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# Evaluation of knowledge and practices related to pediatric nutritional assessment among health providers (HPs) in the Programa de Saude da Familia (PSF), Vespasiano, Minas Gerais, Brazil

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# Evaluation of knowledge and practices related to pediatric nutritional assessment among health providers (HPs) in the Programa de Saude da Familia (PSF), Vespasiano, Minas Gerais, Brazil

By

Amina Maria Khawja

B.A. Tufts University, 2005

Thesis Committee Chair: Juan Leon, PhD, MPH

An abstract of

a thesis submitted to the Faculty of the Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of

Master of Public Health in Global Health

2011

**Abstract**

# Evaluation of knowledge and practices related to pediatric nutritional assessment among health providers (HPs) in the Programa de Saude da Familia (PSF), Vespasiano, Minas Gerais, Brazil

By

Amina Maria Khawja

**Background**
In 2009, data from the Food and Nutrition Surveillance System Network (SISVAN) indicated a 12% prevalence of wasting and 19% prevalence of obesity among children 0-3 year olds in Vespasiano, Brazil. There is a need to assess the role of Brazil's Programa de Saude da Familia (PSF) in preventing childhood malnutrition.
**Goal**
The goal of this study is to examine knowledge and practices of pediatric nutritional assessment in PSF health professionals in Vespasiano, Minas Gerais, Brazil in 2010.
**Methods**
A quantitative survey was used to evaluate health providers' (HP) knowledge and practices related to infant feeding and growth monitoring. In addition, medical records were randomly selected and reviewed to determine the frequency of child visits that had height, weight, and age recorded.
**Results**
Of 75 HPs surveyed, only 40 (53.3 %) correctly identified a normal growth curve, with a borderline difference (p=0.05) between doctors, nurses, nurse aids, and community health agents (CHAs). 70 (93.3%) of HPs identified that exclusive breastfeeding should be sustained for six months. CHAs were more likely than nurses to report receiving training in child growth monitoring (OR=4.52 95% CI [1.03, 19.88]). Most non-doctors believed the Food and Nutrition Surveillance System Network (SISVAN) had improved PSF nutrition services yet felt it had inefficiencies in data collection and dissemination of surveillance findings. 358 PSF medical records were reviewed. Of all child visits, 76.4% had height, weight, and age recorded. For every day and a half increase in a child's age there was a lower likelihood [OR=0.95 95% CI (0.93, 0.97)] that a child had 75% of visits on track with the routine schedule.
**Conclusion**
PSF HPs had poor knowledge in child growth monitoring, possessed basic knowledge of infant feeding practices, and recorded height, weight, and age for the majority of child visits.
**Implications**
These data on HPs' knowledge and practices related to growth monitoring and infant feeding practices provides evidence for local level decision-makers to identify gaps in training and develop strategies to encourage timely routine growth monitoring of the PSF's pediatric population.

# Evaluation of knowledge and practices related to pediatric nutritional assessment among health providers (HPs) in the Programa de Saude da Familia (PSF), Vespasiano, Minas Gerais, Brazil

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# LITERATURE REVIEW

## *GLOBAL BURDEN OF MALNUTRITION*

Undernutrition accounts for over 33% of child deaths worldwide [1]. Child and maternal underweight account for 9.5% of the global burden of disease and is equivalent to 138 million disability adjusted life years (DALY) [2]. Of the ten major risk factors for disease, developed by topic experts, childhood malnutrition was estimated to account for the greatest loss of DALYs among all age groups [3]. In addition, factors related to nutritional status such as vitamin A and zinc deficiencies, stunting, wasting, and intrauterine growth restriction have been estimated to account for 35% of deaths in children under five years of age [4].

In the literature, *malnutrition* is an umbrella term for both undernutrition and overnutrition. Undernutrition refers to stunting, wasting, micronutrient deficiencies, and hunger [4], whereas overnutrition refers primarily to obesity or overconsumption of nutrients required for normal human growth [5]. The United Nations World Food Programme defines malnutrition as "a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain natural bodily capacities such as growth, pregnancy, lactation, learning abilities, physical work and resisting and recovering from disease" [6]. Malnutrition can also be classified as acute or chronic protein-energy malnutrition. Protein-energy malnutrition (PEM) refers to insufficient consumption of protein rich foods and is characterized as acute or chronic. Acute PEM commonly manifests in conditions such as marasmus and kwashiorkor [7] and is indicated

by wasting (low weight for height). In contrast, chronic PEM is indicated by stunting (low height for age) [4, 6].

Micronutrients refer to vitamins and minerals required for normal physiological functioning. In order for the human body to sustain these processes, micronutrients should be consumed through food and/or supplements. Data from 2004 estimate that nearly 11% of deaths in children under 5 are due to vitamin A and zinc deficiencies and less than 1% of deaths are attributable to iron and iodine deficiencies [4].

*Morbidity and Mortality of Malnutrition*

Malnutrition exists in both developing and developed countries. In developing countries, malnutrition is most often manifested in stunting, wasting, underweight, overweight, and vitamin deficiencies. In 2005, 32% of children under 5 in the developing world were stunted, 3.5% were severely wasted, and 20.2% were underweight. However, these prevalences differed greatly by region, where Africa and Asia rank the highest. Africa had the highest prevalence of stunting and wasting followed by Asia and Latin America and the Caribbean. Asia had the highest prevalence of underweight children under 5. An estimated 42% of the world's stunted children lived in south-central Asia. The highest prevalence of vitamin A and zinc deficiencies was also in south-central Asia and certain regions of Africa [4]. The prevalence of children under 5 who were overweight in 1995 was estimated to be 3.3% in developing countries [8]. Although the prevalence of obesity is substantially lower than in developed nations, rates are rising at a faster rate in lower and middle-income countries than in higher-income countries [9]. Countries such

as Brazil experienced over a threefold increase between 1974 and 1997 in the prevalence of overweight children [10].

In developed countries, malnutrition most often manifests as obesity and vitamin deficiencies. Childhood obesity and overweight estimates in Europe range from 11.8% (Romania) to 32.3% (Spain) [11] and 17% in the US [12]. Vitamin deficiencies exist in the developed world where in Europe 22% of preschool-aged children are affected by anemia and 60% of school-aged children consume an insufficient amount of iodine (reviewed in [13])**.**

*Consequences of childhood malnutrition in adult development*

The effects of malnutrition in childhood can have health and psychosocial effects that carry into adolescence and adulthood. Various studies demonstrate that stunting in childhood has been associated with shorter stature in adulthood, where every 1 cm increase in birth-length is associated with a 0.7–1 cm increase in adult stature (reviewed in [14]). Childhood stunting has also been shown to be a risk factor for obesity and hypertension in adulthood [15-17]. In addition, malnutrition during childhood could cause psychosocial effects in the long-term. Micronutrient deficiencies in early childhood, for example, have been linked to impaired cognitive abilities in adulthood (reviewed in [18]). Martorell *et al.* recently found that better nutrition during childhood resulted in improved cognitive abilities, increased financial earnings, and more years of formal education [19]. In conclusion, malnutrition during childhood can have permanent negative effects in those affected and in their communities as a whole. This therefore, presents a challenge and opportunity to the healthcare system.

## *GROWTH MONITORING*

Given the lifelong negative effects of early childhood malnutrition, it is important to identify children at risk for malnutrition. One such way to assess risk for malnutrition is through growth monitoring. Although growth monitoring can be implemented by parents, it is most often conducted by health care providers in primary care settings. Growth monitoring is a tool that serves multiple purposes. It is used to diagnose a child's health and nutritional status and to educate caretakers and health workers on the impact of diet and diseases on a child's growth. It is also used to link caretakers to primary healthcare (reviewed in [20]). It has also been viewed as a tool to provide incentives for mothers to exclusively breastfeed their infants for the first six months of life [21].

Growth monitoring is usually conducted as a three-stage process, involving anthropometry, interpretation, and referral (reviewed in [22]). First, anthropometry refers to physical measurements which are used to classify individual and population nutritional status (reviewed in [23]). The anthropometric measurements most frequently measured in children are height and weight [24]. In the second stage, a child's height and weight is interpreted conducted by plotting the measurements on age and sex-specific growth charts. These charts demonstrate the change and distribution of anthropometric measurements with age and are developed using a healthy population as a standard [22, 25]. For example, the most recent international growth charts that developed from the WHO Multicentre Growth Reference Study, gathered growth data from 8,440 healthy breastfed infants and young children from developed and developing countries over a span of three years [25]. In the third stage, depending on where a child "falls" on the growth chart, healthcare workers can tailor interventions that range from referrals to specialized

care, prescribed treatments, or behavior changes. For example, healthcare workers may refer children to a nutritionist or therapeutic feeding center, prescribe specific treatments for growth disorders, or recommend that caretakers adjust feeding practices [22] .

The evidence as to whether growth monitoring results in reductions in child malnutrition is unclear. Earlier studies from the 1970s and 1980s in Nigeria, Jamaica, and India, found significant differences in mortality and weight among children receiving nutritional interventions compared to controls. Interventions included a combination of growth monitoring, nutrition education, counseling, food supplements, and/or immunizations. However these findings could not be directly attributed to growth monitoring itself, due to study design (not randomized trials). (reviewed in [20]). Recent randomized control trials of nutrition education in Peru and India demonstrated significant improvements in feeding practices and linear growth in children whose mothers received growth monitoring as part of nutrition-related services [26-27]. On the other hand, evidence from another randomized control trial in India demonstrated a significant decrease in malnutrition *without* the provision of growth monitoring [28].

Despite the mixed evidence of growth monitoring as an effective strategy to reduce malnutrition, there are known challenges to implementing growth monitoring in health care settings. Such challenges revolve around actual measurements taken, interpretation of growth charts, and measurement errors. In a survey of growth monitoring practices in 145 countries, all Latin American and Caribbean countries reported recording weight. These countries were those that responded to the question related to the type of anthropometric measurements obtained during growth monitoring visits. Of these same countries, half obtained height measurements and 36%

obtained weight for height. In addition, over 80% of countries in Latin American and Caribbean reported that health care workers encountered problems with growth charts. The most frequently cited problems encountered with growth charts were interpreting growth curves and plotting measurements on the charts themselves [29]. These problems were most likely due to lack of training among all categories of health care workers, a common finding that has been cited in various Latin American settings [30-31]. In a primary health care setting in northeastern Brazil, Lima *et al.* recently found that only 18% of health care workers had received training in anthropometric measurements during the two years prior to the study [32]. Lack of training could also lead to measurement errors, causing anthropometric measurements to be unreliable and biased (reviewed in [33]).

## *CHILD FEEDING PRACTICES*

Along with growth monitoring, assessment of feeding practices is used to determine whether a child is at risk for malnutrition. WHO recommends that breastfeeding be initiated during the first hour after birth and continued exclusively until the children reaches six months. After six months, a mother can no longer produce enough milk to meet the caloric and nutritional needs of the infant. Therefore foods and fluids should be introduced and breastfeeding continued up to at least 2 years of age [34].

