Appendix A, B, D and F

ADOLESCENTS 360 OUTCOME EVALUATION IN TANZANIA

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Appendix A – Methodology details

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Study design

Study populations

In Tanzania, we conducted a pre- and post-population-based cross-sectional survey. In line with the main focus of A360 in Tanzania, the target population for the study, both unmarried and married girls aged 15–19 years. Furthermore, only adolescent girls who reported having had sexual intercourse within the 12 months preceding the survey were asked questions regarding use of contraception and family planning services. Therefore, our primary outcome (mCPR) was measured only in sexually active adolescent girls aged 15–19 years.

To measure community acceptance and social support for adolescent girls to adopt healthy sexual and reproductive health behaviors our target population were adults in the household who may be most influential to a girl's decision making. Therefore, in households where the girl interviewed was married we invited the husband/male partner to participate. The girl's permission was sought to interview her husband/male partner. In households where the girl interviewed was unmarried, we asked her to nominate a co-habiting adult (age 20+ years) whose views were most likely to influence her decision-making with regards to sexual health and family planning.

Study unit inclusion criteria and selection

Region

Mwanza Region was selected by the evaluators in collaboration with PSI because of the high unmet need for modern contraception among girls aged 15 to 19 years relative to other A360 target regions (Chandra-Mouli & Akwara, 2020) due to the absence of other large-scale family planning (FP) and sexual and reproductive health (SRH) activities. Additionally, PSI has previous experience working in the region.

District

PSI following consultations with the OE team has purposively selected Ilemela District in Mwanza Region as the evaluation study site.

Selection of study populations

A360 targets married adolescent girls aged 15 to 19 years (**Box 1**). Eligibility criteria does not include any criteria related to contact with or exposure to elements of the A360 programme.

Inclusion criteria

- Adolescent girls aged 15 to 19 years (both married and unmarried)
- Living, at the time of the survey, in the study sites
- Voluntarily provides informed consent

Exclusion critieria

- There were no specific exclusion criteria

Box 1 Study eligibility criteria

Population A: 15–19-year-old girls

The primary sampling unit (PSU) for our survey was a 'street', a smallest administrative unit within each ward. As per the study protocol, a two-stage sampling design was used. For the baseline survey, 15 urban and semi-urban wards of the Ilemela district were included. A simple random sample (SRS) of 34 streets was selected from across the 15 urban and semi-urban wards of Ilemela district. In the first eight streets, a simple random sample of households were visited; after this, the sampling strategy was modified to visiting all households in a street. Therefore, in the remaining 26 streets all households were visited. The change in sampling strategy was necessary to ensure the target sample size was achievable. A similar sampling strategy was employed at endline as well. However, due to logistic reasons one of the wards in baseline had to be dropped at the endline leading to the survey area spanning over 14 wards and 30 streets.

Population B: Cohabitating adult

In addition to adolescent girls, co-habiting adults were also interviewed as a part of the survey. In accordance with the study protocol, the adults were systematically picked after certain intervals from a list of eligible girls. Eligible girls are the ones who reported sexual activity in the past 12 months and the ones who consented to the interview of an adult they live with. For every eight sexually active adolescent girls aged 15–19 years interviewed, one was systematically selected and asked permission to interview her husband/male partner (married girls) or a co-habiting adult (unmarried girls).

Data collection tools

The data collection tool employed was a questionnaire that was adapted from several research instruments that have been used and validated in Tanzania. The questionnaire was developed in English and then translated into Swahili. Following extensive pretesting and after pilot surveys in communities outside of the selected study areas, final modifications were made to the questionnaire.

Female interviewers aged between 18 and 26 administered the questionnaire in face-to-face interviews. The interviewers were provided with one-week extensive training prior to the administration of the interview. Data was collected and recorded electronically on tablets in the field. This allows for improved data quality through real-time data delivery, built-in logical checks and skip patterns.

The questionnaire had four components:

1. Socio-demographic characteristics – age, religion, education, household amenities;
2. Sexuality and fertility characteristics – age at first sexual intercourse, timing of last sexual intercourse, pregnancy and childbearing experiences and intentions;
3. Contraceptive characteristics – knowledge and use of contraception, heard about modern contraception and sources of information on contraception, approval of married/unmarried couples using a modern contraceptive method to avoid or delay pregnancy, where method was obtained, knowledge of the benefits of contraception, misconceptions about contraception, self-efficacy to use modern contraception, reasons for not using;
4. Exposure to the A360 intervention.

All studies were approved by the London School of Hygiene and Tropical Medicine (LSHTM) ethics committee and by the local in-country ethical entity.

Modifications made to the A360 outcome evaluation protocol

Changes due to COVID-19 pandemic

Following the confirmation of the first case of COVID-19 in Tanzania on the 16th of March 2020, all public gatherings were banned. This led to the complete halt of A360 activities for the next three months in the region. In the meantime, a revised model of intervention was proposed and piloted by PSI, to meet the girls' need safely, this revised model included in-clinic events only since they attracted only small crowds, in which case enforcement of social distancing is possible. Instead of mobilization through schools and public announcements, the Kuwa Mjanja Queens along with the Community Health Workers resolved to conduct door-to-door visits. The in-clinic events were modified to ensure that girls spent no more than 30 minutes in facilities to minimize risk, including a short 'inspirational talk' which contains a shorter version of the 'know your body' and 'know your path' messaging to encourage girls to think about their life goals.

The mode of data collection in baseline and endline surveys differed somewhat because of modifications to reduce the risk of COVID-19 transmission. At endline, the second section of the questionnaire was administered by telephone, and personal protective equipment (PPE) such as face masks were used during the first, in-person, section of the questionnaire.

Outline of statistical analysis

Definitions and data manipulations

This section deals with data manipulation of key variables for analysis. Outcomes are presented in order of their importance in relation to the project aims.

Main and secondary outcomes

Modern contraceptive prevalence rate (**mCPR**) is the main outcome of this evaluation and was defined as follows:

$$\frac{Number\ of\ fecund\ sexually\ active\ 15-19\ year\ old\ girls\ reporting\ use\ of\ modern\ contraceptives[1]\ at\ the\ time\ of\ the\ survey}{Number\ of\ fecund\ sexually\ active\ 15-19\ year\ old\ girls}$$

[Equation 1. Married girls*][2]*

Tables 3 to 5 detail variable categorization from questionnaire.

In general, for those variables created based on two or more questions, scale or index scores was calculated using an unweighted procedure. This was done by simply summing raw item scores (Armor, 1973, Boateng et al., 2018). Greater sums were generally regarded as more desirable than lower sums.

[1] Male and female sterilization, contraceptive implants, intrauterine contraceptive devices, injectables, oral contraceptive pill, emergency contraceptive pill, male condom, female condom, Standard Days Method (**SDM**), Lactational Amenorrhoea Method (**LAM**), diaphragm, spermicides, foams, and jelly.

[2] Sexually active girls: those who report having sexual intercourse in the last 12 months.
Fecund girls: those who have started menstruating, are not pregnant, and do not report that they are infertile.

