Intensified Nutrition Interventions in Antenatal Care Services Increased Consumption of Iron and Folic Acid Supplements and Early Breastfeeding Practices in Burkina Faso: Results of a Cluster-Randomized Program Evaluation

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Content

- Research questions and study outcomes
- Unpacking the interventions
- Evaluation design and methods
- Key results
- Reflections and lessons learned

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Research Questions

1. What are the program **impacts on maternal nutrition practices**: (1) consumption of diversified foods and adequate intake of micronutrients, protein and energy; (2) consumption of iron-folic acid (IFA) supplements; and (3) early breastfeeding practices?

2. Can the **coverage and utilization** of antenatal care (ANC) and key maternal nutrition interventions be improved through health systems strengthening and social and behavior change communication?

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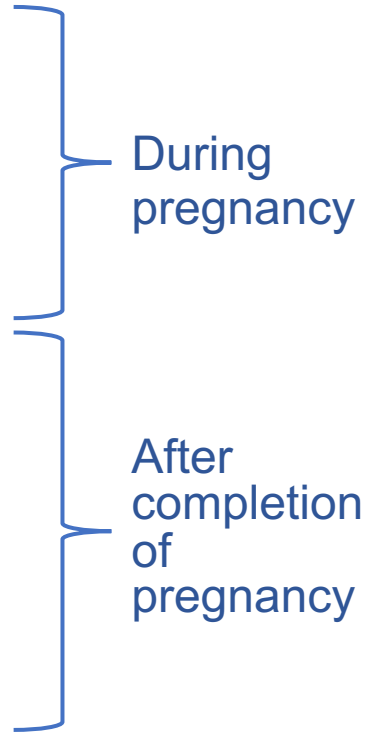
Study Outcomes and Indicators

Outcome
Consumption of diversified foods
Adequate intake of micronutrients, protein and energy
Consumption of IFA supplements
Early breastfeeding practices
Exposure to ANC
Exposure to maternal nutrition interventions



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Overview of A&T Maternal Nutrition Interventions

Groupe d'Apprentissage et de Suivi des Pratiques d'ANJE (**GASPA**)

Nurse/midwives and community health agents (agents de santé à base communautaire, ASBC) provide:

- Counseling on early timing and frequency of ANC
- Counseling on maternal diet – diversity and quantity
- IFA supplement distribution and counseling
- Weight gain monitoring and counseling
- Counseling on early breastfeeding practices
- Meetings with husbands and mothers-in-laws to support pregnant women

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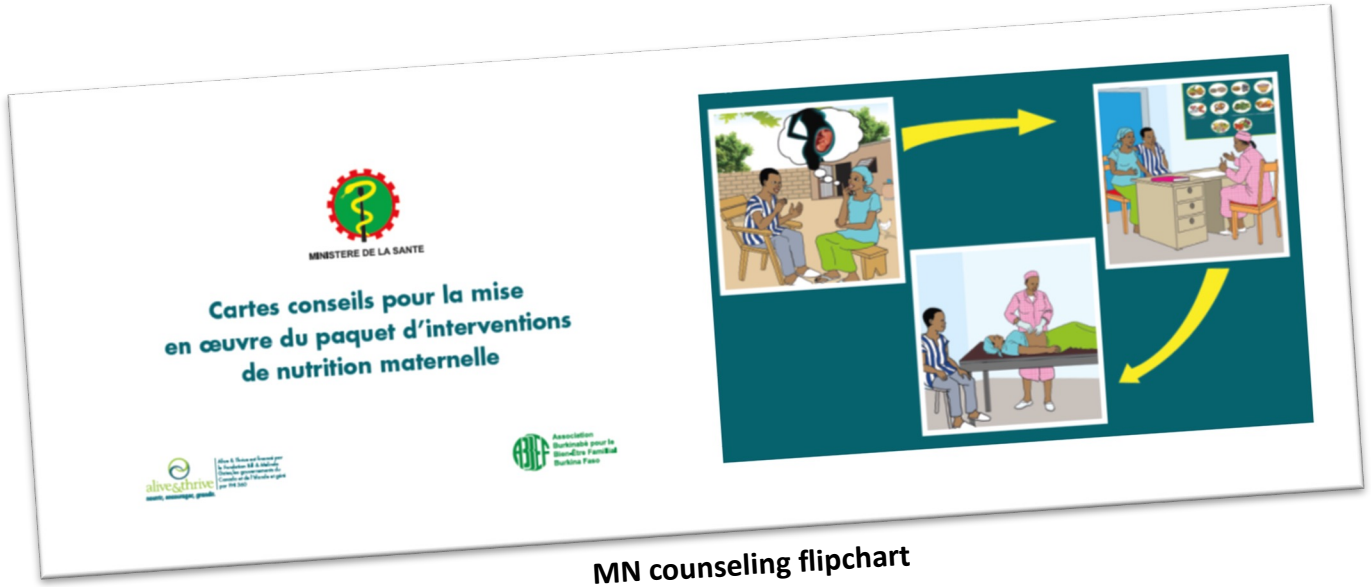

