Maternal Mortality Risk and the Gender Gap in Desired Fertility

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Motivation

- (Desired) fertility has steeply declined around the world
- This transition has stalled in much of sub-Saharan Africa (Bongaarts, 2008)
  - Women's demand for children has fallen rapidly
  - Men's preferences remained relatively constant
  - Widening gender gap in desired number of children

Gender gap in fertility preferences
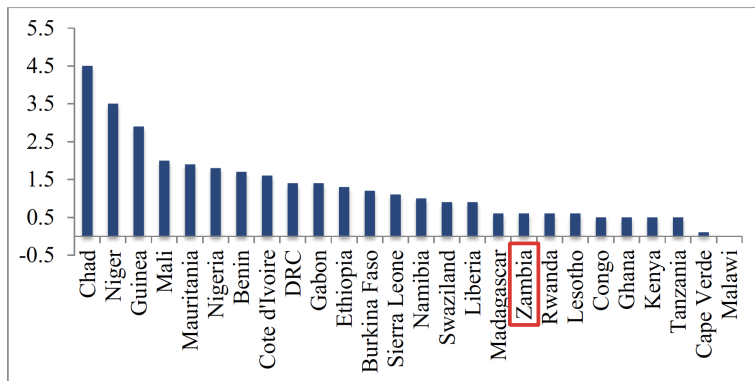
Source: Westoff (2010)

Why the gender preference gap matters

- Strong implications for intra-household decision-making: Ashraf, Field and Lee (AER, 2014)
    - Field experiment with 800 couples: randomly varied whether women given access to contraceptives alone (standard NGO model) or with their husbands (spousal veto).
    - Women given access with their husbands 19% less likely to seek family planning services, 25% less likely to use concealable contraceptives, 27% more likely to give birth.
    - Effects concentrated among couples where husband wanted more kids than wife did.

Understanding the Gender Gap in the Demand for Children

- Many possible reasons for a gender gap
- Is the gender gap in fertility demand partly determined by a difference in *beliefs* about cost?
    - Health risks of childbirth: maternal mortality and morbidity
- Can targeted information align the gap?
    - (open question re: why information doesn't spread in the household to facilitate efficient decision making, and why wrong/different beliefs could be sustained over time.)

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    - **Setting**: poor suburbs of Lusaka, Zambia
    - **Inclusion criteria**: Married couples of childbearing age (wife) that both agree to participate in health information session

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    - Do couples believe incorrectly that their individual risk of birth complications is low?

- To date, we know very little about beliefs about risk, but reason to anticipate that both men and women – *but especially men* – may underestimate individual risk (i.e. likelihood they are a high-risk case)

Today

- Conceptual framework and supporting descriptives
- Experimental design: three arms
  1. Husband receives maternal mortality training & wife receives family planning training
  2. Wife receives maternal mortality training & husband receives family planning training
  3. Both receive family planning training (separately)
- Endline Outcomes
  - Changes in realized fertility after the intervention
  - Mechanisms: maternal health knowledge, fertility preferences, communication

Why would individuals have inaccurate beliefs on risk of a woman dying in childbirth?

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  - Specific risk *factors*, which may be particularly hard to observe in the presence of superstitious beliefs

Role of superstition

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- In baseline, positive correlation between past complication and current risk assessment for both men and women
    - But masks very strong correlation for those without traditional beliefs and zero correlation for those with traditional beliefs (Ashraf et al., 2017)

Fertility decision in the household

- Spouses have different preferences

$$U^H = -(\alpha^H - n)^2 - (C - \theta^H)^2$$

$$U^W = -(\alpha^W - n)^2 - (C - \theta)^2$$

- α^i is ideal number of children with $\alpha^H > \alpha^W$;
- n is the realised number of children, with $n = f - C$
- θ is the realised risk of complication of the wife and θ^H is the man's belief about θ;
- C is set of actions that determines the number of children in the couple (contraceptive use, frequency of sexual intercourses, wife's health investment)

Optimal actions with no asymmetric information

- Men choose a set of actions that implies a higher realized fertility than wife's optimal

$$C^{*H} = \frac{f + \theta_j - \alpha^H}{2}$$

$$C^W = \frac{f + \theta_j - \alpha^W}{2}$$

where $C^{*H} < C^W$.

