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A Validation Study of Maternal Recall on Breastfeeding Duration Six Years after
Childbirth.

By

Emma A. Amissah, M.D.
Degree to be awarded: M.P.H

Executive MPH

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A Validation Study of Maternal Recall on Breastfeeding Duration Six Years after
Childbirth.

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An abstract of
Thesis submitted to the Faculty of
Rollins School of Public Health of Emory University,
in partial fulfillment of the requirements for the degree of
Master of Public Health in Epidemiology
2016

Abstract

A Validation Study of Maternal Recall on Breastfeeding Duration Six Years after Childbirth.

By
Emma A. Amissah, M.D.

Background: Previous research studies have often depended on a mother's ability to recall her breastfeeding duration several years after delivery. Mothers have been reported to accurately recall their breastfeeding initiation and duration when the recall period is (≤3 years); however, very few studies have assessed the validity of long-term maternal recall. The objective of this study is to assess the validity of maternal recall of breastfeeding 6 years after childbirth, and the association between accurate maternal recall of breastfeeding and socio-demographic factors.
Methods: The two data sets used i.e. Infant Feeding Practices Study 2 (IFPS2) and Year 6 Follow-up (Y6FU) were obtained from the Center for Disease Control (CDC). Data on breastfeeding duration collected from 2005 to 2007 (baseline) was compared to breastfeeding recall data obtained six years later among 856 study participants. The Intra-Class correlation coefficient (ICC) and Bland-Altman plots were examined as a measure of agreement between the two data sets. Sensitivity and specificity estimates were calculated to assess validity of recall. Socio-demographic determinants associated with accurate recall to within one month was examined using multiple logistic regression analysis.
Results: Maternal recall of breastfeeding duration was found to be fairly valid after 6 years of childbirth with a small median overall bias (0.2weeks) toward overestimation. The overall concordance was high (ICC=0.84) and observed to be consistently high among the different socio-demographic groups except among mothers between the ages of 23 to 30 years and smokers. Parity was the only significant predictor of accurate recall to within one month of the baseline study (adjusted OR 0.69; 95% CI 0.5, 1.0, *p*-value 0.023).
Conclusion: Our study found that maternal recall of breastfeeding duration was fairly accurate even after 6 years of childbirth. Further research studies are required to identify the different socio-demographic groups less likely to give accurate recall of breastfeeding duration, and the magnitude and direction of the bias, so researchers relying on their recall can handle the data with care.

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ACKNOWLEDGEMENTS

I would like to thank Dr. Vijaya Kancherla, the Chairperson for my thesis paper, for her invaluable guidance and tremendous support which kept me focused throughout this process. I also want to thank Dr. Ruowei Li who always asked the difficult questions, for her shared insights and expertise on breastfeeding. Thanks to Dr. Yi-An Ko for her time and feedback in reviewing this report.

Finally, I would like to thank my husband Kwesi and our two daughters, Aba and Nana Ekua for their sacrifice and constant support of all my educational endeavors.

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INTRODUCTION

Given the well-established benefits of breastfeeding, the World Health

Organization (WHO) recommends exclusively breastfeeding for a duration of six months

initially, then to supplement with complementary foods till the infant's second birthday

and beyond (1). Globally, breastfeeding promotion is considered one of the most

effective interventions for an infant's development and survival (2), and the notion of it

being a personal lifestyle choice is shifting to that of a public health priority (3). The

expansive growth in research as a result of improved epidemiological methods and

technological advancements have facilitated for a more sophisticated means of assessing

the importance and diverse advantages of breastfeeding. The short and long term health

benefits for mother and infant, as well as the psychosocial (4), environmental (5) and

economic benefits (6-7) have been documented.

Despite the incalculable value of breastfeeding, in 2014 only a small proportion

(18.8%) of mothers in the United States (US) breastfed their babies for six months

exclusively and (26.7%) were breastfeeding at 12 months (8). Breastfeeding has been

suggested to confer protective effects against chronic illnesses in later life. The

preponderance of research studies in this regard have mostly been observational with

some long term outcomes relying on a mother's ability to recall her breastfeeding

duration several years after delivery. For example, breastfeeding duration has been stated

to influence neurodevelopmental risks and predict cognitive outcomes in children in a

dose-dependent manner (9). These studies (10-11) depending on long term maternal

recall, reported that increasing breastfeeding duration was associated with a cognitive

advantage and a lesser likelihood of the development of Attention Deficit Hyperactivity Disorder (ADHD) in children.

Also, in the United States (US), cardiovascular disease accounts for 1 in every 4 female deaths (12). Research studies (13-17) that have assessed the effect of lactation on maternal metabolic health and showed an association between the duration of breastfeeding and the prevalence of hypertension and cardiovascular disease in women relied on long term maternal recall of the infant's feeding history.

Similarly, concerning obesity (18-23) as an endpoint, these studies have demonstrated through maternal recall, that breastfeeding for longer periods have the potential to mitigate the development of overweight or obesity in the child in later life.

Furthermore, the protective role of breast milk against certain childhood cancers has been documented and through data obtained from long term maternal recall, an inverse association has been shown (24-27) between the duration of breastfeeding and the development of childhood cancers including acute lymphoblastic leukemia, Hodgkin's disease and neuroblastoma. A systematic review and meta-analysis by Martin et al (27) stated, that of the 49 publications between 1966 and 2004 examining the association between early nutrition and childhood cancers, 85% depended on long term recall of the breastfeeding history. Finally, of the 11 federally funded data sets examining breastfeeding behavior in the US, 8 rely on maternal recall with recall periods varying from 6 months to 18 years (28).

Clearly, maternal recall of breastfeeding history has played a major role in helping to identify behaviors that could inform population strategies and elucidate non-communicable disease mechanisms operating through early life exposures. This

retrospective method, though a cost-efficient alternative to prospectively obtaining data (29), could be altered by differential recall bias (30) and social desirability bias (31) as a mother's ability to accurately report her past infant feeding history may be affected by the outcome of a perinatal event (32) the imprecision of her memory (33) and the tendency to want to conform to existing norms.

According to a previous literature review based on seven research studies (34-40) assessing the validity of recalled duration of any breastfeeding, two (34-35) examined maternal recall within 3 years of delivery.

Of these, Li et al. (41) reported a much higher correlation and percentage agreement on breastfeeding duration in comparison to the other 5 studies (36-40) that assessed long term maternal recall of any breastfeeding duration. Among these 5 studies, 4 used fairly small sample sizes (n <150) and all five, with the exception of one involved study populations outside of the US, most often in countries where breastfeeding frequency is normally high among women. Only three (34) (38-39), of the five studies assessed recall differences by socio-demographic factors and though one study (39) identified a significant difference in recall of breastfeeding duration by socio-economic status but there was no mention of the magnitude and direction of this difference.

While the only US study on long term maternal recall (34-50 years after birth) of any breastfeeding duration involved a small sample size (n=140), it was also limited to only elderly college-educated women from Minnesota (26). To address the gaps in previous studies, our study will use data from a prospective study of a large population of a nationally distributed sample of young women from across the US. It will compare data on breastfeeding duration from long term maternal recall six years after delivery with

short term recall each month during the first year, assess for variations in recall by sociodemographic factors and examine determinants of accurate maternal recall.

METHODS

Study Population

Infant Feeding Practices Study 2 (IFPS2), conducted between 2005 and 2007 by the US Food and Drug Administration (FDA) in close collaboration with US Centers for Disease Control and Prevention (CDC), collected information prospectively from mothers in their third trimester of pregnancy and throughout the first year of their infant's life. It comprised of 4,902 pregnant women selected from a nationally distributed consumer opinion panel of 500,000 households throughout the United States. The eligibility criteria included a healthy woman of at least 18 years of age who gave birth after at least 35 weeks gestation to a singleton infant weighing at least 5 pound at birth and hadn't stayed in intensive care for more than 3 days (42). Around their expected date of delivery, a telephone interview was done to determine if a baby had been born and if the mother-infant pair were eligible for the study. Follow up was conducted through post card reminders asking outstanding households that couldn't be reached via phone call to complete the birth screening questionnaire by calling a number on the postcard. If this also failed a printed copy of the birth screening questionnaire was mailed to the household. Data about various infant feeding practices including cessation of breastfeeding was then collected from all eligible participants using mailed questionnaires, the first of which was sent when the infant was approximately 3 weeks old. Subsequently, questionnaires were sent at approximately monthly intervals until 7 months, then every 7 weeks until the infant was 12 months of age.

Six years later, the FDA and CDC conducted the Year 6 Follow-Up (Y6FU) study using a cross-sectional study design between March and June of 2012 from mothers who had previously participated in IFPS2 (43). To qualify for the Y6FU sample, mothers had to have completed the Neonatal (Month 1) questionnaire in the IFPS2 (n = 3,033) and not be subsequently disqualified from IFPS2 (n = 75). Disqualification criteria included death of the infant or mother, being diagnosed with a condition likely to affect feeding, or living in a geographic area to which the post office stopped delivering mail because of the Gulf Coast hurricanes of 2005. Questionnaires were then mailed to 2,958 eligible mothers to collect data on health, development, dietary intake and many other information including a maternal recall on cessation of breastfeeding when their children were 6 years old. After two failed attempts for those who did not respond, the same information was obtained through telephone interview to ensure maximum response. The structured and comprehensive questionnaires used for both studies were developed with permission from established national surveys or published scales. The FDA's Research Involving Human Subjects Committee and Emory's Institutional Review Board approved the study (43).

Study Population

Among 3,033 mothers who completed the first postpartum questionnaire of IFPS2, 2,958 were eligible for the Y6FU. After excluding mothers who either refused to participate in the study (n=82) or were unreachable (n=1,334), the final eligible sample size for the Y6FU was 1,542 (Fig. 1) with a response rate of 52.1%. Among them, 315 had missing data on recalled breastfeeding duration of which 93 mothers were still breastfeeding at their last IFPS2 survey, leaving a total of 371 still breastfeeding at their

last IFPS2 study who had recall breastfeeding duration data. After excluding these women from the data set our final analytical sample included (n=856) (Fig.1), i.e. 28.9% of eligible women. We also analyzed our data by imputing the median recall breastfeeding duration for mothers still breastfeeding at their last survey and who completed the month 12 questionnaire, in which case the analytical sample was (n=1,102).

Measures of Breastfeeding Duration

Any breastfeeding duration was defined as the total time that infants were fed breast milk irrespective of whether they additionally received water, other fluids and solid food (44). This key variable was determined from the same question regarding age of the infant when the mother completely stopped breastfeeding or pumping milk in both IFPS2 (reference) and Y6FU.