MN counseling flipchart

Husband leaflet

MIL leaflet

ANC poster

Dietary diversity poster

IFA tablets poster

EIBF poster

IFPRI

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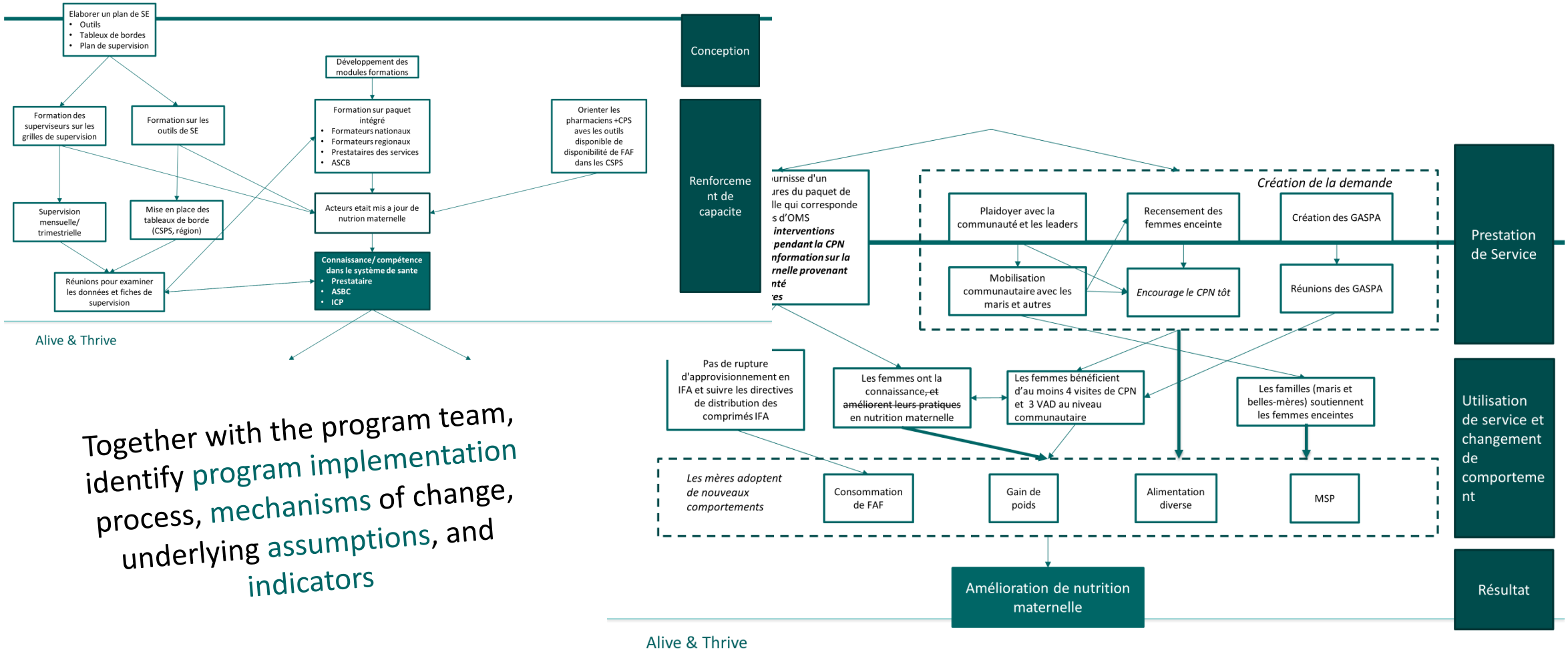
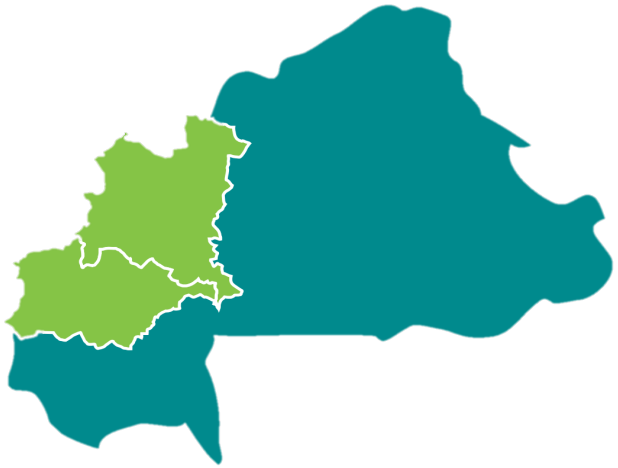
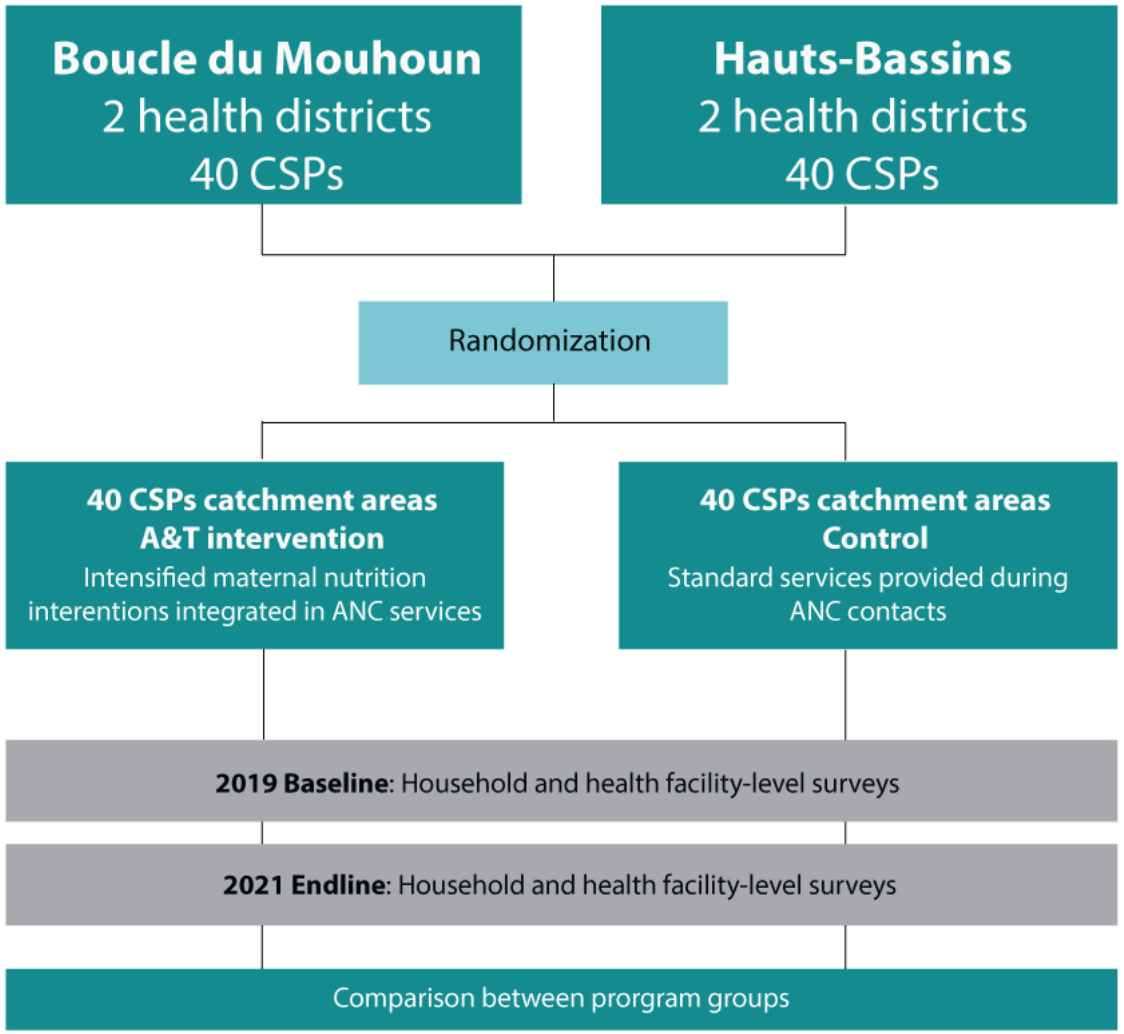
Mapping of Program Impact Pathways



Together with the program team, identify program implementation process, mechanisms of change, underlying assumptions, and indicators

Evaluation Design





HH survey sample	Baseline 2019		Endline 2021	
	A&T	Control	A&T	Control
Pregnant women	483	477	480	480
Recently delivered women with children 0-5 mos	953	967	950	970

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Study Timeline

- **Baseline survey**:
  November 6 - December 17, 2019

- **Endline survey**:
  January 22 - March 1, 2021

  [delayed due to elections on 11/22/2020]

- **Implementation start**:
  February 2020

  [brief disruption due to COVID-19: April-May 2020]

- **End of A&T direct support**:
  December 2020

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Data Analysis

- Intent-to-treat specification
- Impact estimates using difference-in-difference (DID) method
- Plausibility analysis
  - Assess influence of social desirability bias
  - Examine outcomes among program impact pathways (service delivery to exposure and behavioral determinants)
- Comparison of differences between program groups by survey period using mixed-effects regression models, accounting for geographical clustering

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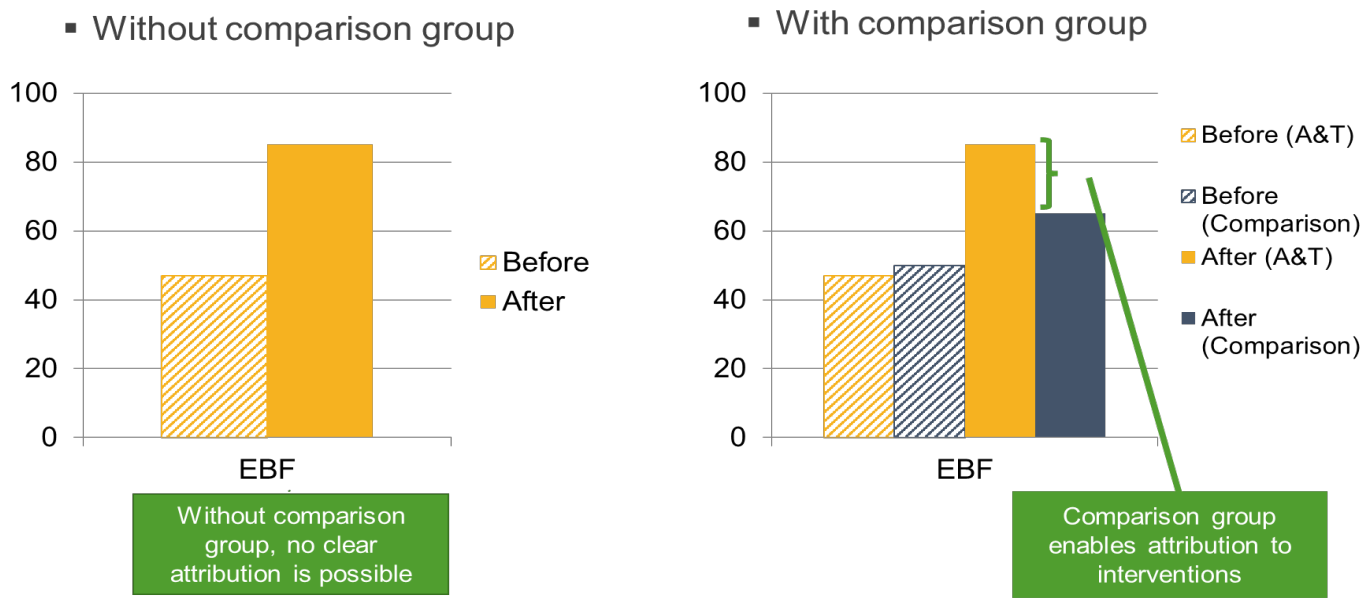
What is needed to bring rigor to program evaluation?