Incomplete information about risk in the household

- Woman has more precise information about the risk realization θ
  - Information updating may have been more salient to her
  - She may have been exposed to information updating more frequently
  - Husband may have more sticky priors

Communication and information in the household with asymmetric information

- Woman sends signal about such risk to her husband
  - Due to gap in preferences and fact that signal is costless, she has incentive to report she is high-risk
- Husband only updates partially, and contraception use is not his optimal
  - As the number of partitions in equilibrium increases, contraceptive choice in the cheap talk game is closer to optimal
- If preference gap is large enough ($\alpha^H - \alpha^W \geq \frac{1}{4}$), communication can be uninformative (Crawford and Sobel 1982):
  - For high-risk women ($\theta_j > \frac{1}{2}$), men underestimate their risk
  - Realised fertility is higher than in the complete information case

Differences in preferences at baseline
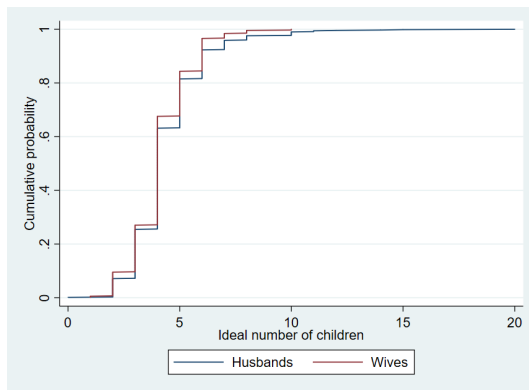
Men's distribution FOSD that of women

Differences in preferences at baseline
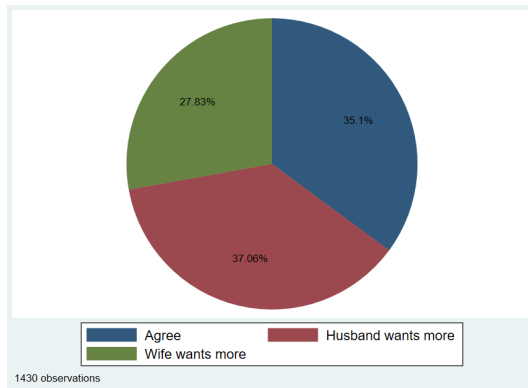
Differences in risk assessment at baseline

Question: 2 women, 40 and 20 yrs respectively, who has greater risk of dying from childbirth?
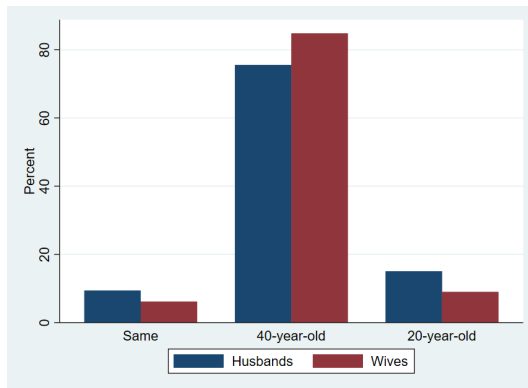
Sticky priors: Beliefs on causes of complications at baseline

"What is the cause of maternal mortality risk and complications during childbirth?"

	Men			Women			
	Mean	SE	N	Mean	SE	N	p-val
Infidelity	.547	.019	711	.434	.019	709	0.00***
Violence	.225	.016	714	.1426	.013	710	0.00***
No checkups	.313	.017	712	.281	.017	713	0.18
Health	.344	.018	713	.331	.018	711	0.60
Young age	.126	.012	713	.010	.011	712	0.11
Old age	.121	.012	712	.133	.012	712	0.47
Many children	.054	.008	706	.063	.009	710	0.44
No spacing	.072	.010	706	.094	.011	713	0.14
HIV	.126	.013	700	.124	.013	691	0.94
Not delivering in facility	.100	.011	706	.119	.012	707	0.29