IFPS2 mothers received monthly mail questionnaires at approximately 1, 2, 3, 4, 5, 6, 7, 9, 10.5, and 12 months of their infant's age. The structured questionnaires were made up of 8 modules (45). Apart from the first questionnaire that additionally assessed factors commonly occurring around the time of birth, detailed data were collected on infant feeding and health, breastfeeding cessation, food allergy, breastfeeding, pumping and expressing milk, infant formula, information sources, sleeping arrangement, childcare, employment and health among others throughout the first year of life. Sections on breastfeeding cessation and infant feeding and health were repeated with every questionnaire mailed out. Demographic information was assessed at both the baseline and 6 year follow up. Breastfeeding duration was determined from the monthly IFPS2 survey using responses to the following two questions: "Have you completely stopped

breastfeeding and pumping milk for your baby?" and, if yes, "How old was your baby when you completely stopped breastfeeding and pumping milk?" with response option either in days or weeks (45)

Recalled measures of breastfeeding duration 6 years after birth

The Y6FU questionnaires comprised of five sections that obtained information on the dietary quality, health, behavioral and developmental outcomes of children, who together with their mothers had initially participated in IFPS2. In addition, mothers provided among others, information on demographics and family medical history. From this survey, mothers were also asked: "How old was this child when you completely stopped both breastfeeding and pumping milk for him or her? "with response options either in weeks or months (45)

Independent Variables

The independent variables examined included sociodemographic characteristics of the mother-infant pairs, of which some have been suggested from previous studies (30, 35-36, 38, 46) to be associated with maternal recall of breastfeeding duration. The maternal covariates examined were: age (in years) at study entry (23-30, 30- 35, 35-40 > 40), education (not a high school graduate, high school, not a college graduate, college or greater), parity (primiparous vs. multiparous), poverty status calculated as the percent of federal poverty level (poorest <185%, somewhat poor = 185-349%, not poor >350%), race/ethnicity (white / black / Hispanic / Other), marital status (married / unmarried), occupation (employed / unemployed), smoking status (smokers / non-smokers) and Women, Infant and Children (WIC) participation (yes / no). The infant's covariates included gender (male / female) and birth weight (in pounds) (< 8lbs / ≥ 8lbs).

Statistical Analysis

The recalled data set was linked to the reference database using the respondent's unique identity number. From the covariates previously discussed, demographic characteristics of mothers who responded and were eligible to participate were conducted and compared with non-responders using Chi-square or the independent samples t-test to evaluate susceptibility of the study to selection bias.

Breastfeeding duration in this survey was recorded as a continuous variable with a non-normal distribution (Figs. 2 and 3) so the median breastfeeding duration overall for both the baseline and six years later were compared using the non-parametric Mann-Whitney test for paired samples. A two-sided p-value of 0.05 or less was set to determine the level of statistical significance. Comparisons of reported breastfeeding duration were also made according to selected socio-demographic characteristics between the two data sets. Positive values represented overestimation while negative values represented underestimation of the true value.

Analytical techniques assessing inter-test score differences and plots of inter-test differences against means account for measurement biases and have been stated to be more appropriate measures of validity (47) as opposed to tests of correlation. Thus recalled and recorded breastfeeding durations were compared using Intra-Class correlation coefficient and Bland-Altman plots. The Intra-Class correlation coefficient was calculated as a measure of agreement between recalled and baseline breastfeeding duration. Strength of agreement was defined as follows: ICC < 0.4 = poor, $0.4 \leq$ ICC < 0.75 = fair to good and ≥ 0.75 = excellent (48)

Sensitivity and specificity estimates of maternal recall were also calculated. Sensitivity was defined as: of the breastfeeding durations stated in the prospective study (baseline), what proportion of mothers recalled having that duration at the year 6 study; and specificity was defined as: of the breastfeeding durations not stated in the prospective study), what proportion of mothers also recalled not having that duration at the year 6 study.

We examined socio-demographic determinants associated with accurate recall of breastfeeding duration (± one month) using logistic regression analysis. Association between aforementioned sociodemographic characteristics and the status of valid breastfeeding recall (yes / no) were examined individually using bivariate logistic regression. Significance was based on p-value < 0.10. Socio-demographic variables that were significantly associated with valid breastfeeding recall were included in a multivariable logistic regression model. Variables were dropped from the full model using backward logistic regression, if the p-value was > 0.05 and the odds ratio (OR) of any of the variables did not change by 10% or more. The final reduced model included all significant and confounding variables that determined the accurate recall of breastfeeding duration. An *a priori* model with all variables previously suggested in published literature to be associated with recall of breastfeeding duration was also assessed. SAS® version 9.4 (SAS Institute Inc., Cary, NC) was used for all the analyses.

RESULTS

Among the overall sample of respondents in our study (n=856) the average age of the mother at the time of study entry was 30.2 (± 5.2) years. Additionally, an analysis of socio-demographic characteristics showed that a majority of respondents were non-

Hispanic white (85%), more likely to be non-smokers (84%), married (80%), multiparous (72%), had college or higher degrees (40%) (Table 1).

We compared the characteristics of respondents and non-respondents to examine potential of selection bias. In our analysis, the two groups differed from each other with respect to pre-pregnancy body mass index (BMI), smoking status, and employment status ($P < 0.05$). Specifically, compared with respondents, non-responders had a greater proportion of mothers who were between the underweight to normal weight limit (55 % vs. 42%), a higher proportion of unemployed mothers (42% vs. 31%) and a lower proportion of smokers (8% vs. 15%). Respondents on the other hand tended to be more overweight and obese compared to non-responders (57% vs. 45%) respectively (Table 1). Mothers who were still breastfeeding at their last IFPS2 survey, a higher proportion tended to be unemployed (Data not shown in table 1).

Among respondents, the median breastfeeding duration was 11 weeks (Inter-Quartile Range (IQR) 32.5) for the IFPS2 study and 17 weeks (IQR 39.0) for the Y6FU study. The overall median difference was small (0.2 weeks) with a large variability of (IQR 5.3 weeks, $P < 0.0001$), showing a tendency for women to over-estimate their recall breastfeeding duration at the 6 year study. Significant median differences between recalled and recorded breastfeeding duration was observed across the socio-demographic variables listed in Table 2, except among women who were not high school graduates, blacks and other racial groups. These median differences were also small (range, 0 to 1.5) and positive, again reflecting a tendency for mothers to over-report their breastfeeding duration in the year 6 study. Large variabilities were however noted among the groups, ranging from IQR (4.1 to 12 weeks) (Table 2).

As shown in Table 2, no significant differences in recall error of more than one month was observed among the different socio-demographic groups. Across the groups however, disagreement tended to be in the direction of over-reporting. Recall error was more prevalent among the youngest age group, unemployed, married, some college education, Hispanics, somewhat poor, multiparous, WIC participants, and women with normal birth weight infants.

The overall proportion of mothers who accurately recalled their breastfeeding duration to within a month of the IFPS2 study was (n= 535, 63%), with a median breastfeeding duration of 4 weeks (IQR 33). A majority of women (n=230) over-reported their breastfeeding duration, with a median breastfeeding duration of 26 weeks (IQR 31). Among those that under-reported the breastfeeding duration (n=91), the median time was 17 weeks (IQR 25). The two groups had a significantly different median breastfeeding duration ($P<0.0001$). Overall, only (n=194, 22.7%) of mothers accurately recalled the exact breastfeeding duration of their infant, while 43.6% accurately recalled it to within a week of the IFPS2 study. When breastfeeding recall was examined only among mothers who breastfed, the proportion of mothers who accurately recalled their breastfeeding duration to within a month fell to 53.1% with a median breastfeeding duration of 25.8 weeks (IQR 41.3).

With median imputation for mothers still breastfeeding at their last IFPS2 study, the accuracy of maternal recall was underestimated i.e. 54% of mothers accurately recalled their breastfeeding duration to within one month of the prospective study, with a median difference of 8 weeks (IQR 44). Women were twice more likely to over-report their breastfeeding duration than under-reported it (31.8% to 14.8%), respectively.

Among women who over-reported, the median breastfeeding duration was 48 weeks

(IQR 52), while for those who under-reported, it was 39 weeks (IQR 39) (p-value <

0.0001). Finally, sensitivity and specificity estimates were 91.8 and 96.3% respectively.

The overall agreement between the IFPS2 study and maternal recall of

breastfeeding duration was fairly high (ICC=0.84). The ICC ranged from fairly good to

excellent and was highest among mothers who had above normal birth weight infants

(ICC= 0.92). Generally, percentage agreement appeared to improve among the following

socio-demographic groups: mother's age (but decreased for mothers older than 40 years),

unemployment vs. employed, extremes of poverty, non-smokers vs. smokers, no WIC

participation vs. WIC participation, boy infant vs. girl infant and above normal weight

babies vs. normal weight babies. Among educated women, those with college and higher

degrees had the highest agreement while blacks had the lowest among the different racial

groups. Also, among multiparous women, the ICC appeared to decrease with an increase

in number of other children the respondent had. The overall agreement decreased to 0.78

when recall of breastfeeding duration was assessed only among breastfeeding mothers.

The Bland-Altman plot was performed to compare the recalled and recorded

breastfeeding durations and to also determine the extent of agreement between the two

methods. The average discrepancy was approximately 2.5 weeks with a standard

deviation of 10.9 weeks. The limits of agreement were narrow and majority of the points

(95.7%) fell within the 95% limits with only (n=32) extreme points falling outside the

limits. The plot depicted proportional bias with a tendency towards overestimation as it

showed a trend with a greater number of data points (3.5%) above the mean of the

difference line vs. (0.6%) below (Fig 4). Linear regression analysis performed to model

the relationship between differences in breastfeeding duration (recalled-recorded) and the averages also showed a significant coefficient of the mean ($p<0.0001$).

The bivariate analyses showed marital status and parity as the only significant determinants of accurate recall to within one month at $p< 0.10$. Women who were unmarried were more likely to give an accurate recall of their breastfeeding duration compared to those who were married. Multiparous women on the other hand were less likely to accurately recall their breastfeeding duration compared to primiparas (Table 3). Age, education, smoking, employment status, race and ethnicity, WIC participation, gender and birth weight of the infant did not significantly influence long term maternal recall of breastfeeding duration (Table 3). Parity was the only significant predictor of accurate recall to within one month of the IFPS2 study in our multivariable model (adjusted OR 0.69; 95% CI 0.5, 1.0, p-value 0.023) (Table 3). The odds of a multiparous woman giving an accurate recall of her breastfeeding duration to within a month of the baseline breastfeeding duration was 0.69 times lower than the odds for a primiparous woman, after adjusting for the mother's age, marital status, educational status, smoking status, parity, employment status, race/ethnicity, poverty level, the infants birth weight, gender, and WIC participation. (95% CI = 0.5, 1.0). The *a priori* model also showed parity as the only significant predictor for accurate recall of breastfeeding duration (adjusted OR 0.65; 95% CI 0.5, 0.9, $P = 0.016$).

