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Hypothetical Willingness-to-Pay for Lipid-Based Nutrient Supplements and Micronutrient Powders for Children in Bangladesh

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April 2018

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This report is made possible by the generous support of the American people through the support of the Office of Maternal and Child Health and Nutrition, Bureau for Global Health, U.S. Agency for International Development (USAID) under terms of Cooperative Agreement No. AID-OAA-A-12-00005, through the Food and Nutrition Technical Assistance III Project (FANTA), managed by FHI 360.

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April 2018

Recommended Citation

Cummins, Joseph; Gunadi, Christian; Vosti, Stephen A.; et al. 2018. *Hypothetical Willingness-to-Pay for Lipid-Based Nutrient Supplements and Micronutrient Powders for Children in Bangladesh.* Washington, DC: FHI 360/FANTA.

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Abbreviations and Acronyms

CHDP	Community Health and Development Program
CHW	community health worker
FANTA	Food and Nutrition Technical Assistance III Project
hWTP	hypothetical willingness to pay
IFA	iron/folic acid
LNS	lipid-based nutrient supplement(s)
LNS-C	lipid-based nutrient supplement(s) for children
LNS-PLW	lipid-based nutrient supplement(s) for pregnant and lactating women
MNP	micronutrient powder(s)
RDNS	Rang-Din Nutrition Study
SDU	safe delivery unit
SUN	Scaling Up Nutrition
USAID	U.S. Agency for International Development
VHV	village health volunteer
WTP	willingness to pay

1 Introduction

Approximately 155 million children worldwide are stunted[1] (UNICEF 2017), including 36% of Bangladeshi children under the age of 5 (DHS 2014). Early-life stunting can have long-term consequences for adult health and economic productivity (Dewey and Begum 2011; Almond and Currie 2011). Beyond stunted physical growth, there are cognitive and behavioral developmental delays associated with undernutrition in early life (Hoddinott et al. 2008; Prado et al. 2016).

Chronic nutrient deficiency in early life is considered one of the main drivers of child stunting, along with infections (Dewey 2016). But even small, well-timed investments in improved child nutrition may yield high returns (Shekar et al. 2016; Hoddinott et al. 2008). Household expenditures on maternal and child nutrition, including nutritional supplements, may have long-lasting impacts on a child's full life course if they improve the child's developmental trajectory. But households can make economically optimal decisions regarding such investments only if they understand the benefits of improved nutrition on a child's future health and labor market outcomes (Dupas 2011; Glewwe and Miguel 2008).

Two critical questions for economists related to overcoming the challenge of childhood undernutrition are the extent to which households want (in terms of beliefs) to invest in reducing nutrient deficiencies among children and whether markets are able to provide households the ability (in the form of monetary resources, e.g., loans to cover the costs of nutrition supplements) to correct for such deficiencies. If decision makers within households systematically undervalue health inputs relative to their true long-term benefits, then they will rationally underinvest in child nutrition, and no fully functioning market system can lead to the socially optimal provision of nutritional inputs. And even if resource-poor households fully understand the importance of providing optimal nutrition to their children, if they simply cannot afford to do so due to low income or lack of access to credit markets, it is impossible for an unsubsidized free market, in the form of private purchases of nutritional supplements from local stores, to greatly influence child nutritional intake, at least in the short term. For these reasons, it is useful to develop a deeper understanding of the factors associated with household decision makers' valuations of products that have the potential to improve child health.

In this report, we briefly describe an economic conceptual model of stated hypothetical willingness to pay (hWTP) for nutritional inputs and focus on decision makers' expected returns to investments in improved nutrition. We then investigate, along two dimensions, the household valuation of daily use small-quantity lipid-based nutrient supplements (LNS) for pregnant and lactating women (LNS-PLW) and of LNS for children (LNS-C) and multiple micronutrient powders (MNP) for children during the first 2 years of life.[2] The first dimension examines the *levels* of hWTP for LNS and MNP *at given points in a child's development*. The second dimension analyzes the effects on stated hWTP of the random assignment to provision of LNS-PLW or iron and folic acid (IFA) for women and LNS-C, MNP, or no supplement for children, and how experience with[3] the products might alter the perceived value of these supplements to caregivers and heads of households over time. The research was conducted as part of the Rang-Din

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[1] "Stunted" is defined as having attained height below −2 standard deviations of median height-for-age based on the World Health Organization (WHO) child growth standards.

[2] The intervention we investigated also included provision of iron and folic acid (IFA) tablets to women during pregnancy, but these were provided as standard of care to women who did not receive LNS-PL, and we did not collect hWTP information on these supplements.

[3] The term "experience with" refers to having been given the product for a period of time due to assignment to a treatment arm provided with that product.

Nutrition Study (RDNS), a cluster-randomized, controlled trial of the effectiveness of LNS for preventing undernutrition of pregnant and lactating women and their children (Dewey et al. 2017).

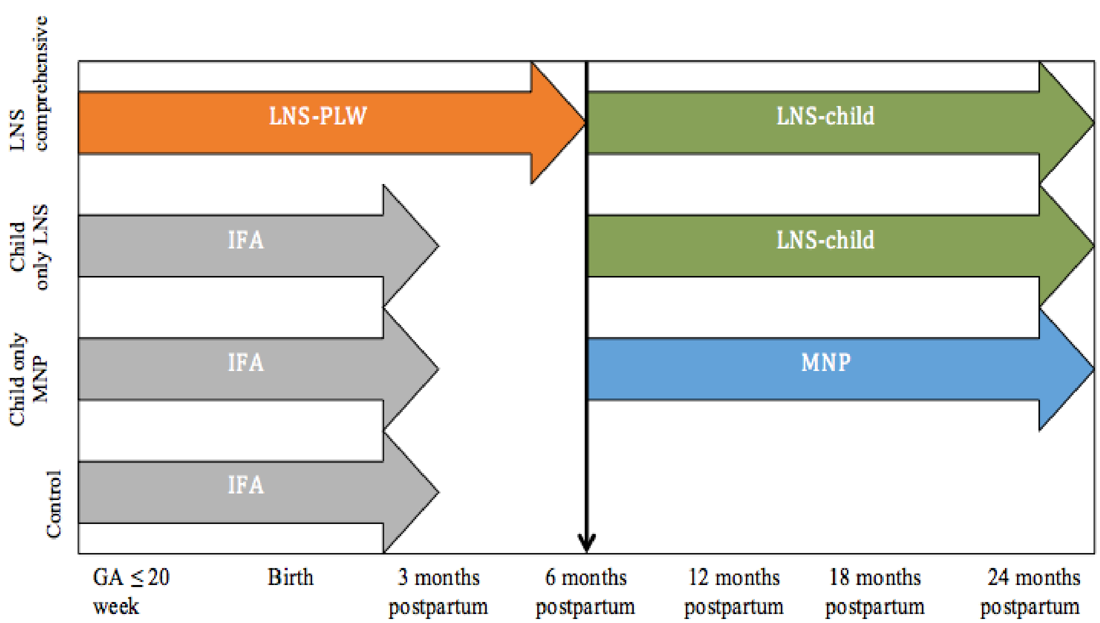
In the next section, we provide details on the RDNS and on the hWTP data collection activities, followed by a description of the statistical analysis used in the estimation. Section 3 presents the results, and Section 4 provides a discussion about those results. The report concludes with a section on key messages.

