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Full Length Research Paper

Introduction of complementary foods to infants as self-reported by urban and rural low-income mothers in Guatemala

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The World Health Organization (WHO) recommends exclusive breastfeeding for the first 6 months of life with the introduction of adequate complementary foods thereafter. The association between the early introduction of complementary foods and negative health outcomes may be underestimated by inconsistencies in reported age-of-introduction of complementary foods. We aimed to determine the reproducibility of reported age-of-introduction of 10 selected complementary foods. Mothers of 6-12 mo old Guatemalan infants (50 rural, 64 urban) were interviewed on 3 occasions within an interval of 2-14 wks, and asked the age of their infant on introduction of 10 commonly consumed foods (*INCAPARINA*®, oatmeal, rice, fruits, vegetables, white rolls, sweet rolls, baby food in jars, potatoes and coffee). A score of 3 (full repetition), 2 (2 of 3 consistent) or 0 (3 distinct answers) was given for each food, and summed across all foods for a "maternal score", with 30 as maximal. Baby food, sweet rolls and coffee were the most reproducibly-reported foods for both settings, whilst vegetables and fruits were the least consistently reported items. The median maternal score was 20.0 in the urban sample, and higher at 23.0 in the rural sample (p=0.020). We conclude that the moderately high degree of consistency in the responses adds confidence to the proposition that published data on age of complementary foods introduction could generally be valid.

Key words: Reproducibility, complementary foods, self-reported, infant nutrition, Guatemala.

INTRODUCTON

The World Health Organization (WHO) recommends exclusive breastfeeding for the first 6 months of life (WHO, 2003) based on studies comparing exclusive breastfeeding for 4 to 6 months, versus for 6 months in terms of growth, infant iron status, morbidity, atopic disease, motor development, postpartum weight loss, and amenorrhea (WHO, 2001). In a systematic review concerning the age of introduction of complementary foods to the healthy full-term infant Lanigan et al. (2001) set methodological criteria for the selection of studies included for consideration. One criterion set was that "attempts had been made to reduce recall bias, for example, via investigator verification of subjective reporting". Of the 400 studies examined, 22 of the selected 33 met this criterion. The observed association between the early introduction of complementary foods and negative health outcomes (Brown et al., 1989; Frongillo and Habicht, 1997; Habicht et al., 1986; Victora et al., 2008) and unhealthful subsequent feeding behaviors (Grummer-Strawn et al., 2008) may be underestimated by inconsistencies is reported age of introduction of complementary foods.

When data rely on self-reporting and recall, a series of informant-related factors, including memory, honesty and comprehension of the query, can influence data validity. The accuracy of information is fundamental for developing valid descriptions or unraveling correct associations

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Abbreviations: CeSSIAM, Center for studies of sensory impairment, aging and metabolism; **WHO,** World Health Organization.

among variables. One often finds in survey research that no attempts have been engaged to determine the accuracy (degree of error) in responses of recalled events elicited in a questionnaire (Coulthard et al., 2009; El Mouzan et al., 2009; Ghuman et al., 2009; Lanigan et al., 2001; Spiby et al., 2009).

Our group conducted a survey on complementary feeding based primarily on 24 h recalls of infants' intakes (Campos et al., 2010; Enneman et al., 2010; Enneman et al., 2009; Hernández et al., 2010), it also included a retrospective questioning of the age of introduction of items commonly consumed during the weaning period. In a protocol on infant feeding during the second semester of life, a standard series of questions eliciting information on the date of introduction of 10 specific food and beverage items were posed on three distinct occasions, in two geographical areas among low-income mothers. Analysis of the repeated questioning data allowed for an estimation of retest consistency in providing the same dating of first food offering for various complementary feeding items. We present here a description of this secondary analysis with respect to consistency at the level of specific food, individual informant and geographic setting.

