Effect of Mass Media on Family Planning Choices in Indonesia

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Executive Summary

Realizing the necessity of family planning, the Indonesian government started family planning programs in the late 1960s, long before the global Program of Action from the International Conference of Population (ICPD) in 1994.

Many studies have tried to draw plausible explanations for the prevalence of family planning focused mainly on socio-economic factors but few studies have approached the issue from the perspective of mass media influence as the variable of interest. This study attempts to fill this gap created by the lack of empirical evidence about mass media effects of family planning choices by examining the contraceptive behavior of Indonesian married women.

In this study, I used two Indonesia cross-sectional DHS couple datasets from 2007 and 2012. These datasets have a nationally representative sample that would reflect my entire population of interest: married women in Indonesia. To test my hypothesis, I used a logistic regression with respondents' likelihood to participate in family planning programs currently and in the future as the dependent variables, exposure to mass media as the independent variable of interest and several control variables that might influence the association.

I found that, overall, television had a positive association with Indonesian married women's contraceptive behaviors. But, the existing family planning campaigns in mass media did not show any clear pattern. This finding suggests that by creating effective family planning television campaigns, the Indonesian government might be able to overcome its budget constraints in delivering information about the family programs.

Introduction

Overpopulation is a controversial issue. Most fundamentally, the existence of overpopulation is still debatable. This debate was started by Thomas Malthus, a British thinker in the early 18th century. He posited that the human population would grow geometrically while food production would grow at an arithmetic rate. Therefore, at some point in the future, the physical world would not able to sustain the human population anymore (Malthus, 1798). His hypothesis evoked different reactions. Two early influential criticisms came from Hazlitt (1807) and Godwin (1820). Hazlitt argued that Malthus' theory was based on his self-interest while Godwin questioned the accuracy of Malthus' predictions by suggesting that the population would never grow beyond the limits of the food supply and food production would improve simultaneously with the population increase. On the other hand, Mill (1848) defended Malthus' idea by suggesting that all criticisms of Malthus were superficial. In later years, more scholars argued about this topic. In 1986, Goldstone was able to draw a model that explained the English industrial revolution (1760-1840) by using Malthus' population theory. While in 2001, a study by Bjorn, a Danish environmentalist, showed that along with technology improvement, the environment where humans live, in fact, has actually improved to fulfill human needs. It is just a matter of resources redistribution and management.

Aside from the inconclusive studies and debates about whether or not there is overpopulation, family planning programs that were at first primarily designed to reduce fertility rates and to slow down population growth have had many other measurable effects, both positive and negative. China, for example, having engaged in decades of forced abortions and forced sterilizations, now faces concerns that the country may "grow old before it gets rich." One of the

most visible positive effects of family planning is that family planning decreases maternal and newborn deaths, especially for women outside of the optimal biological age for pregnancy[1], unintended pregnancies, and high numbers of pregnancies. This means family planning promotes healthier mothers and newborns. Ensuring human rights that individuals and couples have a fundamental right to decide their reproductive patterns is also another rationale for family planning programs. This was brought up at the International Conference on Population and Development, held in Cairo, in 1994.

In Indonesia, family planning has a special place in the government's human development policy. The Indonesian government realized the necessity of family planning and started this program in the late 1960s, long before the global Program of Action from the International Conference of Population (ICPD) in 1994 (UNFPA-Indonesia, 2015). Furthermore, Indonesia is one of the top priority target countries of a global family planning program called the Family Planning 2020 (FP2020) created by the UK Government along with the Gates Foundation and UNFPA (FP2020, 2015). This program supports the rights of women and girls to decide, freely, and for themselves, whether, when, and how many children they want to have by giving women and girls access to contraceptives by 2020.

We can find many studies that try to map the prevalence of contraceptive use in developing countries. Among the most prominent studies is a study by Ainsworth et al. (1996) that focused on education, income improvement and religion related practices to explain the prevalence in fourteen sub-Saharan African countries. Behrman et al. (2002) in Kenya and

[1]The average age of motherhood has risen through time and by considering average human health improvement and technology enhancement in medical field, it is difficult to have a fix range of optimal biological age for pregnancy. But, by taking into account fertility factors and probability of miscarriage, UK National Health Service (NHS) suggests that the ideal biological age for pregnancy is between 20 and 35 years.

