

## Assessment of Salient Beliefs Affecting Mothers' Intention to Adherence to Dietary Diversity in their Children's Complementary Feeding

### Abstract

**Background:** Providing a variety of foods has been emphasized as one of the most important features of optimal complementary feeding. This study investigated key beliefs that guide mothers' intention to adherence to dietary diversity in their 1–2-year-old children's complementary feeding. **Methods:** This was a cross-sectional study involving 290 mothers (mean age = 27, standard deviation = 5.32) with child 1–2-year-old attending maternal and child health section of health centers in Rasht, Iran. To represent the socioeconomic status of the participants, 6 centers out of 15 were selected from three different socioeconomic areas (low-, middle-, and high-income areas). Mothers completed a questionnaire assessing intention and belief-based items of theory of planned behavior. Correlations and multiple regression analyses were performed. **Results:** The mean age of mothers was  $27 \pm 5.33$  (27–43 years). Regression analyses revealed that among behavioral beliefs, the perception that adherence to dietary diversity would lead to improve children's growth was the significant predictor of intention ( $\beta = 0.13, P = 0.04$ ). Regarding normative beliefs, perceived social pressure from health-care professionals to adherence to dietary diversity significantly predicted intention ( $\beta = 0.15, P = 0.01$ ). Among control beliefs, the perception that daily pressures made difficult adherence to dietary diversity was the key determinant ( $\beta = 0.19, P = 0.01$ ). **Conclusions:** Findings of this study represent the important beliefs that can be addressed in development planning aimed at modifying mothers' child complementary feeding practices.

**Keywords:** Beliefs, complementary feeding, mothers, theory of planned behavior

### Introduction

The first 2 years of life is accompanied by high nutritional requirements. Nutritional deficiencies during the first 2 years of life could lead to several adverse health outcomes.<sup>[1]</sup> It is estimated that malnutrition due to inadequate complementary feeding is responsible for more than one-third of mortality in under 5 years.<sup>[2]</sup> Data from the Iran's Multiple Indicator Demographic and Health Survey 2010 showed that in Iran, 6.83% of children aged <5 years were stunted and 4.08% were underweight.<sup>[3,4]</sup>

The World Health Organization (WHO) has emphasized on improving dietary diversity applying foods that are available locally as one of the approaches to advise the feeding practices of infant and young child.<sup>[5]</sup> Complementary feeding should be timely, adequate, and appropriate.<sup>[6]</sup> It is estimated that 6% of all deaths in children 6–23 months of age can be prevented through providing appropriate complementary feeding.<sup>[7]</sup> Dietary diversity

is one of the most important features of optimal complementary feeding. Dietary diversity refers to receiving foods from at least four out of seven food groups. These seven food groups included grains, legumes and nuts; flesh foods; eggs; dairy products; roots and tubers; Vitamin A-rich fruits and vegetables; and other fruits and vegetables.<sup>[8]</sup> Children's feeding pattern including consumption of at least one fruit or vegetable, one animal-source food, in addition to a staple food provides a rational basis for this definition.<sup>[9]</sup> Consuming a variety of foods has a critical role in responding to essential nutrient requirements needed to promote growth. On the other hand, exposure to a variety of foods promotes acceptance of more readily new foods.<sup>[10]</sup> Food variety as one of the characteristics of human food behavior rises slowly from the adding of solid foods to the routine infant's diet before peaking around 2.5 years.<sup>[11]</sup> Nicklaus *et al.* tracked the trend of food variety over several

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years including primary years of childhood until the adulthood.<sup>[12]</sup>

In developing countries, despite the emphasis on importance of food variety, common complementary feeding pattern is based mainly on starchy staples and includes few or no nutrient-rich food sources.<sup>[13-15]</sup> For example, a study in Iran showed that the most common pattern of complementary food was rice mucilage, pudding, and almond porridge, respectively.<sup>[14]</sup>

Under 5 years, children are dependent on their parents (or caregiver) for food and parents (or caregiver) control the exposure of them to multiple food items.<sup>[16,17]</sup> Previous researches confirmed the role of mother's decision-making about variety of health-related behaviors for their children.<sup>[17-21]</sup> Thus, as noted by Ajzen<sup>[22]</sup> determining the salient beliefs underlying mothers' decision-making about their child's eating behaviors could be useful to develop effective intervention plans. The evaluation of an intervention developed to modify key beliefs of adolescent regarding snacking behavior showed that, compared to control group, the intervention group had less intention to consume unhealthy snacks.<sup>[23]</sup>