MATERIALS AND METHODS

Study population

This survey is part of a study that was conducted in the Republic of Guatemala with the goal of exploring the timing of introduction of complementary foods in relation to the nutrient adequacy of the diets of infants in the second semester of life (Campos et al., 2010; Hernández et al., 2010). The urban sample (Hernández et al., 2010) was comprised of infants attending a health care centre in the district of "Centro America" in Zone 7 of the nation's capital, which is at an altitude of 1500 m above sea-level and is estimated to have 1, 200,000 inhabitants. The rural setting (Campos et al., 2010) is located in the Mayan village of Santo Domingo Xenacoj, in the central highlands, 45 km from Guatemala City along the Pan American Highway. In both areas, most households have a per capita earning of less than two U.S. dollars per day, and are thus classified as being poor.

Subjects

Data of the mothers of 114 infants (64 form urban setting and 50 from rural setting), aged 6 to 12 mo, visiting the local health center or midwife, respectively, were used for this survey. Inclusion criteria were: 1. the infant was at least 6 months old, but had not reached his or her 1st year birthday; and 2. the infant had consumed both breast milk and complementary foods the day before the first interview. Exclusion criteria were: 1. exclusive breastfeeding the day before the first interview; 2. no breastfeeding the day before the first interview; 3. congenital anomalies or chronic illness; and 4. failure to sign the study consent form.

Ethical approval was obtained from the Human Subjects Committee of the Center for Studies of Sensory Impairment,Aging and Metabolism (CeSSIAM) and the study conforms to the provisions of the Declaration of Helsinki in 1995 (as revised in Edinburgh 2000). The study protocol was approved by the local authorities of the Ministry of Health. The purpose and procedures of the study were explained and all mothers gave written informed consent; subject anonymity was preserved. Participants received a small compensation in kind after each interview.

Data collection

As part of a study to examine the timing of introduction of complementary foods in relation to the nutrient adequacy of infants (Campos et al., 2010; Hernández et al., 2010), three structured questionnaires were developed. The first questionnaire queried socio-demographics characteristics, breast-feeding practices, use of colostrum, use of *agüitas* (flavored water), use of formulas, use of whole milk, age of introduction of drinks and foods, and the first complementary food offered and the person who advised the foods introduced. The second questionnaire included questions related to morbidity, exclusivity of breast feeding, timing of breast-feedings, initiation of weaning, the use of formulas (including brand names) and dietary supplements.

The third questionnaire included a pre-determined list of 10 commonly consumed complementary foods (*Incaparina*®, oatmeal, rice, fruits, vegetables, white rolls, sweet rolls, baby food in jars, potatoes and coffee). Mothers or caretakers were asked to report the age of the infant at which each was introduced if at all. Only these questions were used for this particular analysis.The 10 foods chosen were not based on any prior evidence or analysis of those most frequently offered earlier or later, but rather a collection devised from the experience of the field investigators, initially as a question to warm up the interviewees to the dietary inquiries within the study. In fact, the first 14 mothers in the rural area were not asked the questions, because they were introduced as an orientation adjunct based on the early experience.

Each mother was interviewed three times by a team of 2 trained and standardized nutritionists. Data were collected on 3 non-consecutive days, always on weekdays. The first interview took place on the day of enrolment. Most interviews took place within an interval of 2-14 wks with the majority within a calendar month. The study was conducted throughout the year 2007.

Data analysis

The number of infants who had been introduced to the 10 index food items of interest was computed for each interview separately and cumulatively at the conclusion of the 3 - interview series. The proportion of infants having consumed the 10 index items were compared visually using bar graphs.

The average reported age at introduction of the 10 items was computed for each interview separately and for the combined series of 3 interviews. Infants who reported not having consumed each item were excluded from this analysis. The maximum number of responses was 192 (64 participants times 3) in the urban sample and 150 (50 participants times 3) in the rural sample.