While there are several socio-cultural factors influencing child feeding practices, various studies have shown that health professionals play a crucial role in incentivizing and educating mothers about duration and benefits of breastfeeding and the introduction of complementary foods. In

developed country settings, studies have shown that women who received encouragement from health providers to breastfeed, were indeed more likely to initiate breastfeeding. For example in the United States, a nationally representative study found that women who received encouragement from health providers were four times more likely to initiate breastfeeding than their counterparts who did not receive such encouragement [35]. Similarly, breastfeeding encouragement from health providers has been found to be effective in prolonging the duration of breastfeeding. For example, a recent Cochrane review found that women who participated in randomized trials in which they were encouraged by health care providers to breastfeed, were more likely to exclusively breastfeed up to 3 months after birth (RR, 0.91, 95% CI, 0.84–0.98) and continue breastfeeding at 4 months after birth (RR, 0.94, 95% CI, 0.87–1.01) [36].

Various studies in developing country settings have found similar effects due to health provider education on breastfeeding. In Iran, for example, a quasi-experimental cohort study was conducted to determine if participating in a breastfeeding education program and follow-up visits led by trained nutritionists were positively associated with breastfeeding duration. Mothers who were part of the intervention group exclusively breastfed significantly longer than those in the control group. Infants of the intervention group also had significantly higher mean weight and length at four months than infants in the control group [37]. Similarly, in a recent randomized controlled trial in Pakistan, health care workers (HCWs) working in health centers were randomly assigned to receive feeding counseling training. Mothers who received counseling on complementary feeding from the trained HCWs were interviewed at several time points. Investigators found that mothers who received counseling from the trained HCWs were more likely to report better feeding practices than those in the control group. They were also 1.5-3

times more likely to recall correct feeding information such as providing eggs and liver to their children, than mothers in the control group [38]. Another case-control study from Mexico found that breastfeeding counseling was positively associated with exclusive breastfeeding for at least 4 months even when controlling for a number of other factors such as mother's education level [39].

## *NUTRITION SURVEILLANCE SYSTEMS*

In 1974, nutritional surveillance was proposed as a key strategy to reduce hunger at the World Conference on Nutrition in Rome. Under this strategy, indicators for nutritional surveillance should be developed by governments in order to identify nutritional priorities, determine causes, and develop, implement, and evaluate interventions to improve nutritional conditions. The Food and Agriculture Organization of the UN (FAO) recommended that nutritional surveillance systems collect "information on mortality, morbidity, anthropometry, food availability, food intake, food prices, breast-feeding, food quality and safety, along with information on knowledge, attitudes and practices, family size and income, rainfall and landholding" [40].

Along these lines, the Food and Nutrition Surveillance System Network (SISVAN) was formed in Latin America to serve as a technical mechanism made up of public, private or independent institutions. The purpose of SISVAN is to support the development of food and nutrition surveillance and increase technological capacity through the exchange of experiences and knowledge between Latin American countries. Sponsored by the Food and Agriculture

Organization of the UN (FAO) Regional Office of Latin America and the Caribbean since 1996, SISVAN is currently comprised of 19 member states. Data from SISVAN is used to generate Country Nutritional Profiles which are the basis for the development of the Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS) [41]. Country Nutritional Profiles present a nutritional snapshot of individual countries by highlighting statistics related to agricultural production, health, demographic and economic indicators [42] .

## *MALNUTRITION IN BRAZIL*

Since the 1970s, Brazil has consistently demonstrated a reduction in the prevalence of child malnutrition. From 1975 to 1996, the prevalence of child stunting decreased by 72% [43]. More recently, between 1996-2007 Monteiro *et al.* found that Brazil experienced a 6.3% per annum decline in child malnutrition, suggesting an elimination of malnutrition by 2018 [44]. Such declines have been attributed to improvements in maternal education, family income, access to health care services, and sanitation [44-45].

Although there have been country-wide declines in child malnutrition in Brazil, various studies pointed to other nutritionally-related diseases that have remained unchanged or have increased in prevalence. For example, the prevalence of anemia in children under 5 has ranged from 19% to 47% from 1982 to 1996 (reviewed in [46]) . In addition, prospective cohort studies have indicated increases in the prevalence of overweight children under 13 months in southern Brazil (reviewed in [47]).

*Role of health professionals in education related to feeding*

A number of studies have demonstrated the importance of health professionals in promoting appropriate child feeding practices in Brazil. A recent qualitative study conducted in northeastern Brazil revealed that most mothers who were part of the Family Health Program, (FHP), were knowledgeable about the benefits of breastfeeding, partly because they were consistently informed by health care workers [48]. Another, recent survey in northeast Brazil showed that nurses played a major role in providing guidance related to complementary feeding to mothers [49]. Other studies conducted among health care professionals of the Brazilian FHP found that the majority of professionals were aware of the benefits of breastfeeding but had difficulties explaining breastfeeding techniques and management of challenges that mothers face when breastfeeding [50-51]. Given the role of health professionals in providing guidance related to child feeding practices, it is important that they are informed in order to best counsel and orient mothers.

*SISVAN in Brazil*

SISVAN began to be implemented in Brazil in 1977 and was formerly regulated through the Ministry of Health's Directive 080 in 1990. Under this Directive, states must have SISVAN implemented in order to receive federal funding to address malnutrition. However it was not until 2004 that official guidelines for the implementation of SISVAN were instituted through Directive 2246. Such guidelines included indicators related to nutritional situation/specific deficiencies, food consumption, service quality and performance. The purpose of SISVAN in Brazil was to gather data to inform public policies, to maintain an updated profile of Brazilian

nutritional conditions, to identify geographic areas and population groups at risk, and to track and evaluate patterns of nutritional problems [52].

In Brazil, at the municipal level, data collection forms related to patient nutritional status and dietary intake are filled out by healthcare workers at public hospitals and health posts and forwarded to local secretary of health for entry [53]. Given that a large part of SISVAN depends on healthcare worker's data collection, it would be beneficial to explore their perceptions towards the data collection process and on the SISVAN.

*Public Health System in Brazil*

The Family Health Program, or Programa de Saude da Familia (PSF), is a component of the larger Unified Health System (SUS) and was established in 1994 in an effort to decentralize SUS. In addition to decentralizing SUS, the PSF model was implemented to increase "case-resolving capacity in the health services, promote social control", and foster "closer links between families and the health teams" [54]. Each PSF team is comprised of a physician, a nurse, a nurse assistant, and five to seven community health agents. In certain areas, dentists and social workers may also be included in the PSF teams. The PSF program is administered at the municipal level through each municipality's Secretariat of Health. The Secretariat of Health determines the PSF's catchment areas and assigns each PSF team a geographic region for which the team is tasked with conducting outreach, enrollment, and monitoring the community's health status [54].

Limited research exists to assess the role of PSF health teams in promoting healthy nutritional practices and in preventing childhood malnutrition and obesity. Insight into health care professionals' knowledge and practices related to child feeding and pediatric nutritional assessment would help local level decision-makers to the identify gaps in knowledge and practice.

*Setting of study*

The study described in this thesis took place in the city of Vespasiano, Brazil, under the Family Health Program, or Programa de Saude da Familia (PSF). Vespasiano is a city and municipality located about 28km from Belo Horizonte, the capital of the southeastern state of Minas Gerais. In 2000, Vespasiano had a population of 76,328 individuals with 1,146 individuals living in rural areas [55]. Vespasiano is an industrial center for metallurgy and is made up of many other small and medium enterprises.

According to the local Unified Health System (SUS) database, the Vespasiano public health system is composed of various health care posts, specialized clinics, private practices, a general hospital, a mental illness health care center, primary care clinics, a medical school clinic, an emergency room, and auxiliar health care units (dentistry and physical therapy) [56]. The PSF in the municipality of Vespasiano was established in 2005 [57] and has been expanding ever since.

In Vespasiano, SISVAN data from 2009 estimated a 19% prevalence of overweight and 12% prevalence of wasting in 0-3 year olds. However, these data are not specific to children enrolled

in the PSF program and are considered incomplete. Since all PSF health units do not regularly provide data collection forms to be entered into SISVAN these estimates are not representative of children who attend the PSF [53].

## *GOALS AND AIMS*

To address these needs, the goal of this thesis is to examine knowledge and practices of pediatric nutritional assessment in PSF health professionals in Vespasiano, Minas Gerais, Brazil in 2010. Findings from this thesis will inform policy makers of strengths and areas for improvement within the PSF model that could be affecting its impact on children's nutritional status. Specific aims are to: 1) assess basic knowledge related to child feeding practices and growth monitoring by each healthcare professional category (doctor, nurse, nurse aid, and community health agent), 2) evaluate non-doctors' perceptions related to the SISVAN, 3) determine the frequency of child visits that had height, weight, and age recorded, and 4) determine the factors associated with whether a child had 75% of their visits on track with the schedule of routine child follow-up visits put forth by the Vespasiano Secretariat of Health.

## *SIGNIFICANCE*

An examination of health professionals' knowledge and practices related to child nutrition will provide important information to policymakers to identify PSF's strengths and areas of improvement in order to maximize the program's impact on child health. In addition,

professionals' perceptions of SISVAN will help in identify barriers to timely nutritional data collection and reporting and may suggest ways to improve to unit-based health surveillance processes. Such information will complement the limited literature related to the role of Brazilian PSF health teams in promoting healthy nutritional practices and in preventing childhood malnutrition and obesity.

# CONTRIBUTION OF STUDENT

For the following manuscript, I designed the study, developed the data collection tools and databases, assisted in the compilation of the Institutional Review Board (IRB) study protocol, and managed data collection and entry. In addition, I conducted quality control and analyses of all databases, wrote all sections of the manuscript, and developed all tables and figures.

# MANUSCRIPT

## *INTRODUCTION*

Malnutrition in childhood can have health and psychosocial effects that carry into adolescence and adulthood. Childhood stunting has also been shown to be a risk factor for obesity and hypertension in adulthood [16-17] [58]. It can also have long-term psychosocial effects. Micronutrient deficiencies in early childhood, for example, have been linked to impaired cognitive abilities in adulthood (reviewed in [18]). Given the lifelong negative effects of early childhood malnutrition, it is important to identify children at risk for malnutrition. Two ways to assess risk for malnutrition are through growth monitoring and assessment of child feeding practices. Due to the permanent negative effects of malnutrition during childhood, addressing malnutrition presents both a challenge and opportunity for a healthcare system.