DeGraff et al. (1997) in the Philippines addressed the same issue but adding community and socio-environmental determinants to the models. We can see that, these studies along with most other studies about family planning are focused on socio-economic factors to draw a plausible explanation of the prevalence. We can only find a few studies that approach this issue from the perspective of mass media influence as the variable of interest. This is somewhat surprising since mass media has been found to influence important personal decisions in other areas such as voting choices (Mutz, 2001) and criminal behavior (Bickman, 1975; Heath and Gilbert, 1996).

Literature Review

Sinding (2008) provides a broad definition of family planning. It includes both the act of deciding if and when pregnancy should happen and the organizing efforts to make contraceptive services, such as providing birth control supplies, accessible to both women and men through information availability or technical support. This definition includes government intervention as an important factor in family planning programs.

Why do policy makers around the world, especially in the developing countries, pay such close attention to the implementation of family planning programs? We can answer the question from different perspectives. First, from the human rights perspective, family planning is the manifestation of the fundamental human right to choose the number and timing of children by freeing individuals from involuntary reproduction. It was started in 1975 with The Declaration of the International Women's Year Conference that demanded an equal treatment of women as independent human beings. Women must be assured full decision-making autonomy, including their reproductive decisions (UN Women, 1975).

Second, there is the health perspective. It is the most prominent objective of the family planning program. The World Health Organization in 2015 reported that approximately 99% or 302,000 incidents of global maternal deaths occur in developing countries. Unsafe abortions account for between 8 and 15 percent of that figure. The global maternal death counts only for mother death during pregnancy, during birth and right after birth. It excludes the most common complications, such as severe hemorrhage and postpartum infections, which are massively underreported (Grimes et al., 2006). In addition to this statistic, in 2015, 4.5 million infant deaths occurred within the first year, which is approximately 75% of the total child deaths under five years old. Again, although globally these statistics have sharply declined over time, the disparity

between the developed and developing countries remains immense. For instance, the risk of a mother dying during or after birth is over nine times higher in Indonesia than in the United States (WHO, 2015). By implementing family planning that allows individuals to decide when they are ready to have a baby based on their own judgment about their health condition and other factors, obstetric-related mortality could be decreased by approximately 150,000 cases which account for 32% of all maternal deaths and nearly 10% of childhood deaths (Clealand et al, 2006).

Third, there is the economic perspective. Studies by Schultz (2009) and Joshi and Schultz (2012) examined an outreach family planning program intervention in the district of Matlab, Bangladesh from 1977 to 1996. They found that, holding other factors constant, women in the villages that participated in the program were on average reported to be healthier and more productive than the comparison group. In addition, for the long-term effect, they also earned 40% higher income and had 25% more physical assets per adult in their household than women in the comparison group. Since the outreach family planning program was a package of family planning, reproductive health, and child health interventions, the observed effects would be a combination of these three sub-programs and it would be impossible to attribute any particular share to a specific sub-program. But, a study by Debpuur et al. (2002) that examined a similar intervention experiment related to family planning programs held in Navrongo, Northern Ghana, from 1993 to 1999 replicated the result and increased confidence in the long term effect of family planning program. Overall, planned reproduction behavior and fertility reductions could decrease youth dependency and stimulate more female participation in the labor force in developing countries, which adds to aggregate economic growth.

In Indonesia, the family planning program started in the late 1960s. It was a voluntary program without any incentives or coercion for the participants. The program was fully

implemented in 1970. Since then, the Indonesian fertility rate has declined sharply. For the first 15 years of the program, the percentage of participants of the program among all eligible couples rose from 2.8 percent in 1971/72 to 62.6 percent in 1984/85 (McNicoll and Singarimbun, 1983). Therefore, this program was considered as a model of government-sponsored fertility control in a developing country. The Indonesian family planning program had three basic strategies: to expand program coverage, to promote the program and ensure the continuation of use by contraceptive users, and to create regulations that standardize family planning practice and achieve low fertility in the society (Warwick, 1986).