- **Pre-post assessments** in intervention and comparison groups (e.g., a *double-difference* approach)
- An appropriate **counterfactual**; randomization where possible
- Rigor in **measurement** – the right impact indicators, data on immediate drivers, capturing program exposures, contextual factors
- **Theory-driven** evaluation design (process and impact)



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Key Results

Photo credit: A&T

Sample characteristics of pregnant and recently delivered women[1]

Indicator	Baseline 2019[2]		Endline 2021[2]	
	Intervention	Control	Intervention	Control
Pregnant women (*n*)	483	477	480	480
Maternal characteristics				
Age (y)	27.8 ± 6.6	27.0 ± 6.5	28.0 ± 6.7	27.3 ± 6.7
Educational level (%)				
Never attended school	67.1	66.9	61.5	61.7
Koranic literacy training	6.2	6.5	6.3	7.7
Primary school (grades 1–5)	18.2	15.7	18.1	19.2
Secondary school or higher (grades 6+)	8.5	10.9	14.2	11.5
Religion as Muslim (%)	61.1*	75.3	61.7	72.9
Gestational age (mo)	6.1 ± 2.0***	5.6 ± 2.0	5.9 ± 1.9	5.9 ± 2.0
First trimester (%)	12.0	18.2	13.8	14.8
Second trimester (%)	41.6	47.2	43.1	43.1
Third trimester (%)	46.4***	34.6	43.1	42.1
Previous pregnancy (%)	86.7	87.4	85.8	83.5
Household characteristics				
Household food secure (%)	62.7	63.3	64.8	59.6
Household wealth (tercile)				
First/low (%)	32.0	34.6	32.7	34.0
Second/middle (%)	32.0	34.6	32.7	34.0
Third/high (%)	36.0	30.8	34.6	32.1
Recently delivered women (*n*)	953	967	950	970
Maternal characteristics				
Age (y)	27.2 ± 6.7	26.6 ± 6.6	27.2 ± 6.6	27.1 ± 7.0
Educational level (%)				
Never attended school	64.6	68.4	62.1	62.7
Koranic literacy training	6.3	5.6	6.4	6.6
Primary school (grades 1–5)	15.7	16.2	16.1	16.4
Secondary school or higher (grades 6+)	13.3	9.8	15.4	14.3
Religion as Muslim (%)	64.3*	76.9	62.5	71.5
Parity (%)				
1–2	36.7	41.7	37.8	40.4
≥3	63.3*	58.3	62.2	59.6
Age of youngest child (mo)	2.0 (3)	2.0 (3)	2.0 (3)2	3.0 (3)
Household characteristics				
Household food secure (%)	66.6	65.3	66.6	62.1
Household wealth (tercile)				
First/low (%)	28.7	37.8	33.2	33.5
Second/middle (%)	34.6	32.1	30.8	35.8
Third/high (%)	36.7**	30.1	36.0*	30.7

[1] Values are means ± SD or percentages, except for the age of youngest child which is the median and interquartile range.
[2] Different from control at baseline and endline, accounting for clustering: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

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Baseline data used to examine modifiable factors associated with nutrition practices

- ↑ **Early and 4+ ANC visits** were associated with higher IFA consumption.
- ↑ **Receipt of nutrition counseling** associated with higher IFA and EIBF.
- ↑ **Nutrition knowledge** among women associated with higher MDD-W, IFA, and EIBF.
- ↑ **Positive social norms and family support** associated with higher IFA.

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ORIGINAL ARTICLE

Maternal & Child Nutrition WILEY

Multiple modifiable maternal, household and health service factors are associated with maternal nutrition and early breastfeeding practices in Burkina Faso

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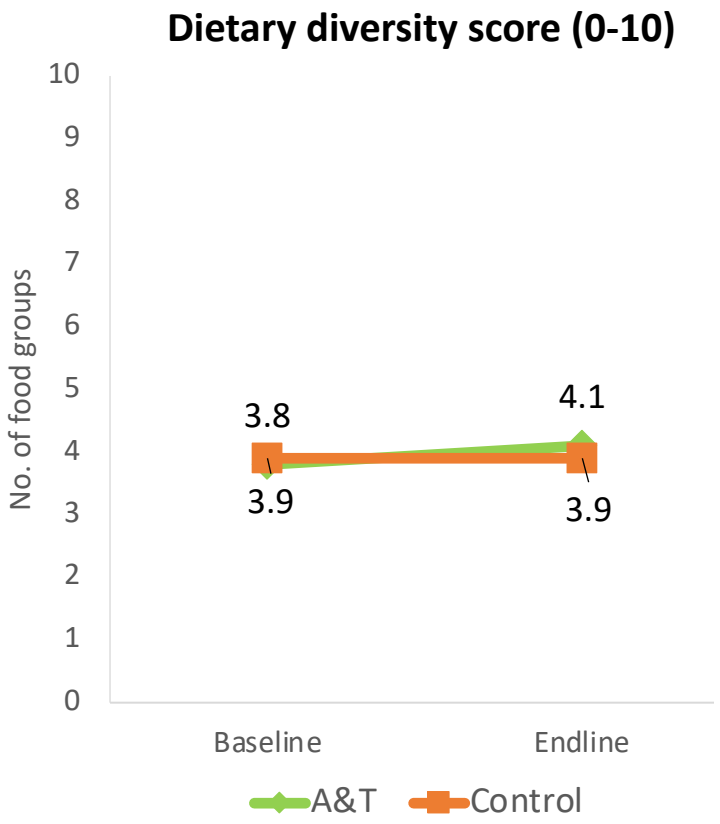
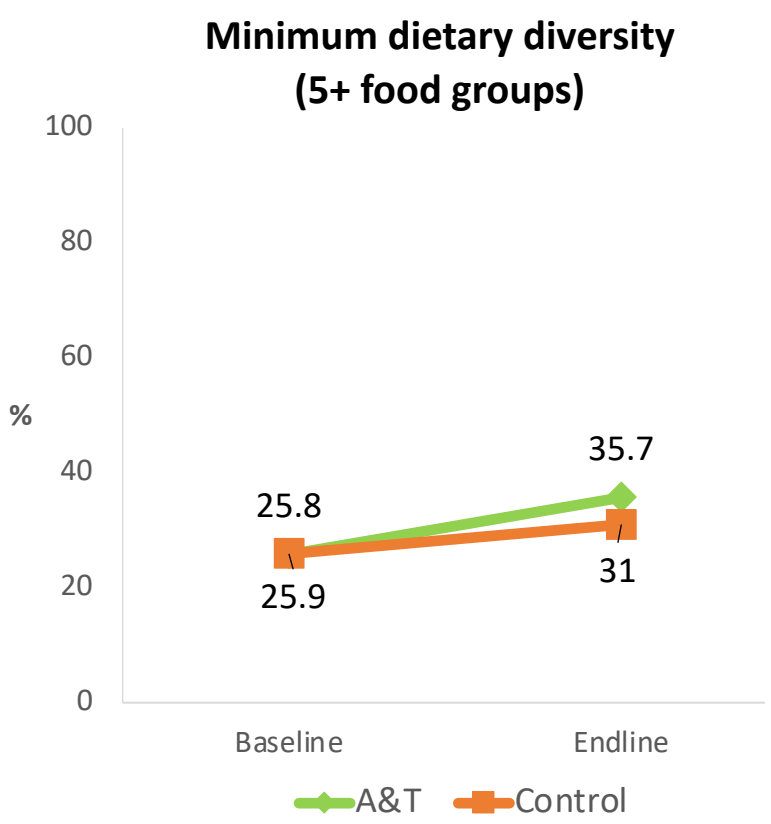
Abstract
Low coverage of effective nutrition interventions in many high-burden countries, due to service provision and demand factors, result in poor uptake of recommended practices and nutrition outcomes. We examined the factors that influence maternal nutrition and early breastfeeding practices and determined the extent that the key factors could improve these practices in two regions in Burkina Faso. We used household survey data among pregnant ($n = 920$) and recently delivered women ($n = 1840$). Multivariable regression analyses were conducted to identify the determinants of a diverse diet and iron-folic acid (IFA) supplement consumption, weight monitoring during pregnancy and early initiation of breastfeeding (EIBF). Population attributable risk analysis was used to estimate how much the outcomes can be improved under optimal conditions of interventions that address the modifiable determinants. During pregnancy, 21% of women achieved minimum diet diversity (MDD-W), 70% consumed 90+ IFA tablets and 65% were weighed 4+ times; EIBF was 40%. Nutrition knowledge was associated with MDD-W (odds ratio [OR]: 3.2), 90+ IFA (OR: 1.5) and EIBF (OR: 1.9). Positive social norms and family support were associated with 90+ IFA (OR: 1.5). Early and 4+ ANC visits were associated with 90+ IFA (OR: 1.5 and 10) and 4+ weight monitoring (OR: 6.2). Nutrition counselling was associated with 90+ IFA (OR: 2.5) and EIBF (OR: 1.5). Under optimal programme conditions, 41% of women would achieve MDD-W, 93% would consume 90+ IFA, 93% would be weighed 4+ times and 57% would practice EIBF. Strengthening the delivery and uptake of interventions targeted at these modifiable factors has the potential to improve maternal nutrition practices.