In Brazil, the Family Health Program, or Programa de Saude da Familia (PSF), is a component of the larger Unified Health System (SUS) and was established in 1994 in an effort to decentralize SUS. In addition to decentralizing SUS, the PSF model was implemented to increase "case-resolving capacity in the health services, promote social control", and foster "closer links between families and the health teams" [54]. A number of studies have demonstrated the importance of PSF health professionals in promoting appropriate child feeding practices. Health care workers have played a role in consistently informing mothers about the benefits of breastfeeding [48] and in providing guidance related to complementary feeding to mothers [49]. Other studies conducted with PSF health care professionals found that the

majority of professionals were aware of the benefits of breastfeeding but had difficulties explaining breastfeeding techniques and management of challenges that mothers face when breastfeeding [50-51]. Given the role of health professionals in providing guidance related to child feeding practices, it is important that they are informed on appropriate child feeding practices in order to best counsel and orient mothers.

In addition, there are known challenges to implementing growth monitoring in health care settings. Such challenges revolve around actual measurements taken, interpretation of growth charts, and measurement errors. In a survey of growth monitoring practices in 145 countries, all Latin American and Caribbean countries reported recording weight. These countries were those that responded to the question related to the type of anthropometric measurements obtained during growth monitoring visits. Of these same countries, half obtained height measurements and 36% obtained weight for height. In addition, over 80% of countries in Latin American and Caribbean reported that health care workers encountered problems with growth charts. The most frequently cited problems encountered with growth charts were interpreting growth curves and plotting measurements on the charts themselves [29]. These problems were most likely due to lack of training among all categories of healthcare workers, a common finding that has been cited in various Latin American settings [30-31]. In a primary health care setting in northeastern Brazil, Lima *et al.* recently found that only 18% of healthcare workers had received training in anthropometric measurements during the two years prior to the study [32]. Lack of training could also lead to measurement errors, causing anthropometric measurements to be unreliable and biased (reviewed in [33]). However, the prevalence of basic knowledge and training in growth monitoring it is unknown among PSF health providers.

In addition to counseling mothers on child feeding practices and conducting routine growth monitoring of children, health care workers also play a role in the surveillance of nutritional status of a population. The Food and Nutrition Surveillance System Network (SISVAN) was formed in Latin America to serve as a technical mechanism made up of public, private or independent institutions. In Brazil, official guidelines for the implementation of SISVAN were instituted in 2004. At the municipal level, data collection forms related to patient nutritional status and dietary intake are filled out by healthcare workers at public healthcare facilities and forwarded to local secretary of health for entry [53]. Given that a large part of SISVAN depends on healthcare worker's data collection, it would be beneficial to explore their perceptions towards the data collection process and on the SISVAN. To date, no studies have addressed healthcare workers' perceptions of the SISVAN.

To address these needs, the goal of this study was to examine knowledge and practices of pediatric nutritional assessment in PSF health professionals in Vespasiano, Minas Gerais, Brazil in 2010. A knowledge and practices (KP) survey was administered to health professionals employed by the PSF during the months of June and July 2010. In order to determine the prevalence of child visits that had anthropometric measurements recorded, medical records of children 5 and under were randomly selected and reviewed. The prevalence of training related to child growth monitoring differed among non-doctor professionals. Basic knowledge of growth monitoring also differed among all professional categories. Of all child visits recorded in PSF medical records, the majority of child visits had weight, height, and age recorded. Insight into health care professionals' knowledge and practices related to child feeding and pediatric

nutritional assessment, along with their perceptions of the SISVAN, would help local level decision-makers identify gaps in knowledge and practice.

# *METHODS*

## Sample Population

### *Knowledge and Practices (KP) Survey*

Research subjects included health care professionals employed by the PSF in Vespasiano, Brazil during the months of June and July 2010. During this period, there were 81 eligible professionals, all of whom were over the age of 18, and thus eligible for inclusion in the study. Professionals were informed of the study and asked to participate during PSF health unit visits made by the investigator. Written informed consent was requested of each subject prior to beginning each interview. A total of 75 professionals agreed to participate including 41 Community Health Agents, 10 nurses, 11 nurse assistants, and 7 doctors. The 6 professionals who did not participate were on vacation or sick leave. Two attempts were made to recruit professionals for participation the study, after which they were not included from the study.

### *Medical Record Review (MRR)*

In order to determine the prevalence of child visits that had anthropometric measurements recorded, medical records of children 5 and under were reviewed. A proportionally allocated stratified random sample of children 5 and under was selected and their medical records were reviewed. An enumerated list of children 5 years and under enrolled in the PSF was used as the sampling frame [59]. This list was a compilation of the lists provided by each of the 10 health units and was stratified by health unit. As of June 2010 there was a total of 2,076 children 5 and under served by the 10 PSF units. Assuming a prevalence of the recording of height and weight of 50% (unknown), and a desired precision level of 5%, a sample of 384 children was calculated

[60]. After adjusting for a small population (<25,000) and a non-response rate of 20%, the investigator determined a final sample size of 405. Human research ethics approval for this study was granted by the Emory University (Atlanta, GA, USA) Institutional Review Board (IRB) and the *Faculdade da Saúde e Ecologia Humana* (FASEH, Vespasiano, MG, Brazil) IRB.

**Data Collection**

*KP survey*

The survey was administered in the form of a one-on-one interview. Interviews were conducted in Portuguese by two trained students from the local medical school (FASEH) either at the PSF health unit where the professional worked, or at the professionals' home. The survey contained questions regarding trainings and knowledge related to child growth monitoring, infant feeding practices, perceptions of the Food and Nutrition Surveillance System Network (SISVAN), and health provider communication preferences. Questions related to knowledge of child growth monitoring and infant feeding practices were developed using information from the Brazilian Ministry of Health's Practical Guide for the Community Health Agent [61] and the Manual for Community Health Agents Diet and Nutrition of Families enrolled in the Family Assistance Program [62]. Open ended responses were recorded in Portuguese and translated into English by the two medical students fluent in English and Portuguese. The investigator, who is a native English speaker and fluent in Portuguese, reviewed these translations for accuracy. Discrepancies were clarified through discussions with the two medical student translators and the investigator made the final decision on any discrepancies prior to entering the translated data into the database. Pilot testing of the survey was conducted in a PSF unit in Belo Horizonte. Survey questions that required further explanation by volunteers in the pilot test, were modified and

redundant questions were eliminated. Each interview took approximately 30 minutes to complete.

*Medical Record Review*

Two trained data extractors (a student from FASEH and the Emory investigator) reviewed all the records that were randomly selected and present at the unit. A data extraction collection form and protocol were developed prior to the review of medical records. The data extraction form was developed based on Vespasiano's Flowchart of Child Care, which illustrated the quantity and timing of routine visits a child should have with a PSF doctor and nurse from birth until the age of 5 [63]. There were 14 visits illustrated in the Flowchart of Child Care in which children were to be seen by either a nurse or physician. During each of these 14 visits, growth monitoring was to be conducted [63]. Child visits to the PSF that were non-emergency visits were assessed to see whether height and weight were recorded. "Non-emergency" visits were defined by the investigator as visits in which children presented to the unit for routine follow-up and not because of ailments such as fever, diarrhea, skin irritations, vomiting. However, if a child presented to the unit because they had one or more of these ailments and height and/or weight were recorded, the visit was noted in the database as being part of growth monitoring for that visit.

**Data Analysis**

*KP survey*

All surveys were double-data entered into EpiInfo version 3.5.1 by three different data operators. The database was cleaned using the data compare feature of EpiInfo. Discrepancies were

documented in a Microsoft Excel error log. The investigator and data collectors resolved these discrepancies by referencing the survey hard copies. Corrections were applied to a master EpiInfo database, after which 5% of entries were assessed for accuracy. The master database was subsequently exported into Statistical Analysis Software (SAS) version 9.2. Continuous data were assessed for normality. The median was used for analysis for variables that did not satisfy normality assumptions.

Open-ended responses were translated from Portuguese to English by the authors and entered into the master EpiInfo database. To allow for easier coding, open-ended responses were exported to a Microsoft Excel file. For each survey, the investigator and one data collector together read each response to each open ended question and assigned a theme. Similar themes were then grouped together. Several days later, all open-ended responses were then reviewed for a second time by the investigator and data collector to confirm that the themes assigned upon first review were correct [64].

*Medical Record Review*

Data extracted from the medical records was entered into an EpiInfo database. Upon completion of the entire medical record review, this database was exported to Excel and subsequently SAS version 9.2 for analysis. Backwards elimination and logistic regression was used to model the outcome (whether 75% of visits were on track with the schedule of routine visits for growth monitoring) with a set of potential predictors. Visits that occurred during the months recommended in the schedule, occurred at months 1, 3, 4, 6, 7, 9, 10, 12, 15, 18, 24, 36, 48, and 60. A dichotomous variable was then created to determine whether children met at least 75% of

their visits. Three observations were set to missing given that the children's ages were implausible or over 60 months. The gold standard model for each routine visit included the child's age at the time of the visit, the season in which the visit took place, sex of the child, the proportion of all health providers by PSF unit who believed they had enough time to discuss prevention of child malnutrition and diarrhea during visits (enoughtime), the median years of practice among doctors and nurses by unit (medianyrsprac), and the length of time the child attended the PSF (proxy). The *enoughtime* and *medianyrsprac* variables were created using data from the KP survey database. Confounding was assessed by comparing the OR of the effect of age in the gold standard model to each model. If the OR fell +/- 10% outside of the 95% CI of the gold standard model OR, the variable was determined to be a confounder and was therefore added back to the model. Precision of the OR estimates was assessed by examining the width of the 95% CIs. The most parsimonious model that generated the narrowest CI and an unconfounded OR was selected as the best model. Spearman's rank correlation was used to assess the correlation between a child's age and percent of on track visits.

## *RESULTS*

The goal of this thesis is to examine knowledge and practices of pediatric nutritional assessment in PSF health professionals in Vespasiano, Minas Gerais, Brazil in 2010. During the study period, of the 10 PSF units surveyed, most units had a health team that comprised of a doctor, a nurse, a nurse assistant, and 5-7 Community Health Agents (CHAs), which was in compliance with the program requirements set forth by the Brazilian MOH. Three units did not have a doctor, one unit had two nurse assistants, and two units had 3-4 CHAs. 73 (97%) of respondents were female and median reported monthly income was BRL 610 (~368 USD) (data not shown). 61 (82%) respondents identified with being Catholic, Protestant, or Evangelical (data not shown). In order to determine health providers' age and length of experience practicing in the medical field and within the PSF, (method) investigators collected self-reported information from all participants. Among PSF health providers, doctors had been practicing the shortest amount of time whereas nurse aids had been practicing the longest. However, community health agents had been practicing the longest within the PSF (Table 1). Given the demographic characteristics of health providers, it is apparent that the health providers are young and fairly new to the healthcare field and the PSF.