DISCUSSION

After comparing prospectively recorded and recalled breastfeeding duration data from a large US population of mothers at about 30 to 36 years old, maternal recall of breastfeeding duration was found to be fairly valid after 6 years of childbirth with a small

median (0.2 weeks) overall bias toward overestimation. The overall concordance was high and also observed to be consistently high among the different socio-demographic groups except among mothers between the ages of 23 to 30 years and smokers. Indicative of a differential validity by socio-demographic status. Similarly, the overall sensitivity and specificity of recall of breastfeeding duration after 6 years of child birth was high, 91.8% and 96.3%, respectively. With a restriction of our calculation to only breastfeeding mothers the ICC for recall of any breastfeeding duration decreased to 0.78 with 53% of mothers accurately recalling their breastfeeding duration to within one month.

Validity of long-term (> 3years) maternal recall of breastfeeding duration has been previously investigated and a tendency toward overestimating the recall breastfeeding duration has been reported by these studies (36-40, 49). Among a sample (n=74) of Jerusalem residents with a recall period of more than 20 years (36) and a cohort of 374 Norwegian women with a recall period of 20 years (40), the validity of maternal recall of breastfeeding duration 6 years after birth in this study as measured by ICC was similar. However, it was lower than that reported for 95 Canadians (r=0.95) after a recall period of 8 years (39). Our overall median difference was smaller than that reported by Natland et al. study (40). Among only breastfeeding mothers our concordance (ICC=0.78) was better than that reported for 140 elderly college-educated US women with a recall period of between 34 and 50 years (kappa = 0.55) (38) but lower than that reported among 567 Mexican women (ICC = 0.94) after a recall period of 2 to four years (49). Also, our sensitivity, specificity and recall accuracies were higher than reported among (n=144) Australians by Tienboon et al. study (37).

Our findings in terms of recall accuracy were also consistent with previously published reports. Natland et.al. (40) found 64% of mothers in their study accurately recalled their breastfeeding duration to within a month and Promislow et al. (38) reported 55% accuracy to within a month among only breastfeeding college-educated elderly mothers. Conclusions from these comparisons are to some extent consistent with the hypothesis by some researchers (50-51) that recall accuracy appears to decrease as the length of the recall period increases. This is because our findings, even though better than those of Tienboon et al. (37) and Promislow et al. (38) both of longer recall periods and less favorable in comparison to Cupul-Uicab et al.'s study (49) of shorter recall period, it was similar to that of Natland et al. (40) with an even longer recall period. Our overall median difference and IQR however, was smaller than that of Natland et al. (40). Thus, similar to the findings from the study of maternal recall of infant feeding events by Bedouin Arab women we can state that increases in the median difference of breastfeeding duration between recorded and recall studies occurs as the recall period is lengthened (52). Our finding of an overall better agreement than that reported by Promislow et al. (26) could also be due to the differences in ages of study participants i.e. (younger vs. older) as aging could be associated with a higher incidence of memory problems.

In the present study, although women with less education i.e. non-high school graduates and mothers with higher education (college and beyond) had high agreements, it is worth mentioning that mothers with less education had no significant overall bias and misclassification, while women with higher education had significant misclassification and an overall recall bias toward overestimation. This could reflect the view that highly

educated women better understand the importance of breastfeeding and so more likely to give socially acceptable recall breastfeeding duration periods to signify their conformity with existing standards. Among college educated US women, Promislow et al. (38) found no overall bias toward over or under reporting breastfeeding duration. However, the effect of education on maternal recall accuracy has been unclear as some studies have shown that highly educated women recall more accurately (50, 53), while other studies have shown no effect (54-55)

Contrary to the expectation, with the exception of race, some of the socio-demographic characteristics considered as indicators of disadvantage were associated with higher agreement i.e. unemployment, less than high school graduates and the poorest group. Non-white race and ethnicity, WIC participants and smokers had lower agreement. Additionally, less than high school graduates, blacks and other racial groups had no overall recall bias and no significant misclassification. It is plausible that these women of lower socio-demographic characteristics had lesser access to health care services and lesser awareness of the importance of breastfeeding as such less likely to exaggerate their recall breastfeeding duration.

Our multivariable logistic regression analysis indicated parity as the only socio-demographic determinant associated with the accuracy of maternal recall of breastfeeding duration to within one month of the IFPS2 study even after adjusting for factors like marital status, employment, smoking status, age, educational status, race/ethnicity, poverty status, WIC participation, gender and birth weight of the infant. This is in agreement with Cupul-Uicab et al's study (49) which showed a higher likelihood of poorer recall among women with four or more children. To our knowledge, this study is

the first long term maternal recall of breastfeeding duration study to comprehensively

examine variations in maternal recall by socio-demographic factors.

The main strengths of our study include its large sample size and wide

distribution of study participants across the US. Another strength of this study is that a

large set of socio-demographic factors were collected and examined for its association

with recall bias. Also, the prospective design and monthly frequency with which the

breastfeeding duration data was collected during the 1st year also made the baseline study

a good reference for its comparison with exactly the same question on breastfeeding

duration asked for mothers 6 years after birth. Given this frequency, it is unlikely that the

breastfeeding duration data collected was inaccurate. However, all the variables analyzed

were self-reported, maternal weight and height for instance was not cross-checked with

medical records and so the possibility of inaccurate reporting cannot completely be

excluded.

Thus, in spite of the strengths previously mentioned, our study was not without

limitations. Firstly, the IFPS2 study used a non-random sample of a self-selected

consumer panel with an over-representation of white women of higher socio-economic

status (42). Implying that our findings may not be generalizable to the entire US

population of breastfeeding mothers. Secondly, as is typical of long-term studies, the

extent of losses to follow up (i.e. 52.1% response rate) due mainly to inability to maintain

contact due to change of addresses or telephone numbers and the significant differences

identified between respondents and non-respondents, indicate the possibility of selection

bias in our findings. Individuals lost to follow-up tended to be healthier as they had a

higher proportion of normal weight mothers and a lower proportion of obese mothers and

smokers. They also appeared to have a lower proportion of mothers who never breastfed but this was due to the inclusion of a large number of mothers still breastfeeding at their last survey. Finally, the reference data on breastfeeding duration were missing for mothers who were still breastfeeding at the last survey of IFPS2. Since these mothers tend to breastfeed longer and may be better off in recall, one may speculate that the accuracy of maternal recall could have even been larger if their data had not been excluded from the study.

In conclusion, our study found among a large sample of US mothers, aged about 30 to 36 years, with various socio-economic classes represented, that long term maternal recall of breastfeeding duration was fairly valid even 6 years after childbirth with a small overall tendency toward over-estimation. Additionally, in comparison with primiparity, multiparous women were associated with lower odds of accurate recall. Further research studies are thus required to correctly identify the magnitude and direction of recall bias associated with the different socio-demographic groups, so future researchers relying on their data can handle it with care.

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Fig 1: Cohort profile. Flow-chart of Study Participants in the Breastfeeding Duration Study, United States, 2005-2007 and 2012.

Participants in the IFPS2[a] study

(Recorded)

N=3033

*Unreachable and ineligible

n=75

Participants eligible for the Y6FU[b]

(Recalled)

n= 2958

Eligible and contacted but refused n= 82

Eligible and unreachable n=1334

Participants in the Y6FU study

n=1542

Missing recalled breastfeeding data

n=315

Participants with recalled and recorded breastfeeding data.

n=1227

Participants still breastfeeding at their last IFPS2 survey and had complete recall breastfeeding duration data.

n=371

Participants with complete[d] recalled and recorded breastfeeding data.

n=856

[a] Infant Feeding Practices Study 2.

[b] Year 6 Follow-Up Study.

*Mother lived in a State where mail service was stopped due to the Gulf Coast hurricanes in 2005, infant died or had an illness that prevented breastfeeding.
[c] Unreachable due to a previous request to be removed from the mailing list, a change of address, non-working phone number and unavailability of respondent by phone.
[d] The breastfeeding duration data was deemed complete if it had a recorded entry of either having been breastfed or never breastfed.

Table 1: Maternal and Child Characteristics of Responders and Non-responders			
Variables	**Responders (n=856)[a]**	**Non-responders (n=686)[b]**	**P-value[c]**
Maternal Characteristics[d]			
Age at study entry, yrs, mean (SD)[e]	30.2 (5.2)	29.9 (5.4)	0.194
Pre-pregnancy BMI, kg/m2, n (%)			
0<bmi<18.5	28 (3.3)	37 (5.4)	
18.5<=bmi<=24.9	327 (38.2)	337 (49.1)	
24.9<bmi<=29.9	245 (28.6)	161 (23.5)	
bmi>29.9	244 (28.5)	144 (21)	
Unknown	12 (1.4)	7 (1.02)	<0.0001
Smoking, n (%)			
No	721 (84.2)	629 (91.7)	
Yes	135 (15.8)	57 (8.3)	<0.0001
Employment n (%)			
Employed	549 (64.1)	353 (51.5)	
Unemployed	263 (30.7)	287 (41.8)	
Unknown	44 (5.1)	46 (6.7)	<0.0001
Marital Status n (%)			
Married/cohabiting	681 (79.6)	562 (81.9)	
Unmarried	132 (15.4)	85 (12.4)	
Unknown	43 (5.0)	39 (5.7)	0.216
Parity n (%)			
Primiparous	238 (27.8)	191 (27.8)	
Multiparous	618 (72.2)	495 (72.2)	0.987
Education n (%)			
Not a High School Grad	12 (1.4)	12 (1.8)	
High School grad	103 (12.0)	68 (9.9)	
Some College	327 (38.2)	230 (33.5)	
College and beyond	370 (43.2)	338 (49.3)	
Unknown	44 (5.1)	38 (5.5)	0.121
Race/Ethnicity n (%)			
White	724 (84.6)	587 (85.6)	
Black	33 (3.9)	23 (3.4)	
Hispanic	50 (5.8)	34 (5.0)	
Other	49 (5.7)	42 (6.1)	0.811
Infant Characteristics[f]			
Birth weight, lb, mean (SD)	7.7 (1.0)	7.7 (1.1)	0.939
Gender, n (%)[g]			
Boy	428 (50.1)	342 (49.9)	
Girl	426 (49.9)	344 (50.2)	0.918

Abbreviations': SD, standard deviation; BMI, body mass index; IQR, interquartile range.