To judge consistency of reported age of introduction of the 10 items, we created a scoring system. Each mother received a maximum score of 3.0 for 3 consistent answers, 2.0 for 2 consistent answers, and 0.0 for three disparate responses for each separate food item. Answers were considered consistent if plausible, and these were not necessarily identical. For example, a mother reporting not having given a food on the first interview, and then reporting the same age of introduction on the second and third interview, would be assigned a maximum score of 3.0. Food items that had not been introduced were given a score of 3 for being consistent in the 3 interviews. A normalized alternative scoring, considering only food items reportedly introduced at least once was

calculated. Only food items reportedly consumed on any or all 3 interviews were included. The maximum number of respondents per food item was 64 in the urban sample and 50 in the rural sample. When foods were reportedly not introduced on the first interview, and consistent ages were given on the second and third interview a score of 3.0 was assigned if all reported ages were plausible. When foods were reportedly not introduced on the first and second interviews, and a plausible age of introduction was reported on the third interview a score of 3.0 was. an average consistency scores per food item, considering all infants or only consumers at least once, was calculated for mothers in the urban and rural sample separately.

Furthermore, each mother was given a consistency score based on the sum score of the 10 food items. A given mother's score could range from 30.0 (perfect consistency) to 0.0 (total inconsistency). An average mother-based consistency score was calculated including and excluding food items which were reported by area of residence.

Food consistency scores by tertile of time since the introduction of the specific food item were computed and visualized in bar graphs for the 10 food items of interest by area of residence.

Statistical analysis

Data were analyzed using SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). Mean and median ages of the mothers and infants were computed and differences between residential areas were compared using Mann-Whitney U Test. Differences between residential areas in food-based consistency scores were examined using Independent T-test; differences in mother-based consistency scores were examined using Mann-Whitney U test. In addition, mother-based consistency scores including or excluding food items which were not consumed were compared using paired t test in the urban sample, and Wilcoxon test in the rural sample. Spearman correlations were performed for the difference between the age at questioning and the age at introduction versus the adjusted food consistency score. We considered a probability of 5% to be significant.

RESULTS

Demographic characteristics of the sample

The demographic characteristics of the study's sample are provided in Table 1. There was an excess of male babies in both settings (61% male babies). Both groups of infants had a similar age on enrolment into the study. Urban mothers had a mean age of 25 years, which was significantly less than that of the rural mothers (that is, 28 years old, p=0.017).

Assessment of consistency scores in the age of introduction by food item

The cumulative prevalence of introduction of the 10 index items by the conclusion of the entire interview series is shown in Figure 1. Introduction approached 100% in both geographic settings for rice, potatoes, coffee and white rolls were the items with the lowest rates of presentations into the infants' diets. These same four items demonstrates a 10% point or greater difference, moreover, between the cumulative rate between urban and rural responses. Baby foods and sweet rolls were lower in the rural area, whereas white rolls and coffee were lower among urban babies.

The average reported age at introduction for the 10 items of interest for each interview is shown in Table 2; this ranged from as early as 6.2 mo for baby food in jars in the rural sample to as late as 7.5 mo for oatmeal in the urban sample. The average reported age at introduction of the three interviews are reported in Table 3 together with average consistency scores of timing of recalls. The average consistency scores, based on the scale of 0 to 3.0 per three responses to an item ranged from a low of 1.5 for reporting of initial rice introduction in the urban sample to a high of 2.6 for reporting of first baby food offering in the rural sample. Urban-to-rural differences were statistically different for two items only – rice (p=0.001) and potatoes (p=0.018) – with better consistency scores in the rural area.

When items from the list not yet included into infants diets were excluded from consideration (Table 3, right-hand columns), the consistency scores were generally weaker in both geographic areas. Adjusted consistency scores ranged from 1.3 to 2.2. Only for the first introduction of potatoes, however, was there any statistically significant difference by geography, with less reporting consistency within the urban sample.

To address the hypothesis of a remoteness-in-the-past factor for reducing consistency of reporting, we used both an aggregated (tertile analysis) and an individual (Spearman rank-order correlation) strategy. The tertile analysis was conducted at the level of individual-foods consistency to address, in approximate terms (Figure 2). Classical, step-gradient configuration from most remote to most recent tertiles was seen visually in 7 of 20 instances (35%); the third tertile was numerically greater than the first in 14 instances (70%). When analyzed by the Spearman correlations approach, for the difference between the age at questioning and the age at introduction versus the adjusted food consistency score, the sign was negative, consistent with hypothesis that the more remote the event, the less precise is the recall. However, the r values were of low order (-0.011 to 0.148), with only the association for recall of introduction of *Incaparina*® approaching statistical significance, with a p value of 0.07 (data not shown).