Correlations between desired fertility and communication at baseline

The bigger the conflict of preferences, the lower the probability of communicating about maternal risk
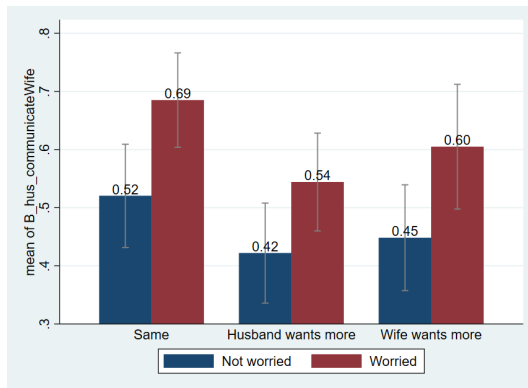
Correlations between infidelity beliefs and communication at baseline

The higher the infidelity beliefs, the lower the probability of communicating about maternal risk
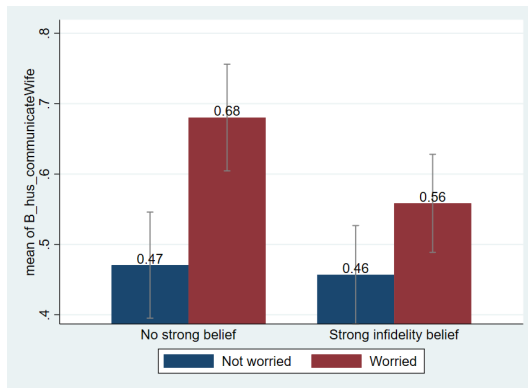
Study design
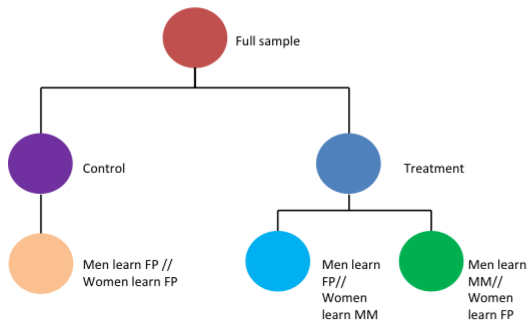
Identification

- **Identification**: we required both spouses to come to the meetings, regardless of which spouse was treated
- We can disentangle effects due to:
    - Gender differences in compliance
    - Gender differences in response to treatment

Intervention

- Family Planning Community Meeting
- Maternal Mortality + Family Planning Community Meeting
  - ‣ curriculum
- Minimize spillovers by having same treatement all weekend, so no chance of contamination
- At most 2 groups of husbands and wives simultaneously
  - e.g., 20 households, 2 husband meetings, 2 wife meetings
  - Assigned to particular room (check ID)
- All community meetings in same location
  - School, central distance to respondents' residences

  ‣ balance

Maternal Mortality Curriculum

MATERNAL MORTALITY IS HIGH IN ZAMBIA

1 woman in 59

Maternal Mortality Curriculum

SOUTH AFRICA

1 woman in 300

Maternal Mortality Curriculum

BOTSWANA

1 woman in 230
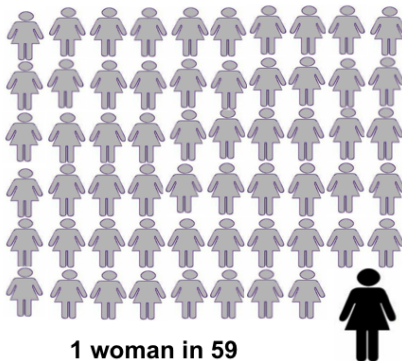
Maternal Mortality Curriculum

PREGANCY PUTS STRAIN ON A WOMAN'S BODY

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Maternal Mortality Curriculum

**HAVING CHILDREN WITHOUT SPACING
INCREASES THE RISK OF COMPLICATIONS**

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Maternal Mortality Curriculum

HEMORRHAGE

Normal placenta

Uterus

Placenta

1

2

Cervix

Normal postpartum
condition with
contracted uterus
preventing hemorrhage

Uterine atony allows
hemorrhage to flow
into the uterus

[1] © Mayo Foundation for Medical Education and Research   [2] © 2008 Nucleus Medical Art, Inc.