Before assessing the specific knowledge related to pediatric nutritional assessment in health providers, it was important to assess non-doctor professionals' training surrounding infant feeding practices and child growth monitoring. Doctors were not asked these questions because they presumably received training in such topics during their medical training, as described in the footnote. Investigators asked non-doctor professionals if they had received training around

infant feeding practices and child growth monitoring during the time they had been working with the PSF. Also, non-doctor professionals were asked whether they felt they needed more training related to child nutrition. Over half of non-doctors professionals reported that they had received training related to infant feeding practices and child growth monitoring during the time they worked with the PSF. However, there was a significant difference in training related to child growth monitoring, but not infant feeding practices, between professionals, where CHAs had the highest proportion individuals trained in child growth monitoring and nurse aids had the lowest proportion of individuals trained in child growth monitoring. Interestingly, although nurses typically conduct routine growth follow-up visits, only 30% reported being trained in child growth monitoring (**Table 2**). CHAs were more likely than nurses to report receiving training in child growth monitoring (OR=4.52 95% CI [1.03, 19.88]) (data not shown). Of all non-doctor professionals, 64 (94.1%) felt they needed more training in child nutrition (data not shown). In conclusion, non-doctor professionals perceived the need for further training in child nutrition, the 'prevalence' of training related to infant feeding practices did not differ by professional category, and the 'prevalence' of training related to child growth monitoring differed significantly.

Health professionals play a role in providing guidance related to child feeding practices. It is therefore important to assess, more deeply, the PSF professionals' knowledge related to child growth monitoring and infant feeding practices and determine differences in knowledge between professional categories. The investigator asked participants several questions based on information from the Brazilian MOH training manuals for CHAs. Regarding child growth monitoring knowledge, slightly over half of all professionals were able to correctly identify a normal growth curve with a borderline significant difference between doctors, nurses, nurse aids,

and CHAs (**Table 3**). On the other hand, less than half of all professionals knew that a child's sex, weight, height, and date of birth were necessary to assess nutritional status, with a borderline difference between doctors, nurses, nurse aids, and CHAs. Regarding growth monitoring practices, the majority of non-CHA professionals reported always/almost always plotting growth measurements on a chart and recording measurements in PSF medical records and the Child Booklet. However there were significant differences between doctors, nurses, and nurse aids reporting that they always/almost always plotted growth measurements on a chart and in the Child Booklet. There were no significant differences between doctors, nurses, and nurse aids related to the practice of recording measurements in PSF medical records (**Table 3**). In addition, most professionals were familiar with child feeding recommendations related to exclusive breastfeeding for six months and strategies to prevent anemia. However, the majority of professionals incorrectly answered questions related to the types of food that should be given to a child during the first two months of complementary feeding, with the exception of 'same food as the rest of the family'. The knowledge related to whether a child should be given only mashed foods during the first two months of complementary feeding was significantly different between professional categories (**Table 4**). There were no significant differences between professional categories related to knowledge of the length of exclusive breastfeeding, corn as appropriate complementary food, meats as inappropriate complementary food, and strategies to prevent anemia. In conclusion, related to child growth monitoring, knowledge and most practices were (borderline) different among professional categories, whereas in general, knowledge related to infant feeding and practices was the same among professional categories.

The Vespasiano Secretariat of Health developed a schedule of routine child follow-up visits for

children who were part of the PSF in 2009. Growth monitoring was a component of each of these visits. In order to determine the frequency in which height, weight, and age were recorded at each non-emergency child visit, the investigator selected a random sample of 404 medical records belonging to children 5 and under. Of these 404 selected records, the investigator found 358 medical records (89% of selected records) and reviewed these. A child's sex, date of birth, dates of non-emergency visits to the PSF, height, weight, and age noted on the date of the visits, were entered into the database. In addition, in order to identify factors associated with whether a child met 75% of routine child follow-up visits, the investigator built logistic models using backward elimination to determine the most parsimonious model. Of all non-emergency visits recorded in 358 medical records, a total of 76.4% of non-emergency child visits to the PSF had height, weight, and age recorded (data not shown). Age and the duration of a child's participation in the PSF program in Vespasiano were univariately associated ($p<0.001$) with whether 75% of a child's visits were on track with the routine visits (data not shown). However, when other variables were added to the model, the duration of participation in the PSF was insignificant. A final model including only the age variable was selected as the most parsimonious model to determine whether 75% of a child's visits were on track with the routine visits (**Table 5**). For example, for every day and a half increase in a child's age there was a 5% [OR=0.95 95% CI (0.93, 0.97)] decreased odds of having 75% of visits on track with the routine schedule. As a child's age increased, the percentage of on track visits declined significantly (Spearman's rank correlation $p<0.0001$) (**Figure 1**). In conclusion, health professionals recorded anthropometric measurements for the majority of non-emergency child visits. Also, the older the child, the less likely they were to have 75% of their visits on track with routine visits.

Given that a large part of SISVAN depends on healthcare worker's data collection, it would be beneficial to explore their perceptions towards the data collection process and on the SISVAN. In order to assess PSF professionals' perceptions related to the SISVAN, non-doctors were asked closed and open-ended questions regarding their experiences with and opinions about SISVAN. Doctors were not asked their perceptions on the SISVAN data collection process given that typically doctors are not involved in the process [63]. The investigator analyzed responses to open-ended forms by assigning a theme to each response and then grouping similar themes. Nurses and CHAs comprised the majority of professionals that had filled out the SISVAN form at least once. 17 (37.8%) of professionals who had filled out the form, responded that it was neither easy nor difficult to fill out while 27 (60.0%) responded that it somewhat or very easy to fill out. 29 (64.4%) of professionals who filled out SISVAN forms believed that SISVAN has contributed at least somewhat to improve PSF services related to nutrition. Health professionals provided several reasons why they believed SISVAN had or had not contributed to the improvement of PSF services related to nutrition. Such reasons included the belief that SISVAN can be used as tool for pediatric assessment, information, and policy but there are also challenges for dissemination and data collection (**Table 6**). Although most professionals believed SISVAN has contributed in some way to the improvement of PSF services related to nutrition, several respondents felt it had not contributed due to inefficiencies in data collection and dissemination of surveillance findings.

## *DISCUSSION*

The goal of this thesis is to examine knowledge and practices of pediatric nutritional assessment in PSF health professionals in Vespasiano, Minas Gerais, Brazil in 2010. This study assessed health professional's knowledge and practices related to child growth monitoring and infant feeding practices, the frequency of visits with anthropometric measurements recorded, perceptions of the SISVAN, and the factors associated with whether a child had at least 75% of their visits on track with routine child growth monitoring. We found that the majority of non-doctor professionals reported that they received training related to infant feeding practices and child growth monitoring during the time they worked with the PSF. In addition, the majority of child visits recorded in PSF medical records were found to have anthropometric measurements recorded. The investigator also observed that health professionals perceived the SISVAN to have contributed at least somewhat to improve PSF services related to nutrition but also cited challenges (Table 6). Lastly, we found that as children became older, the odds of them having 75% of on track routine visits decreased.

Various studies have evaluated health providers' training related to child growth monitoring and infant feeding in Brazil. In a primary health care setting in northeastern Brazil, Lima *et al.* recently found that only 18% of health care workers had received training in anthropometric measurements during the two years prior to the study [32]. Also in northeast Brazil, only 26% of doctors, nurses, and nurse aids working in the public health system in the state of Pernambuco, had received training in child growth monitoring [30]. In the southern region of Brazil, one study found that 89% of professionals received training related to breastfeeding and [51]. Another study found that approximately 30.1% of PSF professionals received training related to

breastfeeding [50]. Given that estimates of health care workers who received training in child growth monitoring ranged from 18-26% [30, 32] and from 30.1-89% for training related to infant feeding practices [50-51], our study found a higher prevalence of training in child growth monitoring (54%) and a lower prevalence of training in infant feeding practices (54%), than other national studies.

Possible explanations for the differences in the prevalence of training between our study and previous studies, may be due to the study location, the definition of training, and the professional backgrounds of the study participants. The study location is important, as the PSF design and implementation differs greatly depending on the municipality [54], which could shape the trainings provided to health providers. In addition, the definition of 'training' can determine whether or not a health provider received training. For example in our study, training was defined generally as formal or informal, given that within the PSF formal trainings are often supplemented by informal trainings [65]. Also, in our study, questions regarding training were not asked to doctors because it was assumed that they had received training in pediatric nutritional assessment in medical school.

In terms of specific knowledge of infant feeding practices and growth monitoring, past studies found that 25-97% of all PSF professionals identified that infants should be breastfed exclusively for six months [50-51] and cited difficulty in the plotting and interpretation of growth charts in Latin America and the Caribbean [29]. Our study found that 93% of health providers identified that infants should be breastfed exclusively for six months, a figure which falls in the upper

range observed in the above studies. Also in our study, the majority of CHAs received training in growth monitoring yet did not correctly identify a normal growth curve (Table 3), which indicates difficulties in the interpretation of growth charts.

Possible explanations for the differences and similarities between our observations and previous studies may be due to the length of practice in the PSF and in the healthcare field and difficulties understanding training content. The median number of years of practice in the PSF for health professionals in our study was higher for CHAs, nurses, and nurse aids, when compared to previous studies [50-51]. This could account for a higher percentage of health providers that correctly answered that exclusive breastfeeding should continue for six months. Also, length of practice in the healthcare field could explain differences in the proportion of health providers who correctly answered the question related to exclusive breastfeeding duration. It is possible that the PSF Vespasiano health professionals had less years of experience in the healthcare field compared to the health providers in São Paulo [51]. Such information, however, was not available for comparison. In relation to the difficulties in plotting and interpreting growth charts, it is possible that health providers who received growth monitoring training did not fully understand the training content. Such a problem was recently cited in the same study population [66].

Related to child growth monitoring practices, we found that 76.4% of child visits had height, weight, and age recorded in PSF medical records. This finding seems to be in line with the

observation that the majority of non-CHA health providers reported that they always or almost always recorded measurements in the PSF medical records (Table 3). However, it is unlikely that the same providers who participated in the survey were those who recorded the measurements noted in the medical records that underwent review. One possible explanation for the omission of such recorded information in the remaining 23.6% of visits, could be that the PSF units lacks the proper equipment (scales and measuring tapes) to take height and weight measurements. Inadequate equipment as an obstacle to carrying out growth monitoring has been cited not only in public health settings in Brazil, but in other parts of Latin America and the world [29-31]. For example, in de Onis *et al*. among all Latin American and Caribbean countries reported recording weight, only half obtained height measurements, and 36% obtained weight for height [29]. This hypothesis, however, is doubtful given that PSF medical records were assessed at all 10 health units and it is unlikely that units sometimes had inadequate equipment and sometimes did not. Another explanation for the omission of anthropometric measurement recorded in medical records, could be lack of time during the visit to either conduct growth monitoring or record the measurements. For example, in a study conducted in Nigeria, 12.9% of health care workers believed growth monitoring was too time consuming [67]. However this is unlikely in this study population given that only 8 (10.6%) of professionals believed they did not have enough time during visits to discuss prevention of malnutrition and diarrhea with caretakers (data not shown). Lastly, it is possible that there is lack of interest in growth monitoring among professionals, given that there is little emphasis on growth and nutrition in medical and nursing school curricula [68].