[a] Responders with recorded and recalled breastfeeding duration data.

[b] Non-responders with recorded breastfeeding data and include mothers still breastfeeding at their last survey.

[c] *P*-values for comparison of responders and non-responders was assessed using Chi-square test for (categorical data) and independent samples t-test or the Wilcoxon-Mann-Whitney test (non-parametric for continuous data).

[d] Variables reported in recalled data set/Y6FU except for age, bmi, race/ethnicity and parity which are from the recorded data set. Continuous variables are presented as mean (SD) or median (IQR) while categorical variables are presented as n (%).

[e] Missing data for the variable age at study entry: n=1

[f] Variables from the recorded data set/IFPS2.

[g] Missing data for Infant gender n=2

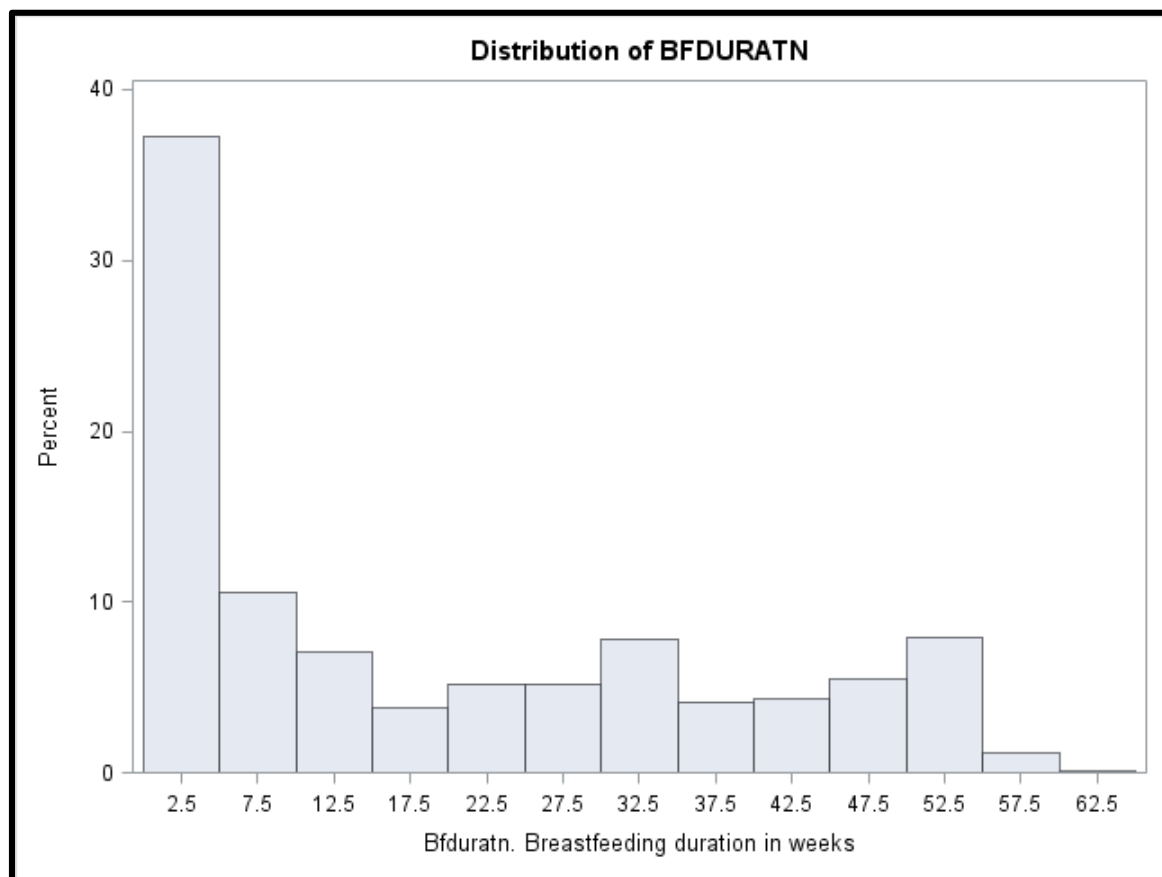**Fig 2: Distribution of breastfeeding duration at baseline (IFPS2)**

Fig 3: Distribution of breastfeeding duration at year 6 study (Y6FU)

Distribution of y6e15a3

Fig 4: Bland-Altman Plot

difference in breastfeeding duration, weeks(recalled-recorded) vs. the mean of the two breastfeeding duration, weeks (n=856)Limits of agreement: Mean ± 2SD, 2.48 ± 2*10.85
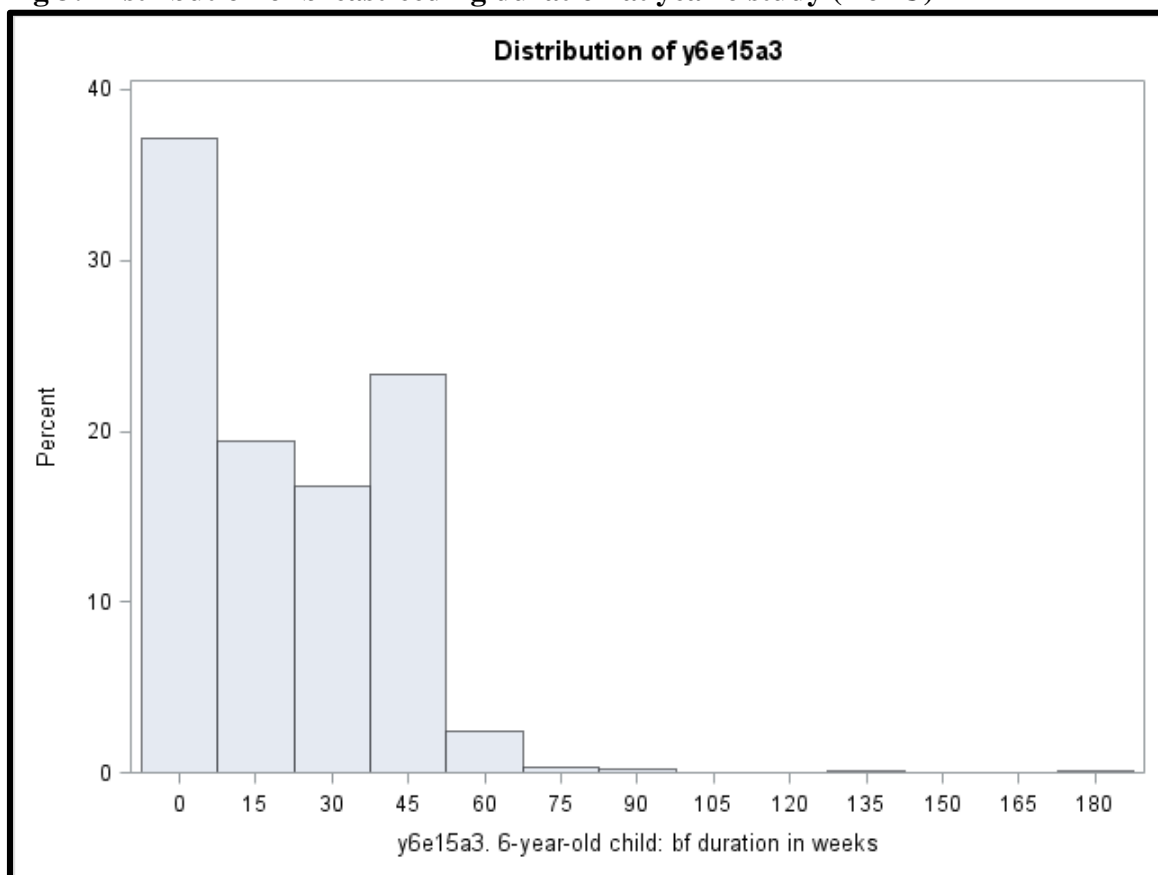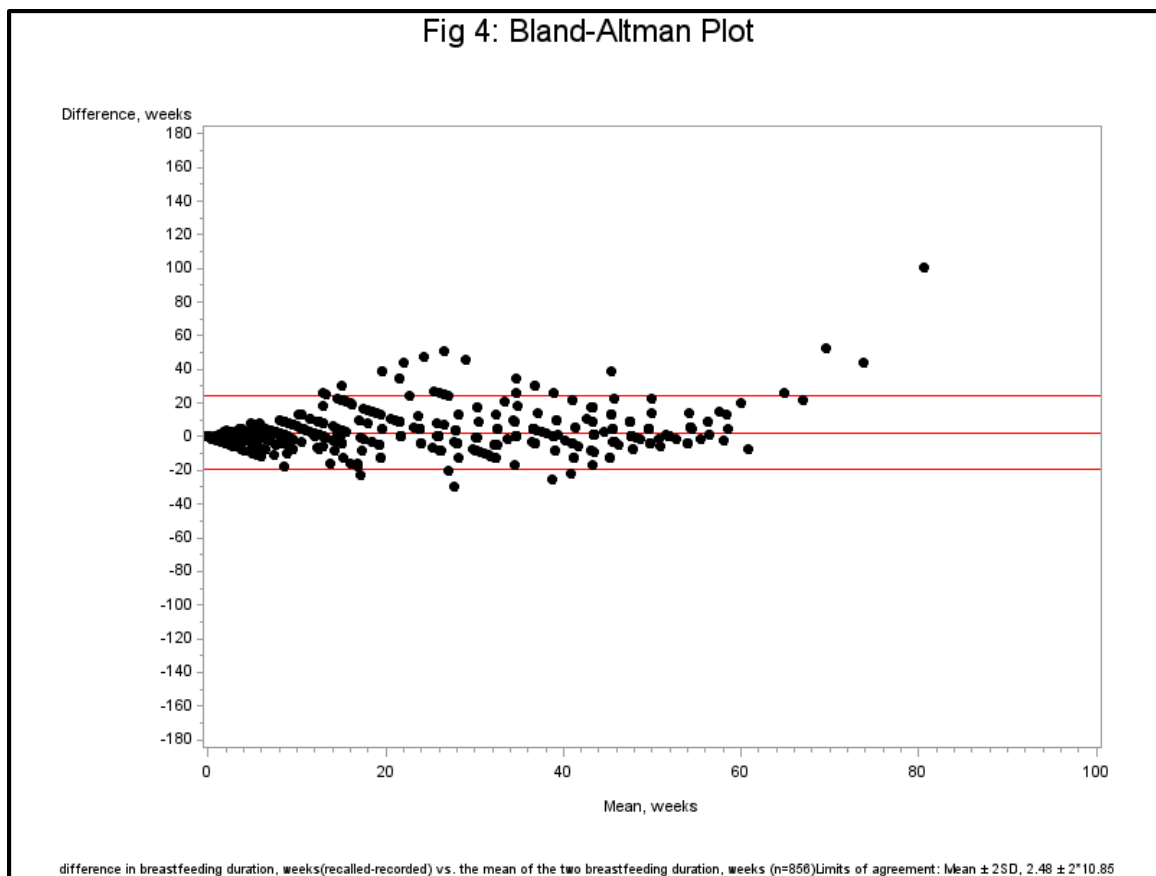
Table 2: Comparison of recorded and recalled breastfeeding duration and recall error by socio-demographic characteristics (n=856)