Assessment of consistency scores in age of introduction by reporting mothers-infant dyads

The paradigm for assessment of consistency scores on an individual basis is illustrated in Table 4. The median consistency score for all 10 items was 20.0 for the fruits and vegetables. Prepared baby food, sweet rolls urban and 23.0 for the rural infants. The distribution is significantly

Table 1. Demographic characteristics of the sample.

Characteristic		Urban sample (n=64)	Rural sample (n=50)	P-value
N	Female	23	21	
	Male	41	29	
Maternal age (yrs)	Mean±SD	25.3±7.2	28.0±6.4	
	Median	(24.5)	(27.0)	0.017[1]
Infant age at enrolment (mo)	Mean±SD	8.6±1.9	8.8±2.0	0.521[1]

[1] Differences between residential areas examined using Mann - Whitney U Test.

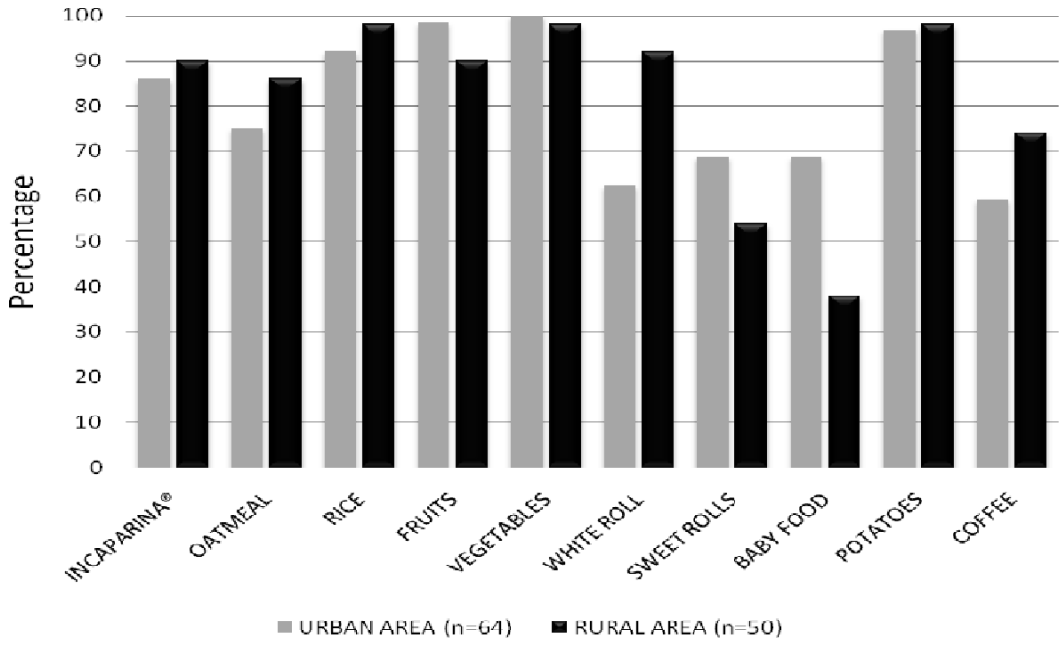

Figure 1. Cumulative percentage of respondents who reported introducing each of the 10 food items of interest in the questionnaire at any time during the interview series. Urban area bars shaded in gray (n = 64). Rural area bars shaded in black (n = 50).

different by the Mann-Whitney U test (p=0.020). Adjusting for exclusion of items not yet introduced reduced the respective medians to 17.6 and 21.5, again with a significant difference from the unadjusted status for the respective sites (p=0.0001). Moreover, after the same adjustment, the inter-regional differences remained significantly different (p=0.006).