2 Participants and Methods

2.1 The Rang-Din Nutrition Study

The RDNS was a cluster-randomized, controlled trial with four arms. Women in the first arm (Comprehensive LNS or LNS-LNS) received LNS-PLW daily during pregnancy and for the first 6 months postpartum, and their children received LNS-C daily from 6 to 24 months of age. Women in the second arm (Child-Only LNS or IFA-LNS) received IFA daily during pregnancy and every other day in the first 3 months postpartum, and their children received LNS-C daily starting at 6 months of age and continuing until they were 24 months of age. Women in the third arm (Child-Only MNP or IFA-MNP) received IFA daily during pregnancy and every other day for the first 3 months postpartum, and their children received MNP daily from 6 months to 24 months of age. Women in the fourth arm (Control or IFA-Control) received IFA daily during pregnancy and on an every other day basis during the first 3 months postpartum, and no additional supplements were provided to their children.[4] The randomization process and experimental arms are represented in **Figure 1**.

Figure 1. Structure of the RDNS Effectiveness Trial



LNS-PLW, lipid-based nutrient supplement designated for pregnant and lactating women; LNS-child, lipid-based nutrient supplement designed for children; IFA, iron and folic acid; MNP, micronutrient powder; GA, gestational age

[4] While the distribution of IFA tablets to pregnant women is the suggested standard of care in Bangladesh, in practice, IFA tablets are not distributed at no cost to women, but rather are made available for purchase at safe delivery units (SDUs). Hence, the RDNS "control" group is not representative of the current standard of care.

A cluster was defined as the supervision area of a community health worker (CHW) of the Community Health and Development Program (CHDP) run by the LAMB project (formally known as Lutheran Aid to Medicine in Bangladesh). Each cluster covered a population of roughly 2,500–6,000 individuals and had 3–6 village health volunteers (VHVs) to assist the CHW. Sixty-four clusters in two districts (Rangpur and Dinajpur) of northwestern Bangladesh were randomly assigned to one of the four study arms.

2.2 Data Collection Timeline

The hWTP data were collected in two phases, using two separate subsamples of RDNS participants (mothers/caregivers) and heads of households. Choice of respondent was determined randomly between the RDNS participant and the head of her household. We collected data on hWTP for LNS-PLW from a random subsample from each of the study arms of households at enrollment and again at 42 days postpartum. Data on hWTP for LNS-C and MNP were collected at 6 months postpartum from a new random subsample of households and again from these same households when index children reached 24 months of age. This was done primarily to limit respondent burden, since the hWTP module added significant time to the household visit. The total enrollment for the RDNS was 4,011. We aimed for subsamples that represented approximately 30% of those enrolled, after accounting for attrition. The number of women who completed the hWTP interview for each round and treatment group can be seen in **Table 1**. The hWTP subsample for the LNS-PLW group consisted of 1,394 women enrolled at baseline, of whom 1,164 also completed the follow-up at 42 days postpartum. The hWTP subsamples for LNS-C and MNP were 1,118 at 6 months postpartum, of whom 1,047 also completed the follow-up when their children reached 24 months of age.

Data on household characteristics were collected at enrollment. For our analysis, we used information on household food insecurity; asset ownership; parental age and education; and demographic characteristics, such as whether there were children under 5 in the household and whether the household was comprised of a joint or a nuclear family.

2.3 Contingent Valuation and hWTP

We used a contingent valuation method to solicit hWTP for LNS-PLW, LNS-C, and MNP (e.g., see Adams et al. 2016). Through a series of questions designed to avoid biasing respondents toward any particular value, this method elicits the highest price they are willing to pay for a product. This price, the maximum hWTP, is then interpreted as the expected utility benefit (in takas) to the household of consuming this product, net of any unmeasured household costs (e.g., time spent mixing foods) or unmeasured effects, positive or negative (e.g., increased nausea during pregnancy). This expected utility is based on respondents' perceptions of the short- and long-term benefits of consumption of the product that households expect to realize through improved maternal and child health and from expected improved labor market outcomes over children's lifespans. If household decision makers believe that LNS-PLW, LNS-C, or MNP is likely to have larger (smaller) benefits for their children and their families, they will be willing to pay higher (lower) prices for the product.

However, since the economic returns to improved nutrition are generally unknown (even or especially to those conducting this experiment), households have only imperfect beliefs about the potential benefits of LNS and MNP. We thus interpreted hWTP by households as the perceived expected value of improved maternal and child nutrition. There is extensive literature using contingent valuation for soliciting hWTP for unknown health products, including Onwujekwe et al. (2001) and Bhatia et al. (2004) in Nigeria and India, respectively, for insecticide-treated bed nets, Cropper et al. (2004) in Ethiopia for a hypothetical malaria vaccine, and Gustafsson-Wright et al. (2009) in Nigeria for health insurance. It should be noted, however, that as no transactions took place during the solicitation process, respondents could choose not to reveal their true willingness to pay (WTP), so that hWTP based on contingent valuation method might be a poor predictor of *actual* WTP (e.g., Diamond and Hausman 1994; Bratt 2010).

2.4 Measurement of hWTP

Baseline hWTP for LNS-PLW was solicited at study enrollment (mean of 13 weeks gestation) and then again from the same respondent at or near 42 days postpartum. Participants were first asked whether they would pay *any* amount to purchase the supplement if it were available at a shop within walking distance of their home. They were then asked a series of eight "yes/no" questions like "Would you be willing to pay *X* takas for one sachet of LNS-PLW?" These questions were asked using one of three different randomly drawn survey instruments with the eight prices proffered in different orders in each version. The enumerator then asked "What is the largest amount you would be willing to pay for one day's worth of the supplement?" This was followed by asking the respondents how much they would be willing to pay for the supplement *every day* of pregnancy and for the first 6 months postpartum. The responses were cross-validated with the preceding questions at the time of interview.[5] For convenience, we refer to data regarding one day's supplements as WTP for "one-time" use and to data for repeated use of supplements over the period in question as WTP for "repeated use."

A similar method was used for soliciting hWTP for LNS-C and MNP. Baseline hWTP for these supplements for use by the study children was collected when children reached 6 months of age, from a different subsample of the RDNS population than those interviewed regarding hWTP for LNS-PLW. Follow-up data were collected when children reached 2 years of age on the same, second subsample. The same method was used for soliciting hWTP for LNS-C and MNP as that used for LNS-PLW. Households in this subsample answered questions regarding both LNS-C and MNP regardless of which treatment arm they were assigned to, so that measures of hWTP for both supplements are taken from the same respondents.

In addition to the questions related to hWTP, respondents were asked about either their preferred method of purchasing the supplements or their reasons for not wanting to purchase the supplement at any price. Specifically, if households reported positive hWTP, they were asked "How frequently would you prefer to buy [supplement]?" If households reported zero hWTP, they were asked "Why are you not willing to buy [supplement]?"

2.5 Empirical Methods

We examined two sets of outcome variables for each product separately: LNS-PLW, LNS-C, and MNP. The first set of outcomes relates to the prevalence of non-zero hWTP for each product. The second set relates to the effects of experience with one or another of the nutrition products on hWTP.