Table 1: Outcomes of interest for the A360 Outcome Evaluation related to population A – collected at baseline and endline

OUTCOMES	DEFINITIONS AND DATA COLLECTION TOOLS	
	DENOMINATOR	**NUMERATOR**
Prevalence of current modern contraceptive use	Girls who are fecund (started menstruating; not pregnant; not infertile) and sexually active in the last 12 months	*Variables needed:* ▪ Current use of modern contraception (binary variable: not using or using) ▪ Any known confounders (age, education, religion, parity)
Proportion of current modern contraceptive users who are using a LARC	Girls who are sexually active in the last 12 months and are currently using a modern contraceptive method	Currently using a long-acting (i.e. intrauterine device or implant) or permanent method (i.e. male or female sterilization); (binary variable: not using or using)
Modern contraceptive use in last 12 months[3]	Girls who are sexually active in the last 12 months	Used a modern method in last 12 months
Age specific fertility rates	Number of girl-years of exposure 12 months before the survey	Number of births that occurred 12 months before the survey to girls aged 15–19
Total unmet need for modern contraception **(a) unmet need for spacing** **(b) unmet need for limiting**	Girls who are sexually active in the last 12 months	The **total unmet need** is composed of unmet need for spacing plus the unmet need for limiting. The numerator includes only women who were not using contraception at the time of the survey. The non-users were first split into ▪ Pregnant or postpartum amenorrhoeic (menstrual period not returned following a birth during the two years preceding the survey), who are then classified by whether the pregnancy or last birth (last 24 months) was:

[3] We restricted past use to the last 12 months to decrease recall bias.

OUTCOMES	DEFINITIONS AND DATA COLLECTION TOOLS	
	DENOMINATOR	**NUMERATOR**
		○ wanted at that time – unmet need for spacing ○ or unwanted – unmet need for limiting; ▪ Women who were neither pregnant nor postpartum amenorrhoeic were then classified into fecund and infecund; fecund women were further split into: ○ Fecund women who want children two or more years in the future, or are undecided whether/when they wanted a child – unmet need for spacing; ○ Fecund women who wanted no more children – unmet need for limiting.
Awareness of where to obtain contraceptive services and products	Girls who are sexually active in the last 12 months and are not currently using a contraceptive method (traditional or modern)	**Awareness of where to obtain health services** was assessed through the question: ▪ "Do you know of a place where or person from whom you would feel comfortable getting family planning services and products to delay or avoid getting pregnant?" If the girl answers 'No', then she is coded 0'No' or 'Don't know' for awareness of where to obtain health services. If the girl answers 'Yes', then she is coded 1'Yes' for awareness of where to obtain health services.
Awareness of contraceptive products	Girls who are sexually active in the last 12 months	**Awareness of contraceptive products** was assessed through the question • "Have you ever heard of contraceptives?" If the girl answers 'No', then she is coded 0'No' or 'Don't know' for awareness of contraceptive products. If the girl answers 'Yes', then she is coded 1'Yes' for awareness of contraceptive products.
Benefits of modern contraception	Girls who heard about modern contraceptives	**Benefits** of modern contraception was assessed through the question "Using modern contraception can allow an adolescent woman girl to complete her education, find a better job and have a better life" with which the respondent must agree or disagree, scored 1 or 0, respectively.
Misconceptions about modern contraceptives	Girls who are sexually active in the last 12 months and have heard about modern contraceptives	**Misconceptions** about contraception were assessed through three questions, with each of which the respondent must agree or disagree, scored 0 or 1, respectively. The questions include whether the woman believed that:

OUTCOMES	DEFINITIONS AND DATA COLLECTION TOOLS	
	DENOMINATOR	**NUMERATOR**
		1. Some modern contraception can stop an adolescent woman from ever being pregnant again even after she stops using it; 2. If a modern contraception changes an adolescent woman's menstrual bleeding, it's bad for her health and can harm her womb; and 3. Some modern contraceptives can make adolescent women permanently fat. Sum score may therefore range between 0 and 3. With greater scores being more desirable than lower scores.
Agency (self-efficacy) to use modern contraceptives to prevent unintended pregnancies	Girls who are sexually active in the last 12 months and have heard about modern contraceptives	**Self-efficacy** was assessed through four questions relating to the woman's ability to access and use family planning methods, each of which the respondent must agree or disagree with, scored 1 or 0, respectively. The questions include whether she: 1. Felt able to start a conversation with her partner about contraception; 2. Felt able to use a method of contraception even if her partner did not want her to; 3. Felt able to obtain information on contraception services and products if she needed to; and 4. Felt able to obtain a contraception method if she decided to use one. Sum score may therefore range between 0 and 4.
Attitudes towards the use of modern contraceptives to prevent unintended pregnancies	Girls who heard about modern contraceptives	**Attitudes** towards the use of modern contraceptives was assessed through two questions, each of which the respondent answers "approve" or "disapprove", scored 1 or 0: 1. Do you approve or disapprove of married couples using a modern contraceptive method to avoid or delay pregnancy? 2. Do you approve or disapprove of couples who are not married using a modern contraceptive method to avoid or delay pregnancy? Sum score may therefore range between 0 and 2. With greater scores being more desirable than lower scores.

LARC, long-acting reversible contraception (i.e. intrauterine device or implant)

Table 2: Other outcomes of interest for the A360 Outcome Evaluation related to population A – only collected at endline

OUTCOMES	DEFINITIONS AND DATA COLLECTION TOOLS	
	DENOMINATOR	**NUMERATOR**
Benefits on the use of modern contraception to prevent unintended pregnancies	Girls who heard about modern contraceptives	**Benefits** of contraception were assessed through the question "Using modern contraception can allow a girl to achieve her life goals" with which the respondent must agree or disagree, scored 0 or 1.
Modern contraceptives disadvantages	Girls who heard about modern contraceptives	**Modern contraceptives disadvantages** were assessed through the question "What do you see as the disadvantages/negative consequences of using modern contraceptive methods?", which then was coded as 1 if the girl responded 'none' and coded 0 if the girl mentioned at least one disadvantage.
Descriptive norms	Unmarried girls who heard about modern contraceptives	**Descriptive norms** towards the use of modern contraceptives were assessed through three questions, each of which the respondent answers "Most of them", "Less than half of them", "None of them" or "Don't know": 1. How many unmarried girls aged 15–19 years in your community do you believe discuss using a method of contraception with their boyfriend/partner? 2. How many unmarried girls aged 15–19 years in your community do you believe use contraceptive methods? 3. How many unmarried girls aged 15–19 years in your community do you believe use contraceptive methods in secrecy from their boyfriend or family? Questions were scored 2 if the girl answered "Most of them", and 1 if answered "Less than half of them" and 0 for the answer "None of them". Sum score may therefore range between 0 and 6. With greater scores being more desirable than lower scores.
	Married girls who heard about modern contraceptives	**Descriptive norms** towards the use of modern contraceptives were assessed through three questions, each of which the respondent answers "Most of them", "Less than half of them", "None of them" or "Don't know": **1.** How many married girls (or living as married) aged 15–19 years in your community do you believe discuss using a method of contraception with their husband/partner? **2.** How many married girls (or living as married) aged 15–19 years in your community do you believe use contraceptive methods?

