	1	9.1	0	0.0	
With Dinner	2	18.2	1	16.7	
In between meals	4	36.4	2	33.3	
Whenever my child asks for the supplement	0	0.0	0	0.0	
With both breakfast and lunch	2	18.2	2	33.3	
With both lunch and dinner	1	9.1	1	16.7	
Other	1	9.1	0	0.0	
Choose best answer that represents your feelings about your child's Medical Nutritional Supplement.					0.4667
I am happy about child's my child's supplement	6	54.5	5	83.3	
I am confused about my child's supplement	0	0.0	0	0.0	
I am angry about my child's supplement	0	0.0	0	0.0	
I am concerned about my child's supplement	2	18.2	0	0.0	
I don't have much information about my child's supplement	3	27.3	1	16.7	

Choose the best answer that represents your feelings about how you think the MNS is helping your child's health.					1.0
The supplement will help my child reach a healthy weight	6	54.5	3	50.0	
The supplement contains everything my child needs to be healthy	2	18.2	2	33.3	
The supplement is going to help my child grow taller	1	9.1	0	0.0	
I am not sure how the supplement help's my child's health	2	18.2	1	16.7	
The supplement won't help my child's health	0	0.0	0	0.0	
I believe the MNS is a better source of nutrition for my child than food meals.					1.0
Strongly Disagree	1	9.1	1	16.7	
Disagree	2	18.2	1	16.7	
Neutral	6	54.5	3	50.0	
Agree	2	18.2	1	16.7	
Strongly Agree	0	0.0	0	0.0	

^aFisher's exact test (p<0.05 indicates statistical significance)

Appendix C

Survey

Caregivers' Perception Towards Medical Nutritional Supplements

1. Is your child enrolled in a WIC program in the State of New Mexico?
 - A. Yes
 - B. No

2. Has your child been prescribed Pediasure by a healthcare professional?
 - A. Yes
 - B. No

3. Has your child been diagnosed as underweight or inadequate growth?
 - C. Yes
 - D. No

4. Ethnicity origin: Please choose your ethnicity. You can choose more than one answer. (If you circle "other" please write your ethnicity.)
 - A. White
 - B. Hispanic or Latino
 - C. Native American
 - D. Asian/Pacific Islander
 - E. Prefer not to answer
 - F. Other _____

5. To which gender do you most identify? You can circle more than one answer. If you circle "other" please explain in the space below.
 - E. Female
 - F. Male
 - G. Prefer not to answer
 - H. Other _____

6. What is the highest degree or level of school you have completed? If you circle "other" please explain in the space below.
 - A. Some high school, no diploma

- B. High school graduate, diploma or the equivalent
- C. Some college credit, no degree
- D. Associate degree
- E. Bachelor's degree
- F. Master's degree
- G. Doctorate
- H. Prefer not to answer
- I. Other_____

7. How did you discover your child's Medical Nutritional Supplement (Pediasure)? If you circle "other" please explain in the space below.

- I. TV commercial
- J. Radio
- K. Newspaper/ad
- L. My child's pediatrician
- M. Other_____

8. How concerned are you about your child's weight? If you circle "other" please explain in the space below.

- A. Not concerned
- B. Somewhat concerned
- C. Concerned
- D. Very concerned
- E. Other_____

9. How concerned are you about your child's eating habits? If you circle "other" please explain in the space below.

- A. Not concerned
- B. Somewhat concerned
- C. Concerned
- D. Very concerned
- E. Other_____

10. How confident are you about knowing the purpose of the Medical Nutritional Supplement (Pediasure)? (If you circle "other" please explain in the space below.)

- A. Not confident
- B. Somewhat confident

- C. Confident
- D. Very confident
- E. Other _____

11. How many times does your child prefer to drink their Medical Nutritional Supplement (Pediasure)? If you circle "other" please explain in the space below.

- A. 1 time/day
- B. 1 time/week
- C. 1 time/month
- D. None
- E. Other _____

12. Please choose the best answer that represents your feelings about the following sentence (if you circle "other" please explain in the space below):

I am confident my child's health has improved because of the Medical Nutritional Supplement (Pediasure).

- A. Strongly Disagree
- B. Disagree
- C. Neutral
- D. Agree
- E. Strongly agree

13. How long has your child been drinking the Medical Nutritional Supplement (Pediasure)? (If you circle "other" please explain in the space below)

- A. 1 month
- B. 2 months
- C. 3 months
- D. More than 3 months
- E. Other _____

14. Please choose the best answer that represents your feelings about the following sentence (If you circle "other" please explain in the space below):

I become worried if my child does not drink the Medical Nutritional Supplement (Pediasure) at least once a day.

- A. Strongly Disagree
- B. Disagree
- C. Neutral
- D. Agree
- E. Strongly Agree
- F. Other_____

15. Please complete the following sentence. You may circle more than option (If you circle "other" please specify in the space below):

My child commonly drinks the Medical Nutritional Supplement (Pediasure)

- A. With Breakfast
- B. With dinner
- C. In between meals
- D. Whenever my child asks for the supplement
- E. With both breakfast and lunch
- F. With both lunch and dinner
- G. Other_____

16. Please choose the best answer that represents your feelings about your child's Medical Nutritional Supplement (Pediasure). If you circle "other" please explain in the space below.

- A. I am happy about my child's supplement
- B. I am confused about my child's supplement
- C. I am angry about my child's supplement
- D. I am concerned about my child's supplement
- E. I don't have much information about my child's supplement
- F. Other_____

17. Please choose the best answer that represents your feelings about you think the Medical Nutritional Supplement (Pediasure) is helping your child's health. You can circle more than one option. If you circle "other" please explain in the space below.

- A. The supplement will help my child reach a healthy weight
- B. The supplement contains everything my child needs to be healthy
- C. The supplement is going to help my child grow taller

- D. I am not sure how the supplement helps my child's health
- E. The supplement won't help my child's health
- F. Other _____

18. Please choose the best answer that represents your feelings about the following sentence. If you circle "other" please explain in the space below.

I believe the Medical Nutritional Supplement (Pediasure) is a better source of nutrition for my child than food meals.

- A. Strongly Disagree
- B. Disagree
- C. Neutral
- D. Agree
- E. Strongly Agree
- F. Other _____

19. If you have anymore thoughts about your child's Medical Nutritional Supplement (Pediasure) please explain in the space below.

20. If your survey qualifies for the study you will be compensated with a \$10 e gift card to Walmart. Please provide an email address below where we can send the card.