In its early implementation, the Indonesian family planning program adopted a passive, clinic-based approach to contraceptive provision. This approach was not effective and resulted in slow growth in contraceptive use (Rogers, 1971). Therefore, the Indonesian government changed the approach to be more active by using fieldworkers that promoted this program door-to-door. By shifting the approach, the number of contraceptive users increased rapidly (Suyono, 1976). But, a new problem arose. Instead of using Intrauterine Devices (IUD) as the recommended method, the new users preferred to use the pill -a method that required continuous resupply and reminders to be effective. With contraceptive use spreading across the country, more fieldworkers were needed. In 1974, the Indonesian government developed a new approach: village family planning groups. These groups consisted of selected women who were currently contraceptive users and supported the family planning program at the village-level by giving information to married women in their villages to participate in the program and maintain contraceptive use. This method instantly decreased the demand of additional fieldworkers. But, with a field workers-service village ratio of 1:4, it was still far from an ideal ratio of 1:2 (Suyono, 1976). To address this issue, one possible solution is to use a mass media campaign to promote

family planning programs. The cost would be relatively lower than hiring additional fieldworkers.

The positive view of family planning as a success story was challenged by Pit et al. (1993) and Gertlar and Molyneaux (1994) that examined the educational impact on the Indonesian fertility rate over a 5-6 year period in the early 1980s. They found a strong association between a mother's education and advantageous effects for her children. This finding dwarfs any family planning effect as one of the explanatory variables of fertility. Thereafter, analysts considered the fertility rate decline to mostly be a result of increases in women's educational attainment, with little independent impact of the family planning program. In their study, Angeles et al. (2005) challenged these results by proposing two possible flaws of the educational impact studies. First, they found that education attainment could influence a woman's decision about age at marriage; therefore, the effect of education on fertility was indirect. Second, it is likely that individuals in the sample who completed more schooling might be a self-selected sample, which raises a concern about endogeneity. Therefore, Angeles et al. (2005) argue that making inferences about the causal impact of education on the fertility rate might be invalid. They also found that the presence of the family planning program not only yielded a significant fertility reduction but also substantially increased female educational attainment.

Overall, despite the controversy about overpopulation as the reason behind the family planning programs and also the controversy about the effects of family planning itself, many countries in the world, including Indonesia, are still implementing this program. Human rights, health, and economic perspectives are three major reasons of this implementation.

We cannot discuss a public program without considering the most effective way to deliver the program to the target population. This part is where the mass media takes a major role. Mass media has a great impact on changing behavior. A study by Ball-Rokeach (1976) suggests that mass media exposure has numerous effects on society's behavior, two of which are activation and de-activation. The audience would do something that they would not otherwise have done after receiving messages from mass media (activation). Or on the other hand, they would change their decision to not do something they would otherwise do after receiving a certain type of message from mass media (de-activation). Studies that explain human behavior patterns with respect to mass media exposures support this hypothesis. For instance, exposure to mass media that transmits certain images and symbols would shape viewers' beliefs and lead to changes in thought, affect, and action (Bandura, 2001). Controlled laboratory studies, particularly for television and print media, provide convincing (high internal validity) estimates of such media effects (O'Bryant & Corder-Bolz, 1978; Heath, 1984; Siegel, 1958). These studies found that mass media changes the viewers' preferences in both the short term and long term.

Research Design

Research Question

In this study, I addressed the question whether exposure to mass media, especially to radio, television, and print publications, affects family planning attitudes and behavior in Indonesia. But, due to the methodology and data limitation, I did not draw any causal inference from the result; instead, I presented the result as an association. This being the case, I expected to see a significant positive association between mass media exposure and Indonesian citizens' family planning practices.

Data

The data that I used are from the Demographic and Health Surveys (DHS) conducted by Macro International Inc. The surveys were funded by USAID. One of the DHS dataset's special features is that it uses a standardized set of questionnaires such that the results are comparable across countries. The surveys are designed to collect data on marriage, fertility, family planning, reproductive health, child health, and HIV/AIDS among women of reproductive age (15–49) as the focus of the survey. In every selected household, the surveyors identified all eligible women for individual interviews. Therefore, all DHS surveys have at least two datasets: household datasets and women's datasets. In this study, I used two Indonesia cross-sectional DHS couple datasets from 2007 and 2012. These datasets have a nationally representative sample, which means that it would reflect my entire population of interest: married women in Indonesia.

Methodology

To test my hypothesis, I used logistic regression. Exponentiated coefficients in the logistic model represent the odds ratio of respondents' prevalence to participate in family planning programs by having exposure to certain types of mass media. I measured this attitude

by using two dependent variables. The first variable is whether the respondents are currently using any contraceptive methods and the second variable is whether they have any intention of using contraceptive methods in the future. Both of this variables are dichotomous variables.