OUTCOMES	DEFINITIONS AND DATA COLLECTION TOOLS	
	DENOMINATOR	**NUMERATOR**
		3. How many married girls (or living as married) aged 15–19 years in your community do you believe use contraceptive methods in secrecy from their husband/partner? Questions were scored 1 if the girl answered “Most of them”, 1 if answered “Less than half of them” and 0 for the answer “None of them”. Sum score may therefore range between 0 and 6. With greater scores being more desirable than lower scores.

Table 3: Outcomes of interest for the A360 Outcome Evaluation related to population B, and data collection tools

OUTCOMES	DEFINITIONS AND DATA COLLECTION TOOLS	
	DENOMINATOR	**NUMERATOR**
Descriptive norms*	Co-habiting adult of unmarried girl who heard about modern contraceptives	**Descriptive norms** towards the use of modern contraceptives were assessed through four questions, with each of which the respondent answers "Most of them", "Less than half of them", "None of them" or "Don't know": 1. How many husbands/partners of girls aged 15–19 years in your community do you believe discuss using a method of contraception with their wife/partner? 2. How many parents/guardians of girls aged 15–19 years in your community do you believe discuss using a method of contraception with their daughter? 3. How many girls aged 15–19 years in your community do you believe use contraceptive methods? 4. How many girls aged 15–19 years in your community do you believe use contraceptive methods in secrecy from their husband/partner or family? Questions were scored 1 if the adult answered "Most of them", and 0 if the adult answered "Less than half of them" or "None of them". Sum score may therefore range between 0 and 4. With greater scores being more desirable than lower scores.
	Husband/partner of married girl who heard about modern contraceptives	**Descriptive norms** towards the use of modern contraceptives were assessed through two questions, each of which the respondent answers "Most of them", "Less than half of them", "None of them" or "Don't know": 1. How many husbands/partners of girls aged 15–19 years in your community do you believe discuss using a method of contraception with their wife/partner? 2. How many couples in your community do you believe use contraceptive methods? Questions were scored 1 if the adult answered "Most of them", and 0 if the adult answered "Less than half of them" or "None of them". Sum score may therefore range between 0 and 2. With greater scores being more desirable than lower scores.

*Only measured at endline

Exposure to the A360 intervention

We used a series of questions to rank individuals by their level of engagement with the A360 interventions that are available in the place where they live. Exposure questions used in endline surveys in Tanzania were first defined by the LSHTM OE team members Catarina Krug and Aoife Doyle, Itad members Melanie Punton, Ellie Brown and Mary Lagaay, as well as with Population Services International (**PSI**) members Claire Cole, Brett Keller, Mathew Wilson and Alexis Coppola in January 2020. Additional revisions were completed in May 2021 by the above team members as well as Melissa Neuman from LSHTM and Saidi Kapiga, Mussa Kelvin Nsanya, and Philip Ayieko from MITU. **Table 4** shows the final definition of exposed and non-exposed girls according to endline exposure questions.

Table 4: Defining exposure to A360 based on exposure questions

		POSITIVE ANSWER	NEGATIVE ANSWER	EXPOSED	NOT EXPOSED
Q1	Heard about health project with pineapple as a symbol (no/yes)	Answers yes	Answers no	Answers positively to Q1 and to Q3 or Q4	Answers positively to Q1 but not to Q3 or Q4
Q2	Heard about Kuwa Mjanja (no/yes)	Answers yes	Answers no	Answers positively to Q2 and to Q3 or Q4	Answers positively to Q2 but not to Q3 or Q4
Q3	Attended a meeting, event or workshop where Kuwa Mjanja was mentioned or pineapple displayed (no/yes)	Answers yes	Answers no	Answers positively to Q3 and to Q1 or Q2	Answers positively to Q3 but not Q1 or Q2
Q4	Heard sentences from the nanasi story (1 to 4 sentences)	Recognises at least one sentence	Does not recognise sentences	Answers positively to Q4 and to Q1 or Q2	Answers positively to Q4 but not Q1 or Q2

Figure 1: Image presented to endline survey respondents

Regression framework

Analysis of main outcome

The impact of A360 on each outcome was assessed through two analyses. In the first, impact was assessed by quantifying change between baseline and endline. In the second, it was assessed through self-reported exposure to the A360 program at endline.

The association between time (baseline versus endline) and primary and secondary outcomes

Two data sets were used, one with baseline data, and the other with endline data. Datasets were appended, and a dummy variable (e.g. time) identified whether the survey was conducted at baseline (time '0') or at endline (time '1').

We calculated mCPR at the street level, and then used linear regression models with mCPR (at the street level) as the outcome, and Time and street as predictors, as follows:

$$Y_{it} \sim \text{Normal}(\mu_{it}, \sigma^2)$$
$$\mu_{it} = \alpha + \beta\text{Time} + \sum_i \gamma_i \, \text{Indicator}(\text{street} = i)$$

where μ_{it} is the predicted mCPR for the i^{th} street at time t (baseline or endline); α is the intercept; β represents the effect of Time (endline, Time '1', vs baseline, Time '0'); and γ_i is the effect of street, which is included to account for variation in mCPR between streets and therefore increase precision.

We adjusted for the following demographic variables, which are associated with contraceptive use according to the literature: age, education level, parity, religion and wealth quintile (Greenland et al., 2016). These were added to the model at the Kebele level (e.g. average age per street).

The association between the A360 program and self-reported exposure to the program, at endline

We first described modern contraceptive use among girls who reported being exposed to A360 and those who reported not being exposed at endline. We then used logistic regression models to assess the strength of association between self-reported exposure (exposure '0', some exposure '1') and the use of modern contraception (outcome):

$$Y_i \sim \text{Bernoulli}(p_i)$$
$$\text{Logit}(p_i) = \alpha + \beta \, \text{Exposure}_i + \sum_j \gamma_j \, \text{Indicator}(\text{street} = j)$$

where p_i is the probability of modern contraceptive use for the i^{th} girl, α is the intercept; β is the regression coefficient for Exposure and corresponds to the natural logarithm of the odds ratio between exposed and not exposed girls; and γ_j is the Kebele effect included to account for clustering of observations. We adjusted for the same demographic variables that were included in the primary analysis. We also used logistic regression models to assess the effect of exposure on other binary outcomes such as use within last 12 months and proportion of LARC users.

To assess the effect of exposure on continuous outcomes such as age at first birth and aspirations index score, we first calculated the mean (95%CI) among girls who reported being exposed to A360 and among those who reported not being exposed at endline. We then used linear regression models with exposure as the predictor, as follows:

$$Y_i \sim \text{Normal}(\mu_i, \sigma^2)$$
$$\mu_i = \alpha + \beta\text{Exposure} + \sum_j \gamma_j \, \text{Indicator}(\text{street} = j)$$

where μ_i is the predicted outcome for the i^{th} girl; α is the intercept; β reflects the effect of Exposure (exposed '1', vs not exposed '0'); γ_j is the street fixed effect included to account for clustering within streets. We adjusted for the same demographic variables mentioned for the model above.