We first present summary results addressing the prevalence of non-zero hWTP for LNS and MNP. For each round and treatment arm, we compute the proportion of households willing to pay a non-zero amount for the supplement over the relevant period (both one-time and repeated use). We then compute average hWTP for each product and each treatment arm for each period. Throughout the analysis, we included households who reported no WTP—or zero hWTP—in the sample.

For the analysis of hWTP for LNS-C and MNP, we compared all four treatment arms separately at 6 and 24 months after the child was born. However, for the analysis of LNS-PLW, we compared households randomized into the LNS-PLW treatment arm to households in the three other arms combined into a

[5] Cross-validation ensured that maximum hWTP was not higher than the highest "yes/no" response and inconsistencies were noted, but this occurred in fewer than 5% of cases.

single “composite control” group. We did this because, prior to children reaching 6 months of age, all households in the other three treatment arms (IFA-LNS, IFA-MNP, and IFA-Control) received the same regimen of IFA supplementation for pregnant and postpartum women.

In addition to these quantitative summary estimates, we estimate the effects of exposure to nutritional supplements via randomization to treatment arm in the RDNS. Households that have experience with the supplements may revise their valuation of the product if consumption causes them to update their beliefs about the effectiveness of the supplement or the importance of child nutrition for long-term outcomes, and also update their beliefs regarding unmeasured costs and unintended effects.

Regression estimates for the effects of treatment arms are estimated using least squares with standard errors accounting for study design. Model covariates for least squares estimates of hWTP (whether non-zero or average hWTP) include respondent type (study participant or head of household), respondent age (continuous in years), respondent education (five categories), household asset index, square root of household food insecurity score, indicator for whether there were children under the age of 5 in the household at baseline, indicator for whether the household was composed of a joint or a nuclear family, and a series of dichotomous variables for 11 geographic unions. Standard errors account for clustering at the level of randomization of treatment assignment and allow for arbitrary within-cluster covariance of error terms. Tables report standard errors and plus signs and asterisks denote statistical significance level [+ (0.10); * (0.05); ** (0.01); ***(0.001)].

3 Results

We present results separately for LNS-PLW, LNS-C, and MNP. The results for LNS-PLW cover hWTP for pregnant and lactating women at study enrollment and at 42 days postpartum. The results for LNS-C and MNP cover hWTP for children at 6 months and 24 months of age.

3.1 Average hWTP

Table 1 presents the average hWTP for LNS-PLW, LNS-C and MNP at baseline (1) and endline (2), in Takas (US$1=70 Takas). Baseline for LNS-PLW is at enrollment, and endline is at 42 days postpartum. Baseline for LNS-C and MNP is at 6 months after birth and endline is at 24 months after birth.

Table 1. Average hWTP for LNS and MNP1

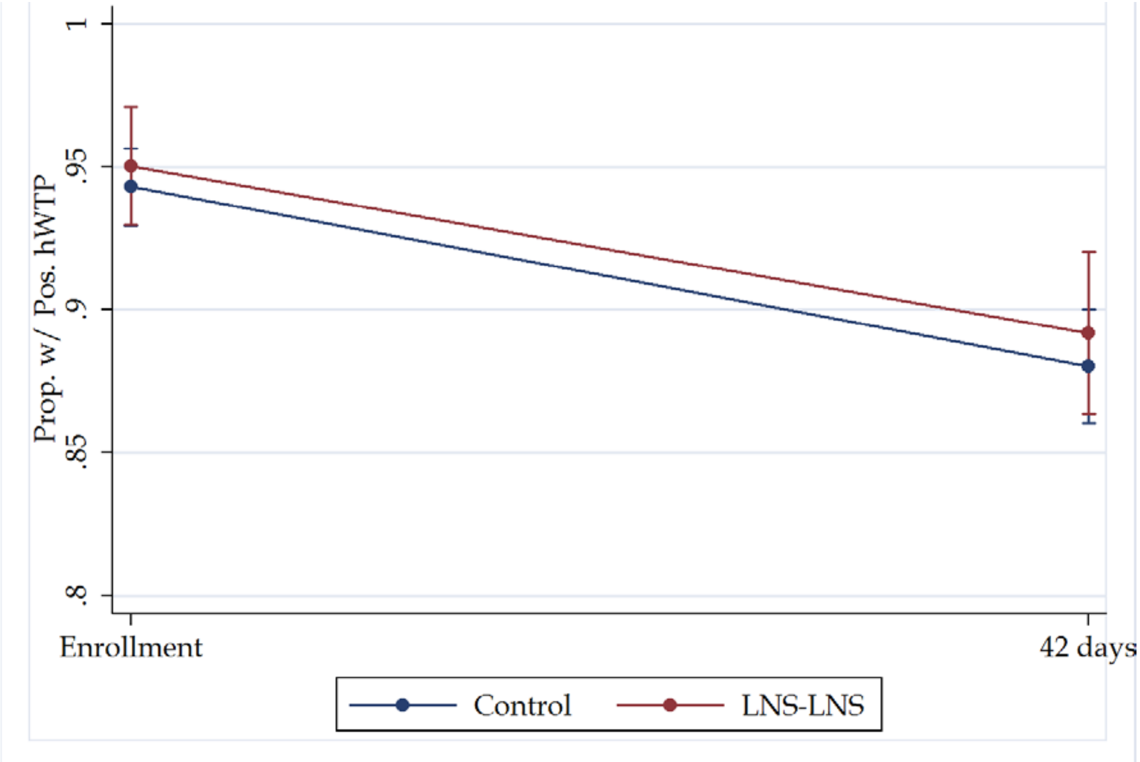
	Period	N	Mean	SD	% Positive hWTP	Endline-Baseline Mean Diff. p-value
Repeated	LNS-PLW 1	1,394	3.79	3.74	93%	0.00
	LNS-PLW 2	1,172	3.32	3.64	89%	
	LNS-C 1	1,118	3.67	3.15	91%	0.70
	LNS-C 2	1,159	3.77	2.89	92%	
	MNP 1	1,117	2.94	3.09	91%	0.04
	MNP 2	1,159	2.75	2.68	91%	
Once	LNS-PLW 1	1,394	6.44	6.17	95%	0.01
	LNS-PLW 2	1,174	5.64	5.63	88%	
	LNS-C 1	1,118	5.76	4.73	94%	0.00
	LNS-C 2	1,159	6.69	4.53	96%	
	MNP 1	1,118	5.11	4.86	97%	0.03
	MNP 2	1,159	5.58	4.81	96%	

Notes: Mean values are presented in Takas (US$1=70 Takas). "Repeated" refers to repeated use of supplements over the period in question, while "one-time" refers to respondents' hWTP for 1 day's use of supplements. The furthest column to the right provides p-values testing changes over time in mean hWTP.

3.1.1 LNS-PLW

Approximately 95% of households across both treatment arms (LNS-PLW and a composite control group of all the other arms) reported non-zero hWTP at baseline. That is, they answered "yes" to the question "If LNS-PLW is available at a shop within walking distance of your house, would you pay any money to purchase a 1-day supply, which is one sachet for yourself/the pregnant or lactating woman in your family?" **Figure 2** shows the proportion of households reporting non-zero hWTP, by treatment group, at enrollment and at 42 days postpartum. The mean proportion of households reporting positive hWTP decreased slightly, from just about 95% at baseline to just under 90% at follow-up.