Although Muslim scholars unanimously agree that any method of family planning (even abortion) can be done if the life of the mother is in danger, they still have different opinions about family planning application in general. With the fact that Indonesia has the largest Muslim population percentage in the world at nearly 90%, the social desirability bias issue arises. The respondents might answer the questions related to their contraceptive status and desire to use any contraceptive method in the future in a manner that will be viewed favorably by others. To deal with this possible issue, I used survey questions that capture the respondents' desirable number of children. A nonnumeric response of this question that often appeared in the form of: "Up to God" can be used to capture the upper bound respondents' attitudes to family planning related to their religion. The result showed that only 9% of the respondents gave non-numeric responses. Therefore, I can justify that the social desirability bias issue is not a problem in my model.

In this model, I controlled for several variables that might influence the association, such as maternity record and related socio economics variables such as age, number of children, whether the respondent has both male and female, regions of residency, education level and occupation. I also controlled for respondent's husband characteristics, such as husband's age, occupation, and education level. The variables that I used in the models are shown in table 1 as follows:

Table 1: Variable Use in Logistic Regression

Variable	Description
Dependent Variable:	
Current User	Respondents contraceptive user status. 0: currently does not use any contraceptive method 1: currently using contraceptive method
Intention to use contraceptive method in the future	Consist of respondents that currently do not use any contraceptive method. 0: have no plan to use any contraceptive method 1: will use contraceptive method in the future
Variables of Interest:	
Exposure to mass media	0: no at all 1: less than once a week 2: at least once a week
Exposure to TV	
Exposure to radio	
Exposure to print media	
Exposure to family planning campaign:	
On TV	0: have not watched/heard/read/experienced direct visit about family planning in the last few months 1: ever watched/heard/read/experienced direct visit about family planning in the last few months
On radio	
On print media	
Direct visit by family	
Control Variables:	
Respondent's Age	Respondent's age in completed years
Respondent's Education Level	Respondent's years of education
Respondent's Working Status	0: currently does not work 1: currently working
Number of Children	Total number of living children
Wealth Index	Respondent's wealth index score. Generated with a principal components analysis by DHS.
Pair Children	0: don't have both male and female 1: have both male and female
Type of place of residence	0: rural 1: urban
Husband Age	Husband's age in completed years
Husband Education Level	Husband's years of education
Husband Working Status	0: currently does not work 1: currently working

I checked the validity of my model by using the Hosmer–Lemeshow goodness-of-fit test statistic. This test estimated the goodness of-fit in my model. If the differences between the fitted values and observed values are small and these differences did not systematically contribute to the error structure of my model, I can justify the overall goodness of fit of my model. I also estimated the variance inflation factor (VIF) value to check the possibility of collinearity issues by running a linear regression beforehand.

To check the robustness of the outcome, I compared the results between simple descriptive statistic analysis and multivariate analysis and also between two different years: 2007 and 2012. Moreover, comparing the result with similar studies in other demographically equivalent countries helped to justify the external validity of the study.

Results

From 2007 to 2012 married women in Indonesia had approximately an 8% increase in the exposure of television. This increase is in contrast to exposure to radio and print media which demonstrated 11% and 1% declines, respectively (Figure 1). The increase in exposure to television in general is followed by the increase of married women's exposure to family planning campaigns through television by 16% (Figure 2). Exposure to television in Indonesia is following the trend of a rapid increase in other developing countries in the world that globally have at least a six-fold increase since the 1980s (Thomas, 2003)

Figure 1: Percentage Married Women Exposed at Least Once a Week by Certain Type of Mass Media