Analysis of secondary outcomes

All secondary outcomes measured at both baseline and endline were evaluated as described for the main outcome:

A. The association between time (baseline versus endline) and primary and secondary outcomes;

B. The association between self-reported exposure to the program and primary and secondary outcomes, at endline.

For those outcomes which were only measured at endline, we only analysed them as described in option (B) above, which only uses endline data.

Sample size calculations

The mCPR estimates used in our original sample size calculations were obtained from PSI and were based on projections of mCPR using the most recent DHS estimates. Effect estimates are based on an analysis conducted by one of our evaluation collaborators, Ms Michelle Weinberger (Avenir Health). The assumptions used are outlined in **Table 5.**

In Ilemela district, among sexually active 15–19-year-olds, we have assumed that because of A360, mCPR will increase from 26.7% to 32.7% between 2017 and 2019. This represents an absolute increase of 6.0% and a relative increase of 22% between 2017 and 2019 in A360-exposed girls. A sample size of 1,217 sexually active girls aged 15–19 years would give us 90% power to detect this difference based on the assumptions in **Table 5.**

Taking into account the sampling design, estimated non-response and the fact that not all adolescent girls will be currently sexually active, the final target sample size is 4,980 girls aged 15–19 years **(Table 6).** In this scenario, we have estimated that the design effect will be 1.5

Table 5: Assumptions for key parameters used in sample size calculation, and final sample size calculation after accounting for design effect

Scenario	Original 90% power to detect 22% increase in mCPR (26.7% to 32.7%)	Revised (final) 90% power to detect 22% increase in mCPR (48.9% to 59.7%)
Proportion of 15–19-year-old females who are married (or living together with partner)	21.7% (PSI data)	5.9%[1]
Proportion of 15-19-year-old females who are unmarried (not currently married)	78.3 % (PSI data)	94.1%[1]
Proportion of married 15–19-year- old females who report sexual activity in past year	97% (TDHS 2015-16 – all ages married)	91.5%[1]
Proportion of unmarried 15–19-year-old females who report sexual activity in past year	24.8% (PSI data)	22.2%[1]
Proportion of 15–19-year- old females who report sexual activity in past year	40.4% (PSI data)	26.2%[1]
Proportion of sexually active girls who are married	51.8% (PSI data)	20.5%[1]
Proportion of sexually active girls who are unmarried	48.2% (PSI data)	79.5%
Target sample of sexually active 15–19-year-old girls	1,217	519

Scenario	Original 90% power to detect 22% increase in mCPR (26.7% to 32.7%)	Revised (final) 90% power to detect 22% increase in mCPR (48.9% to 59.7%)
Total sample size of 15–19-year-old girls **• Effective sample size** **• Includes estimated non-response (10%)** **• Includes non-sexually active girls**	3,314	2,179
Design effect	1.5	1.5
Sample size (effective sample size * design effect)	4,971	3,269

[1] Estimated from interim baseline survey.

We set out to equally divide across 30 'streets' in 15 wards the sample target of 4,980 female participants aged 15–19 years. Based on assumptions derived from local census data we estimated that 34.2% of households have a female aged 15–19 years so we would need to enumerate 485 households per street to find approximately 166 adolescent girls per street. Our sampling strategy assumed we would identify 10 households per GPS point and an average of three eligible adolescent girls (one of whom is sexually active) per household cluster.

Following sampling in the first two wards, we found these assumptions largely overestimated the number of eligible girls identified per street using our planned strategy. In order to achieve the desired sample size, we revised our sampling strategy as described below.

Original sample size calculations

Based on interim analysis of data from four wards, mCPR was estimated to be higher (48.9%) than our original estimate (26.7%). We revised our sample size calculations accordingly **(Table 5).** In Ilemela district, among sexually active 15–19-year-olds, we have assumed that because of A360, mCPR will increase from 48.9% to 59.7% between 2017 and 2019. This represents an absolute increase of 10.8% and a relative increase of 22% between 2017 and 2019 in A360-exposed girls. A sample size of 519 sexually active girls aged 15–19 years would give us 90% power to detect this difference based on the assumptions. Taking into account the sampling design, estimated non-response and the fact that not all adolescent girls will be currently sexually active, the final target sample size is 3,269 girls aged 15–19 years. In this scenario, we have estimated that the design effect will be 1.5. Following revision of sample size calculations based on interim baseline survey results, we estimated that sampling two streets from each of the remaining 13 wards (26 streets) and visiting all households to identify eligible girls would be sufficient to reach our revised target sample size.

However, for the endline survey, due to logistic reasons one of the wards in baseline had to be dropped at endline leading to the survey area spanning over 14 wards and 30 streets.

Analysis of trends in modern contraceptive use

A secondary dataset on modern contraceptive use was examined to assess the change in mCPR in the A360 region. This was done because mCPR was measured only for intervention areas and there was no comparison group, so observed changes in mCPR could be due to other influences (Atchison et al., 2018).

This publicly available data (see **Table 6**) on mCPR from the Tanzania National Health Portal was used to see the trend in mCPR in Tanzania. The data was collected as a part of routine data collection by the Ministry of Health (MoH) in Tanzania. This data was not disaggregated and presented only the average monthly mCPR from 2016 to 2020 as collected by Tanzania MoH. This secondary data focused on both married and unmarried women in the 15–49 age group. Since the mCPR was calculated as a part of routine data collection by the MoH, the A360 definition of mCPR might not have been used.

Table 6: Data available on modern contraceptive prevalence in Tanzania National Health Portal

Survey Year	Average mCPR
2016	19.58
2017	17.33
2018	21.48
2019	25.7
2020	27.11

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Appendix B – Exploratory analysis on modern contraceptive prevalence rate (mCPR) and self-reported exposure to the Adolescents 360 (A360) intervention

Table of contents

Introduction

This document discusses the impact of Adolescents 360 (**A360**) on modern contraceptive prevalence rate (**mCPR**) in Tanzania.

Additionally, this document also summarises:

1) Self-reported exposure to A360 as well as
    a. its association with sociodemographic factors;
    b. and its impact on mCPR, proportion of long-acting reversible contraception (**LARC**) users among current modern contraceptive users, and use of a modern contraceptive method within last 12 months.

The impact of A360 intervention on mCPR

Hypothesis

As described in the analysis plan

The primary hypothesis is that the intervention leads to an increase in mCPR over time. Additionally, it is hypothesised that greater increase would be expected upon exposure to A360.

Primary objectives

As described in the analysis plan

The primary goal of the outcome evaluation (**OE**) study was to evaluate the effectiveness of the A360 intervention in increasing mCPR among girls aged 15–19 years in Tanzania.

mCPR was defined as follows:

$$\frac{Number\ of\ fecund\ sexually\ active\ 15-19\ year\ old\ girls\ reporting\ use\ of\ modern\ contraceptives[1]\ at\ the\ time\ of\ the\ survey}{Number\ of\ fecund\ sexually\ active\ 15-19\ year\ old\ girls}$$

[Equation 1. Married or unmarried girls]

Methods

As described in the analysis plan

For the evaluation, a before-and-after design without the presence of a comparison group was employed in Tanzania. A population-based survey was conducted in late 2017 and early 2018 for the before-intervention data. Additionally, an endline survey was conducted from May 2021 to October 2021.