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Maternal Mortality Curriculum

POST-PARTUM INFECTION

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Outcome Measurement

1. Fertility preferences, attitudes toward family planning
2. Beliefs/knowledge of maternal health issues, household communication (baseline and endline surveys)
3. Husband's demand for a family planning voucher (intervention follow-up)
4. Voucher takeup (clinic) and contraceptive use (endline survey)
5. Fertility outcomes (endline survey)

Main Outcome: Realized Fertility

Wife Surveyed	(1) Currently pregnant	(2) Birth spacing since meeting (ms)	(3) Pregnant/delivered at least 8 ms after meeting
Husband Treated	-0.055*	0.11	-0.055*
	(0.029)	(0.24)	(0.030)
Wife Treated	-0.043	-0.19	-0.031
	(0.030)	(0.23)	(0.032)
Stratification Variables	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.68	0.25	0.47
Outcome Mean in Control Group	0.12	11.54	0.17
Observations	534	534	534

- Contraceptive use: 33% (4.9 pp) increase in probability of using the pill correctly

Mechanisms 1: Desired Fertility (1)

Panel A: Husband Surveyed	(1) Want another child	(2) Believe spouse wants more kids	(3) Believe spouse wants less kids	(4) Believe spouse wants another child
Husband Treated	-0.071*	-0.078*	0.011	-0.13***
	(0.038)	(0.041)	(0.039)	(0.034)
Wife Treated	0.032	-0.013	-0.013	-0.022
	(0.035)	(0.047)	(0.045)	(0.040)
Stratification Variables	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.01	0.12	0.59	0.02
Outcome Mean in Control Group	0.67	0.23	0.19	0.75
Observations	516	515	515	503

Mechanisms 1: Desired Fertility (2)

Panel B: Wife Surveyed	(1) Want another child	(2) Believe spouse wants more kids	(3) Believe spouse wants less kids	(4) Believe spouse wants another child
Husband Treated	-0.012	0.075	-0.057*	-0.0072
	(0.040)	(0.055)	(0.031)	(0.043)
Wife Treated	0.041	-0.0012	0.019	0.025
	(0.039)	(0.055)	(0.033)	(0.038)
Stratification Variables	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.28	0.10	0.02	0.43
Outcome Mean in Control Group	0.70	0.24	0.15	0.73
Observations	534	532	532	515

Mechanisms 2: Maternal Health Knowledge (1)

	Panel A: Husband Surveyed				Panel B: Wife Surveyed			
	(1) Age	(2) Many kids	(3) No birth spacing	(4) Main factors	(5) Age	(6) Many kids	(7) No birth spacing	(8) Main factors
Husband Treated	0.086	0.053	0.065*	0.14***	0.030	-0.038	0.038	0.031
	(0.053)	(0.037)	(0.039)	(0.052)	(0.049)	(0.039)	(0.045)	(0.043)
Wife Treated	0.041	0.064*	0.012	0.067	0.082	0.053	0.092*	0.10*
	(0.052)	(0.035)	(0.034)	(0.051)	(0.052)	(0.046)	(0.054)	(0.051)
Stratification Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.34	0.73	0.16	0.12	0.36	0.04	0.28	0.19
Outcome Mean in Control Group	0.23	0.08	0.09	0.30	0.35	0.26	0.30	0.47
Observations	515	515	515	515	534	534	534	534

Mechanisms 2: Maternal Health Knowledge (2)

	Panel A: Husband Surveyed			Panel B: Wife Surveyed		
	(1) Older than 40	(2) With more than 4 kids	(3) Pregnant right after delivery	(4) Older than 40	(5) With more than 4 kids	(6) Pregnant right after delivery
Husband Treated	0.40*	0.092	0.082	0.45**	-0.11	0.052
	(0.20)	(0.18)	(0.27)	(0.22)	(0.24)	(0.21)
Wife Treated	-0.11	-0.24	-0.079	0.38	0.30	0.15
	(0.23)	(0.23)	(0.27)	(0.23)	(0.26)	(0.25)
Stratification Variables	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.02	0.13	0.51	0.73	0.07	0.68
Outcome Mean in Control Group	7.40	6.45	7.77	7.81	6.44	7.47
Observations	516	516	516	532	532	532