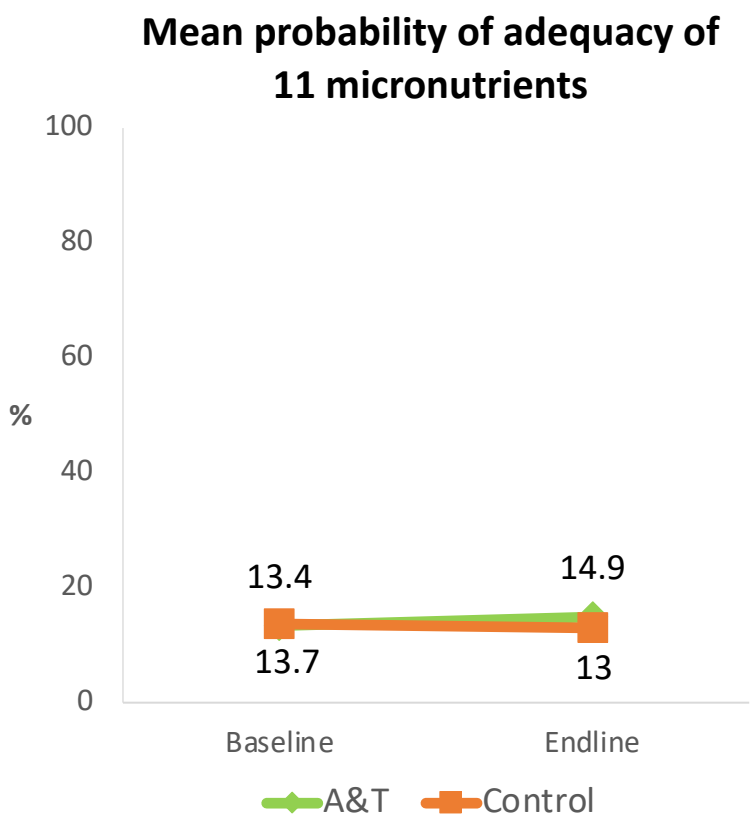
KEYWORDS
breastfeeding, Burkina Faso, dietary diversity, iron and folic acid, maternal nutrition

Abbreviations: ANC, antenatal care; A&T, Alive & Thrive; EBF, exclusive breastfeeding; EIBF, early initiation of breastfeeding; IFA, iron and folic acid; MDD-W, minimum dietary diversity for women.

No significant improvement in dietary diversity or adequacy of micronutrients among pregnant women







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No impact on dietary diversity, but 9-11pp difference in pulses and nuts & seeds due to decreased consumption in control areas at endline

	Baseline		Endline		Unadjusted DID[1]	Adjusted DID[2]
Indicator	**A&T N=481**	**Control N=474**	**A&T N= 479**	**Control N= 478**	**pp**	**pp**
Dietary diversity score (0-10)	3.8±1.1	3.9±1.1	4.1±1.2	3.9±1.2	0.2	0.2
Minimum dietary diversity (5+ food groups)	25.8	25.9	35.7	31.0	4.9	4.4
Food groups consumed in the past 24h:						
Grains, white roots and tubers	100.0	100.0	100.0	99.8	0.2	0.2
Pulses (beans, peas and lentils)	**21.2**	**25.5**	**19.6**	**14.9**	**9.1***	**8.4***
Nuts and seeds	**64.4**	**69.2**	**62.6**	**56.9**	**10.5***	**10.6***
Milk and milk products	9.4	9.7	20.5	15.7	5.1	4.3
Meat, poultry and fish	38.5	38.0	43.2	45.8	-3.1	-4.1
Eggs	0.2	1.1	1.7	2.3	0.2	0.2
Dark green leafy vegetables	67.6	68.6	61.0	64.9	-2.9	-2.7
Other vitamin A-rich fruits and vegetables	3.5	1.5	3.3	2.3	-1.0	-0.7
Other vegetables	65.7	59.3	85.4*	79.7	-0.7	0.1
Other fruits	12.3	12.7	7.7	7.7	0.4	0.8
Sweets or sweetened beverages	60.9	65.2	67.0	72.8	-1.5	-1.1

*p<0.5

[1] Unadjusted difference-in-difference (DID) using intent-to-treat sample controlled for geographical clustering only.

[2] Adjusted DID controlled for gestational age and clustering effect.

Seasonal vegetables like okra

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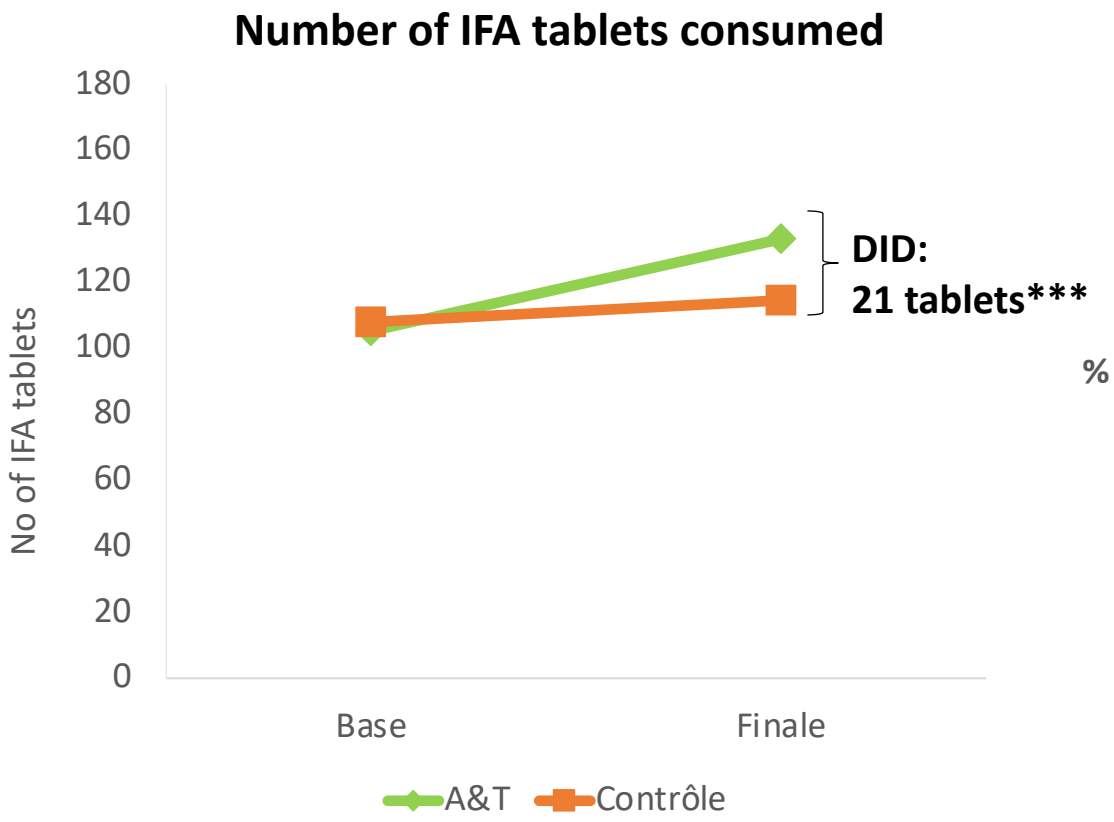
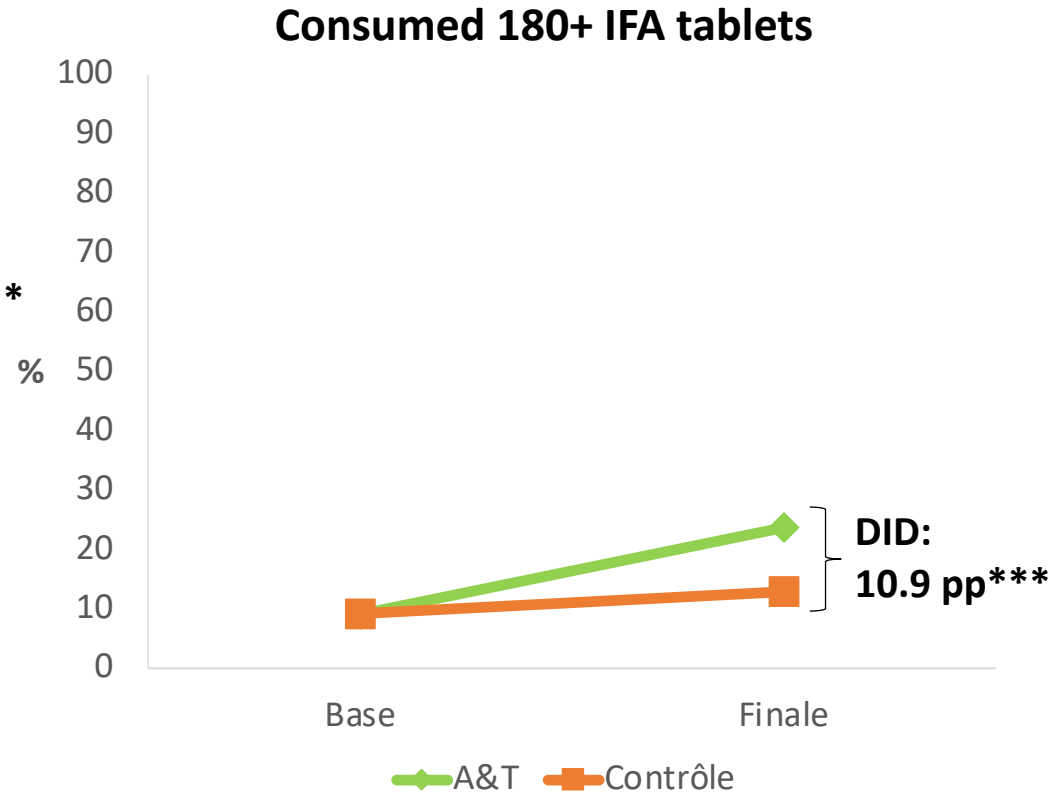
Positive impacts on consumption of IFA supplements during pregnancy