Although most health professionals believed the SISVAN had contributed in some way to the improvement of PSF services related to nutrition, several respondents felt it had not contributed due to the absence of feedback from the Secretariat of Health and inefficiencies in data collection. One potential explanation for this finding is that the SISVAN, in comparison to other surveillance networks in Vespasiano, is fairly new [53], thus the process of feedback from the municipal level to providers may not be clearly defined. Another explanation could be due to confusion on the Secretariat of Health's schedule for collecting data surveillance forms from the PSF units, given that different data surveillance forms are collected from the PSF units at different intervals (ie monthly collection for SISVAN versus weekly collection for the National Notifiable Diseases Information System (SINAN)) [53]. To our knowledge, there is no literature addressing perceptions of SISVAN in Latin America, let alone Brazil.

Our study found that age was strongly associated with whether a child covered by the PSF in Vespasiano attended 75% of their routine visits on time (Figure 1). One hypothesis is that there is a decline in the percentage of on track visits with an increase in age perhaps due to the emphasis of growth monitoring during a child's first two years of life [69], and the implications of growth faltering during this period. Logistic regression was used to test this hypothesis and investigator found that growth monitoring (when controlling for age) was borderline significantly associated ($p=0.05$) with the outcome of whether 75% of visits were on track with routine visits. Thus this finding provides support for the above mentioned hypothesis. Given that the schedule of routine child visits to the PSF that was used for analysis was tailored to Vespasiano and recently implemented, the investigator was unable to find comparable studies. A study cross-sectional conducted in 1995 and 2004 found that among households surveyed in

southern Brazil, there was an increase in preventative healthcare utilization for immunizations and growth monitoring in children under five [70]. However given that said study relied on caregiver's recall of child visits (and not child medical records) and was not longitudinal, it is impossible to determine whether this upward utilization would have occurred in the same children. Another possible explanation for these findings could be that younger children are more likely to develop illnesses that warrant medical attention. A recent study conducted in the city of São Paulo, found that children under the age of one accounted for 74% of hospitalizations in the public health system, compared to children ages one to four who accounted for 16% of hospitalizations [71]. Thus it is possible that younger children present to the PSF unit more than older children because they are sick more often, in which case the likelihood of their visits being in line with the schedule of routine visits would be greater.

This study had several strengths. Given that the majority (93%) of health professionals were interviewed, it is likely that findings related to knowledge and practices of child growth monitoring and infant feeding practices and perceptions of the SISVAN can be extrapolated to the remaining health providers who did not participate. Also, this is the first study to assess health providers' perceptions of a national nutritional surveillance system that was recently implemented at the municipal level. Lastly, this study was also the first study that built epidemiologic models to determine factors associated with whether 75% of a child's visits were on track with the schedule put forth by the municipality's Secretariat of Health.

This study also presents various limitations. Given that knowledge and practices of health providers related to growth monitoring and infant feeding practices was self-reported, it is

possible that recall bias and social desirability played a role in determining how health providers responded to certain questions. Such biases could have been minimized through patient-provider observations. Given that the medical record review was retrospective, the investigator imposed the outcome to visits that occurred prior to the development of the PSF schedule of routine child visits in 2009. Due to time constraints, the review of all medical records by both data extractors and the calculation of intra-observer reliability was not possible. However, the medical records that underwent review were randomly selected, thus ensuring a representative sample of all PSF medical records belonging to children 5 and under.

Based on our findings, the Vespasiano Secretariat of Health should provide and encourage continuous capacity strengthening related to the detection and prevention of child malnutrition, ensure that health units are supplied with proper growth monitoring equipment, disseminate timely feedback on nutritional surveillance data to the health professionals, and incorporate health providers' feedback on the surveillance process.

Our findings of the prevalence of professionals who received training in infant feeding practices and growth monitoring (54%), correctly identified the duration of exclusive breastfeeding (93%), and experienced difficulty in the plotting and interpretation of growth charts, are in agreement with previous studies from Brazil [50-51] and Latin America [29]. This study also provides new information related to health providers' perceptions on the benefits and obstacles of a regional nutritional surveillance system and factors associated with on track routine child visits. Such findings offer valuable insight into the areas that the PSF can improve upon in order to detect and prevent malnutrition in the Brazilian pediatric population. Further studies are necessary to

evaluate the effect of having an on track visit with better nutritional status along with the use of patient-provider observations to more clearly assess the interplay of knowledge and behavior and the impact on pediatric nutritional status.

# CONCLUSION AND RECOMMENDATIONS

- PSF health professionals in Vespasiano are predominantly of young age and are fairly new to the healthcare field and the PSF. Among PSF health providers, doctors had been practicing the shortest amount of time whereas nurse aids had been practicing in the healthcare field the longest. Community Health Agents, however, were among the health professionals that had been practicing the longest within the PSF.

- Non-doctor professionals perceived the need for further training in child nutrition. Over half of non-doctor health professionals were trained in infant feeding practices and child growth monitoring. The 'prevalence' of training related to infant feeding practices did not differ by professional category whereas the 'prevalence' of training related to child growth monitoring differed significantly. CHAs were more likely than nurses to report receiving training in child growth monitoring.

- Related to child growth monitoring, knowledge and most practices were (borderline) different among professional categories, whereas in general, knowledge related to infant feeding and practices was the same among professional categories.

- Health professionals recorded anthropometric measurements in PSF medical records for the majority of non-emergency child visits. Also, the older the child, the less likely they were to have 75% of their visits on track with routine visits.

- Although most professionals believed SISVAN has contributed in some way to the improvement of PSF services related to nutrition, several respondents felt it had not contributed due to inefficiencies in data collection and dissemination of surveillance findings.

Finally, findings from this study highlight the need for continuous training in basic knowledge related to child growth monitoring and infant feeding practices and integration of health providers' perceptions of the SISVAN data collection-feedback cycle. More training related to child growth monitoring should be provided to nurses, given that they are usually more involved in routine growth monitoring. The need for health professionals to record anthropometric measurements in PSF medical records should be reinforced and scales and measuring tapes should be functioning in order to facilitate growth monitoring. Caregivers should also be continuously reminded of the importance of growth monitoring and bringing their children to the PSF for routine visits. Further studies are necessary to evaluate the effect of having an on track visit with better nutritional status along with the use of patient-provider observations to more clearly assess the interplay of knowledge and behavior and the impact on pediatric nutritional status. Public health decision makers should ensure that nutritional surveillance information is fed back to health professionals, in order to maximize timely data collection.

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# TABLES AND FIGURES

Table 1: Characteristics of PSF health care professionals in Vespasiano, state of Minas Gerais, Brazil, 2010 (n=75)

| **Professional category** | **n (%)** | **Median age in years, 5th quartile, 95th quartile)** | **Median number of years of practice (5th quartile, 95th quartile)** | **Median number of years working with PSF (5th quartile, 95th quartile)** |
|---|---|---|---|---|
| **Doctor** | 7 (9) | 28 (25, 39) | 1.75 (0.50, 12.00) | 0.33 (0.04, 1.50) |
| **Nurse** | 10 (13) | 32 (27,44) | 4.84 (1.33, 10.50) | 2.67 (0.25, 7.58) |
| **Nurse Aid** | 11 (15) | 37 (20, 52) | 10.00 (0.67, 29.25) | 2.92(0.17, 11.25) |
| **Community Health Agent** | 47 (63) | 31 (25, 49) | 5.33 (1.17, 12.50) | 5.25(0.67, 11.25) |

Table 2: Trainings received by PSF non-doctor healthcare professionals stratified by category in Vespasiano, state of Minas Gerais, Brazil, 2010 (n=68)*

| Category | n | Infant feeding practices (%) | n | Child growth monitoring (%) |
|---|---|---|---|---|
| **Nurses** | | | | |
| **Yes** | 5 | 50 | 3 | 30 |
| **No** | 5 | 50 | 7 | 70 |
| **Nurse Aids** | | | | |
| **Yes** | 3 | 27 | 3 | 27 |
| **No** | 8 | 73 | 8 | 73 |
| **Community Health Agents** | | | | |
| **Yes** | 29 | 62 | 31 | 66 |
| **No** | 18 | 38 | 16 | 34 |
| **p- value** | | 0.11 | | 0.02 |

* Doctors were not asked the questions regarding training in infant feeding practices and child growth monitoring because investigators assumed they received such training in medical school.

Table 3: Knowledge and practices related to child growth monitoring among PSF healthcare professionals stratified by category in Vespasiano, state of Minas Gerais, Brazil, 2010

| **Professional category** | Identified normal growth curve on chart n (%) **(n=75)** | | Identified information needed for nutritional assessment n (%) **(n=75)** | | Always/almost always plot measurements on chart n (%) **(n=27)** | | Always/almost always record measurements in records n (%) **(n=27)** | | Always/almost always record measurements Child Booklet n (%) **(n=27)** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** |
| Doctors | 7 (100) | 0 (0) | 3 (43) | 4 (57) | 6 (100) | 0 (0) | 6 (100) | 0 (0) | 6 (100) | 0 (0) |
| Nurses | 9 (90) | 1 (10) | 8 (80) | 2 (20) | 10 (100) | 0 (0) | 9 (90) | 1 (10) | 10 (100) | 0 (0) |
| Nurse aids | 5 (46) | 6 (54) | 5 (46) | 6 (54) | 1 (9) | 10 (91) | 9 (82) | 2 (18) | 4 (36) | 7 (64) |
| Community Health Agents | 19 (40) | 28 (60) | 15 (32) | 32 (68) | -- | -- | -- | -- | -- | -- |
| All professionals | 40 (53) | 35 (47) | 31 (41) | 44 (59) | 17 (63) | 10 (37) | 24 (89) | 3 (11) | 20 (74) | 7 (26) |
| *p-value | 0.05 | | 0.05 | | 0.001 | | 0.726 | | 0.004 | |

* Chi square p-value does not include 'All professionals' category
-- CHAs were not asked the questions re: growth monitoring practices given that they were not part of their responsibilities.