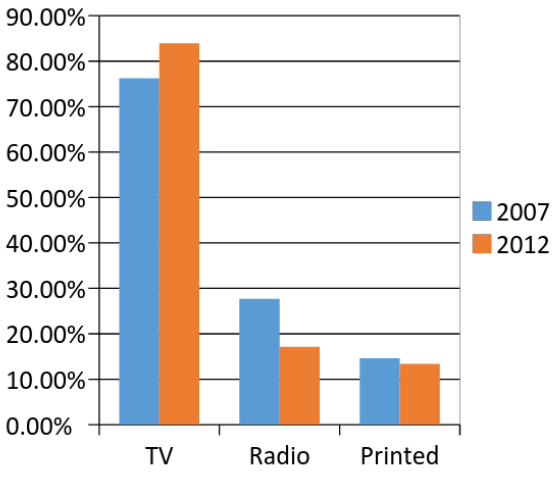
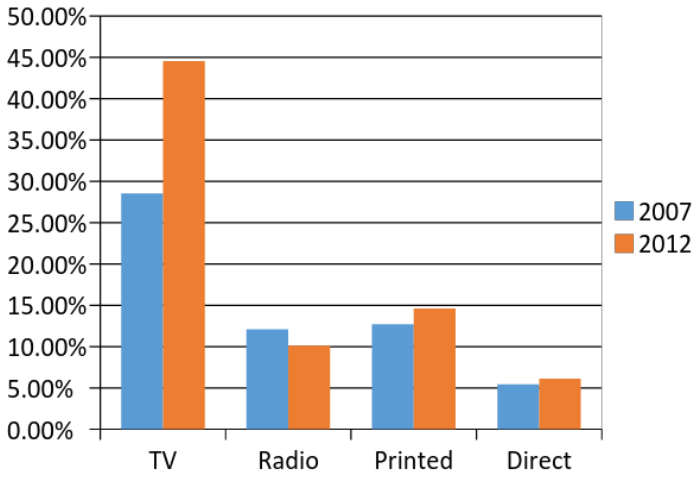


Figure 2: Percentage Married Women Exposed by Family Planning Campaign in The Last Few Months.



Source: Indonesia DHS Survey 2007 and 2012.

To determine whether the increase of mass media exposure, both in general or with family planning campaign content, has an association with contraceptive behavior, I ran a

logistic regression with contraceptive use (table 2) and intention to use (table 3) as dependent variables of interest. The results are as follows:

Table 2: Logistic Regression Result of the Effects of Exposure to Mass Media on Current Use of Family Planning, for Married Women in Indonesia.

Variable	2007		2012	
	Coefficient	s.e	Coefficient	s.e
Respondent's Characteristics				
Respondent's Age	-0.0524***	0.006	-0.0468***	0.006
Respondent's Education Level	0.0407***	0.009	0.0225**	0.009
Respondent's Working Status	0.235***	0.051	0.0258	0.051
Number of Children	0.181***	0.021	0.292***	0.023
Wealth Index	0.102***	0.024	0.0972***	0.023
Pair Children	0.753***	0.061	0.668***	0.057
Residential	0.0103	0.061	-0.0342	0.055
Husband Age	-0.0003	0.006	-0.00173	0.006
Husband Education Level	-0.0195*	0.008	-0.0226**	0.008
Husband Working Status	0.578**	0.189	0.801***	0.202
Media Exposure				
TV Exposure (base: no exposure)				
Less than once a week	0.582***	0.105	0.799***	0.129
At least once a week	0.931***	0.097	1.019***	0.114
Radio Exposure (base: no exposure)				
Less than once a week	-0.0266	0.060	0.124*	0.059
At least once a week	-0.0258	0.066	0.213**	0.075
Print Media Exposure (base: no exposure)				
Less than once a week	-0.0252	0.062	-0.0147	0.061
At least once a week	-0.0814	0.091	-0.149	0.090
Exposure to Family Planning Campaign				
On TV	0.12	0.063	-0.0138	0.054
On Radio	-0.0352	0.065	0.0619	0.090
On Print Media	-0.177*	0.071	-0.148	0.079
Direct Visit	-0.0387	0.078	0.241*	0.104
Constant	-0.581*	0.244	-0.906***	0.256
Number of Observations	7757		8161	

* p<0.05, ** p<0.01, *** p<0.001
Source: Indonesia DHS Survey 2007 and 2012.

As seen in table 2 above, most of the control variables that have statistically significant effects show the direction as expected. For instance, respondent education level has a positive value which means that, holding everything else constant, on average, the higher the woman's education level the more likely she is to use contraception. Better educated women have broader knowledge toward reproduction than less educated women which could influence reproductive behavior. The negative result from the respondent's age variable can be interpreted as the respondent's awareness about their fertility cycle along with their desire to have children. With the common knowledge that early 20's is the most fertile period and declines with age, older women that desire to have children will be less likely to use any contraceptive methods. A striking result comes from the husband's education level variable that has a negative value. This value shows us that having a more educated husband decreases the likelihood of respondents using contraception. A more comprehensive model that takes into account the spousal education difference might be able to answer this finding.