1.1.1 Statistical analysis

As described in the analysis plan

Two data sets were used, one with baseline data, and the other with endline data. Datasets were appended, and a dummy variable (i.e. time) identified whether the survey was conducted at baseline (time '0') or at endline (time '1').

We calculated mCPR at the street level, and then used linear regression models with mCPR (at the street level) as the outcome, and time as the predictor, as follows:

$$Y_i = \beta_0 + \beta_1 Time + \beta_2 Street$$

where Y_i is the predicted mCPR for the i^{th} street; β_0 is the intercept; β_1 reflects the overall effect of time (endline, time '1', vs baseline, time '0'); β_2 is the street fixed effect included to match baseline and endline streets, and therefore increase power.

We adjusted for the following demographic variables, which are associated with contraceptive use according to the literature: age, education level, parity, religion and wealth quintile (Greenland et al., 2016)

[1] Male and female sterilization, contraceptive implants, intrauterine contraceptive devices, injectables, oral contraceptive pill, emergency contraceptive pill, male condom, female condom, Standard Days Method (**SDM**), Lactational Amenorrhoea Method (**LAM**), diaphragm, spermicides, foams, and jelly.

These will be added to the model at the street level (e.g. average age per street).

Results

In **Table 1**, we present the prevalence of mCPR modern contraceptive use in baseline and endline surveys. Overall, the mCPR dropped from 50.79 (95%CI: 47.81-53.76) at the baseline to 41.56 (95%CI: 38.41 – 44.77) at the endline.

Table 2 presents the results of the linear regression models, unadjusted and adjusted for confounders. Overall, mCPR decreased by 12% (-17% to -8%) between baseline and endline surveys.

Table 1: Descriptive results: mCPR (95%CI) in Tanzania at baseline (2018) and endline (2021)

	Baseline	Endline
Married	31.31 (23.10 – 40.89)	33.94 (18.13 – 40.28)
Unmarried	53.71 (50.78 – 56.62)	43.22 (39.47 – 47.06)
Married + Unmarried	50.79 (47.81 – 53.76)	41.56 (38.41 – 44.77)

Table 2: Analytical results: The relationship between contraceptive use (95%CI) at the street-level and time unadjusted and adjusted for confounders

	Unadjusted for confounders		Adjusted for confounders[1]	
	Coefficient (CI)	**P- value**	**Coefficient (CI)**	**P – value**
Married+ Unmarried[2]				
mCPR * time	-0.09 (-0.15 – -0.05)	0.0004	-0.09 (-0.17 – -0.003)	0.0429
For married girls				
mCPR * time	0.02 (-0.09 – 0.14)	0.670	0.04 (-0.06 – 0.14)	0.4066
For unmarried girls				
mCPR * time	-0.10 (-0.16 – -0.05)	<0.001	-0.08 (-0.15 – -0.003)	0.0418

[1] Street-level estimates adjusted for age, religion, education level, parity, wealth quintile. Results of a linear regression model. [2] The model with both married and unmarried respondents were adjusted for marital status in addition to the other confounders.

Conclusion

- Overall, there was some evidence of a decrease in mCPR by 9% before and after the intervention, suggestive of a not favourable impact of A360 in Tanzania.
- Additionally, there is strong evidence decrease in mCPR in the unmarried population (coefficient: -0.08; 95%CI: -0.15 – -0.003; p-value: <0.0418) compared to the married population.

Self-reported exposure to A360

The impact of the A360 program according to self-reported exposure

Describing self-reported exposure to A360

Methods/Tools

Exposure questions used in endline surveys in Tanzania were first defined by the LSHTM OE team members Catarina Krug and Aoife Doyle, Itad members Melanie Punton, Ellie Brown and Mary Lagaay, as well as with Population Services International (**PSI**) members Claire Cole, Brett Keller, Mathew Wilson and Alexis Coppola in January 2020. Additional revisions were completed in May 2021 by the above team members as well as Melissa Neuman from LSHTM and Saidi Kapiga, Mussa Kelvin Nsanya, and Philip Ayieko from MITU.

In response to COVID-19, the survey length was reduced from 40–60 minutes to 20 minutes per respondent. Therefore, we had to reduce the number of exposure questions. We made this decision based on question specificity – questions removed were more general compared to those kept (e.g. The following question was removed: "In the last two years, have you attended a meeting, event or workshop related to family planning /childbirth spacing?").

In the OE analysis plan, we specified an exposure variable with three levels, from lowest, to greatest exposure. However, the low levels of exposure across OE sites, led to the need to create a binary exposure variable – not exposed vs exposed. We discussed the exposure questions with Itad, PSI, and donors, and also received written feedback from PSI on the questions. This feedback was reflected in our final definition. **Table 3** shows the final definition of exposed and non-exposed girls according to endline exposure questions.

Table 3: Defining exposure on the basis of the questions[2]

		POSITIVE ANSWER	NEGATIVE ANSWER	EXPOSED	NOT EXPOSED
Q1	Heard about health project with pineapple as a symbol (no/yes)	Answers yes	Answers no	Answers positively to Q1 and to Q3 or Q4	Answers positively to Q1 but not to Q3 or Q4
Q2	Heard about Kuwa Mjanja (no/yes)	Answers yes	Answers no	Answers positively to Q2 and to Q3 or Q4	Answers positively to Q2 but not to Q3 or Q4
Q3	Attended a meeting, event or workshop where Kuwa Mjanja was mentioned, or pineapple displayed (no/yes)	Answers yes	Answers no	Answers positively to Q3 and to Q1 or Q2	Answers positively to Q3 but not Q1 or Q2
Q4	Heard sentences from the nanasi story (1 to 4 sentences)	Recognizes at least one sentence	Does not recognize sentences	Answers positively to Q4 and to Q1 or Q2	Answers positively to Q4 but not Q1 or Q2

[2] Source: A360 outcome evaluation: statistical analysis plan.

Figure 1: Figure 1: Image presented to endline survey respondents

Results

Appendix C describes the results per exposure question. **Table 4** describes the results of Q1, Q2, Q3 and Q3. **Table 5** describes overall exposure to A360.

Table 4: Self-reported exposure to A360 in Tanzania

Questions	Yes	No	Don't know	No response
Q1	6.09 (307)	93.75 (4728)	0.16 (8)	19.2 (64/269)
Q2	13.96 (704)	86.02 (4338)	0.02 (1)	68.2 (45/64)
Q3	14.53 (733)	85.33 (4303)	0.12 (6)	0.02 (1)
Q4[1]	91.54 (671)	8.46 (62)		

[1] Among the ones who responded positively to Q3

Table 5: Overall exposure to A360

Self-reported exposure to A360	Total respondents	Married	Unmarried
Exposed	23.66 (1,193)	22.25 (79)	23.76 (1,114)
Non-exposed	76.34 (3,850)	77.75 (276)	76.24 (3,574)

Conclusion

Self-reported exposure in Tanzania was nearly 24%. The exposure was slightly more unmarried respondents than the married ones. When 22.25% married respondents were exposed to A360, 23.76 % unmarried respondents reported exposure.