Figure 2. Proportion of Respondents Reporting hWTP>0 for LNS-PLW



Mean hWTP for LNS-PLW across all households and survey rounds for repeated use was approximately 3.5 Takas (US$0.05). **Figure 3a** shows mean hWTP for repeated use of LNS-PLW by treatment group and survey rounds. The decrease in hWTP from enrollment to postpartum was of a similar magnitude for both the LNS-PLW and the composite control groups. Mean hWTP for one-time use of LNS-PLW was higher than for repeated use, around 6.5 and 5.6 Takas (US$0.08) at the baseline and endline, respectively (**Figure 3b**).

Figure 3a. hWTP for LNS-PLW (repeated)

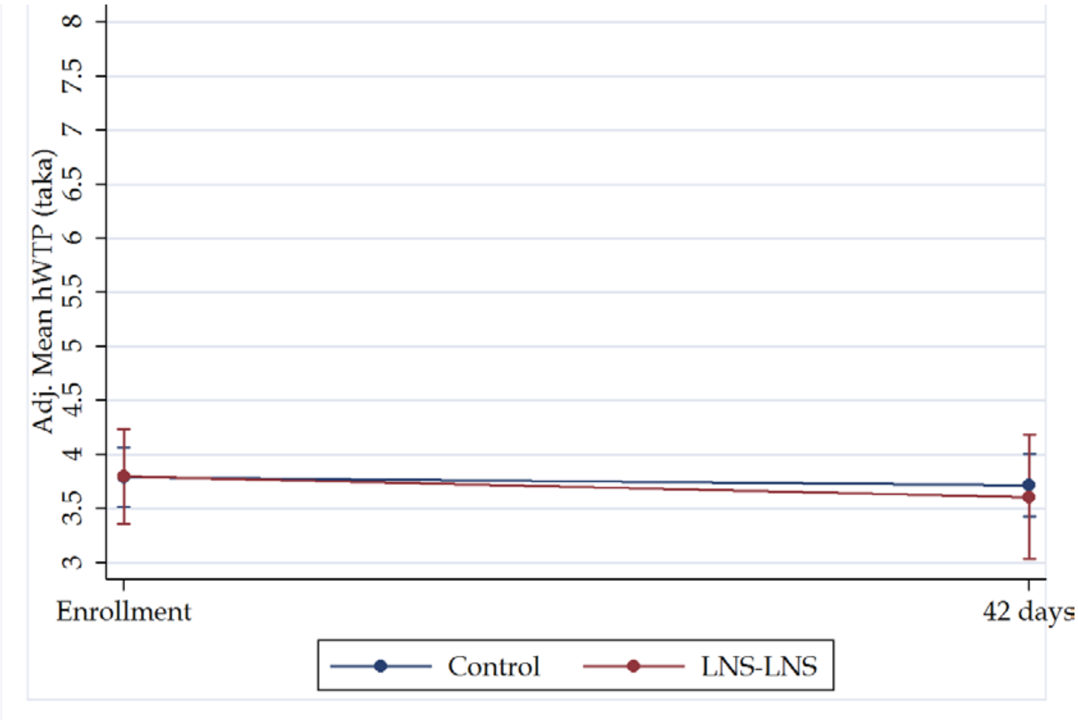
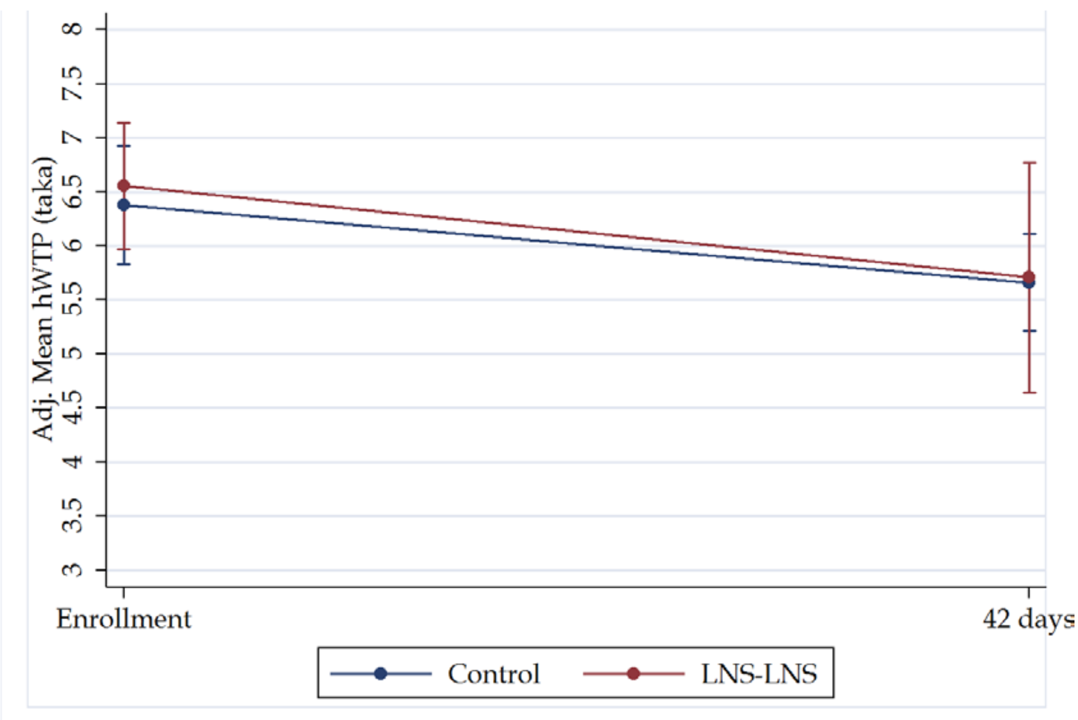


Figure 3b. hWTP for LNS-PLW (one-time)