	n	Recorded Median(IQR)	Recalled Median(IQR)	Median difference[†] (IQR)	Under-estimation > 1 month n(%)	Over-estimation > 1 month n (%)		ICC
		Breastfeeding duration			Recall error			
All mothers	856	11 (32.5)	17 (39)	0.2 (5.3)*	91 (10.6)	230 (26.9)	<0.0001[†]	0.84
Socio-demographic Variables								
Maternal Characteristics[a]								
Maternal Age at year 6 (yrs)[b]								
23-30	63	5 (19.5)	13 (24)	0.6 (7)*	5 (7.9)	21 (33.3)		0.45
30-35	211	10.3 (28.1)	17 (38)	0.4 (5)*	16 (7.6)	62 (29.4)		0.88
35-40	325	12 (33.6)	17 (38)	0 (5)*	35 (10.8)	80 (24.6)		0.90
>=40	254	12 (33.4)	13 (39)	0 (5.5)*	35 (13.8)	65 (25.6)	0.285[†]	0.86
Employment								
Employed	549	10 (33.4)	13 (35)	0 (4.6)*	53 (9.7)	147 (26.8)		0.83
Unemployed	263	16 (36.6)	22 (43)	0.4 (5.7)*	30 (11.4)	74 (28.1)		0.86
Unknown	44	16.7 (39.5)	17 (34)	0 (4.1)	8 (18.2)	9 (20.5)	0.628[†]	0.93
Marital Status								
Married/cohabiting	681	14 (33.9)	17 (37)	0.3 (5.6)*	76 (11.2)	190 (27.9)		0.83
Unmarried	132	3 (12)	3.5 (26)	0 (4.1)*	8 (6.1)	30 (22.7)		0.83
Unknown	43	18 (40.8)	17 (36)	0.2 (6)	7 (16.3)	10 (23.3)	0.122[†]	0.93
Education								
Not a High School Grad	12	4.2 (10)	3 (28)	0 (6.8)	1 (8.3)	3 (25)		0.81
High School grad	103	6 (30)	13 (39)	0 (5.3)*	13 (12.6)	26 (25.2)		0.79
Some College	327	8 (29.1)	13 (35)	0.2 (5.6)*	26 (8.0)	99 (30.3)		0.78
College and beyond	370	17.9 (35.7)	22 (36)	0.3 (4.9)*	43 (11.6)	92 (24.9)		0.89
Unknown	44	19 (40.1)	17 (33.5)	0.1 (5.1)	8 (18.2)	10 (22.7)	0.441[†]	0.93
Race/Ethnicity								
White	724	12 (33.1)	17 (39)	0.2 (4.6)*	74 (10.2)	187 (25.8)		0.85
Black	33	4.0 (12)	6 (26)	0 (12)	3 (9.1)	10 (30.3)		0.67
Hispanic	50	9.5 (17.5)	17 (31)	1.5 (9.6)*	4 (8)	21 (42)		0.74
Other	49	13 (28.4)	17 (31)	0 (5.9)	10 (20.4)	12 (24.5)	0.070[†]	0.91
Poverty Index								
Poorest	182	4.2 (25.8)	9 (30.0)	0 (4.6)*	15 (8.2)	48 (26.4)		0.86
Some what Poor	475	12.0 (32.4)	17 (38)	0.2 (5.3)*	57 (12)	135 (28.4)		0.82
Not poor	199	17.2 (35.7)	26 (36)	0.2 (5.4)*	19 (9.6)	47 (23.6)	0.314[†]	0.86
Smoking								
No	721	14 (35.4)	22 (37)	0.3 (4.9)*	76 (10.5)	195 (27.1)		0.88
Yes	135	4 (12.9)	6 (17)	0 (6)*	15 (11.1)	35 (25.9)	0.954[†]	0.51
Parity								
Primiparous	238	10.2 (31.4)	13.0 (37.0)	0.4 (5)*	18 (7.56)	58 (24.4)		0.78
Multiparous	618	17 (39)	11.5 (34)	0 (5.2)*	73 (11.8)	172 (27.9)	0.070[†]	0.87
Number of Other Children per mother[c]								
1	367	10 (33.7)	17 (39)	0 (4.81)*	40 (10.9)	90 (24.5)		0.88
2	165	15 (36.7)	22 (40)	0.4 (6)*	19 (11.5)	54 (32.7)		0.88
3	49	8 (29.1)	13 (15.7)	0.2 (5)	8 (16.3)	18 (36.7)		0.82
>=4	24	13 (13.7)	14.5 (15)	0 (7.8)	4 (16.7)	7 (29.2)	0.166[†]	0.80
WIC Participation								
Yes	298	6.0 (23.7)	9.0 (30)	0 (5.4)*	27 (9.1)	86 (28.9)		0.77
No	558	16.47 (36.2)	22 (37)	0.2 (5.5)*	64 (11.01)	144 (25.8)	0.418[†]	0.87
Infant Characteristics[d]								
Gender[e]								
Boy	428	11 (32.4)	12 (33.3)	0.2 (5)*	56 (11.7)	112 (26.2)		0.88
Girl	426	17 (38.0)	17 (39)	0.2 (5.5)*	41 (9.6)	118 (27.7)	0.593[†]	0.81
Birth weight, (lb)								
5.5-8.8 (Normal)	740	11 (32.4)	13.0 (39)	0.2 (5.6)*	83 (11.4)	198 (27.2)		0.83
>8.8 (Above normal)	116	21 (38.2)	26 (37.5)	0.4 (4.6)*	7 (6.0)	31 (26.7)	0.196[†]	0.92

Abbreviations: IQR, interquartile range; ICC=Intra-class correlation coefficient.
a Variables for Maternal Characteristics are all from the recalled data set except for race/ethnicity, poverty level and parity.

b Missing data for maternal age at year 6: n=3
c n=251 missing, represent nulliparous women.
d Variables for Infant Characteristics are from the recorded data set.
e Missing data for the variable gender: n=2
† Chi-square Test. Percentages for over and under reporting don't equal 100 because the remaining percentage equals accurate recall.
* Wilcoxon-Mann-Whitney Signed Rank p-values < 0.05
‡ Median Difference (weeks) = recalled- recorded

Table 3. Unadjusted and Adjusted Odds Ratios of Socio-demographic Determinants of Accurate Recall of Breastfeeding Duration

Table 3. Unadjusted and adjusted odds ratios of socio-demographic determinants of accurate recall (n=856)

	Crude			Adjusted Model 1*			Adjusted Model 2*			Adjusted Model 3*		
Socio-demographic Variables	Odds Ratio	90% C.I.[†]	p-value‡	Odds Ratio	95% C.I.[†]	p-value‡	Odds Ratio	95% C.I.[†]	p-value‡	Odds Ratio	95% C.I.[†]	p-value‡
Maternal Characteristics[a]												
Maternal Age at year 6 (yrs)[b]												
23-30 (Reference)	1	---		1	---					1	---	
30-35	1.20	(0.7-1.9)		1.58	(0.9-3.0)					1.55	(0.8-2.9)	
35-40	1.28	(0.8-2.0)		1.69	(0.9-3.2)					1.71	(0.9-3.2)	
>=40	1.08	(0.7-1.7)	0.705	1.42	(0.7-2.7)	0.352				1.49	(0.8-2.8)	0.376
Employment												
Unemployed (Reference)	1	---		1	---							
Employed	1.14	(0.9-1.5)	0.684	1.10	(0.8-1.5)							
Unknown	1	(0.6-1.8)		0.81	(0.08-8.1)	0.811						
Marital Status												
Married/cohabiting (Reference)	1	---		1	---							
Unmarried	1.59	(1.1-2.2)		1.64	(1.1-2.6)							
Unknown	0.98	(0.6-1.7)	0.082	4.86	(0.2-	0.065						
Education												
Not a High School Grad (Reference)	1	---		1	---					1	---	
High School grad	0.82	(0.3-2.4)		0.73	(0.2-2.8)					0.85	(0.2-3.1)	
Some College	0.81	(0.3-2.3)		0.71	(0.2-2.6)					0.83	(0.2-2.9)	
College and beyond	0.87	(0.3-2.4)		0.74	(0.2-2.8)					0.85	(0.2-3.0)	
Unknown	0.72	(0.2-2.2)	0.969	0.2	(0.01-2.9)	*0.826*				0.71	(0.2-2.8)	0.983
Race/Ethnicity												
White (Reference)	1	---		1	---							
Black	0.87	(0.5-1.6)		0.73	(0.4-1.5)							
Hispanic	0.56	(0.4-0.9)		0.56	(0.3-1.0)							
Other	0.69	(0.4-1.1)	0.165	0.64	(0.4-1.2)	0.122						
Poverty Index												
Poorest (Reference)	1	---		1	---					1	---	
Some what Poor	0.78	(0.6-1.1)		0.74	(0.5-1.1)					0.74	(0.5-1.1)	
Not poor	1.07	(0.8-1.5)	0.138	0.93	(0.6-1.6)	0.205				0.92	(0.6-1.5)	0.182
WIC Participation												
Yes (Reference)	1	---		1	---							
No	1.03	(0.8-1.3)	0.853	1.05	(0.7-1.5)	0.787						
Smoking												
No (Reference)	1	---		1	---					1	---	
Yes	1.02	(0.7-1.4)	0.904	0.98	(0.7-1.5)	0.938				1.05	(0.7-1.6)	0.824
Parity												
Primiparous (Reference)	1	---		1	---		1	---		1	---	
Multiparous	0.71	(0.6-0.9)	0.037	0.69	(0.5-1.0)	0.042	0.69	(0.5-1.0)	0.023	0.65	(0.5-0.9)	0.016
Infant Characteristics[c]												
Gender[d]												
Boy (Reference)	1	---		1	---					1	---	
Girl	1.04	(0.8-1.4)	0.874	1.02	(0.8-1.4)	0.799				1.06	(0.8-1.4)	0.687
Birth Weight (lb)												
5.5- 8.8(Normal) (Reference)	1	---		1	---					1	---	
>8.8 (Above normal)	1.27	(0.9-1.8)	0.281	1.27	(0.8-2.0)	0.272				1.31	(0.9-2.0)	0.211
				HL GOF test[ɸ]: 0.71						HL GOF test[ɸ]: 0.09		

[†] C.I. Confidence interval

[‡] Wald p-value

* Model 1: Fully adjusted model

* Model 2: Reduced model excludes variables non-significant at p-value>0.05 and non-confounders as per the 10% rule.