Mechanisms 3: Communication and Relationship (1)

	Panel A: Husband Surveyed				Panel B: Wife Surveyed			
	(1) Agreement on cct use	(2) Tried convincing partner to use cct	(3) Changed partner's mind on cct use	(4) Partner changed resp's mind on cct use	(5) Agreement on cct use	(6) Tried convincing partner to use cct	(7) Changed partner's mind on cct use	(8) Partner changed resp's mind on cct use
Husband Treated	-0.097**	0.069**	0.083***	0.051*	-0.032	0.047*	0.027	0.023
	(0.044)	(0.032)	(0.030)	(0.030)	(0.044)	(0.027)	(0.023)	(0.020)
Wife Treated	-0.048	0.020	0.029	0.046	-0.015	0.033	0.018	0.032
	(0.040)	(0.029)	(0.026)	(0.029)	(0.040)	(0.023)	(0.022)	(0.022)
Stratification Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.25	0.19	0.12	0.89	0.67	0.63	0.68	0.69
Outcome Mean in Control Group	0.86	0.05	0.03	0.05	0.83	0.04	0.04	0.02
Observations	515	515	515	515	531	531	531	531

Mechanisms 3: Communication and Relationship (2)

	Panel A: Husband Surveyed				Panel B: Wife Surveyed			
	(1) Positive interaction	(2) Marriage quality (diagram)	(3) Happy with own marriage	(4) Very happy with own marriage	(5) Positive interaction	(6) Marriage quality (diagram)	(7) Happy with own marriage	(8) Very happy with own marriage
Husband Treated	0.040	0.27**	0.065*	0.10**	0.072	0.049	0.071*	-0.0021
	(0.067)	(0.13)	(0.038)	(0.047)	(0.074)	(0.18)	(0.037)	(0.038)
Wife Treated	0.0022	0.16	0.078*	0.063	-0.019	-0.042	-0.068	0.0032
	(0.071)	(0.16)	(0.039)	(0.055)	(0.079)	(0.19)	(0.048)	(0.054)
Stratification Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.61	0.34	0.69	0.42	0.19	0.63	0.00	0.92
Outcome Mean in Control Group	2.68	6.06	0.81	0.54	2.62	5.63	0.75	0.42
Observations	516	502	502	502	534	515	515	515

▸ measures

Heterogeneity by different preferences over number of kids

	Panel A: Wife Sample			Panel B: Husband Sample	Panel C: Wife Sample
	(1) Currently pregnant	(2) Birth spacing since meeting (ms)	(3) Pregnant/delivered at least 8 ms after meeting	(4) Want another child	(5) Ever used cct while partner unaware
Subsample 1: Husband's ideal children higher than biological					
Husband Treated	-0.058	0.56*	-0.095	-0.12*	-0.028
	(0.052)	(0.30)	(0.069)	(0.071)	(0.029)
Wife Treated	-0.047	0.013	-0.044	0.036	-0.019
	(0.052)	(0.38)	(0.069)	(0.072)	(0.032)
Statification Variables	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Husband Treated=Wife Treated(F-test pval)	0.80	0.12	0.42	0.02	0.77
Outcome Mean in Control Group	0.13	11.43	0.21	0.81	0.05
Observations	213.00	213.00	213.00	209.00	213.00
Subsample 2: Wife's ideal children lower or equal biological					
Husband Treated	-0.086*	0.27	-0.087	-0.20**	-0.087*
	(0.051)	(0.49)	(0.062)	(0.099)	(0.044)
Wife Treated	-0.054	-0.33	-0.049	0.056	-0.0030
	(0.054)	(0.46)	(0.070)	(0.11)	(0.060)
Statification Variables	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Husband Treated=Wife Treated(F-test pval)	0.54	0.22	0.59	0.00	0.09
Outcome Mean in Control Group	0.11	11.86	0.14	0.39	0.06
Observations	112.00	112.00	112.00	107.00	112.00
Subsample 3: Intersection between above groups					
Husband Treated	-0.11	1.45*	-0.098	-0.45**	-0.14
	(0.088)	(0.76)	(0.12)	(0.21)	(0.11)
Wife Treated	-0.0077	0.029	-0.0029	-0.31	-0.097
	(0.11)	(0.59)	(0.14)	(0.20)	(0.14)
Statification Variables	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Husband Treated=Wife Treated(F-test pval)	0.46	0.02	0.54	0.53	0.63
Outcome Mean in Control Group	0.15	11.64	0.23	0.75	0.08
Observations	47.00	47.00	47.00	43.00	47.00