*p<0.5, **p<0.1, ***p<0.01

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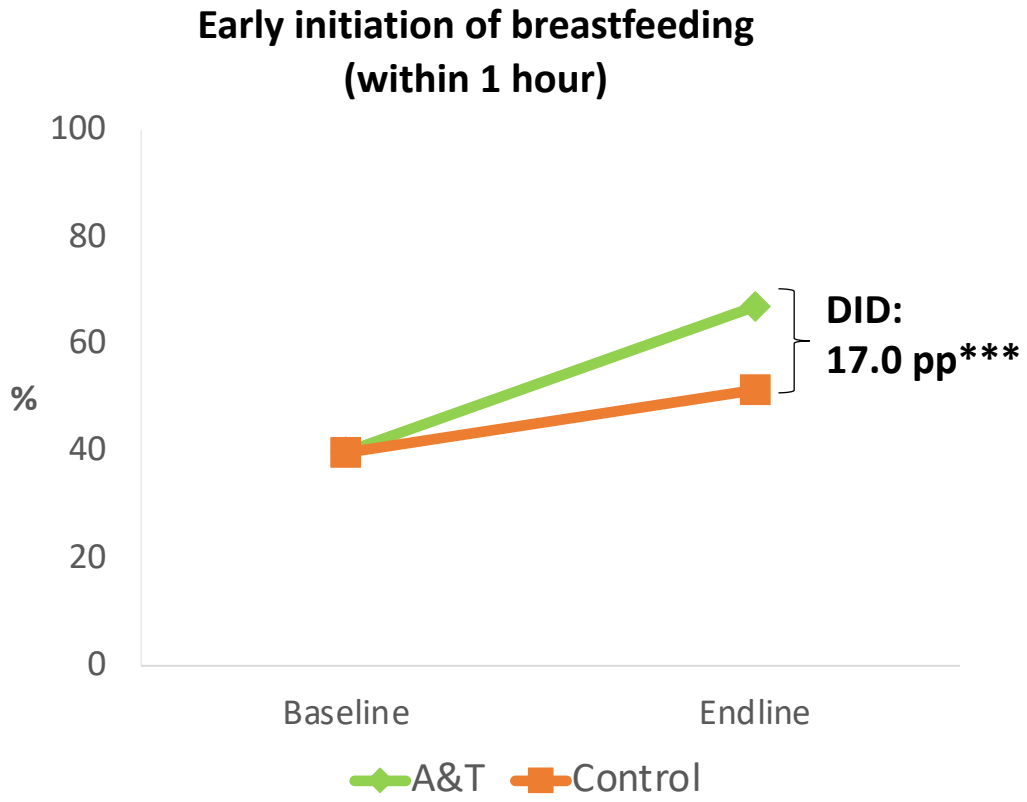
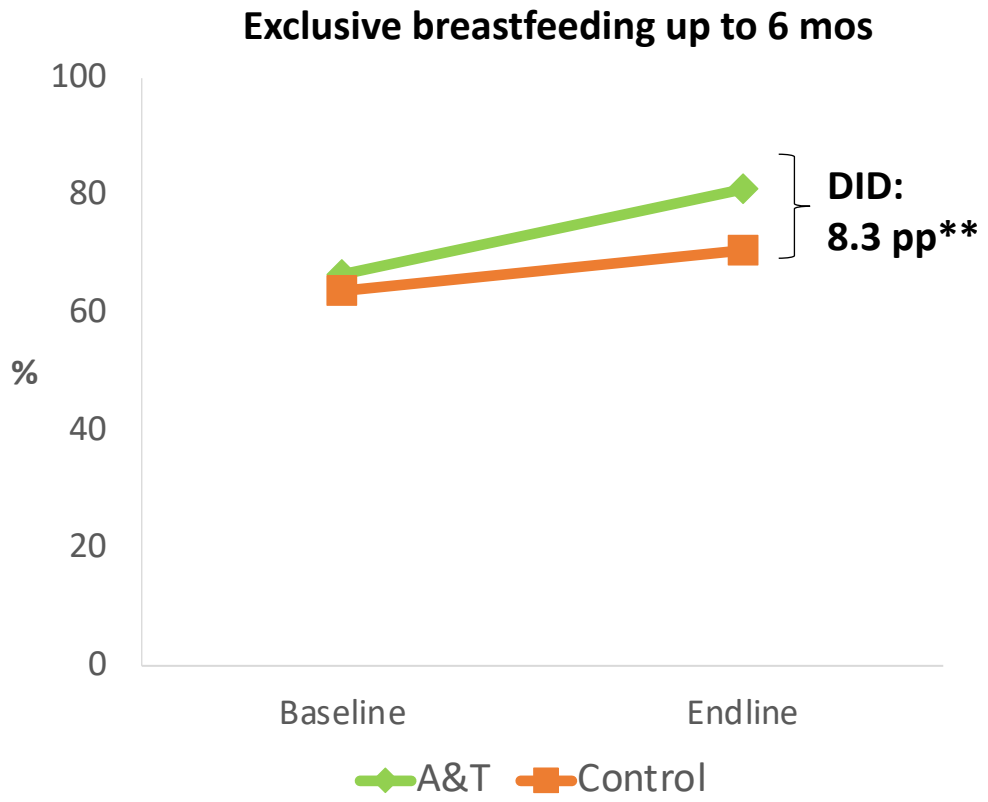
Positive impacts on early initiation of breastfeeding and exclusive breastfeeding up to 6 months