DISCUSSION

To our knowledge there are no similar evaluations of consistency or validity of the date of introduction of complementary food in early life period. With respect to the validation of remote events, the study by den Tonkelaar (1997) showed that 70% of 4892 post-menopausal women correctly reported their own onset of menopause, validated by historical medical records and that validity and reproducibility decreased with increasing number of years since menopause. The authors conclude that the effect of age at menopause may be underestimated in studies relating self reported age at menopause to disease occurrence or mortality. This is consistent both with logic and with the visual impression from our tertile analysis (Figure 2). Because we did not have the luxury of longitudinal design we had to invoke consistency as a proxy indicator for validity. We have identified a series of papers in which consistency of multiple reporting is used as a proxy for the validity of self-reported use of sunscreen and sun protection factor

Table 2. Average reported age of infant at introduction of complementary food listed per interview and residential area.

Food list	Average reported age of infant at introduction of complementary food listed (mo)					
	Urban sample (n=64)			Rural sample (n=50)		
	1st interview	2nd interview	3rd interview	1st interview	2nd interview	3rd interview
Incaparina®	6.9±2.0 (n=33)	7.2±2.2 (n=45)	7.3±2.1 (n=52)	6.7±1.5 (n=36)	6.6±1.5 (n=42)	6.6±1.4 (n=43)
Oatmeal	7.1±2.2 (n=29)	6.8±2.1 (n=39)	7.5±2.0 (n=44)	6.7±1.6 (n=34)	6.7±1.6 (n=39)	6.7±1.4 (n=40)
Rice	6.9±1.9 (n=41)	7.1±2.1 (n=51)	7.3±1.3 (n=56)	6.9±1.2 (n=39)	6.7±1.3 (n=44)	6.5±1.2 (n=47)
Fruits	6.7±1.6 (n=58)	6.6±1.5 (n=62)	6.6±1.2 (n=59)	6.9±1.5 (n=35)	6.8±1.2 (n=41)	6.7±1.3 (n=45)
Vegetables	6.5±1.2 (n=59)	6.7±1.4 (n=63)	6.6±1.0 (n=63)	6.6±1.2 (n=44)	6.7±1.3 (n=47)	6.6±1.6 (n=49)
White Rolls	7.3±1.6 (n=26)	6.9±1.4 (n=30)	6.7±1.5 (n=32)	6.9±1.2 (n=40)	6.5±1.0 (n=42)	6.6±1.4 (n=45)
Sweet Rolls	6.9±1.4 (n=38)	6.9±1.2 (n=35)	7.0±1.3 (n=33)	6.9±1.3 (n=17)	6.7±1.4 (n=17)	7.0±1.4 (n=21)
Baby food	6.2±1.4 (n=35)	6.6±1.1 (n=36)	6.5±0.9 (n=35)	6.3±1.2 (n=16)	6.3±1.3 (n=14)	6.2±1.2 (n=13)
Potatoes	6.8±1.5 (n=53)	6.6±1.3 (n=56)	6.8±1.0 (n=60)	6.6±1.3 (n=46)	6.5±1.3 (n=46)	6.7±1.2 (n=48)
Coffee	7.0±1.8 (n=32)	6.9±1.8 (n=26)	6.8±1.8 (n=24)	6.7±1.1 (n=29)	7.1±1.6 (n=28)	6.7±1.3 (n=32)

Values are mean±SD for participants who reported having introduced the given food item.

(Veierod et al., 2008), past body weight (Klipstein-Grobusch et al., 1998; Olivarius et al., 1997) and alcohol consumption (Longnecker et al., 1992).

We acknowledge a number of limitations in this study, beginning with the underlying assumptions surrounding consistent repeat reporting as a surrogate for a historically correct reply. There is compelling construct validity to the notion that reporting of the same age of introduction on multiple occasions raises the likelihood that the age reported is, indeed, the valid fact. Giving the same answer twice or thrice to the same question logically improves the likelihood of its accuracy as compared to total inconsistency. Even if all res-ponses had been consistent in triplicate repetition for all foods in all mothers in these analyses, however, no true "validation" of recall reporting of age of introduction could be possible without pros-pective, cohort surveillance of maternal introduction of items into their infants' diets from birth. A further limitation is the unplanned and opportunistic nature of the analysis. The original survey was never designed to evaluate the reproducibility of responses regarding first intro-duction of complementary foods and beverages, Moreover, the 10 items considered were not based on any systematic knowledge of their importance to the complementary food fare of the communities, but rather on the interest of the researcher team that composed the questionnaire. Acknowledging these limitations, however, the data-set provided an opportunity to determine difference in consistency in reporting specific to foods, to mother-infant dyads and to geography. The analyses revealed differences in consistency in all three domains.