Table 4: Knowledge related to infant feeding practices and anemia prevention among PSF professionals stratified by category in Vespasiano, state of Minas Gerais, Brazil, 2010

| **Professional category** | Identified length of exclusive breastfeeding n (%) **(n=75)** | | Identified cereals/corn as appropriate complementary food n (%) **(n=75)** | | Identified 'only mashed foods' as inappropriate complementary food n (%) **(n=75)** | | Identified meats are inappropriate complementary foods n (%) **(n=75)** | | Identified 'same food as rest of family' as inappropriate complementary foods n(%) **(n=75)** | | Would recommend liver/ sweetmeats to prevent childhood anemia n (%) **(n=74)*** | | Would not recommend cookies/ sweets to prevent childhood anemia n (%) **(n=74)*** | | Would recommend natural juice to prevent childhood anemia n (%) **(n=74)*** | | Would recommend iron supplements to prevent childhood anemia n (%) **(n=74)*** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** | **Yes** | **No/DK** |
| Doctors | 7 (100) | 0(0) | 2(29) | 5(71) | 0 (0) | 7(100) | 5 (71) | 2(29) | 6 (86) | 1 (14) | 5(83) | 1(17) | 6(100) | 0(0) | 3(50) | 3(50) | 4(67) | 2(33) |
| Nurses | | | | | | | | | | | | | | | | | | |
| Nurse aids | 10 (100) | 0(0) | 6 (60) | 4(40) | 3 (30) | 7 (70) | 4 (40) | 6(60) | 8 (80) | 2 (20) | 9(90) | 1(10) | 7(70) | 3(30) | 9(90) | 1(10) | 10(100) | 0(0) |
| Community Health Agents | 11 (100) | 0 (0) | 2 (18) | 9 (82) | 1(9) | 10 (91) | 2 (27) | 9(73) | 9 (82) | 2 (18) | 9(82) | 2(18) | 9(82) | 2(18) | 10(91) | 1(9) | 9(82) | 2(18) |
| All professionals | 42 (89) | 5(11) | 17 (36) | 30 (64) | 2 (4) | 45(96) | 22 (47) | 25(53) | 35(75) | 12 (25) | 38(81) | 9(19) | 34(72) | 13(28) | 40(85) | 34(15) | 44(94) | 3(6) |
| **p-value | 70 (93) | 5(7) | 27 (36) | 48 (64) | 6 (8) | 69 (92) | 34 (45) | 41 (55) | 58 (77) | 17 (23) | 61(82) | 13(18) | 56(76) | 18(24) | 62(84) | 12(16) | 67(91) | 7(9) |
| | 0.96 | | 0.49 | | 0.04 | | 0.60 | | 0.88 | | 0.65 | | 0.74 | | 0.13 | | 0.06 | |

*One doctor did not answer this question
** Chi square p-value does not include 'all professionals' category

Table 5: Summary of models using backward elimination to determine factors associated with whether a child had at least 75% of visits on track with routine child growth monitoring schedule

| Variables | Parameter estimate of age | OR | 95% CI | 95% CI width |
|---|---|---|---|---|
| age sex enoughtime† medianyrsprac†† proxy* | -0.0258 | 0.98 | (0.95, 1.00) | 0.05 |
| age sex enoughttime proxy | -0.0258 | 0.98 | (0.95, 1.00) | 0.05 |
| age enoughttime proxy | -0.0239 | 0.98 | (0.95, 1.00) | 0.05 |
| age proxy | -0.0242 | 0.98 | (0.95, 1.00) | 0.05 |
| age** | -0.0514 | 0.95 | (0.93, 0.97) | 0.04 |

† enoughtime refers to the proportion of all health providers by PSF unit who believed they had enough time to discuss prevention of child malnutrition and diarrhea during visits
††medianyrsprac refers to the median years of practice among doctors and nurses by PSF unit
* proxy refers to length of time the child attended the PSF
**denotes the most parsimonious model that generates the most precise OR estimates

Figure 1: Relationship between child's age and percent of on track routine visits

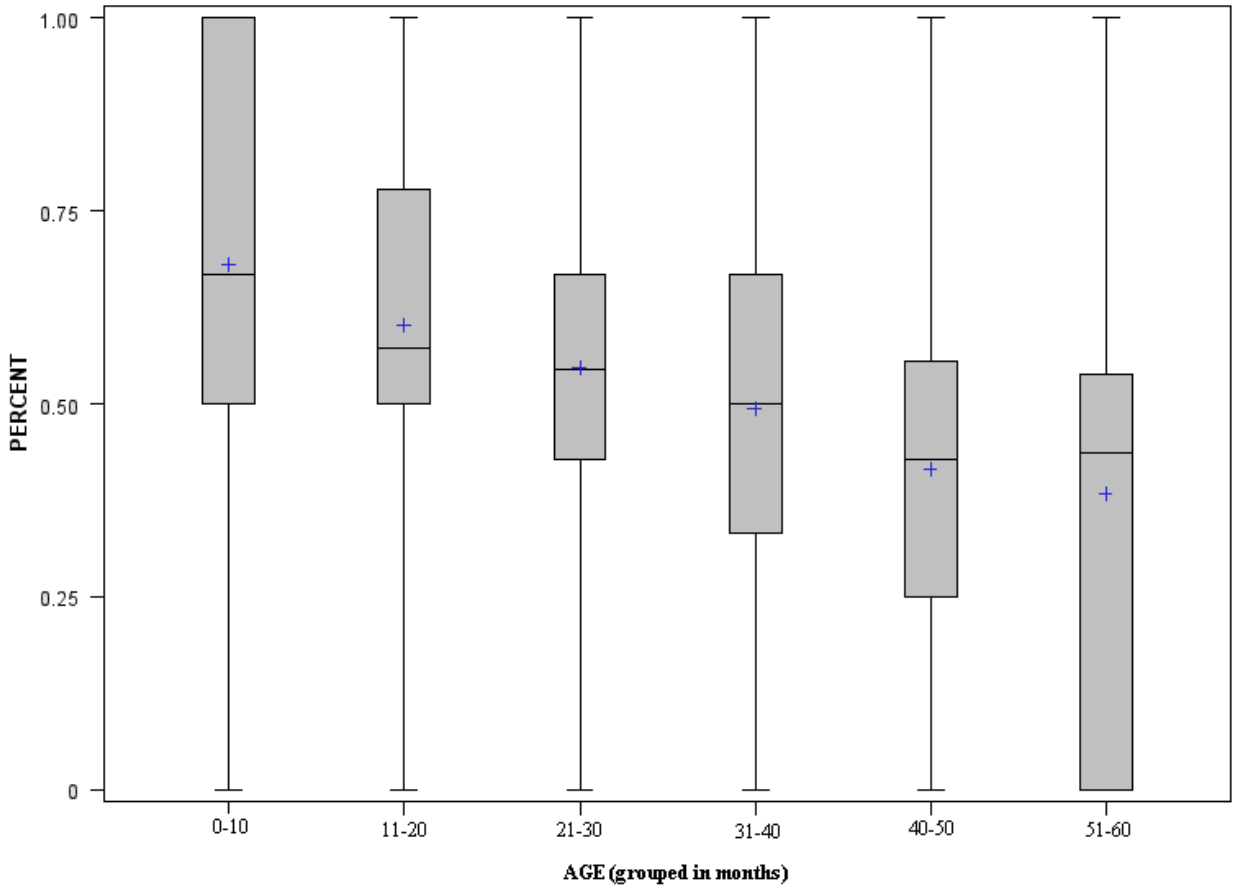



**Figure 1: Percent of on track visits significantly decreases by child's age group (p<0.001).** Boxes represent the range of percentages that a child had visits that were on track with the routine growth monitoring schedule. The bottom of the box represents the 25$^{th}$ percentile, the middle (denoted by ---) represents the median, and the top of the box represents the 75$^{th}$ percentile. The whisker below the box represents the bottom 10% whereas the whisker above the box represents the top 99%. The plus (+) sign represents the mean percentage of child visits that were on track with the routine growth monitoring schedule.

Table 6: Perceptions related to ways in which SISVAN has or has not contributed to improving PSF services related to nutrition (n=45)

| **Themes** | **Responses** |
|---|---|
| *Has contributed*<br>Informs stakeholders | -Informs the community, the Secretary of Health, and the PSF |
| Assists HCWs in pediatric assessment | -Detects the nutritional status of a child<br>-Helps in child follow up<br>-Indicates a child's nutrition |
| Impacts policy | -Guides prevention programs of the PSF |
| *Has not contributed*<br>Information not shared | -Absence of feedback from the Secretariat of Health |
| Problems with data collection | -Community does not come to the health unit to allow for data collection<br>-The data collection forms are not collected from the unit<br>-Only includes children 0-2 years |

# APPENDIX I – Institutional Review Board Approvals

EMORY UNIVERSITY

Institutional Review Board

---

FROM: Aryeh Stein, PhD
Co-Chair
Emory University IRB

TO: Juan Leon, PhD/MPH
Principal Investigator

| CC: | | | |
|---|---|---|---|
| | Holan | Regina | MedInfect |
| | Khawja | Amina | Global Health |
| | Mues | Katherine | Global Health |
| | Perez | Lilian | Public Health |
| | Shukla | Urmy | Graduate Sociology |

DATE: April 26, 2010

RE: **Notification of Amendment Approval and Expedited Approval Determination**
AM3_IRB00020524
Amendment 3 for IRB Study #IRB00020524
Evaluation of the Family Health Program in Vespasiano, Brazil

This is your notification that your above referenced amendment was reviewed and APPROVED by the IRB on **4/21/2010**.

Changes to Consent Form(s)
Changes to Protocol Document(s)
Changes to Advertisements
Changes to study enrollment
Other changes

The amendment changes the status of this study to Expedited (5 and 7), 45 CFR 46.404, single parent consent. Assent for children under 5 years is waived. This approval is valid from **4/21/2010 until 4/20/2011**.

Thereafter, continued approval of this study is contingent upon the submission of a renewal

form that must be reviewed and approved by the IRB prior to the expiration date of this study.

Any serious adverse events or issues resulting from this study should be reported immediately to the IRB and to any sponsoring agency (if any). Amendments to protocols and/or revisions to informed consent forms/process must have approval of the IRB before being implemented.

All inquiries and correspondence concerning this protocol must include the IRB number and the name of the Principal Investigator. If you have any questions or concerns, please contact the IRB office at 404-712-0720 or at email address irb@emory.edu. Our web address is http://www.emory.edu/IRB. Thank you.
Sincerely,

Aryeh Stein, PhD
Co-Chair
Emory University Institutional Review Board
*This letter has been digitally signed*

---

Emory University
1599 Clifton Road, 5th Floor - Atlanta, Georgia 30322
Tel: 404.712.0720 - Fax: 404.727.1358 - Email: irb@emory.edu - Web: http://www.irb.emory.edu/

**Faculdade da Saúde e Ecologia Humana**
***Comitê de Ética em Pesquisa***

# DECLARAÇÃO

Declaramos que o projeto de pesquisa **"Avaliação do Programa de Saúde da Família em relação à vacinação, vigilância nutricional, e as doenças diarréicas em Vespasiano, Brasil."** (N° 365/2010), Pesquisador responsável José Antônio Guimarães Ferreira e demais pesquisadores: Juan S. Leon, Eric Daniel Mintz, José Geraldo Leite Ribeiro, Urmy Shukla, Amina Khawja e Regina Holan foi aprovado em reunião extraordinária do Comitê de Ética em Pesquisa da Faculdade da Saúde e Ecologia Humana no dia 27 de abril de 2010. Por se tratar de pesquisa com cooperação estrangeira, o pesquisador deverá aguardar o parecer da Comissão Nacional de Ética em Pesquisa – CONEP para o início da coleta dos dados.