* Model 3: Apriori model included all variables which had been stated from literature to be associated with accuracy of breastfeeding duration

[ƒ]: Hosmer-Lemeshow goodness of fit test (p-value)

[a] Variables reported from recalled data set/Y6FU except for race/ethnicity, poverty level and parity which are from the recalled data set.
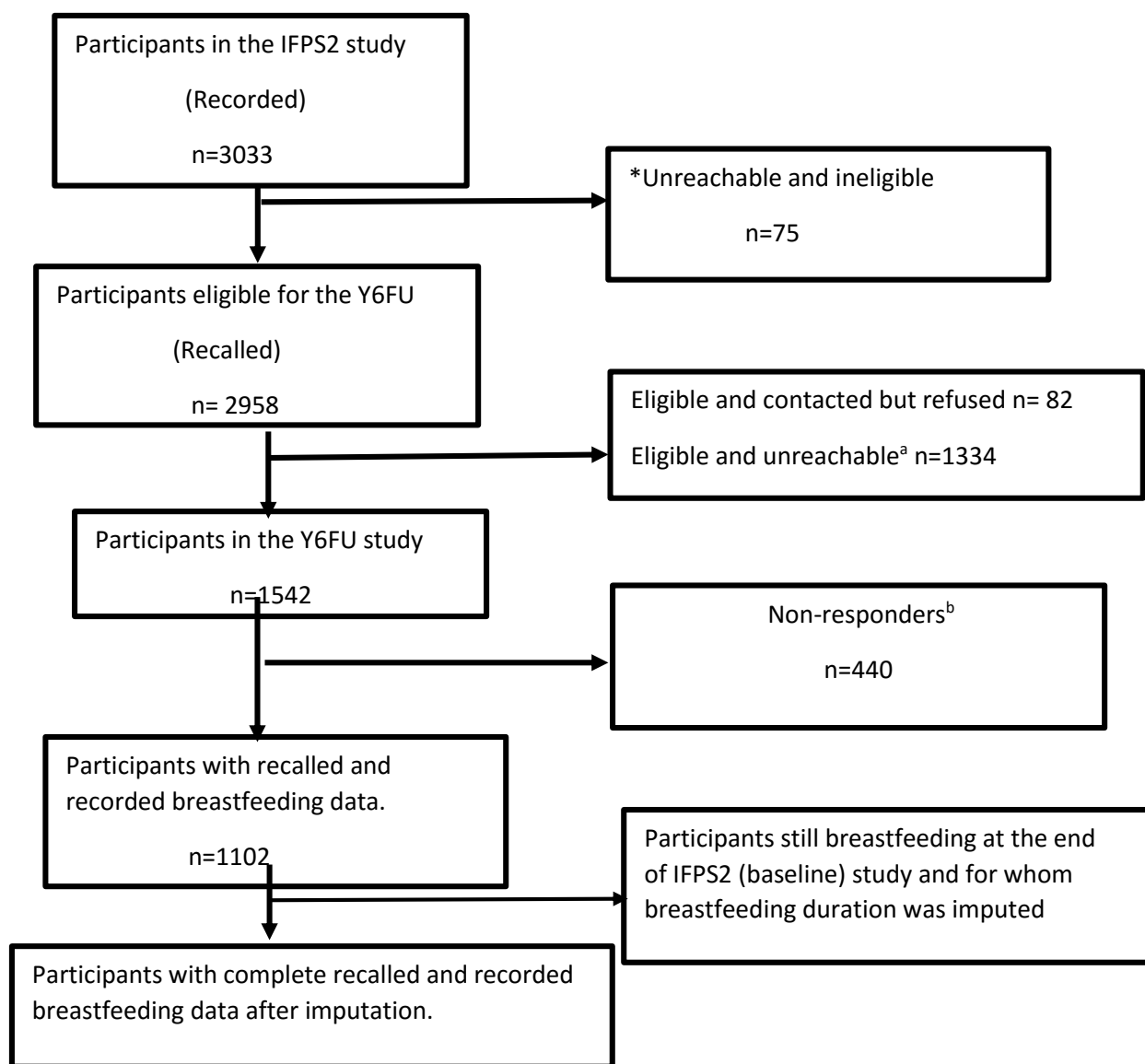
[b] Missing data for maternal age at year 6: n=3

[c] Variables from the recorded data set/IFPS2.

[d] Missing data for the variable gender: n=2

Data Analysis with Imputation for BF=77 with Median bf Duration for Year 6 Study

Fig 1B: Cohort profile. Flow-chart of Study Participants in Breastfeeding Duration Study in the United States, 2005-2007 and 2012.

```
┌─────────────────────────────┐
│ Participants in the IFPS2    │
│ study (Recorded)             │      ┌──────────────────────────────┐
│ n=3033                       │─────▶│ *Unreachable and ineligible   │
└─────────────────────────────┘      │ n=75                          │
              │                       └──────────────────────────────┘
              ▼
┌─────────────────────────────┐
│ Participants eligible for    │
│ the Y6FU (Recalled)          │      ┌──────────────────────────────┐
│ n= 2958                      │─────▶│ Eligible and contacted but    │
└─────────────────────────────┘      │ refused n= 82                 │
              │                       │ Eligible and unreachableᵃ     │
              │                       │ n=1334                        │
              ▼                       └──────────────────────────────┘
┌─────────────────────────────┐
│ Participants in the Y6FU     │
│ study                        │      ┌──────────────────────────────┐
│ n=1542                       │─────▶│ Non-respondersᵇ               │
└─────────────────────────────┘      │ n=440                         │
              │                       └──────────────────────────────┘
              ▼
┌─────────────────────────────┐
│ Participants with recalled   │
│ and recorded breastfeeding   │      ┌──────────────────────────────┐
│ data.                        │─────▶│ Participants still            │
│ n=1102                       │      │ breastfeeding at the end of   │
└─────────────────────────────┘      │ IFPS2 (baseline) study and    │
              │                       │ for whom breastfeeding        │
              ▼                       │ duration was imputed          │
┌─────────────────────────────┐      └──────────────────────────────┘
│ Participants with complete   │
│ recalled and recorded        │
│ breastfeeding data after     │
│ imputation.                  │
└─────────────────────────────┘
```

*Mother lived in a State where mail service was stopped due to the Gulf Coast hurricanes in 2005, infant died or had an illness that prevented breastfeeding.

ᵃ Unreachable due to a previous request to be removed from the mailing list, a change of address, non-working phone number and unavailability of respondent by phone.

[b] Non-responders included 315 with no recall breastfeeding duration data and 125 women who were breastfeeding at their last survey but left the study before month 12.

[c] Breastfeeding duration was imputed for participants who had responded to the final (month 12) survey and were still breastfeeding at the end of the study. The median breastfeeding duration for these mothers (n=246) at year 6 recall was used.

[d] The breastfeeding duration data was deemed complete if it had a recorded entry of either having been breastfed or never breastfed.

Table 1B: Maternal and Child Characteristics of Responders and Non-responders			
Variables	Responders[a](n=1102	Non-responders[b](n=440)	P-value[c]
Maternal characteristics[d]			
Age at study entry, yrs, mean (SD)[e]	30.5(5.2)	28.94 (5.4)	<0.0001
Pre-pregnancy BMI, kg/m2, n (%)			
0<BMI<18.5	40 (3.6)	25 (5.7)	
18.5<=BMI<=24.9	456 (41.4)	208 (47.3)	
24.9<BMI<=29.9	293 (26.6)	113 (25.7)	
BMI>29.9	299 (27.1)	89 (20.2)	
Unknown	14 (1.3)	5 (1.1)	0.019
Smoking, n (%)			
No	956 (86.8)	394 (89.6)	
Yes	146 (13.3)	46 (10.5)	0.133
Employment n (%)			
Employed	673 (64.2)	229 (56.8)	
Unemployed	376 (35.8)	174 (43.2)	
Unknown	53 (4.8)	37 (8.4)	0.001
Marital Status n (%)			
Married/cohabiting	901 (85.7)	97 (86.6)	
Unmarried	150 (14.3)	15 (13.4)	
Unknown	51 (4.6)	13 (10.4)	0.022
Parity n (%)			
Primiparous	297 (27)	132 (30)	0.228
Multiparous	805 (73.1)	308 (70)	
Education n (%)			
Not a High School Grad	15(1.4)	9 (2.2)	
High School grad	117 (11.1)	54 (13.2)	
Some College	395 (37.6)	162 (39.5)	
College and beyond	523 (49.8)	185 (45.1)	
Unknown	52 (4.7)	30 (6.8)	0.170
Race/Ethnicity n (%)			
White	941 (85.4)	370 (84.1)	
Black	39 (3.5)	17 (3.9)	
Hispanic	56 (5.1)	28 (6.4)	
Other	66 (6.0)	25 (5.7)	0.764
Infant characteristics[f]			
Birth weight, lb, mean (SD)	7.7 (1.0)	7.6 (1.2)	0.114
Gender, n (%)[g]			
Boy	542 (49.3)	228 (51.8)	
Girl	558 (50.7)	212 (48.2)	0.367

Abbreviations': SD, standard deviation; BMI, body mass index; IQR, interquartile range.

[a] Responders with recorded and recalled breastfeeding duration data.

[b] Non-responders include 315 with no recall breastfeeding duration data and 125 women who were breastfeeding at their last survey but left the study before month 12.

[c] *P*-value assessed using Chi-square test (categorical data) and independent samples t-test or the Wilcoxon-Mann-Whitney test (non-parametric for continuous data).