*p<0.5, **p<0.1, ***p<0.01

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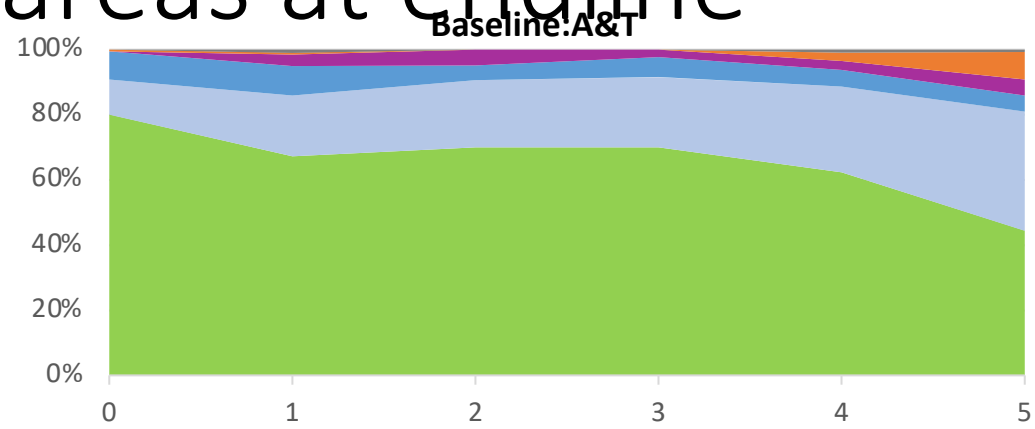
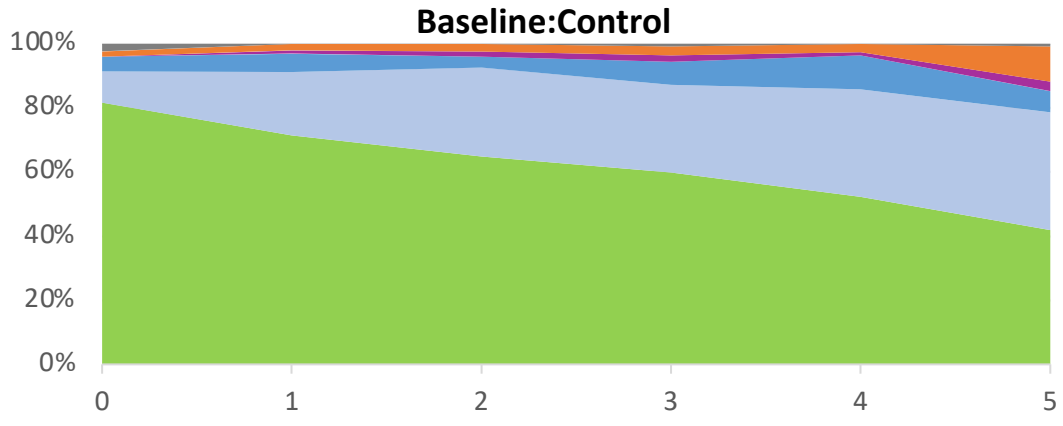
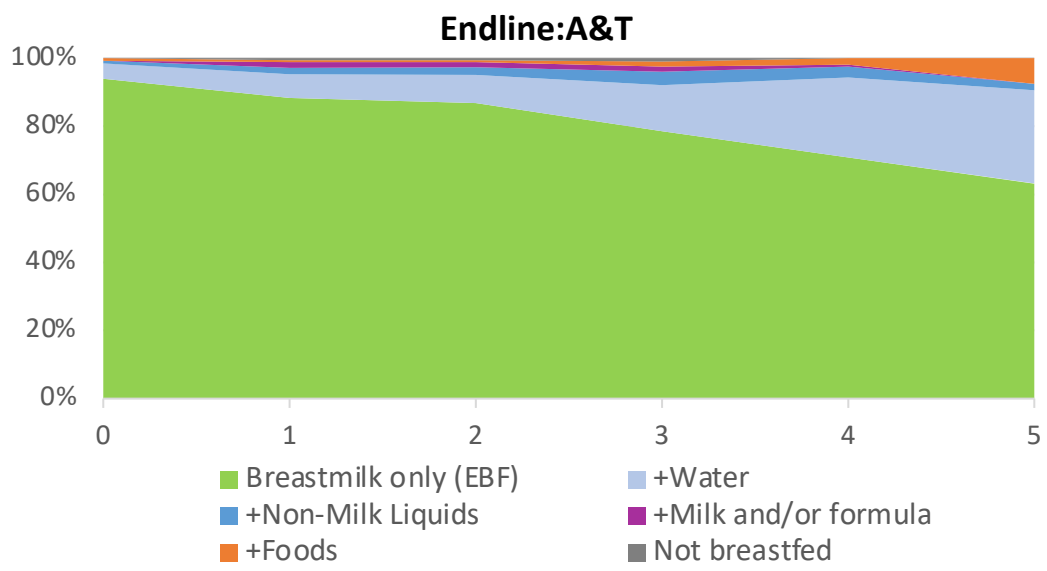
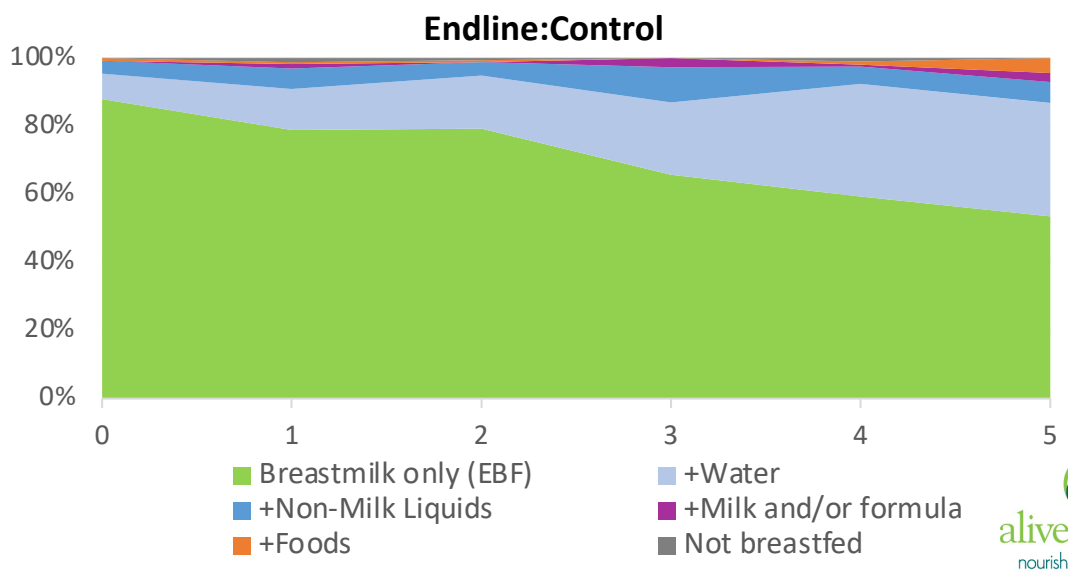
Infant feeding area graph patterns reflect improved EBF (esp. at <3 months) in A&T areas at endline









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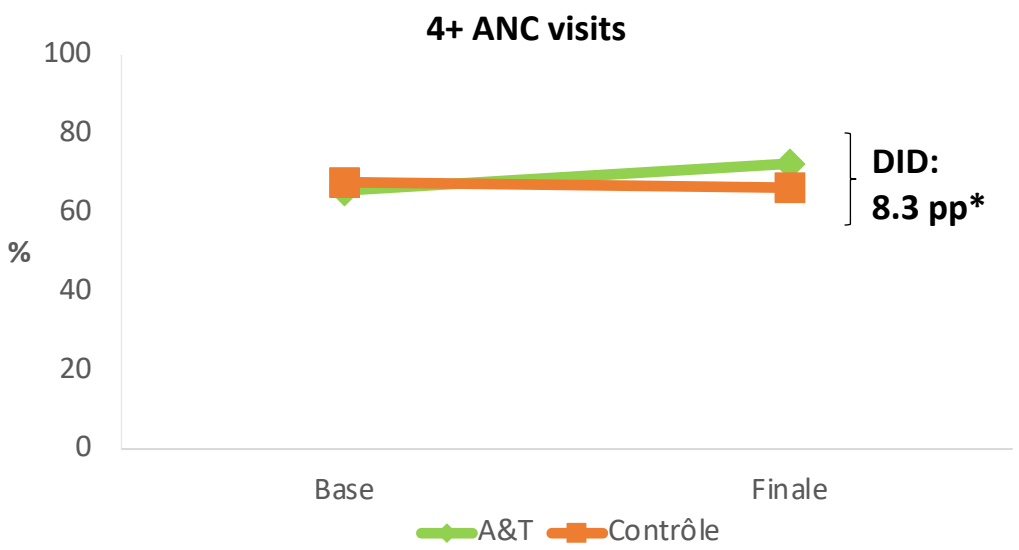
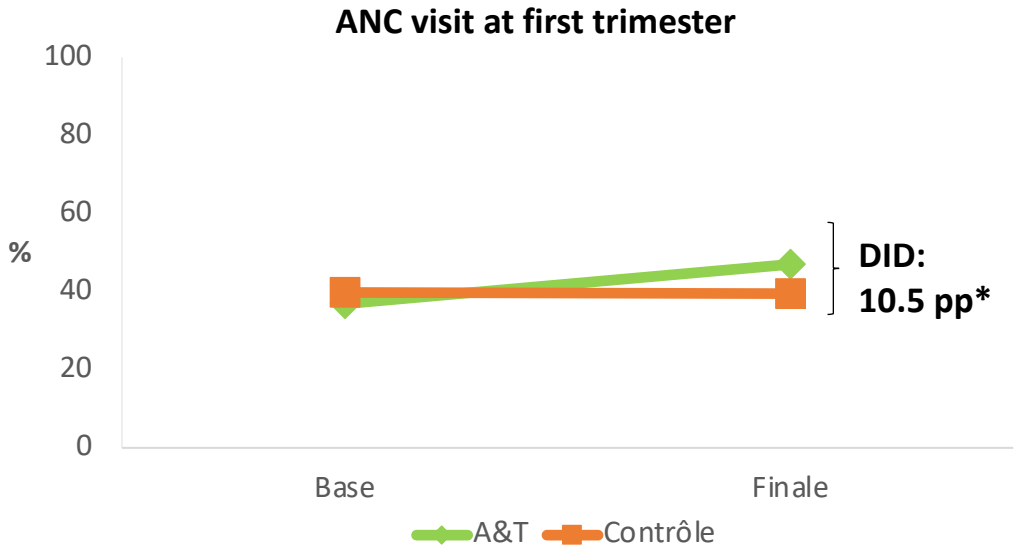
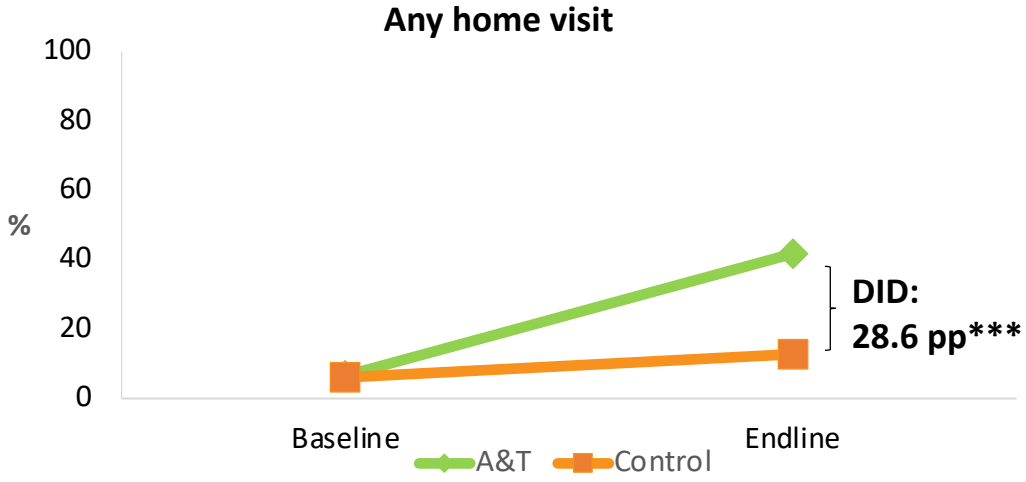
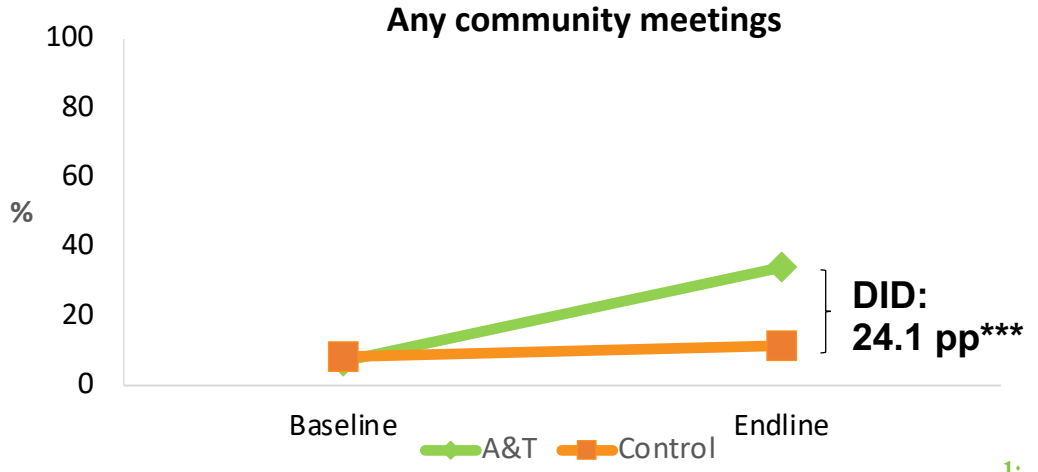
Improvements across ANC coverage indicators