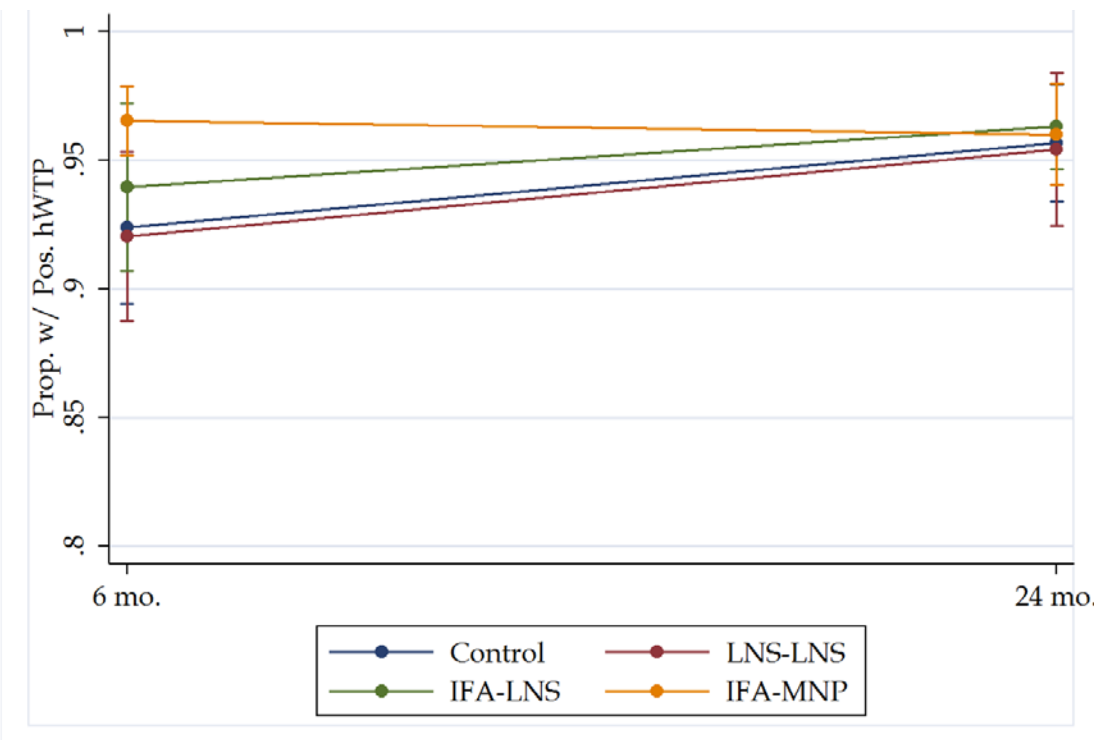
Respondents reporting positive hWTP and responding to our question regarding how often they would prefer to purchase LNS-PLW (N=971) generally preferred to buy either daily (35%) or weekly (50%). Relatively few households reported preferences for purchasing LNS-C either biweekly (6%) or monthly (9%).

Respondents reporting zero hWTP for LNS-PLW and who responded to our question regarding why they did *not* want to purchase it (N=138) overwhelmingly cited "does not have enough money" as their principal reason (86%). Other responses included "does not want it" (4%), "does not know about it" (5%), "fear of side effects" (2%), and "cannot make that decision" (3%). No respondent reported "does not understand why should I take it" or that they have "a belief against using it."

3.1.2 LNS-C

Similar to responses regarding LNS-PLW, approximately 92%–96% of respondents across all treatment arms (LNS-PLW, LNS-C, MNP, and IFA-Control) reported non-zero hWTP for LNS-C. That is, they answered "yes" to the question "If LNS-C is available at a shop within walking distance of your house, would you pay any money to purchase a 1-day supply, which is two sachets for a 6–24 month child in your family?" **Figure 4** shows the proportion of households reporting non-zero hWTP for repeated use separately by treatment arm. There were no clear patterns of changes in hWTP among the treatment arms.

Figure 4. Proportion of Respondents Reporting hWTP>0 for LNS-C



Mean (repeated use) hWTP for LNS-C for the entire sample was approximately 4 Takas (US$0.05). This was similar in magnitude to the mean reported hWTP for LNS-PLW for repeated use (**Figure 5a**). Mean hWTP for one-time use of LNS-C was again similar to that of LNS-PLW, about 6 Takas (US$0.07) at the 6-month visit and about 6.5 Takas (US$0.08) at the 24-month visit (**Figure 5b**).

Figure 5a. hWTP for LNS-C (repeated)

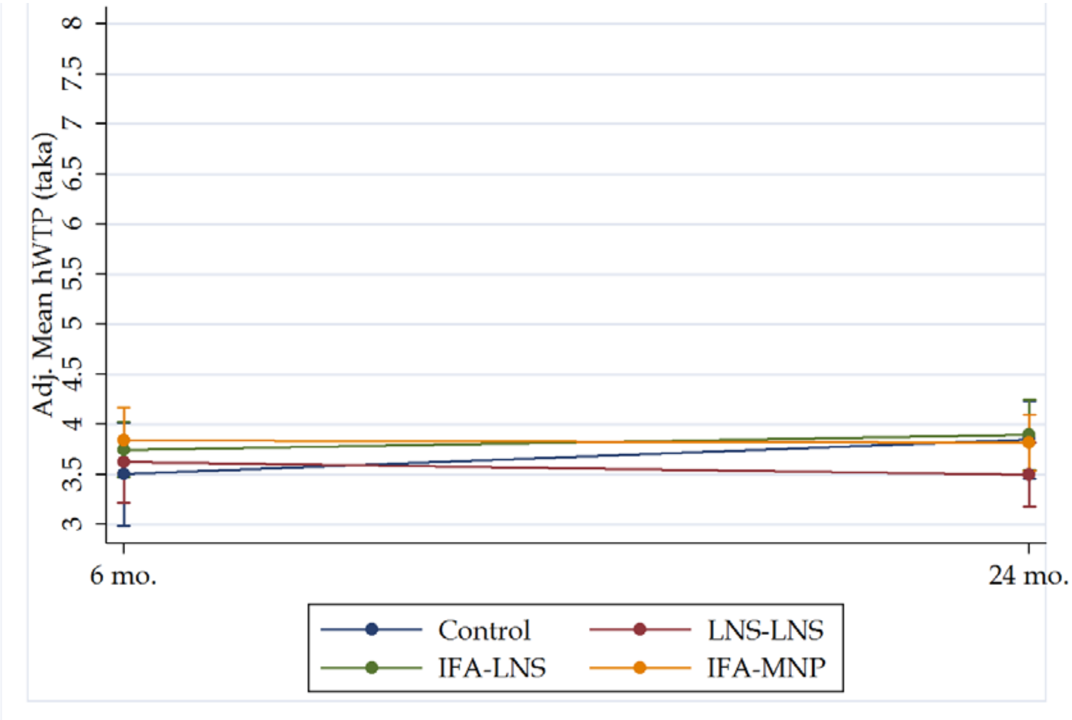
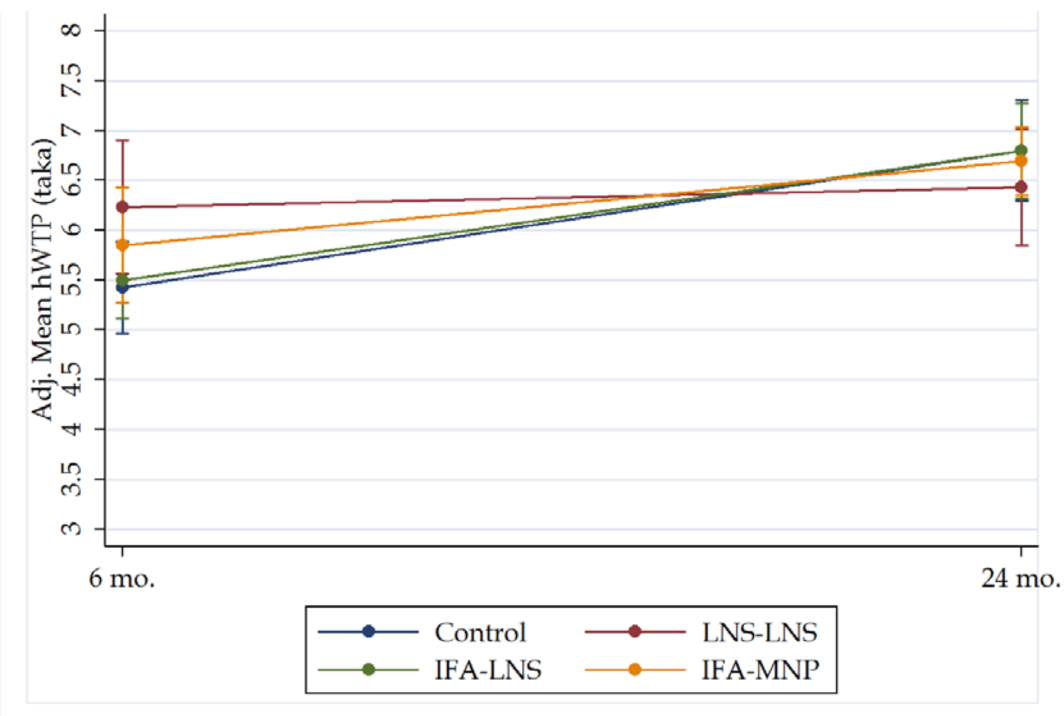