The theory of planned behavior (TPB)<sup>[24]</sup> is a well-validated theory within social psychology. This behavioral decision-making model has been applied in a variety of behavioral domains. Based on TPB, intention is the key predictor of behavioral performance which is, in turn, determined by three types of salient beliefs, namely, attitudes, subjective norms, and perceived behavioral control (PBC).<sup>[24]</sup> Behavioral, normative, and control beliefs are the underpinning of people's attitude, subjective norms, and PBC, respectively. Behavioral belief is defined as an individual's belief about consequences of particular behavior. Normative belief is individuals' perception of the extent to which other important people think they should or should not perform particular behaviors. Control belief refers to individual's perception about the likelihood of occurrence of factors act as facilitator or barrier. Hamilton *et al.*, and Spinks and Hamilton who assessed process of maternal intention formation for their child's feeding, reported the usefulness of TPB approach.<sup>[20,25]</sup>

Limited studies have applied TPB to explore complementary feeding behavior.<sup>[20,25,26]</sup> Hence, the current study was conducted to examine the beliefs guiding maternal decision-making with regard to adherence to dietary diversity for their 1–2-year-old child.

## Methods

### Participants and procedure

In the process of developing a trial, this cross-sectional study was carried out to identify the key intervention points. Data collection was conducted from June to August 2015 using a face-to-face personal interview in a private

space at the health centers in Rasht city, Iran. Participants comprised 290 mothers who had child aged 1–2 years from 6 health centers out of 15 in Rasht city. To represent the socioeconomic status of the participants, these centers were selected from three different socioeconomic areas (low-, middle-, and high-income areas). Participants were selected randomly using their health record number. In Iran, children regardless of the socioeconomic status of their family, receive vaccination and development assessment services. Mothers of children with special dietary needs were excluded. The sample size consisted of 290 mothers with 1–2-year-old children, calculated according to the results reported by Fesharakinia *et al.*<sup>[14]</sup> and considering error  $\alpha$  of 5% and statistical power of 80%.

### Measures

The main instrument contained questions measuring TPB belief-based constructs related to adherence to dietary diversity in children's complementary feeding. A review of the literature was performed to find the content of existing measures of behavioral, normative, and control beliefs related to mothers' feeding practice decisions. Subsequently, a preliminary questionnaire was developed which consisted of 23 items. To maximize correspondence between the prediction and criterion variables, the TPB variables (i.e., behavioral, normative, control beliefs and intention) were assessed at the same level of specificity. The TPB items were constructed in accordance with Ajzen's recommendations<sup>[24]</sup> and were each scored on a five-point Likert scale. An expert panel consisted of 6 specialists in health education evaluated the initial questionnaire. They were asked to make comment on each item in relation to the necessity, relevance, clarity, and simplicity. The wording of five items was slightly modified based on expert reviews. Based on experts' assessments, we computed a content validity ratio for total scale (.99). As suggested by Lawshe, if >50 of the panelists confirm that a question is essential, that question has at least content validity.<sup>[27]</sup> A test-retest analysis (2-week period) was conducted on 30 mothers not involved in the main study. Moreover, internal consistency was assessed using Cronbach's alpha coefficients. The Intraclass correlation coefficient (ICC) was used to assess test-retest reliability. Overall, instrument has demonstrated good test-retest reliability (ICC = 0.74–0.86). Three questions were deleted based on the reliability analysis; therefore, the final draft of questionnaire consisted of 20 items.

An item analysis on the final questionnaire showed reliability coefficients ( $\alpha$ ) of 0.83 for intention, 0.85 for behavioral beliefs, 0.63 for normative beliefs, and 0.64 for control beliefs.

### Behavioral beliefs

Behavioral beliefs were measured by examining five beliefs. Mothers were asked to rate how likely the outcomes such

as improving child growth would result if they performed the target behavior (e.g., preparing a variety of foods for my child every day would lead to improve his/her growth). Responses ranged from (1) extremely unlikely to (5) extremely likely.

### Normative beliefs

Normative beliefs were assessed using six items regarding six socially relevant people (e.g., husband and health-care providers). Mothers were asked to rate how likely these people were to think they should adherence to dietary diversity in their children's complementary feeding (e.g., my husband think that I should prepare a variety of foods for my child every day). Responses ranged from (1) extremely unlikely to (5) extremely likely.