For exposure to mass media as my variable of interest, with all controls, television and radio are two mass media sources that have statistically significant results. For television, more exposure increases the likelihood of using contraceptive methods. This result is robust for both 2007 and 2012. Radio exposure also has a statistically significant positive association but only in the 2012 surveys which is quite interesting to examine since in 2012 radio exposure had declined by 11% since 2007. For exposure to family planning campaign in mass media, a striking finding comes from print media. As the only mass media that has statistically significant result, exposure to family planning campaign in print media surprisingly decreases the likelihood of using contraceptive methods in 2007. While in the later surveys, 2012, direct visits by family planning workers were the only family planning campaign strategy that had a statistically significant

association with contraceptive use[2]. As arguably the most expensive method of campaign since it requires family planning workers, I was expecting to see a statistically positive association for both years. This can demonstrate that the family planning worker campaign has started to be effective only since 2012.

[2] At 5% significance level, the models passed the Hosmer–Lemeshow goodness-of-fit test both in 2007 (chi^2: 7772.32, p-value: 0.362) and 2012 (chi^2: 8328.66, p-value: 0.0624). The result for multicollinearity test also showed that both of the models did not have multicolinearity issue with VIF value for all variables <10

Table 3: Logistic Regression Result of the effects of Exposure to Mass Media on Intention to Use a Family Planning method, for Married Women that Are Not Using Any Family Planning Methods in Indonesia.

Variable	2007		2012	
	Coefficient	s.e	Coefficient	s.e
Respondent's Characteristics				
Respondent's Age	-0.111***	0.012	-0.142***	0.012
Respondent's Education Level	0.0694***	0.018	0.0484**	0.017
Respondent's Working Status	-0.14	0.100	-0.221*	0.105
Number of Children	0.0631	0.036	0.0266	0.038
Wealth Index	-0.0106	0.049	0.0576	0.047
Pair Children	0.186	0.124	-0.0251	0.121
Residential	0.173	0.123	-0.195	0.115
Husband Age	-0.0617***	0.011	-0.0295**	0.011
Husband Education Level	-0.02	0.016	-0.0143	0.016
Husband Working Status	-0.00701	0.334	0.534	0.374
Media Exposure				
TV Exposure (base: no exposure)				
Less than once a week	0.632**	0.200	0.828***	0.247
At least once a week	0.860***	0.187	1.022***	0.219
Radio Exposure (base: no exposure)				
Less than once a week	0.0843	0.122	0.244*	0.122
At least once a week	0.386**	0.133	-0.0807	0.155
Print Media Exposure (base: no exposure)				
Less than once a week	0.275*	0.124	-0.0709	0.128
At least once a week	0.129	0.185	-0.0803	0.185
Exposure to Family Planning Campaign				
On TV	0.207	0.118	0.347**	0.113
On Radio	-0.356*	0.156	0.193	0.184
On Print Media	0.0736	0.155	0.0107	0.161
Direct Visit	0.0126	0.162	0.365	0.223
Constant	4.551***	0.462	4.618***	0.505
Number of Observations	2617		2643	

* p<0.05, ** p<0.01, *** p<0.001
Source: Indonesia DHS Survey 2007 and 2012.

For non-contraceptive users, the logistic regression result in table 2 shows the respondent's intention to use contraceptive method in the future. Respondent's age and education level have a statistically significant association which is the same as the first model. But, unlike the first model, the husband's age variable in this model has a statistically significant negative

association with the respondent's intention to use contraceptive methods. It can be interpreted that having an older husband decreases the likelihood of respondent's intention to use contraception. This finding can be explained by considering Indonesian households' characteristics that on average still depend on the husband as the main source of household income (the dataset confirmed this claim by reporting that more than 98% of husbands work while, for the respondents, less than 56% report working). With this particular characteristic, a respondent that has an older husband will be less likely to plan to use contraceptive methods in the future in order to have children while her husband still actively working.