O relatório final ou parcial deverá ser encaminhado ao CEP um ano após o início do projeto.

Vespasiano, 29 de abril de 2010.

DR. GUSTAVO NUNES TASCA FERREIRA
Fisioterapeuta
CREFITO [illegible] F

Gustavo Nunes Tasca Ferreira
Coordenador do CEP – FASEH

# APPENDIX II – KP Survey Instrument

**Avaliação do conhecimento, das atitudes e das práticas dos profissionais de saúde do Programa de Saúde da Família acerca da verificação do estado nutricional e da cobertura vacinal de crianças de até 5 anos de idade em Vespasiano, Brasil).**
***(Questionário para os profissionais de saúde)***
**July 2010**
**FASEH Medical School, Belo Horizonte, Brazil**
**Rollins School of Public Health, Emory University, Atlanta, GA, USA**

***Interviewer instructions**:*

- *Please circle, in a clear manner, the response chosen by the interviewee and write in detail the interviewee's responses to the open-ended questions, including those that request "**please specify**." Remember to write your interviewer ID, the date of the interview, and the survey number at the top of each page of the survey.*
- *Complete PART 1 before speaking with the respondent*
- *Complete PARTS 2-9 with the respondent*
- *The text " " are statements that introduce the types of questions that follow and should be read to the respondent; text in italics and ( ) are additional instructions.*

Meu nome é _____ e eu sou uma estudante de medicina da Faculdade da Saúde e Ecologia Humana (FASEH). Essa pesquisa está sendo feita pela FASEH e pela Universidade Emory dos Estados Unidos. Ela faz parte de uma avaliação do PSF em Vespasiano, a qual pretende avaliar o estado nutricional, o tratamento da diarréia e a cobertura vacinal de crianças de até 5 anos de idade. A sua participação é completamente voluntária e sua identificação será anônima, já que seu nome será mantido sempre em sigilo em toda e qualquer apresentação desse estudo. Saiba que as respostas oferecidas por você não serão usadas com a finalidade de lhe avaliar, logo se sinta à vontade para responder da forma que lhe parecer a mais apropriada. Estamos particularmente interessadas em envolver profissionais de saúde neste estudo, pois eles podem nos oferecer informações valiosas em relação às práticas do PSF para avaliar o estado nutricional e a cobertura vacinal da população pediátrica de Vespasiano. A informação obtida por meio desse estudo nos possibilitará compreender o seu entendimento das causas, do manejo e da prevenção de agravos nutricionais e doenças preveníveis por meio de vacinas. Isso poderá benficiar o sistema de saúde de Vespasiano, Minas Gerais, assim como as crianças atendidas, as quais possam estar sob risco de desenvolver essas doenças. Esse pesquisa deverá durar em torno de 30 minutos. Desde já agradecemos a sua colaboração.

**Interview start time ☐☐:☐☐ am/pm**

## PARTE 1 (*Complete without asking respondent. Please circle one option under #1-3)*

1. Unit:
    1. Celvia
    2. Jardim da Gloria
    3. Vila Esportiva
    4. Morro Alto I
    5. Morro Alto II
    6. Morro Alto III
    7. Nova Pampulha
    8. Nova York
    9. Suely
    10. Oeste

2. Local da entrevista:
    1. Hospital
    2. Posto de saúde (PSF)
    3. Posto de saúde
    4. Clínica particular
    5. Clínica pública
    6. Policlínica
    7. Residência de um membro da comunidade
    8. Residência de um profissional de saúde
    9. Outro (Por favor especifique) _____

3. Sexo do entrevistado:
    1. Masculino
    2. Feminino
    98. Não sei

## Parte 2 *(PARA TODOS OS PROFISSIONAIS)*

"Primeiro eu vou lhe fazer algumas perguntas sobre você"

4. Quantos anos você tem? ☐☐ anos
    88. Recusou-se a responder
    98. Não sabe

5. Qual é a sua data de nascimento? ☐☐/☐☐/☐☐☐☐
    dd mm aaaa

6. Qual o seu estado civil? (*Leia todas as opções e circule uma*)
    0. Solteiro
    1. Solteiro, mas morando com um parceiro
    2. Casado
    3. Separado
    4. Divorciado
    5. Viúvo
    6. Outro (por favor especifique) _____
    88. Recusou-se a responder

7. Qual a sua religião? (*Leia todas as opções e circule uma*)
    1. Católica
    2. Protestante, não-Evangelico
    3. Protestante, Evangelico
    4. Espirita
    5. Cristã
    6. Nenhuma
    7. Outra (por favor especifique) _____
    88. Recusou-se a responder

8. Apenas para fins de estudo, qual é, aproximadamente, a sua renda mensal?
    R $_____
    88. Recusou-se a responder
    98. Não sabe

9. Qual é o seu grau de escolaridade? (*Leia todas as opções e circule uma*)
    1. $1^0$ grau incompleto
    2. $1^0$ grau completo
    3. $2^0$ grau incompleto
    4. $2^0$ grau completo
    5. Nível técnico
    6. Nível superior
    7. Pós-graduação
    88. Recusou-se a responder

10. Qual é o papel que você desempenha na equipe do PSF? (*Leia todas as opções e circule uma*)
    1. Médico
    2. Enfermeira
    3. Auxiliar de enfermagem
    4. Agente comunitária de saúde

11.Há quanto tempo você trabalha como (*completar com informação da questão 10*)?

☐☐anos ☐☐meses

12.Desde a implantação do PSF no município de Vespasiano, há quanto tempo você trabalha nesta unidade do PSF em (*por favor aponte para o local ao dizer isso*)?

☐☐ anos ☐☐ meses

## Parte 3 *(PARA INFERMEIRAS, AUXILIARES DE ENFERMAGEM E AGENTES COMUNITÁRIAS, SE FOR MÉDICO PULAR PARA A PARTE 4 QUESTÃO 2O)*

"Agora eu vou lhe perguntar sobre os treinamentos relacionados às práticas de avaliação da nutrição infantil"

13.Desde que você começou a trabalhar no PSF em Vespasiano, você recebeu algum treinamento sobre práticas de alimentação infantil? (*Leia todas as opções e circule uma*)

0.Não
1.Sim
98. Não sei
*(Se não ou Não sei pular para a questão 16)*

14.Há quanto tempo você recebeu treinamento sobre práticas de alimentação infantil? (*Leia todas as opções e circule uma*)

1. Há menos de 1 ano
2. Há 1-3 anos atrás
3. Há mais de 3 anos
98. Não sabe

15.O que você aprendeu nesse treinamento em relação à alimentação infantil?

_____
_____
_____

98. Não sabe

16. Desde que você começou a trabalhar no PSF, você recebeu algum treinamento sobre as formas de acompanhamento do crescimento da criança? (*Leia todas as opções e circule uma*)

0.Não
1. Sim
98. Não sabe

*(Se não ou Não sabe pular para questão 19)*

17. Há quanto tempo você recebeu treinamento sobre as formas de acompanhamento do crescimento da criança?

1. Há menos de 1 ano
2. Há 1-3 anos atrás
3. Há mais de 3 anos atrás
98. Não sabe

18. O que você aprendeu no treinamento sobre as formas de acompanhamento do crescimento infantil?

_____
_____
_____

98. Não sabe

19. Você acha que precisa de mais treinamento sobre nutrição infantil? (*Leia todas as opções e circule uma*)

0.Não
1.Sim
98. Não sabe

## Parte 4 *(PARA TODOS OS PROFISSIONAIS)*

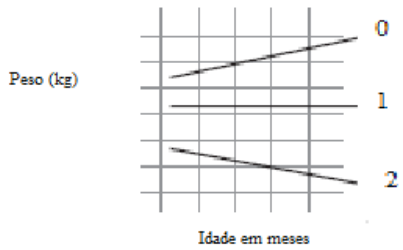
"Agora eu vou lhe perguntar sobre os seus conhecimentos relacionados à nutrição infantil e ao acompanhamento do crescimento da criança"

20. Até qual idade a criança deve ser medida na posição deitada?

☐☐ anos ☐☐ meses

98. Não sabe

21.Qual das seguintes linhas indicam o crescimento normal da criança? *(Mostrar um gráfico ao entrevistado e circular o número por ele selecionado.)*




98. Não sabe

22.Durante qual período da vida da criança, o acompanhamento do estado nutricional é **mais** importante? *(Leia cada opção e circule a que o entrevistado selecionou)*

1. 0-2 anos
2. 6meses-5 anos
3. 1-5 anos
4. Outro (por favor especifique)_____

98. Não sabe

*(Se for agente pule para a 24 )*

23. Após realizar as medidas da criança, com qual freqüência você: (*Leia cada opção e marca X para indicar a resposta do entrevistado.)*

| | Nunca[0] | Raramente[1] | As vezes[2] | Quase sempre[3] | Sempre[4] | Não sabe[98] |
|---|---|---|---|---|---|---|
| a. Coloca essas informações em um gráfico de crescimento parecido com aquele que acabei de lhe mostrar (*mostrar novamente*) | ___ | ____ | ____ | ____ | ____ | ____ |
| b. Anota essas informações na Caderneta de saúde da criança? | ___ | ____ | ____ | ____ | ____ | ____ |
| c. Anota essas informações no prontuário médico do PSF? | ___ | ____ | ____ | ____ | ____ | ____ |
| d. Mostra essas informações ao responsável pela criança naquele momento? | ___ | ____ | ____ | ____ | ____ | ____ |

e. Outro (por favor especifique)_____
_____
_____
_____

24. Para saber o estado nutricional da criança você precisa levar em consideração: (*Leia cada opção e marca X para indicar a resposta do entrevistado.)*

| | Não[0] | Sim[1] | Não sabe[98] |
|---|---|---|---|
| a. O Sexo da criança? | ___ | ___ | ___ |
| b. A Data de nascimento/idade da criança? | ___ | ___ | ___ |
| c. A Altura da criança? | ___ | ___ | ___ |
| d. O Peso da criança? | ___ | ___ | ___ |

*(Caso respondeu não ou não sei a 24a pule para a Parte 5 questão 26)*

25. Quais são as diferenças entre o crescimento de uma menina e de um menino?

_____
_____

98. Don't know

## Parte 5 *( PARA TODOS OS PROFISSIONAIS MENOS AGENTES COMUNTARIOS). ( SE FOR AGENTE COMUNITÁRIO DE SAÚDE, PULE PARA A PARTE 6 QUESTÃO30)*

Agora lhe farei perguntas sobre os serviços do PSF para o tratamento de desnutricao infantil

26. Nas duas últimas semanas, você precisou oferecer a uma criança o soro de reidratação oral, mas ele estava em falta na unidade? *(Leia cada opção e circule a que o entrevistado selecionou)*
    0. Não
    1. Sim
    98. Não sei

*(Caso respondeu não ou não sei, pule a 28 mas se for agente comunitario de saude-pule para a Parte 6 questão 30)*

27. Por que o soro de reidratação oral estava em falta na unidade?

    _____
    _____
    _____

28.Nas últimas 2 semanas, você precisou dar a uma criança (*a,b,c,d*), mas ela estava em falta na unidade? (*Leia cada opção e marca X para indicar a resposta do entrevistado.)*

| | Não[0] | Sim[1] | Não sabe[98] |
|---|---|---|---|
| a. Vacina de rotavírus? | ___ | ___ | ___ |
| b. Antibiótico? | ___ | ___ | ___ |
| c. Polivitamínico (Protovit) | ___ | ___ | ___ |
| d. Sulfato ferroso? | ___ | ___ | ___ |

(Caso respondeu *não ou não sei a qualquer em 28, pule para a Parte 6 questão 30* )

29. Por que (*completar com os itens aos quais respondeu Sim na questão 28*) estava em falta na unidade ?

_____
_____
_____

## Parte 6 *(PARA TODOS OS PROFISSIONAIS)*

Agora lhe farei algumas perguntas sobre as estratégias do PSF relativas à prevenção da diarréia infantil e a melhoria dos hábitos alimentares das crianças.