Figure 5b. hWTP for LNS-C (one-time)



Again similarly to LNS-PLW, most households with positive hWTP (N=1,025) preferred to purchase LNS-C daily (22%) or weekly (56%), with far fewer households reporting a desire to purchase the product biweekly (5%) or monthly (13%). As for households with zero hWTP (N=46), the vast majority reported that their decision was based on a lack of money (76%), with a few households reporting that they either did not know about the product (4%) or did not need it (10%).

3.1.3 MNP

More than 95% of households reported positive hWTP MNP at baseline (**Figure 6**). Mean hWTP for repeated use of MNP was slightly below that of LNS-C, at approximately 3 Takas (US$0.04) per day and was relatively similar across survey rounds (**Figure 7a**). hWTP for one-time use of MNP was again slightly higher than for repeated use (**Figure 7b**), approximately 5 Takas (US$0.07), which was slightly below the one-time use hWTP for the LNS products.

Figure 6. Proportion of Respondents Reporting hWTP>0 for MNP

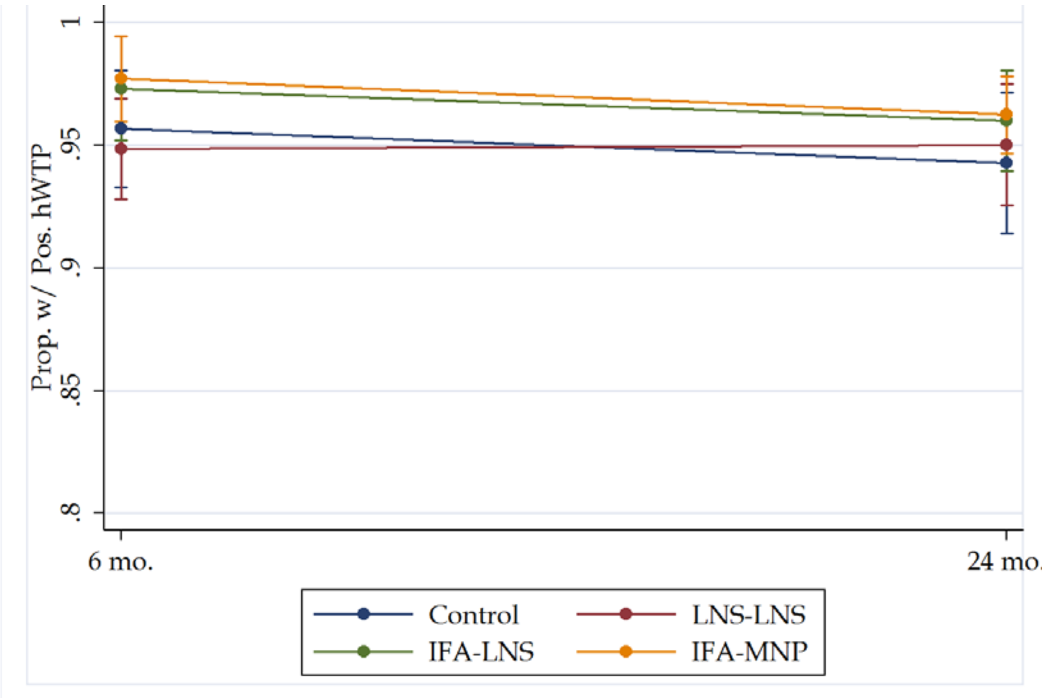


Figure 7a. hWTP for MNP (repeated)

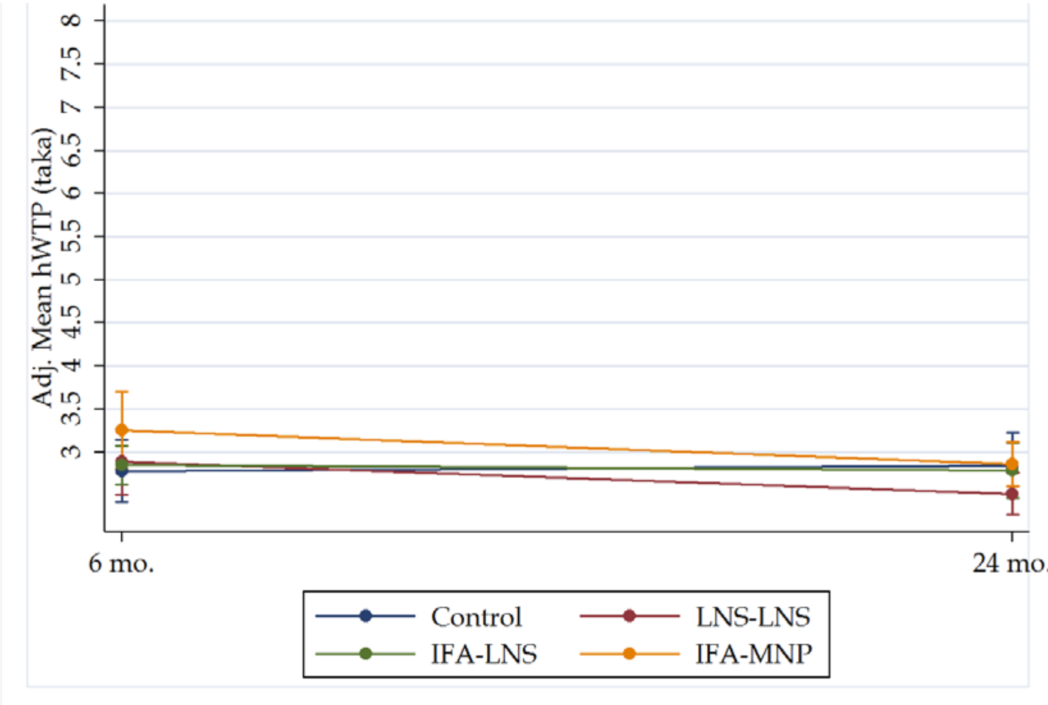
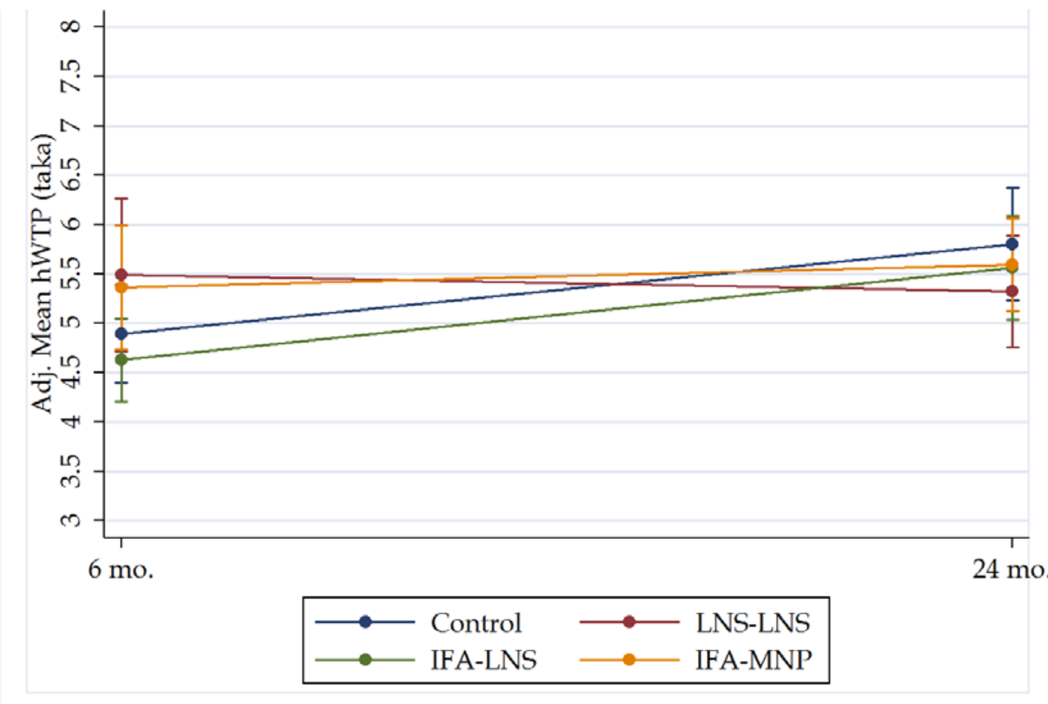