Heterogeneity by belief on infidelity as enhancer of maternal health risk

	Panel A: Wife Sample			Panel B: Husband Sample	Panel C: Wife Sample	
	(1) Currently pregnant	(2) Birth spacing since meeting (ms)	(3) Pregnant/delivered at least 8 ms after meeting	(4) Want another child	(5) Using pill correctly (last taken max 1 day ago)	(6) Ever used cct while partner unaware
Subsample 1: Husband's strong infidelity belief						
Husband Treated	0.064	0.19	0.060	0.059	0.00045	-0.041
	(0.060)	(0.27)	(0.067)	(0.066)	(0.064)	(0.036)
Wife Treated	0.090	-0.49	0.13	0.18**	-0.048	0.031
	(0.063)	(0.39)	(0.077)	(0.087)	(0.080)	(0.059)
Statification Variables	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Husband Treated=Wife Treated(F-test pval)	0.68	0.09	0.33	0.15	0.55	0.22
Outcome Mean in Control Group	0.04	11.78	0.11	0.62	0.17	0.04
Observations	181.00	181.00	181.00	178.00	181.00	181.00
Subsample 2: Husband's weaker infidelity belief						
Husband Treated	-0.15**	0.51	-0.14*	-0.25***	0.22**	-0.020
	(0.064)	(0.49)	(0.085)	(0.091)	(0.10)	(0.043)
Wife Treated	-0.15***	0.38	-0.14**	0.011	0.11	-0.050
	(0.057)	(0.43)	(0.066)	(0.065)	(0.075)	(0.040)
Statification Variables	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Husband Treated=Wife Treated(F-test pval)	0.93	0.74	0.99	0.00	0.22	0.28
Outcome Mean in Control Group	0.18	11.46	0.24	0.62	0.14	0.04
Observations	149.00	149.00	149.00	145.00	149.00	149.00

Conclusion

- Households in which the men receive maternal mortality treatment reduce pregnancies by 46% one year after the intervention thanks to:
  - Men updating their beliefs about maternal mortality risk as a result of information more than women
  - Reduction in demand for children for men who receive maternal mortality information
  - Communication and interactions increase in households in which the men receive maternal mortality information

Balance across Treatments: Sample that Attended Intervention

	Mean			Mean Diff			Joint Test
	(1)MMH	(2)MMW	(3)FP	1 v 3	2 v 3	1 v 2	(p-value)
Panel A: Stratification Variables							
No biological children (couple)	0.04	0.03	0.03	0.01	-0.00	0.01	0.90
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	
Wife over 35	0.17	0.15	0.19	-0.02	-0.05	0.03	0.51
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	
Residential block size	3.69	3.74	3.47	0.22	0.27	-0.05	0.49
	(0.15)	(0.17)	(0.17)	(0.23)	(0.23)	(0.23)	
Wife bel. husband wants child later	0.54	0.47	0.47	0.07	-0.00	0.07	0.31
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	
Wife bel. husband wants child never	0.23	0.22	0.18	0.04	0.04	0.01	0.28
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	
Hus. knows women who died in childbirth	0.17	0.21	0.15	0.02	0.05	-0.04	0.40
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	