30. Você acredita ter tempo suficiente, durante seu horário de trabalho, para conversar com os usuários do PSF sobre maneiras de prevenir a diarréia infantil e a desnutrição? *(Leia cada opção e circule a que o entrevistado selecionou)*

0. Não
1. Ás vezes
2. Sempre

31. Esta unidade de PSF oferece à comunidade materiais impressos (ex.panfletos) relacionados à nutrição infantil? *(Leia cada opção e circule a que o entrevistado selecionou)*

0.Não
1.Sim
98. Não sei

*(Caso o entrevistado tenha respondido NÃO ou não sei, por favor, pule para a pergunta 34)*

32. Quão satisfeito(a) você está com o conteúdo dos materiais impressos (ex.panfletos) sobre nutrição infantil que são distribuídos à comunidade pelo PSF? *(Leia cada opção e circule a que o entrevistado selecionou)*

1. Muito insatisfeito(a)
2. Um pouco insatisfeito(a)
3. Nem satisfeito(a) ou insatisfeito(a)
4. Um pouco satisfeito(a)
5. Muito satisfeito(a)

33. Quais sugestões você gostaria de fazer para melhorar os materiais impressos (ex.panfletos) distribuídos pelo PSF aos usuários?

_____
_____
_____
_____

34. Quão útil você acredita que o material impresso (ex. panfletos) sobre nutrição infantil é/seria para os usuários? *(Leia cada opção e circule a que o entrevistado selecionou)*

1. Muito inútil
2. Inútil
3. Nem útil e nem inútil
4. Útil
5. Muito útil

35. Por que você acredita que (*resposta da 34*)?

_____

_____

## *PARTE 7 (PARA ENFERMEIRAS, AUXILIARES DE ENFERMAGEM E AGENTES COMUNITÁRIAS, SE FOR MÉDICO, PULE PARA A PARTE 8)*

"Agora eu lhe farei algumas perguntas sobre o Sistema de Vigilância Alimentar e Nutricional (SISVAN)"

36. Você já ouviu falar do Mapa de Acompanhamento/formulário do SISVAN para coletar informações relacionadas ao estado nutricional dos usuários do SUS? *(Leia cada opção e circule a que o entrevistado selecionou)*

0. Não
1. Sim
98. Não sei

*(Caso o entrevistado tenha respondido NÃO ou não sei pule para a Parte 8 questão 42)*

37. Você já preencheu alguma vez o formulário de vigilância nutricional do SISVAN? *(Leia cada opção e circule a que o entrevistado selecionou)*

0. Não
1. Sim
98. Não sei

*(Caso o entrevistado tenha respondido NÃO ou não sei pule para a Parte 8 questão 42)*

38. Qual você considera ser o seu grau de dificuldade para preencher os formulários de vigilância do SISVAN? *(Leia cada opção e circule a que o entrevistado selecionou)*

1. Muito dificil
2. Um pouco difícil
3. Nem difícil e nem fácil
4. Um pouco fácil
5. Muito fácil

39. Quais sugestões, caso tenha alguma, você gostaria de fazer para melhorar os formulários de vigilância do SISVAN?

_____
_____
_____

98. Não sei

40. Você acredita que o SISVAN tenha contribuído para a melhoria dos serviços do PSF relativos à nutrição infantil? *(Leia cada opção e circule a que o entrevistado selecionou)*

0. Não
1. Sim
2. Um pouco
98. Não sei

*Caso respondeu Não sei pule para a 42*

41. Por que você acredita que o SISVAN (*resposta a 40*) tem contribuído para a melhoria dos serviços do PSF relativos à nutrição infantil?

_____
_____
_____

## Parte 8 *(PARA TODOS OS PROFISSIONAIS)*

"Agora vou lhe fazer algumas perguntas sobre as práticas de alimentação infantil"

42. Quanto tempo após o seu nascimento, uma criança deve receber o leite materno? *(Leia cada opção e circule a que o entrevistado selecionou)*
    1. Poucas horas após o nascimento
    2. 3 dias após o nascimento
    3. Na primeira semana após o nascimento
    98. Não sei

43. Por quanto tempo uma criança deveria ser alimentada **apenas** com leite materno? *(Leia cada opção e circule a que o entrevistado selecionou)*

1. até os 3 meses de vida da criança
2. até os 6 meses de vida da criança
3. até os 12 meses de vida da criança
4. até os 18 meses de vida da criança
5. até os 24 meses de vida da criança
98. Não sabe

44. Com qual freqüência uma criança deve ser amamentada? (*Leia todas as opções e circule uma*)
    1. a cada hora
    2. a cada 2 horas
    3. a cada 3 horas
    4. a cada 4 horas
    5. não há intervalo fixo para isso, vai depender do desejo da criança
    98. Não sabe

45. Por quanto tempo uma mãe **deveria** continuar oferecendo leite materno ao seu filho(a) após a introdução da alimentação complementar? *(Leia cada opção e circule a que o entrevistado selecionou)*
    1. até os 3 meses de vida da criança
    2. até os 6 meses de vida da criança
    3. até os 12 meses de vida da criança
    4. até os 18 meses de vida da criança
    5. até os 24 meses de vida da criança
    98. Não sabe

*46.* Quando a criança começa a alimentação complementar (a criança deixa de tomar apenas o leite materno para também comer alimentos) quais dos seguintes alimentos deveriam ser oferecidos a ela nos primeiros 2 meses da alimentação complementar?
(*Leia cada opção e marca X para indicar a resposta do entrevistado.)*

| | Não[0] | Sim[1] | Não sabe[98] |
|---|---|---|---|
| a. Cereais (ex. arroz, milho)? | ___ | ___ | ___ |
| b. Apenas alimentos amassados ou batidos no liquidificador? | ___ | ___ | ___ |
| c. Carnes? | ___ | ___ | ___ |
| d. Os mesmos alimentos que a família come? | ___ | ___ | ___ |

*(Caso o entrevistado for Dr, pule para a 48. Se for enfermeira, auxiliar de enfermeria, ou agente comunitario de saude continue a 47)*

47. Quando a mãe precisa parar de amamentar a criança menor de 6 meses, você procura:
(*Leia cada opção e marca X para indicar a resposta do entrevistado.)*

| | Não[0] | Sim[1] | Não sabe[98] |
|---|---|---|---|
| a. Orientá-la a consultar-se com o médico ou enfermeira, de modo a buscar a melhor solução para seu problema? | ___ | ___ | ___ |
| b. Orientá-la a usar qualquer leite de vaca, desde que fervido antes? | ___ | ___ | ___ |
| c. Conscientizá-la de que ela não pode fazer isso de **forma alguma**? | ___ | ___ | ___ |

48. Quais recomendações você acredita que deveriam ser dadas a um(a) cuidador(a) para se prevenir a anemia em suas crianças?

(*Leia cada opção e marca X para indicar a resposta do entrevistado.)*

| | Não[0] | Sim[1] | Não sabe[98] |
|---|---|---|---|
| a. Oferecer fígado ou miúdos ao menos uma vez por semana | ___ | ___ | ___ |
| b. Oferecer biscoitos, doces uma vez por semana | ___ | ___ | ___ |
| c. Oferecer meio copo de suco natural ou uma pequena porção de fruta após a ingestão de papas salgadas para aumentar a absorção do ferro | ___ | ___ | ___ |
| d. Oferecer sulfato ferroso | ___ | ___ | ___ |

## **Parte 9** *Para todos os profissionais*

*"Essa entrevista já está quase no final. Eu a terminarei com algumas perguntas sobre a cobertura vacinal de crianças"*

49. Como você avalia a cobertura vacinal da criança? *(Leia cada opção e circule todas as respostas que o entrevistado selecionar. Você pode selecionar múltiplas opções)*

| | Não[0] | Sim[1] | Não sabe[98] |
|---|---|---|---|
| a. Olhando diretamente na caderneta | ___ | ___ | ___ |
| b.Olhando os prontuários do PSF | ___ | ___ | ___ |
| c.Perguntando aos cuidadores das crianças | ___ | ___ | ___ |

50. Na sua opinião, qual é a importancia da vacinação para as crianças? (*Leia todas as opções e circule apenas uma*)

_____

_____

_____

98. Não sei

51. Desde que você começou a trabalhar no PSF em Vespasiano, você recebeu algum treinamento sobre vacinação infantil? (*Leia todas as opções e circule uma*)

0.Não
1.Sim
98. Não sei

52. Você acredita ter informações suficientes sobre as vacinas que as crianças precisam receber e sobre quando elas devem recebê-las? *(Leia cada opção e circule a que o entrevistado*

*selecionou)*

0. Não
1. Sim
98. Não sei

53. Na sua opinião, qual seria a melhor forma para VOCÊ receber informações sobre vacinas? **Você pode selecionar múltiplas opções** *(Leia cada opção e circule todas as respostas que o entrevistado selecionar.)*

1. Através de palestras
2. Através de Atividades práticas
3. Através de material impresso
4. Oralmente, através de discussões com os colegas
5. Outras (por favor,especifique)_____

98. Não sei

54. Na sua opinião, qual é a melhor forma de a comunidade receber informações sobre vacinas? **Você pode selecionar múltiplas opções** *(Leia cada opção e circule todas as respostas que o entrevistado selecionar.)*

1. Através de material impresso
2. Através de Grupo operativo
3. Através de Atividades da comunidade
4. Através do Rádio
5. Através da TV
6. Através da Igreja
7. Outras (por favor,especifique)_____

98. Não sei

55. Isso conclui o questionário. Há algo mais, como uma crítica ou uma sugestão, relacionado à avaliação nutricional e à cobertura vacinal de crianças, que você gostaria de compartilhar conosco?

_____

_____

**Muito obrigada pela sua disponibilidade em colaborar com a nossa pesquisa.**

**Interview end time** ☐☐:☐☐ **am/pm**