### Control beliefs

Control beliefs were measured by seven items. Mothers were asked to rate how likely factors such as lack of time were to discourage or prevent them from adherence to dietary diversity in their children's complementary feeding (e.g., I do not have adequate time to prepare a variety of foods for my child every day). Responses ranged from (1) extremely unlikely to (5) extremely likely.

### Intention

Two items assessed the strength of intention to adherence to dietary diversity in their children's complementary feeding (e.g., I intend to prepare a variety of foods for my child every day), scored strongly disagree (1) to strongly agree (5).

### Ethics

The study was approved by Ethics Committee of the Hamadan University of Medical Sciences (approval number: IR, UMSHA.REC.1394.197). Mothers were asked to give informed consent to participate in the study.

### Data analysis

To determine the mothers' key beliefs, we followed the procedures used in a number of TPB beliefs-based investigations.<sup>[20,28]</sup> So at first, Pearson's correlation was performed for each belief set (i.e., behavioral, normative, and control beliefs) to examine the relationship between the mothers' belief and intention. Second, to identify key beliefs, within each belief-based measure, the beliefs significantly correlated (i.e.,  $P < 0.05$ ) were then entered into a multiple regression analysis. To consider the potential influence of age and education level (no university education vs. university education) on the regression findings, analyses were undertaken in controlling for these two demographic factors.

### Results

The mean age of mothers was  $27 \pm 5.33$  (27–43 years). About half of mothers had a university education (49.60%)

and the majority of them were unemployed (72%) and primiparous (65%). About 9% of mothers began introducing solid foods to their children before they were 6 months old.

Means, standard deviations, and correlations between mothers' beliefs (i.e., behavioral, normative, and control belief) and intention are shown in Table 1.

For the behavioral beliefs, bivariate correlations showed that three of five beliefs were significantly correlated with the intention ( $r = 0.24$ – $0.25$ ). Furthermore, bivariate correlations revealed three of six normative beliefs ( $r = 0.15$ – $0.28$ ), and three of seven control beliefs ( $r = 0.12$ – $0.26$ ) as significantly correlated with intention. Multiple regression analysis indicated one behavioral belief (improve my child's health) ( $\beta = 0.13$ ), one normative beliefs (health-care professionals) ( $\beta = 0.15$ ), and one control belief (daily pressures) ( $\beta = 0.19$ ) as significant predictor of intention [Table 2].

### Discussion

The aim of the study was to identify key beliefs underpinning the mothers' decision to adherence to dietary

**Table 1: Means, standard deviations, and correlations between mothers' beliefs (i.e., behavioral, normative, and control belief) and intention to adherence to dietary diversity in their 1-2-year-old children**

Beliefs	Mean±SD	r
Behavioral beliefs		
Improve in my child's gain weight	4.31±0.98	0.25***
Improve in my child's linear growth	4.17±1.00	0.24***
Improve my child's health	4.00±1.13	0.24***
Normative beliefs		
Healthcare professionals	4.28±1.00	0.28***
Husband	4.24±1.92	0.15**
Other family member	4.12±1.04	0.21***
Control beliefs		
Not enough time	3.71±1.21	0.12*
Daily pressures	3.20±1.07	0.26***
Worry about child's obesity	4.16±1.02	0.16*

\* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ . SD=Standard deviation, r=Correlation coefficient

**Table 2: Multiple regression for analysis of mothers' beliefs (i.e., behavioral normative, and control belief) predicting mothers' intention to adherence to dietary diversity in their 1-2-year-old children**

Key beliefs	Standardized $\beta$	P	R <sup>2</sup> (%)
Behavioral belief			
Improve my child's health	0.13	0.04	19
Normative belief			
Health-care professionals	0.15	0.01	
Control belief			
Daily pressures	0.19	0.01	

The analyses were performed controlling the mothers' age and education level effects

diversity in their 1–2-year-old children's complementary feeding. Within the TPB literature, to the best of our knowledge, only one study has addressed this issue.<sup>[20]</sup> This is the first study in a developing country with focus on determinants of the adherence of the WHO guideline on children's variety of food. Our results identified a number of key beliefs that are involved in the mothers' decision-making process. Identifying the reasons behind the mothers' decision is critical to support the design effective interventions.