The relationship between sociodemographic variables and exposure to A360 (i.e., intervention user analysis)

Objectives

We aimed to describe self-reported exposure to A360 (percentages) at endline, by sociodemographic variables.

Results

Table 6: Descriptive results: the relationship between self-reported exposure and sociodemographic characteristics, in Tanzania

	Exposed	***Not exposed***
	n=1,335	n=3,695
Age (years), Proportion (95%CI)		
15	19.03 (16.63 – 21.68)	23.90 (22.27 – 25.61)
16	19.61 (17.43 – 22.00)	21.04 (19.73 – 22.42)
17	18.27 (15.25 – 21.74)	18.55 (17.53 – 19.60)
18	20.45 (17.97 – 23.18)	17.77 (16.67 – 18.91)
19	22.63 (20.13 – 25.35)	18.73 (17.19 – 20.37)
Number of living children, Proportion (95%CI)		
No children	6.38 (2.46 – 15.54)	4.59 (3.07 – 6.81)
1 or more children	93.62 (84.46 – 97.54)	95.11 (92.44 – 96.86)
Education level, Proportion (95%CI)		
No education or Primary	19.36 (17.44 – 21.45)	37.38 (35.53 – 39.26)
Secondary or Technical/Vocational	80.64 (78.55 – 82.56)	62.62 (60.74 – 64.47)
Religion, Proportion (95%CI)		
Catholics	34.79 (31.51 – 38.22))	35.79 (33.54 – 38.11)
Protestant, Muslim, No religion, Others	65.21 (61.78 – 68.49)	64.21 (61.89 – 66.46)
Mobile phone access, Proportion (95%CI)		
Any phone access	28.50 (25.77 – 31.39)	17.19 (15.39 – 19.17)
No mobile phone access	71.42 (68.45 – 74.21)	82.73 (80.72 – 84.57)

Interpretation: In Tanzania, among the exposed girls, most of them were 19-year-olds while among the non-exposed, the proportion of 15-year-olds were more than other age groups. Additionally, exposed girls were similar to non-exposed girls in Tanzania.

Conclusion

In Tanzania, exposed girls had similar sociodemographic characteristics to non-exposed girls.

Relationship between exposure to A360 and mCPR (i.e. dose-response analysis)

Hypothesis

As described in the analysis plan

We hypothesized that respondents reporting some exposure to A360 are more likely to use modern contraceptives compared to respondents that report no exposure.

Objectives

As described in the analysis plan

We aimed to quantify the impact of the A360 program according to respondents' self-reported exposure to A360.

1.1.2 Methods

As described in the analysis plan

We first described modern contraceptive use among girls who reported being exposed to A360 and those who reported not being exposed at endline. We then used logistic regression models to assess the strength of association between self-reported exposure (exposure '0', some exposure '1') and the use of modern contraception (outcome), as follows [2]:

$$Y_i \sim \text{bin}[P(\lambda_i)]$$
$$\text{Logit}[P(\lambda_i)] = \beta_{0i} + \beta_1 \text{Exposure}_i + \beta_2 \text{street}$$

where $P(\lambda_i)$ is the probability of modern contraceptive use for the i^{th} girl – it is a function of Exposure through the logit function, and it follows a binary distribution; β_0 is the intercept; β_1 is the regression coefficient for Exposure and corresponds to the natural logarithm of the odds ratio between exposed and not exposed girls; β_2 is the street fixed effect included to account for clustering of observations. We adjusted for the following demographic variables: age, education level, parity, religion and wealth quintile (Greenland et al., 2016). The analysis was restricted to endline data.

We used similar models to the one above to assess the effect of exposure on use within last 12 months and on proportion of LARC users.

Results

The relationship between self-reported exposure and current modern contraceptive use

In Tanzania, 52.74% (95%CI: 46.72 – 58.69) girls who were exposed to A360 reported the use of modern contraceptive methods. However, modern contraceptive use was reported among 37.13% (95%CI: 34.1 – 40.25) of non-exposed girls. Non-exposed girls used more implants than exposed girls. However, use of injectables and IUDs were more for the exposed category of girls **(Table 7)**.

The results of the logistic regression models confirmed the descriptive findings. Odds of modern contraceptive use for girls exposed were twice (OR, 95% CI: 2.01, 1.68-2.43; p<0.01) those of girls not exposed to A360 **Table 8**.

Table 7 : Descriptive results: the relationship between self-reported exposure and modern contraceptive use, in Tanzania

	Oromia	
	Exposed	***Not exposed***
No. of girls	n=328	n=967
Any modern methods	52.74 (46.72 – 58.69)	37.13 (34.1 – 40.25)
Modern method		
Implant	4.57 (2.38 – 8.85)	7.24 (5.65 – 9.23)
Intra-uterine device	0.91 (0.26 – 3.09)	0.10 (0.01 – 0.86)
Injectables	3.35 (1.90 – 5.85))	2.38 (1.68 – 3.35)
Daily pills	0.30 (0.04 – 2.43)	0.31 (0.09 – 1.05)

	Oromia	
	Exposed	***Not exposed***
Emergency pills	1.22 (0.42 – 3.48)	1.24 (0.66 – 2.30)
Male condoms	27.44 (22.96 – 32.42)	14.79 (12.15 – 17.89)
Female condoms	0.30 (0.03 – 2.51)	0.41 (0.09 – 1.94)
SDM	14.02 (11.09 – 17.58)	10.03 (7.69 – 12.99)
LAM	0.61 (0.14 – 2.65)	0.62 (0.21 – 1.76)
Any traditional method	4.88 (2.98 – 7.89)	4.96 (3.79 – 6.46)
Not currently using	42.38(37.62 – 47.29)	57.91 (55.14 – 6063)

Table 8 : Analytical results: the relationship between self-reported exposure and modern contraceptive use in Tanzania

Exposure status	Unadjusted		Adjusted	
	OR (95%CI)	**p-value**	**OR (95%CI)**	**p-value**
Not exposed	Ref		Ref	
Exposed	1.97 (1.61 – 2.42)	<0.001	1.63 (1.28-2.09)	<0.001

Conclusion

In Tanzania, respondents reporting some exposure to A360 were more likely to use modern contraceptives compared to respondents that reported no exposure.

Sensitivity analysis accounting for migration

Degree of self-reported length of time living in the community

Hypothesis

As described in the analysis plan

We hypothesised that there would be a greater intervention impact when only keeping individuals who did not leave the survey area for more than 3 months during the 12 months previous to the survey.

Methods

As described in the analysis plan

Migration was assessed through the following questions:

- In the last 12 months, have you stayed/lived in a place other than this woreda for one month or more?
- In total approximately how long have you spent outside this woreda in the last 12 months?

Being absent for at least three months in the past 12 months was used as a proxy for absence in the previous 24 months (i.e. estimated time between start of the A360 intervention and endline surveys).

Statistical analysis

As described in the analysis plan

This was a sensitivity analysis, in which girls who reported having spent more than three months out of the survey areas in the past 12 months, were excluded from the analysis. We then conducted the same analysis as in Section 1, and observed any changes in statistical conclusions.