Standard errors in parentheses
*p < 0.10, **p < 0.05, ***p < 0.01

▸ back

Balance across Treatments

	Mean			Mean Diff			Joint Test
	(1)MMH	(2)MMW	(3)FP	1 v 3	2 v 3	1 v 2	(p-value)
Panel B: Demographic Variables							
Wife's Age	29.16	30.04	30.09	-0.93	-0.05	-0.88	0.20
	(0.41)	(0.42)	(0.44)	(0.60)	(0.60)	(0.59)	
Husband's Age	34.97	35.92	35.80	-0.83	0.12	-0.95	0.35
	(0.52)	(0.52)	(0.52)	(0.73)	(0.73)	(0.73)	
Wife's highest schooling	7.85	7.31	7.51	0.34	-0.20	0.54*	0.21
	(0.20)	(0.23)	(0.23)	(0.31)	(0.33)	(0.31)	
Husband's highest schooling	9.17	9.29	9.28	-0.11	0.01	-0.12	0.91
	(0.20)	(0.20)	(0.23)	(0.31)	(0.31)	(0.29)	
Husband does not work	0.00	0.03	0.01	-0.01	0.02	-0.03*	0.16
[baseline only, N=343]	(0.00)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	
Wife does not work	0.56	0.65	0.59	-0.03	0.06	-0.08	0.41
[baseline only, N=343]	(0.04)	(0.05)	(0.05)	(0.07)	(0.07)	(0.06)	
Husband's weekly income**	403.23	354.95	489.13	-85.89	-134.17*	48.28	0.14
[baseline only, N=322]	(41.62)	(38.78)	(58.30)	(69.77)	(111.59)	(57.82)	

Standard errors in parentheses
*p < 0.10, **p < 0.05, ***p < 0.01
**Top percentile omitted due to outliers

Balance across Treatments

	Mean			Mean Diff			Joint Test
	(1)MMH	(2)MMW	(3)FP	1 v 3	2 v 3	1 v 2	(p-value)
Panel C: Fertility Preferences							
Wife uses modern contraceptive	0.56	0.48	0.55	0.01	-0.07	0.08	0.26
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	
Wife's Ideal Children	4.16	4.17	4.26	-0.10	-0.09	-0.01	0.71
	(0.08)	(0.09)	(0.10)	(0.13)	(0.14)	(0.12)	
Wife's belief Hus. Ideal Children	4.33	4.17	4.21	0.12	-0.04	0.16	0.59
	(0.10)	(0.11)	(0.14)	(0.17)	(0.18)	(0.15)	
Diff. (Wife belief Hus. - Wife Ideal)	0.19	0.04	0.07	0.12	-0.04	0.16	0.53
	(0.09)	(0.09)	(0.14)	(0.16)	(0.16)	(0.13)	
Hus. Ideal Children [baseline only, N=340]	4.29	4.42	4.45	-0.15	-0.03	-0.13	0.70
	(0.13)	(0.14)	(0.17)	(0.20)	(0.22)	(0.19)	
Hus. belief wife ideal children [baseline only, N=304]	4.16	3.86	4.17	-0.01	-0.31	0.30	0.27
	(0.13)	(0.15)	(0.18)	(0.22)	(0.24)	(0.20)	

Standard errors in parentheses
*p < 0.10, **p < 0.05, ***p < 0.01

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Communication and information in the household with asymmetric information and biased beliefs

Extension: consistently with baseline data, men underestimate the probability that their wife is at high risk of maternal complications:

Assumption

Men underestimate the average risk in the population: $E(\beta^H) < E(\beta)$.

Assumption

At baseline, the ideal number of children of men is sufficiently larger than the women's one and/or the cost that women face in childbearing and childrearing is sufficiently larger than the cost that men face so that: $\alpha^H - \alpha^W > 0$.

Proposition

Assumptions 1 and 2 are sufficient conditions for the action chosen by the husband to be on average lower than the optimal one at baseline.

The effect of the intervention

The intervention is going to reduce the gap between $E(\beta^H)$ and $E(\beta)$ in MM^H relative to FP.

Prediction

If Assumption 1 holds, fertility is going to decrease, on average, for households in which the husband is treated.

Prediction

Fertility is going to decrease more, on average, for households in which the husband is treated and in which there exists a preference gap.