With regard to behavioral beliefs, findings highlight the impact of positive outcome of improving child's health. This result was also found in previous studies.<sup>[20,25]</sup> For example, Spinks and Hamilton reported "improving my child's health" as a key advantage of mothers to adherence healthy eating.<sup>[20]</sup> The majority of mothers (75%) accepted this belief strongly or fully. However, mothers identified the "daily pressures" as a significant factor that could be effect on their intention negatively. Spinks and Hamilton reported resistance from children as key control belief leading mothers' dietary decisions for their children.<sup>[20]</sup> Unlike resistance from a child that is driven more by postvolitional process, daily pressures is driven by prevolitional motivational process. In the other word, mother's intention to provide healthy diet is counteracted by the child's resistance to eat the food options provided<sup>[20]</sup> whereas in case of "daily pressures" the mother does not form an intention to adhere to provide variety of foods. Inexperienced mothers face challenges when combining feeding their children with their work, families, and daily pressures of motherhood. The mean age of mothers in the current study was 27 years, and majority of them were primiparous. When reviewing the percentage of mothers who strongly or fully considered "daily pressures" as a key control belief, about 74% fit into these categories. The source of this mothers' perception may come from the lack of confidence in mothering behavior including feeding practice because the majority of mothers were unemployed and primiparous and were not affected by load of work and others children. Therefore, this is important as such belief can be addressed to improve the quality of young children's diet.

In relation to normative beliefs, social pressure from "healthcare professionals" was recognized as a key factor for mothers' decision-making in this Iranian context. Seventy-five percent of the mothers strongly or fully acknowledged this belief. There is ample support for the role of health-care professionals in improving the status of children's quality of diet.<sup>[29,30]</sup> For example, Miracle *et al.* study's showed that when health professionals provide counseling about the process of providing own mother's milk, mothers are more likely to have successful outcomes.<sup>[29]</sup>

Within health-care system of Iran, vaccination and child development assessment are provided widely free of charge

and regardless of the socioeconomic level of families. This feature of health-care system due to high-frequency contact with health-care professionals may justify the important role of health-care professionals to mothers' decisions in Iran.

However, health-care professionals may not be adequately prepared to play this role. Thus, by capacity building and training of health-care professionals' opportunities arise to improve of young children's quality of diet.

Our finding regarding the normative beliefs differ from those of previous studies identifying proximal (e.g., family members and mother's spouse) or partner rather than distal (e.g., health-care professionals) groups to exert social pressure influencing mothers' feeding decisions.<sup>[20,31]</sup> In settings where mothers are in employment or studying, grandparents play a prominent role in providing a child.<sup>[32]</sup> When mothers relied on others (e.g., their husband, mother, sister(s), and other extended kin) for regular child care, influences of proximal groups' expectations could have a significant role in child care arrangements. In this study, the majority of mothers were unemployed, and it seems that they saw themselves as the central figure in the lives of their children. Instead, they reported a distal group (i.e., health-care professionals) as most influential on their decision-making.

As argued by Ajzen, salient beliefs should be elicited from the target population to formulate an effective intervention.<sup>[24]</sup> The key beliefs recognized in our investigation can shape the basis for the design of a theory-based intervention to improve mothers' intention to adherence to dietary diversity in their children complementary feeding. A variety of techniques have been suggested to change health behaviors, however, it is necessary to address the underpinning beliefs, regardless of the technique adopted.<sup>[33]</sup> In their meta-analysis in a range of behaviors, Webb and Sheeran reported that belief-based interventions accompanied by a 28% improve in intention, and a subsequent 26% improve in behavior.<sup>[34]</sup>

Child's acceptance pattern for a variety of foods developed in early years of life is an important determinant of the variety of food selection in adulthood.<sup>[12]</sup> Thus, the way to attain long-term dietary variety is to offer young children a variety of healthy food options.

A limitation of this study was the use of self-reported measures, which is susceptible to patterns of reporting bias or personal bias. In addition, the majority of participants were unemployed and primiparous, which thus limits the generalizability of the results to other mothers.

## Conclusions

Our study identified salient behavioral, normative, and control beliefs related to mothers' intention to adherence to dietary diversity in their 1–2-year-old complementary

feeding applying a TPB belief-based approach. The information provided from the current study forms a foundation to the construction of effective intervention strategies to modify mothers' child complementary feeding practices, with the hope of preventing nutritional deficiencies during the first 2 years of life and it is adverse health outcomes. To improve understanding of the possible causal associations between the TPB cognitions and intention, it is suggested that future studies apply the prospective design. In addition, given the intention-behavior gap in health behaviors, measuring the behavior and assessing its relationship with TPB cognitions should be considered in future investigations.

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### Conflicts of interest

There are no conflicts of interest.

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