*p<0.5, **p<0.1, ***p<0.01

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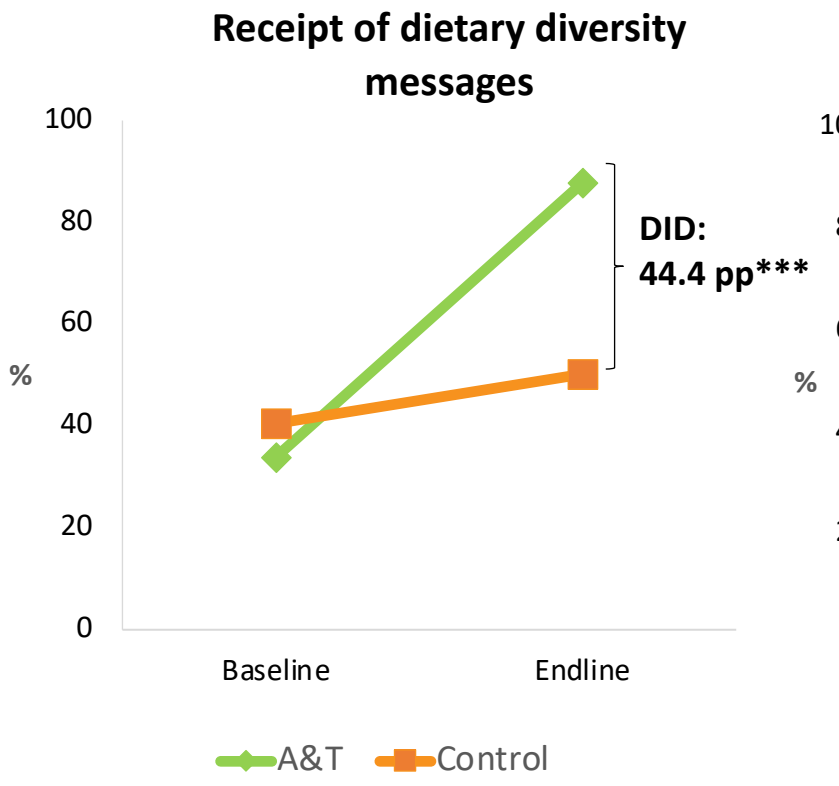
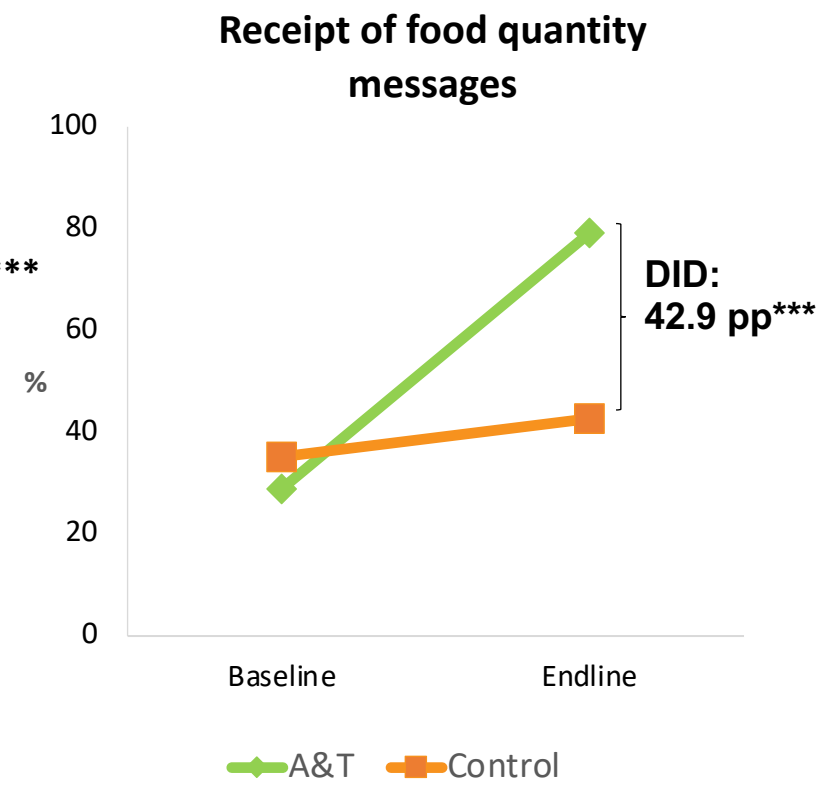
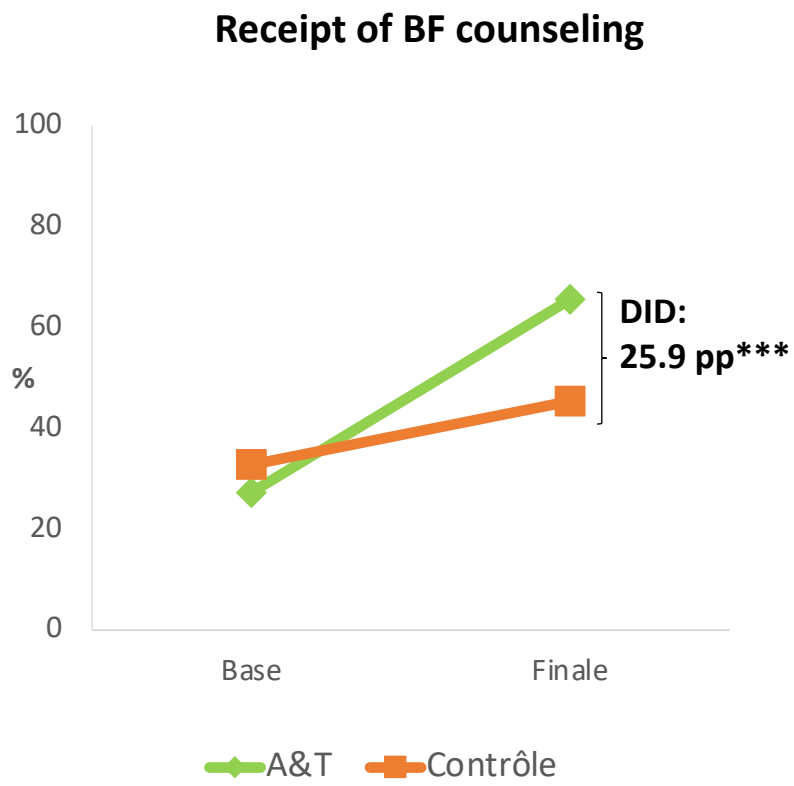
Improvements in exposure to nutrition counseling during ANC