Figure 7b. hWTP for MNP (one-time)



As with LNS-C, households with positive hWTP for MNP (N=1,007) preferred to purchase it either daily (22%) or weekly (56%). Very few households preferred to purchase the supplement less frequently than that, with biweekly and monthly having response rates of 5% and 13%, respectively. Of the 49 households responding to the question of why they would not want to purchase MNP, 61% said that they did not have enough money, and 27% said that they had no need for the supplement (an interesting departure from the case of LNS).

3.2 Effect of Experience and Other Participant Characteristics on hWTP

In this section, we investigate whether or not experience with a given nutritional supplement changes household valuation for these products. This would be the case if, for example, using the nutritional supplements altered either participants' perceptions of their effectiveness or participants' valuations of child health generally. In addition, we also examine if participant characteristics, such as age and food insecurity score, affect hWTP. Household observable characteristics were not significantly different across treatment arms in the subsample for hWTP, and the mean household variable values were similar to those for the full sample.

3.2.1 LNS-PLW

Table 2 reports the marginal effect of assignment to the LNS-LNS treatment group relative to the composite control group on hWTP for LNS-PLW. On average, endline valuation for repeated use of LNS-PLW was not statistically significantly different between the LNS-LNS group and the composite control group.

The remaining rows of Table 2 focus on other factors that could influence the average hWTP for LNS-PLW during pregnancy. Households with higher food security score reported higher hWTP than those with less food security, but the effect was very small (<1 Taka for every point change in score, or around US$0.01). The head of the household reported higher hWTP relative to the study participant, and the difference was statistically significant but again economically small (between 1 and 2 Takas, or less than US$0.01).

Table 2. Factors Associated with hWTP during the Pregnancy

	Once	Repeated
LNS-LNS Group	−0.061 (0.280)	−0.172 (0.195)
Baseline hWTP	0.282*** (0.080)	0.208*** (0.041)
Child under 5 (0/1)	0.030 (0.332)	0.088 (0.216)
Asset	−0.064 (0.095)	−0.050 (0.069)
Square root of food insecurity score	−0.356* (0.136)	−0.296*** (0.084)
Family type	0.289 (0.359)	−0.141 (0.284)
Head of household (0/1)	2.053*** (0.334)	1.230*** (0.189)
Respondent age	0.013 (0.039)	0.010 (0.021)
N	1,164	1,162

Notes: Table shows group differences relative to IFA-Control in units of Takas (US$1=70 Takas). Regressions include sets of indicator variables for geographic union and education level of the mother and the head of household. Family type is a dummy for joint family. Standard errors are clustered at the level of randomization. Symbols for p-values: *=0.05, ***=0.001.

3.2.2 LNS-C

Results in **Table 3** show estimated differences in hWTP for LNS-C between the treatment arm listed and the IFA-Control group. There were no statistically significant differences after correction for multiple hypotheses testing across the groups.

Table 3. Factors Associated with hWTP for LNS-C

	Once	Repeated
LNS-LNS Group (0/1)	−0.064 (0.390)	−0.340 (0.206)
IFA-LNS Group (0/1)	−0.294 (0.363)	−0.053 (0.224)
IFA-MNP Group (0/1)	−0.466 (0.355)	−0.183 (0.211)
Baseline hWTP	0.242*** (0.047)	0.259*** (0.044)
Child under 5 (0/1)	−0.011 (0.249)	0.066 (0.155)
Asset	−0.010 (0.077)	−0.003 (0.063)
Square root of food insecurity score	−0.274* (0.114)	−0.316*** (0.075)
Family type	0.426 (0.258)	0.034 (0.238)
Head of household (0/1)	0.799** (0.267)	0.826*** (0.181)
Respondent age	−0.020 (0.029)	−0.010 (0.015)
N	1,047	1,047

Notes: Table shows group differences relative to IFA-Control in units of Takas (US$1=70 Takas). Regressions include sets of indicator variables for geographic union and education level of the mother and the head of household. Family type is a dummy for joint family. Standard errors are clustered at the level of randomization. Symbols for p-values: *=0.05, **= 0.01, ***=0.001.

Similar to the situation for LNS-PLW, households with higher food insecurity reported lower hWTP than those with less food insecurity, but again the effect is quite small (<US$0.01). The head of the household also reported higher hWTP for LNS-C relative to the caregiver (US$0.01).

3.2.3 MNP

No treatment arm had a significant effect on hWTP for MNP. No treatment arm reported mean 24-month hWTP that differed from pure control by more than 1 Taka. Similar to the situation for LNS-PLW and LNS-C, households with higher food insecurity reported lower hWTP for repeated use, and the head of the household reported higher hWTP relative to the caregiver.