[d] Variables reported from recalled data set/Y6FU except for age, bmi, race/ethnicity and parity which are from the recalled data set. Continuous variables presented as mean (SD) or median (IQR), categorical variables presented as n (%).

[e] Missing data for maternal age at year 6: n=3

[f] Variables from the recorded data set/IFPS2.

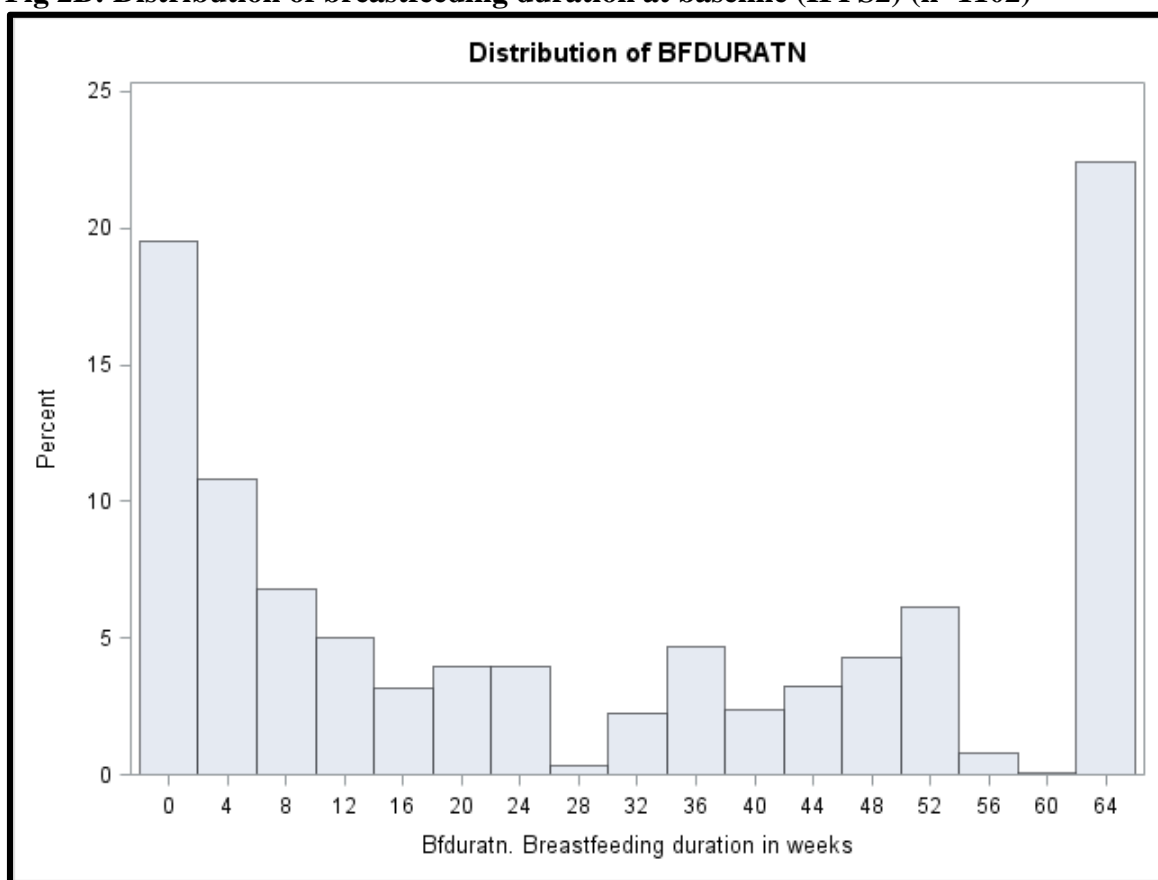[g] Missing data for the variable gender: n=2

Fig 2B: Distribution of breastfeeding duration at baseline (IFPS2) (n=1102)
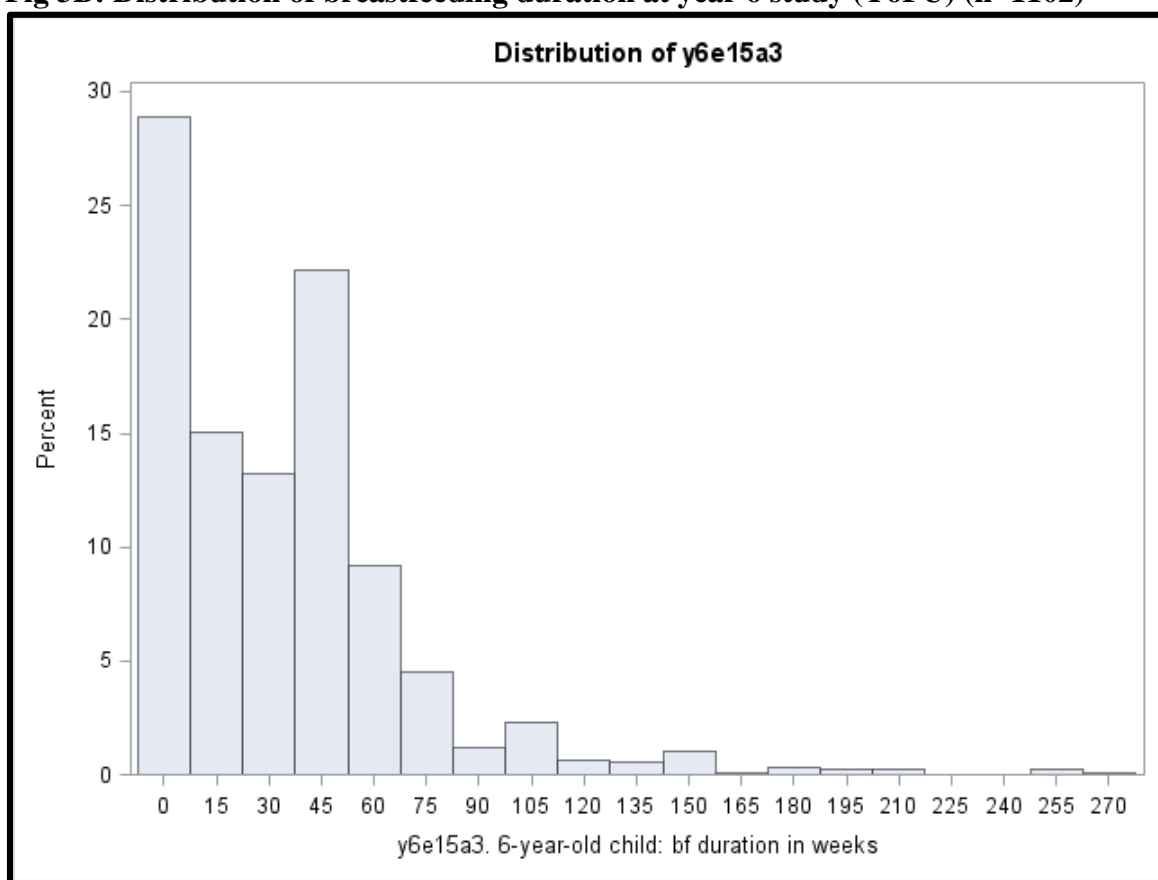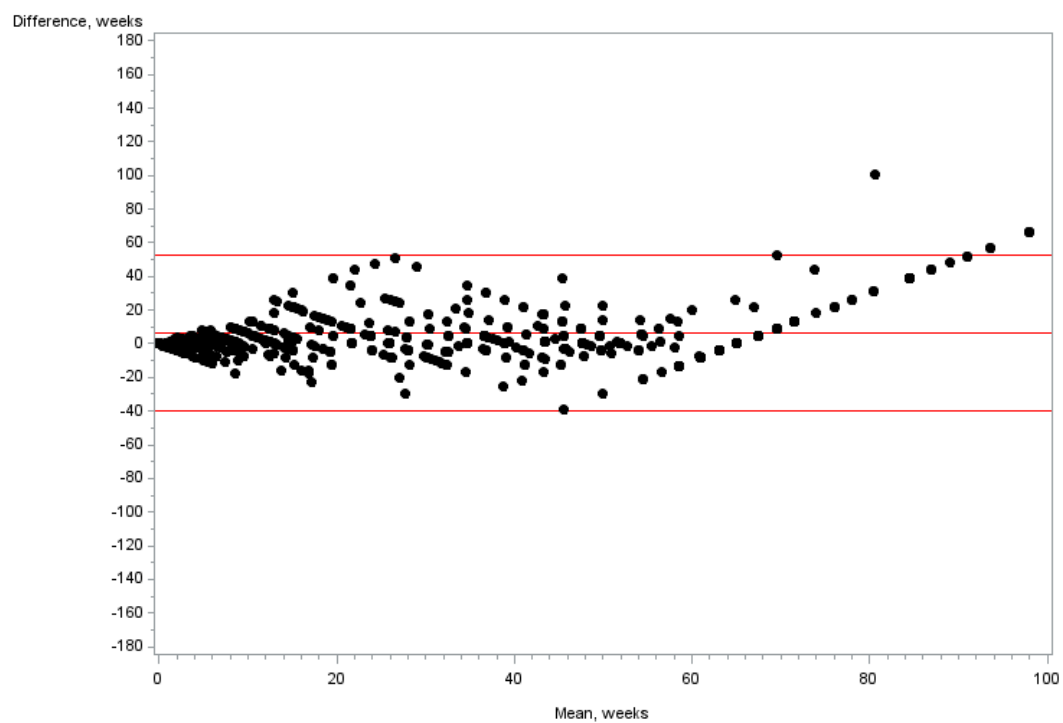
Fig 3B: Distribution of breastfeeding duration at year 6 study (Y6FU) (n=1102)

Fig 4B: Bland-Altman Plot

difference in breastfeeding duration, weeks(recalled-recorded) vs. the mean of the two breastfeeding duration, weeks (n=1102)Limits of agreement: Mean ± 2SD, 6.1 ± 2*23.1