Results

Migration frequencies

In the endline survey carried out between May 2021 and October 2021, 1,062 respondents reported staying/living outside the district for one or more months. Among them, 62.24% (661) reported being away for more than three months.

Sensitivity analysis

Table 9: Analytical results adjusted for confounders[1], excluding girls who migrated[2]

	Adjusted for confounders	
	Coefficient (95%CI)	**p-value**
mCPR*time	-0.13 (-0.18 - -0.08)	<0.001

[1]Age, equity index, education, parity and religion

[2]Absent for at least three months in the past 12 months

Interpretation: The model without girls that migrated (**Table 9**) led to the same point estimates and statistical conclusions as the main analysis (in section 1, **Table 2**).

Conclusion

Removing girls who reported having spent three months or more out of the survey areas in the past 12 months, did not lead to any changes in the statistical conclusions or in point estimates. In other words, the impact of A360 on mCPR was not affected by girls' migration.

References

Greenland, S., R. Daniel, and N. Pearce, *Outcome modelling strategies in epidemiology: traditional methods and basic alternatives.* International journal of epidemiology, 2016. **45**(2): p. 565-575.

Appendix D – DHS mCPR definition and results table

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How does the A360 outcome evaluation define modern contraceptive prevalence (mCPR)?

$$\frac{Number\ of\ fecund\ sexually\ active\ 15-19\ year\ old\ girls\ reporting\ use\ of\ modern\ contraceptives\ at\ the\ time\ of\ the\ survey}{Number\ of\ fecund\ sexually\ active\ 15-19\ year\ old\ girls}$$

[Equation 1. Married or unmarried girls*]*

- **Modern contraception** includes male and female sterilization, contraceptive implants, intrauterine contraceptive devices, injectables, contraceptive pill/oral contraceptives, emergency contraceptive pill, male condom, female condom, Standard Days Method, Lactational Amenorrhea Method, diaphragm, spermicides, foams and jelly.
- **Fecund** girls are those who have started menstruating, are not pregnant and do not report that they are infertile.
- **Sexually active** girls are those who report having sexual intercourse in the last 12 months.

How do Demographic and Health Survey (DHS) define modern contraceptive prevalence (mCPR)?

$$\frac{Number\ of\ married\ 15-19\ year\ old\ girls\ reporting\ use\ of\ modern\ contraceptives\ at\ the\ time\ of\ the\ survey}{Number\ of\ married\ 15-19\ year\ old\ girls}$$

[Equation 2. Married girls*]*

$$\frac{Number\ of\ unmarried\ sexually\ active\ 15-19\ year\ old\ girls\ reporting\ use\ of\ modern\ contraceptives\ at\ the\ time\ of\ the\ survey}{Number\ of\ unmarried\ sexually\ active\ 15-19\ year\ old\ girls}$$

[Equation 3. Unmarried girls*]*

- **Modern contraception**: same definition as A360 applies.
- **Sexually active** girls are those who report having sexual intercourse in the last 30 days.

What are the main differences between the definitions?

- The main difference between DHS mCPR definition and A360 outcome evaluation (OE) definition is that the A360 OE definition excludes pregnant girls, infertile girls, and those girls who have not started menstruating.
- Also, DHS only includes unmarried girls who report having had sexual intercourse in the last month, while the A360 OE definition considers all unmarried girls reporting sexual intercourse in the last year.

Why is the A360 outcome evaluation using a different definition?

The outcome evaluation team has decided to use a more programmatic definition of mCPR as the denominator then reflects the population that the A360 interventions are targeting i.e. the population at risk of pregnancy. By using this definition, we can examine separately the impact of A360 on:

1. Contraceptive use among the A360 target population i.e. those at risk of pregnancy; and
2. Number of pregnancies (age-specific fertility rates are a secondary outcome in A360).

Which definition of mCPR will be used in the OE analysis?

The A360 OE definition of mCPR will be used for the primary outcome evaluation analysis. We will also describe the prevalence of modern contraceptives using the DHS definition to allow direct comparison with studies that have used the DHS definition.

Other ways to define modern contraception

Contraceptives are commonly classified into modern or traditional, but there remain inconsistencies in the definition and criteria for classifying modern contraceptive methods as such (Festin et al., 2016). For example:

- The Lactational Amenorrhea Method and the Standard Days Method are classified as modern by some organizations and countries (e.g. DHS) and as traditional by others (e.g. Multiple Indicator Cluster Surveys).
- Emergency contraceptives are also generally considered a modern method, but it is sometimes difficult to quantify their use.

These differences in modern contraception definition cause confusion and make it difficult to compare mCPR between studies. We will describe method-specific use to facilitate comparisons with other studies.

mCPR results at baseline (2017) and endline (2020) surveys according to A360 and DHS definitions

The target population Tanzania where 15–19-year-old married and unmarried girls. While the DHS definition considers the whole sample of girls surveyed, as shown in the previous equations, the A360 definition only considers sexually active and fecund girls. According to the A360 definition, overall mCPR at endline for married population is 34% and for unmarried is 43%. However, by the DHS definition, the mCPR for married and unmarried population are 26% and 46% respectively. The difference was due to girls who were not fecund or sexually active but were considered in the DHS calculation. However, the mCPR shows a decrease at the endline in the unmarried population according to both A360 and DHS definition. A similar trend of increased mCPR at the endline is seen for the married population according to both the definitions. **Table 1** shows mCPR at baseline and endline using A360 definition and DHS definition.

Table 1: mCPR according to A360 and DHS definition at both baseline (2018) and endline (2021)

	A360 definition		**DHS definition**	
	Married	**Unmarried**	**Married**	**Unmarried**
Baseline	0.31 (0.23 – 0.41)	0.54 (0.51 – 0.57)	0.19 (0.13 – 0.27)	0.51 (0.40 – 0.62)
Endline	0.34 (0.28 – 0.40)	0.43 (0.39 – 0.47)	0.26 (0.22 – 030)	0.46 (0.38 – 0.54)
Difference	0.03	-0.11	0.07	-0.05

Appendix F – Subgroup analysis of secondary outcomes for unmarried and married girls

Index

Introduction

In addition to the primary outcome (mCPR), a post hoc subgroup analysis of all the secondary outcomes disaggregated by marital status was completed.
Table 1 summarizes the analytical results of all the secondary outcomes separately for unmarried and married adolescents. The statistical plan outlined in Section 2.4 was employed for this analysis as well. These linear regression models were adjusted for age, education level, religion, wealth quintiles, and parity averaged at street level. Unlike the primary analysis, marital status was not included as a confounder in these models.

Results

Adolescents' use of high-quality sexual and reproductive health products and services

Kuwa Mjanja was designed to provide high-quality sexual and reproductive health products and services through several activities such as the free, on-the-spot provision of contraceptives in the in-clinic and pop-up events. To assess impact of implementation on this component of the ToC, several outcomes were measured.

Proportion of long-acting reversible contraceptive users among all modern contraceptive users

The regression model showed evidence of a nearly 6% increase in the proportion of unmarried LARC users over time. (95% CI: 1 – 10; p-value: 0.0150). However, no such association was seen among the married adolescents.