Timing of questioning in relation to reported age of introduction had interesting dimensions. The tertile analysis, albeit visually approximated without benefit of statistical applications due to the small sample sizes in subgroups, supported the general post hoc hypothesis that the further away had been the introduction of a food or beverage, the less consistently did the mother report the introduction age on serial questioning. Overall, for 7 of 10 complementary foods, the rural mothers offered the item from 0.1 to 0.5 months earlier than their urban counterparts. Nevertheless, the slightly more remote recall did not affect the rural informants as a group in having a superior net consistency compared to the mothers in Guatemala City.

The fact of significantly better consistency in reporting age of introduction by rural mothers opens us up to speculating as to factors in its origin. Rural superiority is somewhat paradoxical on its face, as common wisdom might suggest that

Table 3. Average reported age of infant at introduction of complementary food listed and average consistency scores of timing of recalls for each food item by residential area.

Food list	Average reported age of infant at introduction of complementary food listed (mo)		Average consistency score considering all infants		Average consistency score considering only consumers	
	Urban sample (n=192)[1]	Rural sample (n=150)[2]	Urban sample (n=64)	Rural sample (n=50)	Urban sample (n=64)[3]	Rural sample (n=50)[4]
Incaparina®	7.1±2.1 (n=130)	6.6±1.5 (n=121)	2.0±0.9	2.1±0.9	1.8±0.8 (n=55)	2.1±0.9 (n=45)
Oatmeal	7.1±2.1 (n=112)	6.7±1.5 (n=113)	2.0±1.0	2.0±1.0	1.7±1.0 (n=48)	1.9±1.0 (n=43)
Rice	7.1±1.8 (n=148)	6.7±1.3 (n=130)	1.5±1.1*	2.1±0.9*	1.3±1.1 (n=59)	2.1±0.9 (n=49)
Fruits	6.7±1.4 (n=179)	6.8±1.3 (n=121)	1.6±1.2	2.0±1.0	1.6±1.1 (n=63)	1.9±1.1 (n=45)
Vegetables	6.6±2.1 (n=185)	6.7±1.3 (n=140)	1.8±1.1	2.1±0.9	1.8±1.1 (n=64)	2.1±0.9 (n=49)
White Rolls	6.9±1.5 (n=88)	6.7±1.2 (n=127)	2.1±1.1	2.3±1.0	1.6±1.1 (n=40)	2.2±1.0 (n=46)
Sweet Rolls	6.9±1.3 (n=106)	6.9±1.3 (n=55)	2.2±0.9	2.5±0.8	1.9±0.9 (n=44)	2.0±0.8 (n=27)
Baby food	6.4±1.1 (n=106)	6.3±1.2 (n=43)	2.4±0.8	2.6±0.8	2.1±0.9 (n=44)	1.8±0.9 (n=19)
Potatoes	6.7±1.3 (n=169)	6.6±1.3 (n=140)	1.8±1.1*	2.2±0.8*	1.8±1.1 (n=62)*	2.2±0.8 (n=49)*
Coffee	6.9±1.8 (n=82)	6.8±1.3 (n=89)	2.3±0.9	2.4±0.8	1.8±0.9 (n=38)	2.1±0.8 (n=37)

Values are mean±SD; [1] Maximum number of responses in the urban sample is 192 (64 participants * 3 interviews); [2] Maximum number of responses in the rural sample is 150 (50 participants * 3 interviews); [3] Maximum number of responses in the urban sample is 64 (64 participants who reported having introduced given food on any interview); [4] Maximum number of responses in the rural sample is 50 (50 participants who reported having introduced given food on any interview); *The pairs in the row are statistically different between areas, p<0.05. using independent *t*-test.

the lower level of schooling and literacy in the countryside might interfere with quantitative reporting. On the other hand, the greater age and parity might provide more mothering experience, which translates into a firmer grasp of the sequence of introducing foods. The lesser array of daily distractions in rural living might allow for better concentration on and retention of the experience of initiating feeding of different new foods to the offspring of the area.