Heterogeneity by conflict over number of kids: realized fertility

-	(1) Pregnant/delivered at least 8 ms after meeting (wife surveyed)	(2) Want another child (husband surveyed)
Husband Treated	-0.14	-0.051
	(0.086)	(0.084)
Wife Treated	-0.032	0.073
	(0.086)	(0.068)
Stratification Variables	Yes	Yes
Demographic Controls	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.23	0.09
Outcome Mean in Control Group	0.28	0.72
Observations	149	147

▸ back

Heterogeneity by conflict over number of kids: use of contraception

Wife Surveyed	(1) Currently using modern cct	(2) Currently using pill	(3) Using pill correctly (last taken max 1 day ago)	(4) Using pill correctly (last taken max 5 days ago)	(5) Ever used cct while partner unaware
Husband Treated	0.052	0.19**	0.16**	0.20***	-0.013
	(0.10)	(0.074)	(0.072)	(0.072)	(0.036)
Wife Treated	0.078	0.047	0.052	0.066	-0.026
	(0.089)	(0.066)	(0.064)	(0.063)	(0.041)
Stratification Variables	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Hus Treat=Wife Treat(F-test pval)	0.81	0.07	0.17	0.10	0.63
Outcome Mean in Control Group	0.59	0.11	0.09	0.09	0.07
Observations	149	149	149	149	149

▸ back

Identification

- Objects of interest

$$ATE^j = E[Y(MM + FP)^j] - E[Y(FP)^j]$$
$$\Delta ATE = ATE^h - ATE^w$$

- With double-blind invitations:

$$E[Y(\cdot)|P(MM + FP)^j = 1] = E[Y(\cdot)|P(FP)^j = 1] =$$
$$E[Y(\cdot)|P^j = 1]$$

$$TOT^j = E[Y(MM + FP)^j|P^j = 1] - E[Y(FP)^j|P^j = 1]$$
$$ITT^j = E[Y(MM + FP)^j - Y(FP)^j]$$
$$= \pi^j E[Y(MM + FP)^j|P^j = 1] - \pi^j E[Y(FP)^j|P^j = 1]$$
$$= \pi^j TOT^j$$

Where π^j is the probability that spouse j attends

Challenge

Cannot compare across genders

$$\Delta ITT = E[(Y(MM + FP)^h - Y(FP)^h) - (Y(MM + FP)^w - Y(FP)^w)]$$
$$= \pi^h E[Y(MM + FP)^h - Y(FP)^h | P^h = 1]$$
$$+ \pi^w E[Y(MM + FP)^w - Y(FP)^w | P^w = 1]$$

Solution

Our solution: $E[Y(\cdot)|P^h = 1 \ \& \ P^w = 1]$

$$\Delta TOT = E[(Y(MM + FP)^h - Y(FP)^h, Y(FP)^w)|P^h = 1, P^w = 1]$$
$$- E[(Y(FP)^h, Y(MM + FP)^w - Y(FP)^w)|P^h = 1, P^w = 1]$$
$$\Delta ITT = E[(Y(MM + FP)^h - Y(FP)^h, Y(FP)^w)|P^h = 1, P^w = 1]$$
$$- E[(Y(FP)^h, Y(MM + FP)^w - Y(FP)^w)|P^h = 1, P^w = 1]$$
$$= \pi^{hw} E[(Y(MM + FP)^h - Y(FP)^h, Y(FP)^w)|P^h = 1, P^w = 1]$$
$$- \pi^{hw} E[(Y(FP)^h, Y(MM + FP)^w - Y(FP)^w)|P^h = 1, P^w = 1]$$

where π^{hw} is the probability that both spouses attend.

Measuring Marital Happiness

Three questions

- Index of positive interaction: sum of answers of "likely" or "very likely" to
    - When problems or issues arise, how likely is it that both you and your spouse avoid discussing the problem?
    - During a discussion of issues or problems, how likely is it that both you and your spouse express feelings to each other?
    - During a discussion of issues or problems, both you and your spouse suggest possible solutions and compromises?
- How happy are you with your marriage?
- Inclusion of other in self scale