Use of a modern contraceptive method within last 12 months

There is no evidence of an effect of Kuwa Mjanja on the use of modern contraceptive methods in the past 12 months among either unmarried or married adolescents. (For unmarried: coefficient: -0.05; 95% CI: -0.14 – 0.03; p-value: 0.2276. For married: coefficient: 0.08; 95% CI: -0.02 – 0.18; p-value: 0.1242.)

Unmet need for modern contraception

According to the regression model, there was no evidence of change over time among either unmarried or married adolescents.

Adolescent girls have access to appropriate high-quality sexual and reproductive health information and services

Another objective of A360 was to provide greater access to high-quality sexual and reproductive health information and services. In order to access the impact on this component of the ToC, we measured the girls' awareness of contraceptive products and their knowledge of where to obtain health services.

Knowledge of contraceptive methods

As represented in **Table 1**, knowledge about contraceptive methods increased over time among the unmarried adolescents (coefficient: 0.14; 95% CI: 0.11 – 0.16; p-value: <0.001). However, no such evidence of an increase was seen among the married adolescents.

Awareness of where to obtain family planning services

The regression model did not show statistical evidence of change in awareness of where to obtain family planning services among the married or unmarried adolescents.

Contraception positioned as relevant and valuable for adolescent girls

A360 interventions were designed to impart the belief that contraception is relevant and valuable for adolescent girls. To assess impact on this component of the ToC, we measured the girls' agreement with statements about the benefits of modern contraception and their intention to use a modern method of contraception.

Benefits of contraceptive methods

The regression model also showed strong evidence of street-level decrease in the proportion of unmarried girls agreeing to the benefit over time (coefficient: -0.06 ;95% CI: -0.08 – -0.03; p-value: <0.001). However, no such change was seen among the married adolescents (see **Table 1**).

Intention to use modern contraception

Intention to use modern contraception among unmarried non-users decreased over time (coefficient: -0.08; 95% CI: -0.14 – -0.01; p-value: 0.031). However, no such association was seen among the married adolescents (see **Table 17** in **Appendix C**).

Supportive environment for adolescent girls to access services

Another important goal of A360 was to enable the provision of a supportive environment for the adolescent girls. To assess the impact of A360 on this component of the ToC, multiple indicators were measured at baseline and endline. These include the girls' attitude and self-efficacy toward the use of modern contraceptives to prevent unintended pregnancies.

Attitudes toward using contraceptive methods

Consistently with the results of the primary analysis, the linear regression model also showed that unmarried adolescent girls' supportive attitude toward modern contraceptive use decreased by 13% over time (95% CI: 3 – 24; p-value: 0.013). However, the supportive attitude of married girls toward modern contraceptives increased by 11% over time (95%CI: 0.01 – 0.21; p-value: 0.033) (see **Table 1**).

Self-efficacy to access and use contraceptive methods

The analytical results of self-efficacy have a regression coefficient of -0.26 (95% CI: -0.44 – -0.09; p-value: 0.0050; see **Table 17** in **Appendix C**), which suggests a decrease in self-efficacy among unmarried adolescents. However, no such change was seen among married adolescents between baseline and endline.

Trust and credibility of family planning products

One of the objectives of A360 was to improve the trust and credibility associated with the modern contraceptive methods. In order to access the impact of A360 in increasing trust and credibility, we measured the girls' views about the misconceptions around the use of modern contraceptives.

Misconceptions and modern contraceptive disadvantages

Of the respondents who had previously heard of contraceptives, three statements were read out to them, relating to misconceptions associated with contraception use: (1) use of a long-acting reversible contraceptive like injections, IUDs and implants can make a girl your age permanently infertile; (2) changes to normal menstrual bleeding patterns, which is caused by some contraceptives, are harmful to health; (3) modern contraceptives can make adolescent girls permanently fat. The respondents were then asked whether they agreed or disagreed with the statement. The prevalence of misconceptions relating to modern contraceptives was high at baseline and endline. A misconception index was set up and a score of 1 was assigned to disagreement to misconceptions and 0 to agreement to misconceptions. The scores for all the corresponding questions were then summed to get the misconception score, which ranged from 0 to 3, with greater scores being more desirable than lower scores.

According to the regression model, there was no evidence of change over time among unmarried girls. However, an increase in the misconception score, suggestive of a decrease in misconception, was seen among the married adolescents (coefficient: 0.35; 95% CI: 0.03 – 0.68; p-value: 0.0343).

Table 1: Analytical results

Outcomes	Time effect, Coefficient (95% CI)[1]	p – value	Time effect, Coefficient (95% CI)[1]	p – value
	Unmarried		Married	
Adolescents use high-quality sexual and reproductive health products and services				
Proportion of current modern contraceptive users using a LARC	0.06 (0.01 – 0.10)	0.0150	-0.03 (-0.26 – 0.20)	0.7768
Unmet need	-0.04 (-0.11 – 0.01)	0.1018	-0.03 (-0.14 – 0.09)	0.6576
Use of modern contraceptives in the past 12 months	-0.05 (-0.14 – 0.03)	0.2276	0.08 (-0.02 – 0.18)	0.1242
Age at first birth	0.03 (-0.55 – 0.62)	0.902	0.46 (-0.06 – 0.99)	0.0813
Adolescent girls have access to appropriate high-quality sexual and reproductive health information and services				
Awareness of where to obtain health services	-0.03 (-0.13 – 0.08)	0.5582	-0.05 (-0.19 – 0.09)	0.4864
Awareness of contraceptive products (heard of contraceptives)	0.14 (0.11 – 0.16)	<0.001	0.06 (0.01 – 0.11)	0.0156
Contraception positioned as relevant and valuable for adolescent girls				
Benefit 1 of modern contraception	-0.06 (-0.08 – -0.03)	<0.001	-0.03 (-0.08 – 0.02)	0.2246
Intention to use a method	-0.08 (-0.14 – -0.01)	0.031	0.08 (-0.06 – 0.22)	0.2341
Supportive environment for adolescent girls to access services created				
Attitudes	-0.13 (-0.24 – -0.03)	0.013	0.11 (0.01 – 0.21)	0.033
Self-efficacy	-0.26 (-0.44 – -0.09)	0.005	-0.05 (-0.30 – 0.21)	0.6941
Trust and credibility of family planning products[2]				
Misconceptions about modern contraceptives	0.05 (-0.07 – 0.17)	0.3817	0.35 (0.03 – 0.68)	0.0343

[1]Street-level estimates adjusted for age, religion, education level, parity and wealth quintile. Results of a linear regression model.
[2] Increase in misconception is the desirable outcome. For the misconception index, respondents who disagreed to the misconception were scored 1 and respondents who agreed were scored 0. Thus, higher scores are more desirable than lower scores.

Limitations of this analysis

Limitations presented in the main report also apply to this analysis. In addition, this is a post hoc analysis, and the number of married girls in the survey is much smaller than the number of unmarried girls. There is limited power to detect differences within these subgroups, particularly among the married subpopulation, and so these results should be interpreted with caution.