Data on repeated responses to the questions here casts some light on how the usual, single-reply recall approaches in surveys might influence analyses of derivative findings. Assuming our primary purpose was to get an average age at introduction for a survey sample, we can perform some modeling of variance. The average age of introduction for all items for all participants was 6.8±1.5 mo. If we take the averages of only the first response, then only the second responses, and finally only the third responses, the respective means would be 6.8±1.5; 6.7±1.5 and 6.8±1.4 mo, respectively. If a survey with this questionnaire had obtained only the highest age estimates that a woman was to give, or the lowest, the respective means would be 6.4±1.5 for (minimal), and 6 7.3±1.5 mo for the (maximal). Hence, the error in maximal deviation from population estimate for mean would be ± 0.4-0.5 mo or ±7% of the global mean.

The effect of variance on attenuating associations is another concern. Let us assume that some other, prospectively observed phenomenon (X) were to follow the exact age of introduction for *Incaparina*®, reported by the rural mothers on the first questioning, the Spearman correlation coefficient would be r=1.00. If we then associatethe x-axis values with the ages reported on second questioning, the Spearman r value would be reduced to 0.694, and to 0.644 with the use of the ages from the third questionnaire series. This level of correlation variation would have implications,

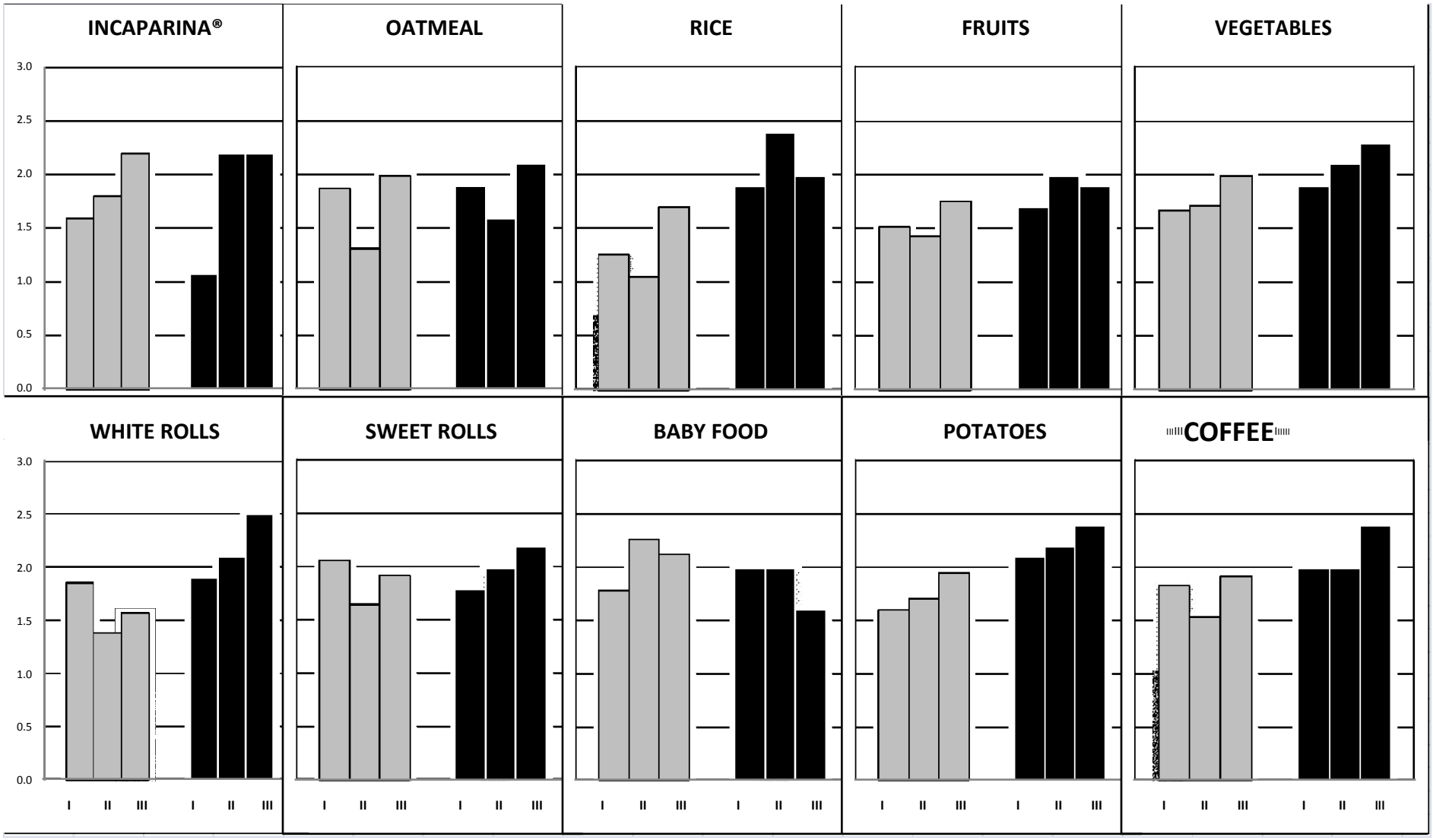

Figure 2. Visual projection of the tertile array of food consistency scores for the 10 items of interest in the survey questionnaire by region by remoteness of recall. Tertile I is the most remote in time, Tertile III is the most proximal in time. Urban area bars shaded in gray, rural area bars shaded in black.

Table 4. Average consistency scores of timing of recalls for the sum of food items listed (maximum score 30) by residential area.

Consistency scores	Urban sample (n=64)	Rural sample (n=50)	P-value
Sum of consistency score *(including food items which were not consumed)*	19.7±5.8 (20.0)	22.4±5.3 (23.0)	0.020[1]
Sum of consistency score *(excluding food items which were not consumed)*	17.5±6.2 (17.6)	20.8±6.1 (21.5)	0.006[1]