*p<0.5, **p<0.1, ***p<0.01

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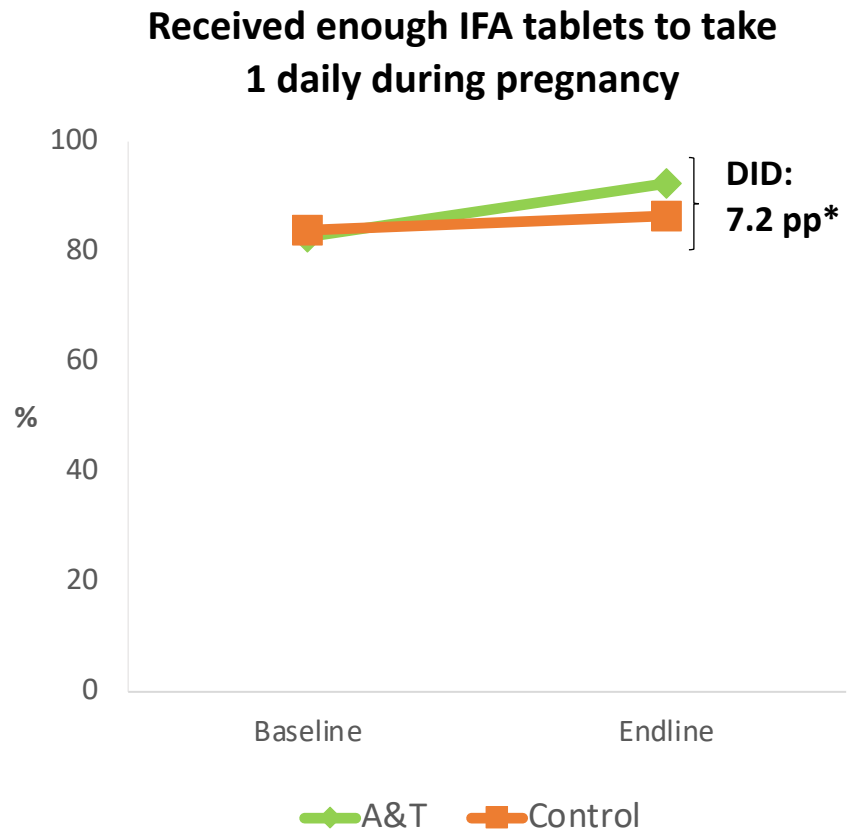
While no change in IFA counseling, improvement in reported receipt of enough IFA tablets



*p<0.5, **p<0.1, ***p<0.01

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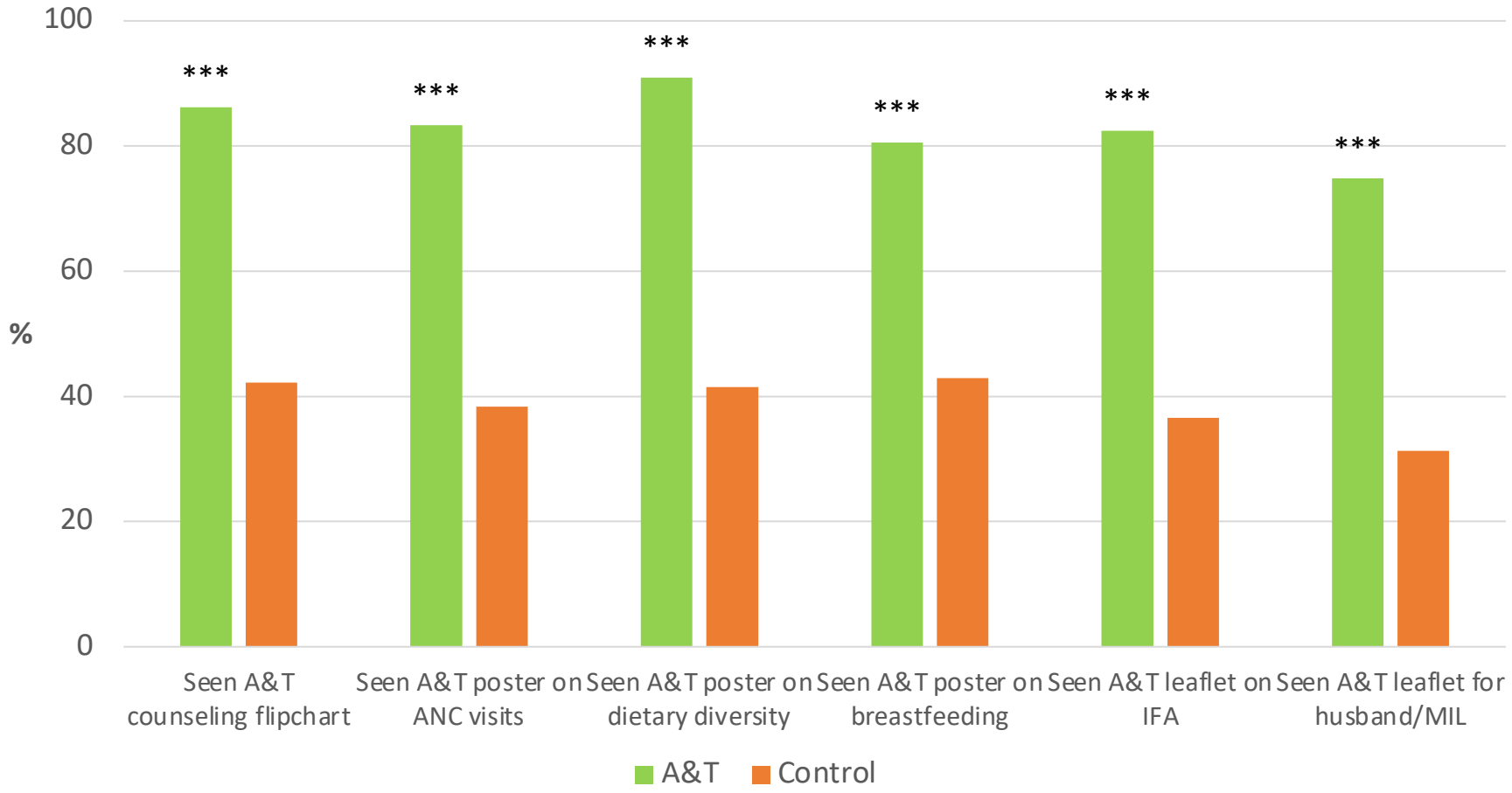
>75% of women in A&T areas had seen/received the A&T materials. However, >30% in control areas also reported exposure, indicating potential program spillover.



*p<0.5, **p<0.1, ***p<0.01

In the last 6 months, ~34% of women in both A&T and control areas heard messages about breastfeeding on the radio.

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Summary of Findings along Impact Pathways

Equipment and materials to support nutrition services	• Increased days (1 day on average) of ANC service provision in A&T areas, and increased availability of materials/job aids related to maternal nutrition. • No difference in IFA stocks or record-keeping at CSPS.
Training and supportive supervision	• >80% of nurses/midwives and ASBCs received training on maternal nutrition (from A&T) in past year, compared to 10-15% reported in control areas. • Higher ANC supervision among nurse/midwives and ASBCs in A&T areas.
Service providers' knowledge	• Nurses/midwives improved knowledge about weight gain and anemia-IFA. • ASBCs improved knowledge about maternal nutrition, weight gain, ANC visits and contacts, and anemia-IFA.
Provision of services	• Most ASBCs conducted home visits or GASPA and met with husbands/MIL in A&T areas (>70%), compared to control (15-42%) • Very high report of nutrition counseling by nurses/midwives and ASBCs during ANC/PW contacts in both areas; differences in specific messages.
Women's behavioral determinants	• Mothers improved knowledge about maternal nutrition, weight gain, ANC visits and contacts, anemia-IFA, and EIBF. • No change in family support or beliefs or social norms
Effects of COVID-19	• <11% of households reported any difficulty in buying food and even less in accessing health services due to COVID-19

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Conclusions

- Our study demonstrated the feasibility of strengthening nutrition interventions during ANC visits and contacts provided by the government health system, even within <1 year.
- No impacts were observed on maternal diets, indicating more intensive longer-term interventions and/or other types of interventions may be needed.
- There was spillover in control areas, potentially attenuating impacts and differences between groups; some improvements also observed in control areas.
- Service provision improved largely in community-based contacts delivered by ASBCs.
- Longer implementation duration may be required improve on some interventions (e.g., weight gain monitoring; and encouraging family and social support for maternal diet and nutrition).

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Reflections and Lessons Learned

Photo credit: A&T

Conducting rigorous evaluation of at scale programs is feasible, but demands…

- Close collaboration with implementers and other stakeholders (government)
    - Good faith on all sides and regular communication
    - Implementer-evaluator/researcher engagement
    - Relevance to program evolution, tempering expectations
- Flexibility
    - Timelines for all stages of the evaluation
    - Design, content, and measurements
- Time and resources
    - Appropriate human resources
    - Adequate data collection costs
    - Sufficient time for data cleaning/processing, analysis, and writing!
    - Plan for dissemination/exchange of findings and lessons learned

alive&thrive
nourish. nurture. grow.

QUESTIONS?