Table 4. Factors Associated with hWTP for MNP

	Once	Repeated
LNS-LNS Group (0/1)	−0.664 (0.422)	−0.168 (0.143)
IFA-LNS Group (0/1)	−0.388 (0.422)	0.007 (0.163)
IFA-MNP Group (0/1)	−0.435 (0.422)	−0.027 (0.171)
Baseline hWTP	0.201*** (0.049)	0.218** (0.073)
Child under 5 (0/1)	−0.345 (0.241)	0.034 (0.157)
Asset	−0.060 (0.084)	0.000 (0.052)
Square root of food insecurity score	−0.151 (0.139)	−0.269** (0.080)
Family type	0.485+ (0.279)	−0.020 (0.179)
Head of household (0/1)	0.732** (0.264)	0.493*** (0.139)
Respondent age	−0.032 (0.030)	0.013 (0.016)
N	1,047	1,046

Notes: Table shows group differences relative to IFA-Control in units of Takas (US$1=70 Takas). Regressions include sets of indicator variables for geographic union and education level of the mother and the head of household. Family type is a dummy for joint family. Standard errors are clustered at the level of randomization. Symbols for p-values: +=0.10, **= 0.01, ***=0.001.

4 Discussion

Our empirical analysis reveals four major insights into household decision makers' valuations of LNS and MNP. First, most households have some positive valuation for both LNS and MNP products. Second, average household valuation of LNS products is currently below the actual cost of production and the price paid by the RDNS (US$0.11/sachet). Third, household experience with LNS and MNP via treatment arm assignment does not detectably alter the valuation of these products. Fourth, very few household characteristics were strongly associated with hWTP. We discuss these findings in turn.

Almost all respondents (more than 90%) of the combined samples over all periods reported a positive valued hWTP for LNS and/or MNP. There are two possible reasons for this result. First, it is plausible that the respondents stated being willing to pay for the supplement to avoid being stigmatized as displaying an "uncaring" attitude toward their children. Although we cannot rule this out, all respondents were told during the consent process that their answers were confidential, which may have mitigated this problem. Second, it may be that households expect (at baseline) or perceive (later on) the potential benefits from improving the nutritional intake of the pregnant women and children above and beyond what is provided through the regular foods they eat. This implies that households understand that their children currently receive biologically suboptimal nutritional intakes, that they would pay something to improve the nutritional status of pregnant women and children, and that they believe that LNS and MNP are at least somewhat effective at generating improvements in nutritional status, again, net of unmeasured costs and unintended effects. While such a belief regarding the value of *MNP* can be explained, at least to some degree, by the history of community experience with these products, prior experience of friends or neighbors *cannot explain* their belief in the effectiveness of LNS, which was a new product. Whatever grounds this belief, it does not change (in either direction) as households in the LNS treatment arms gain experience using the products.

The second key takeaway message from our analysis is that average hWTP for both LNS-PLW and LNS-C is far below the actual cost of production, and thus even further below any potential retail market price for the product. Cost estimates from the RDNS place the production and transportation costs of LNS-PLW and LNS-C at approximately US$0.11 per sachet, between one-and-a-half and three times the average reported household hWTP for these products, depending on whether the focus is on occasional or sustained use of the product (Humber at al. 2017). This price includes only the costs of distribution of LNS through the RDNS, and thus this cost should be interpreted as a minimum potential market price for LNS, as it does not include the costs of middlemen or profits along the value chain. At the endline, approximately 30% of the households were willing to buy LNS-PLW above the cost of production for one-time use, while only about 12% of households were willing to pay LNS-PLW above the cost of production for repeated use. Similarly for LNS-C, approximately 44% of households reported hWTP above the cost of production for one-time use, while only about 12% of households reported hWTP above the cost of production for repeated use.

These results are consistent with those found in a LNS-C market trial in rural Burkina Faso (Lybbert et al. 2017), but much lower than the stated hWTP in Ghana and slightly lower than the stated hWTP in Malawi for similar LNS products (Adams et al. 2016). They are also consistent with general patterns regarding health investments in preventative care in developing countries. Across a number of potential health investments in preventative medicines, household decision makers consistently undervalue these products even if their use could, in the future, lead to decreases in expenditures on acute care that more than compensate for the costs of the preventative care (Dupas 2011).

While average stated hWTP for LNS products is below their actual cost, stated hWTP for MNP is not. (Humber et al. estimate procurement and distribution costs for MNP to be approximately US$0.03 per sachet, a cost that is relatively close to the mean hWTP for repeated use MNP (around 3 Taka or US$0.04) (Humber at al. 2017).

Third, while it is possible that households are improperly valuing the effectiveness of MNP relative to LNS, it does not appear that experience with the product in the short and medium term has affected the relative valuations of the products. All group comparisons between treatment arms reveal very small, nonsignificant differences. In general, we find no evidence suggesting that households update their beliefs regarding the values of improved child nutrition more generally via random assignment of experience with nutritional supplements.

Finally, very few household characteristics are significantly associated with hWTP for LNS and MNP. Households with higher levels of food insecurity reported lower hWTP for repeated use of both LNS and MNP, although the effects were quite small (<US$0.01). The head of the household reported higher hWTP relative to the study participant, which suggests that the head of the household may have had higher perceived benefits from the supplements or more disposable income than caregivers.

5 Key Messages

The international community is committed to improving the health and nutritional status of women of reproductive age and of their young children, and national and subnational governments are sharing that commitment via their participation in the Scaling Up Nutrition (SUN) programs and other ways. All of these stakeholder groups understand that household decision makers must also be committed to the same objectives; purely “top-down” approaches may not work as well as intended (e.g., Easterly 2008; Meslin 2010).

The results reported here contribute to our understanding of household decision makers’ views on the value of selected nutrient supplements, and on the factors that shape these values. The very high proportion of respondents (some mothers/caregivers and others male heads of households) that reported non-zero hWTP values for both LNS products and the MNP product suggests that decision makers care about the nutritional status of their children and believe that these products can improve that status. The absence of any major respondent or household factors that influence hWTP suggests that these values are broadly held in this population.

The absence of large changes over time in hWTP for all products is generally good news, too. Since most of the benefits of these products are expected to accrue later on in life, it is (in fact) encouraging that, even in the absence of observable benefits, reported hWTP remained constant and non-zero.

The low average hWTP for LNS products (vis-à-vis their procurement and transportation costs) is a matter of concern, especially to those who hope that demand for these products will be sufficient to promote the establishment of sustainable retail markets for them. These markets are unlikely to materialize. However, alternative delivery platforms exist, and generally positive hWTP for LNS products suggests that household decision makers seemed to be willing to cover at least some of the costs of these products. Furthermore, the much closer relationship between hWTP for the MNP product and the cost of procuring and delivering it suggest that a retail market may well be viable.

Important concerns remain. First, as noted above, hWTP obtained through contingent valuation methods is a very blunt instrument for measuring effective demand; no transactions take place during the solicitation process, so respondents have no incentive to reveal their true WTP. Second, these products need to be routinely consumed over the prescribed periods in order to generate the expected benefits; persistent effective demand may be lacking, even if short-term effective demand is observed. Third, the rural site in which the RDNS took place has a long history of managed care for pregnant women and their young children; we do not know the extent to which this history has influenced the hWTP estimates reported here, potentially limiting the external validity of these estimates.

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