P-value	0.0001[2]	0.0001[3]	

Values are mean±SD (median); [1]Differences between residential area examined using Mann-Whitney U test; [2] Differences between urban sample consistency scores examined using the paired *t* test; [2]Differences between rural sample consistency scores examined using Wilcoxon test.

imposing a certain amount of attenuation of the degree of association, in regression analyses that used one or another of the sequential responses as the basis of evaluation.

There is a health and nutritional concern with the overall problem of age of introduction of foods and beverages as observed in this study and has been commented upon in the companion publications (Campos et al., 2010; Enneman et al., 2010; Enneman et al., 2009; Hernández et al., 2010). The WHO recommends exclusive breast feeding for 6 mo, only then followed by appropriate complementary foods (WHO, 2003). Although the mean age (and median age, data not shown) was greater than 6 mo for reported introduction of each of the items of interest, a substantial proportion of the introductions occurred during the first semester of life. Of 2,384 reports of first presentation, 1,863 (78%) were prior to the completion of 6 mo, with 931 (39%) of these before the completion of 5 mo of life. To the extent that exclusive breast feeding is regarded as a measure for preservation of life and health (WHO, 2001), a greater effort at delaying introduction of complementary foods is needed in both the city and the countryside of Guatemala.

Conclusion

The fortuitous occurrence of a triple repetition of a question to mothers of infants on the age at first introduction of 10 selected foods into the diet allowed us to gain insights into how much error of estimate there might be in routine questioning. We relied on internal consistency as the surrogate for validity, recognizing the caveats inherent in that assumption. The same age of initiation was repeated on two or three occasions in 66% of mothers, inferentially suggesting a response that is likely to be correct. That serial consistency recapitulates validity for these dietary data, however, awaits prospective confirmation.

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