Table 2B: Comparison of recorded and recalled breastfeeding duration and recall error by socio-demographic characteristics (n=1102)

	n	Recorded Median(IQR)	Recalled Median(IQR)	Median diff (IQR) ‡	Under-estimation > 1 month n(%)	Over-estimation > 1 month n (%)		ICC
		Breastfeeding duration			**Recall error**			
All mothers	1102	25.8 (47.6)	26 (48)	0.2 (7.4)*	163 (14.8)	350 (31.8)	<0.0001[†]	0.72
Socio-demographic Variables								
Maternal Characteristics[a]								
Maternal Age at year 6 (yrs)[b]								
23-30	68	6 (23)	13 (29.5)	0.7 (8.8)*	7 (10.3)	24 (35.3)		0.61
30-35	277	21.5 (51.9)	26 (46)	0.2 (8)*	38 (13.72)	85 (30.7)		0.81
35-40	400	22.18 (48.6)	26 (49)	0 (7.81)*	60 (15)	114 (28.5)		0.83
>=40	353	34.4 (57)	30 (51)	0.2 (9.3)*	58 (16.4)	124 (35.1)	0.289[†]	0.62
Employment								
Employed	673	17.2 (46.9)	26 (50)	0 (6.4)*	93 (13.82)	209 (31.1)		0.75
Unemployed	376	34.4 (59)	39 (48)	0.3 (11.6)*	60 (16.0)	127 (33.8)		0.67
Unknown	53	21.5 (47.6)	26 (44)	0.2 (7.8)	10 (18.9)	14 (26.4)	0.475[†]	0.72
Marital Status				.				
Married/cohabiting	901	30.1 (51.6)	30 (45)	0.2 (8.4)*	141 (15.7)	294 (32.6)		0.72
Unmarried	150	4.7 (25.8)	7.5 (30)	0 (5)*	13 (8.7)	42 (28.0)		0.72
Unknown	51	21.5 (47.6)	26 (44)	0.2 (7.8)	9 (17.7)	14 (27.5)	0.062[†]	0.71
Education								
Not a High School Grad	15	7.3(47.3)	17 (44)	0 (31.9)	1 (6.7)	6 (40)		0.82
High School grad	117	10.1 (38)	16 (48)	0 (7)*	15 (12.8)	35 (29.9)		0.79
Some College	395	13 (45.3)	22 (50)	0 (8)*	45 (11.4)	132 (33.4)		0.76
College and beyond	523	34.4 (54.6)	39 (48)	0.2 (8)*	92 (17.6)	163 (31.2)		0.68
Unknown	52	21.5 (47.3)	26 (42)	0.1 (8.2)	10 (19.2)	14 (26.9)	0.281[†]	0.71
Race/Ethnicity								
White	941	25.8 (48.6)	26 (52)	0 (7)*	140 (14.9)	289 (30.7)		0.74
Black	39	8.0 (38.1)	17 (39)	0 (12.7)	5 (12.8)	13 (33.3)		0.81
Hispanic	56	12.5 (31.6)	17 (38.5)	3.5 (10.3)*	4 (7.1)	26 (46.4)		0.68
Other	66	27.2 (53)	26 (46)	0.3 (12.3)	14 (21.2)	22 (33.3)	0.132[†]	0.57
Poverty Index								
Poorest	228	8.5 (50.6)	17 (52)	0 (8)*	27 (11.8)	71 (31.1)		0.73
Some what Poor	634	25.8 (57)	28 (50)	0.2 (9)*	103 (16.3)	213 (33.6)		0.71
Not poor	240	25.8 (44.8)	26 (44)	0.2 (6.5)*	33 (13.8)	66 (27.5)	0.108[†]	0.76
Smoking								
No	956	30.1 (51.9)	30 (46)	0.2 (7.7)*	148 (15.5)	305 (31.9)		0.72
Yes	146	4 (17.2)	8.5 (26)	0 (7)*	15 (10.2)	45 (30.8)	0.192[†]	0.69
Parity								
Primiparous	297	21.43 (47.6)	26 (48)	0.4 (7)*	39 (13.1)	83 (28.0)		0.66
Multiparous	805	25.8 (48.3)	26 (48)	0 (8)*	124 (15.4)	267 (33.2)	0.086[†]	0.75
Number of Children per mother[c]								
1	466	23.5 (49.6)	26 (49)	0 (6.8)*	74 (15.9)	137 (29.4)		0.80
2	210	28 (47.6)	35 (43)	0.4 (9.9)*	30 (14.3)	76 (36.2)		0.80
3	72	28 (60)	30.5 (56)	0.1 (10.2)*	11 (15.3)	29 (40.3)		0.70
>=4	43	47.3 (57)	44 (87)	4.2 (40)*	7 (16.3)	21(48.8)	0.082[†]	0.49
WIC Participation								
Yes	357	10.0 (45.3)	17 (48)	0 (8)*	37 (10.6)	118 (33.1)		0.74
No	745	30.1 (56)	35 (44)	0.2 (7.9)*	100 (13.4)	232 (31.14)	0.341	0.71
Infant Characteristics[d]								
Gender[e]								
Boy	542	25.8 (47.6)	26 (48)	0.2 (6.9)*	80 (14.8)	169 (31.2)		0.74
Girl	558	23.6 (52)	26 (48)	0 (8)*	83 (14.9)	181 (32.4)	0.889[†]	0.71
Birth weight, (kg)								
2-4 (Normal)	936	21.5 (47.6)	26 (48)	0 (7.8)*	148 (15.8)	294 (31.4)		0.73
>4 (Above normal)	152	34.4 (52.9)	37 (49.1)	0.4 (9)*	14 (9.2)	54(35.5)	0.097[†]	0.68

Abbreviations: IQR, interquartile range; ICC=Intra-class correlation coefficient.

[†] Chi-square Test. Percentages for over and under reporting don't equal 100 because the remaining percentage equals accurate recall.

* Significant Wilcoxon signed rank *p*- values.

[‡] Median Difference (weeks) = recalled- recorded

[a] Variables reported from recalled data set/Y6FU except for race/ethnicity, poverty level and parity which are from the recalled data set.

[b] Missing data for maternal age at year 6: n=3

[c] n=311 represent nulliparous women.

[d] Variables from the recorded data set/IFPS2.

[e] Missing data for the variable gender: n=2

Table 3B: Unadjusted and Adjusted Odds Ratios of Socio-demographic Determinants of Accurate Recall of Breastfeeding Duration (n=1102)

Table 3B: Unadjusted and Adjusted Odds Ratios of Socio-demographic Determinants of Accurate Recall											
						Logistic Regression Analysis					
	Crude			Adjusted Model 1*			Adjusted Model 2*			Adjusted Model 3*		
Socio-demographic Variables												
	Odds Ratio	90% C.I.[†]	p-value[‡]	Odds Ratio	95% C.I.[†]	p-value[‡]	Odds Ratio	95% C.I.[†]	p-value[‡]	Odds Ratio	95% C.I.[†]	p-value[‡]
Maternal Characteristics[a]												
Maternal Age at year 6 (yrs)[b]												
23-30 (Reference)	1	---		1	---					1	---	
30-35	1.05	(0.7-1.6)		1.41	(0.8-2.5)					1.31	(0.8-2.3)	
35-40	1.09	(0.7-1.7)		1.50	(0.8-2.7)					1.41	(0.8-2.5)	
>=40	0.79	(0.5-1.2)	0.134	1.05	(0.6-1.9)	0.069				1.01	(0.6-1.8)	0.112
Employment												
Employed (Reference)	1.22	(1.0-1.5)	0.313	1.21	(0.9-1.6)	0.265						
Unemployed	1	---		1	---							
Unknown	1	(0.7-1.9)		1	(0.07-3.6)							
Marital Status												
Married/cohabiting (Reference)	1	---		1	---		1	---				
Unmarried	1.61	(1.2-2.2)		1.54	(1.0-2.3)		1.59	(1.1-2.3)				
Unknown	1.14	(0.7-1.8)	0.0312	6.91	(0.4-135)	0.052	1.22	(0.7-2.2)	0.039			
Education												
Not a High School Grad (Reference)	1	---		1	---					1	---	
High School grad	1.17	(0.5-2.9)		1.1	(0.4-3.4)					1.25	(0.4-3.7)	
Some College	1.08	(0.5-2.6)		1.01	(0.3-3.0)					1.17	(0.4-3.3)	
College and beyond	0.92	(0.4-2.2)		0.85	(0.3-2.5)					0.97	(0.3-3.8)	
Unknown	1.02	(0.4-2.7)	0.701	0.35	(0.03-4.6)	0.635				1.06	(0.3-3.4)	0.669
Race/Ethnicity												
White (Reference)	1	---		1	---							
Black	0.98	(0.6-1.7)		0.83	(0.4-1.6)							
Hispanic	0.73	(0.5-1.1)		0.68	(0.4-1.2)							
Other	0.70	(0.5-1.1)	0.371	0.67	(0.4-1.1)	0.258						
Poverty Index												
Poorest (Reference)	1	---		1	---		1	---		1	---	
Some what Poor	0.76	(0.6-1.0)		0.82	(0.6-1.2)		0.81	(0.6-1.1)		0.79	(0.6-1.1)	
Not poor	1.07	(0.8-1.5)	0.037	1.22	(0.8-1.9)	0.046	1.17	(0.8-1.7)	0.046	1.16	(0.8-1.8)	0.043
WIC Participation												
Yes (Reference)	1	---		1	---					1	---	0.612
No	0.87	(0.7-1.1)	0.291	0.93	(0.7-1.3)	0.804				1.12	(0.7-1.7)	
Smoking												
No (Reference)	1	---		1	---					1	---	
Yes	1.3	(1.0-1.7)	0.157	1.17	(0.8-1.7)	0.432				1.22	(0.8-1.8)	0.309
Parity												
Primiparous (Reference)	1	---		1	---					1	---	
Multiparous	0.74	(0.6-0.9)	0.027	0.77	(0.6-1.0)	0.091				0.74	(0.6-1.0)	0.047
Infant Characteristics[c]												
Gender[d]												
Boy (Reference)	1	---		1	---					1	---	
Girl	0.95	(0.8-1.2)	0.649	0.92	(0.7-1.2)	0.519				0.94	(0.7-1.2)	0.64
Birth Weight, kg												
2-4 (Normal) (Reference)	1	---		1	---					1	---	
>4 (Above normal)	1.08	(0.8-1.5)	0.683	1.11	(0.8-1.6)	0.578				1.11	(0.8-1.6)	0.559
				HL GOF test[ϕ]: 0.50			HL GOF test[ϕ]: 0.68			HL GOF test[ϕ]: 0.92		

[†] C.I. Confidence interval

[‡] Wald p-value

* Model 1: Fully adjusted model
* Model 2: Reduced model
* Model 3: Apriori model included all variables which had been stated from literature to be associated with accuracy of breastfeeding duration
ᵠ: Hosmer-Lemeshow goodness of fit test (p-value)
[a] Variables reported from recalled data set/Y6FU except for race/ethnicity, poverty level and parity which are from the recalled data set.
[b] Missing data for maternal age at year 6: n=3
[c] Variables from the recorded data set/IFPS2.
[d] Missing data for the variable gender: n=2