For exposure to mass media, with all controls, television and radio are the only two mass media sources that have a statistically significant positive association with respondents' intentions of using contraceptive methods. Both light and heavier exposures of television have significant effects in 2007 and 2012 surveys which are in line with the result in the first model. Differently, radio shows positive effects only for heavier exposure in 2007 and light exposure in 2012. This finding indicates that radio has a positive association in the respondents' intention to use any contraceptive methods. But, this association is inversely related with the amount of exposure through time. In other words, in the next period, the radio exposure will have positive effects only for a lighter exposure compared with the current period. By looking at the declined radio exposure in 2012 and inverse relationship of the exposure amount through time, I could draw a plausible explanation that fewer radio listeners in the latter year are self-selected listeners. Therefore, they are more likely to get influenced by the radio.

For exposure to family planning campaign in mass media, campaign in television had a statistically significant positive association only in 2012. This finding might be derived from a relatively high increase of family planning program campaigns in television in 2012 (figure 2).

Interestingly, in 2007, a woman that had exposed to family planning campaign in radio will be less likely to have plans to use any contraceptive methods in the future[3].

One concern with this study is the presence of endogeneity as a result of reverse causality. Mass media might influence someone's contraceptive choices, but on the other hand it might also be the case that women would actively search for family planning information in mass media. This health information behavior has been addressed by many studies which have found that active information-seeking activities would likely have occurred under life-threatening issues, such as cancer (Leydon et al., 2000; Rees & Bath, 2000) and heart problems (Fleming et al., 2002; Tuominen, 2004) and not for a non-life-threatening circumstances such as wanting to engage in preventive health behavior (Shi et al., 2004). Since family planning might be considered a non-life-threatening subject, I would argue that endogeneity is not an issue in this study.

Conclusion

Overall, television has a positive association with Indonesian married women's contraceptive behaviors. This result explains not only current contraceptive users' behaviors, but also non-users' intention to use any contraceptive methods in the future. On the other hand, family planning campaign in mass media does not show any clear pattern. A further study to examine Indonesian family planning campaigns in mass media is needed to improve the effectiveness of the campaigns in the future.

[3] At 5% significance level, the models passed the Hosmer–Lemeshow goodness-of-fit test both in 2007 (chi^2: 2655.56, p-value: 0.1957) and 2012 (chi^2: 2802.98, p-value: 0.071). The result for multicollinearity test also showed that both of the models did not have multicolinearity issue with VIF value for all variables <10

Although this study only tried to derive an association between mass media exposure with contraceptive behavior and not a causal inference, earlier studies that used DHS datasets in African countries, Pakistan, India, Bangladesh (Westoff and Bankole, 1997 and 1999; Retherford and Mishra, 1997) and Nepal (Barber and Axinn, 2004) had the same results, which increased the possibility of a causal relationship.

Policy Implication

Television exposure has been proven to be a significant factor associated with contraceptive behavior in Indonesia. But this is not the case for television family planning campaigns which only had a positive effect on the intention to use contraceptive methods in the 2012 surveys. Nevertheless, by conducting an effective family planning television campaign based on studies from previous campaigns and also considering the benefit and cost analysis of running massive television campaigns or hiring more workers, the Indonesian government might be able to overcome its budget constraints in delivering information about the family planning programs.

Appendix 1: Descriptive Statistics

Variable	2007					2012				
	Obs	Mean	S.D	Min	Max	Obs	Mean	S.D	Min	Max
Contraceptive user	7822	0.62	0.48	0	1	8225	0.64	0.48	0	1
Currently using	4867					5224				
Not using	2955					3001				
Possible future user	2645	0.50	0.50	0	1	2664	0.60	0.49	0	1
Will use any method	1330					1587				
Doesn't have any plan to use	1315					1077				
Respondent's Age	7822	33.36	8.06	15	49	8225	33.79	8.10	15	49
Respondent's Education Level	7818	7.76	4.16	0	18	8221	8.69	4.25	0	18
Respondent's Working Status	7822	0.56	0.50	0	1	8225	0.59	0.49	0	1
0: Not Working	3412					3334				
1: Working	4410					4891				
Number of Children	7822	2.36	1.59	0	13	8225	2.20	1.47	0	10
Wealth Index	7822	2.85	1.46	1	5	8225	2.82	1.43	1	5
Pair Children	7822	0.71	0.45	0	1	8225	0.69	0.46	0	1
0: Don't have pair kids	2241					2533				
1: Have pair kids	5541					5692				
Residential	7822	0.40	0.49	0	1	8225	0.47	0.50	0	1
0: Rural	4696					4361				
1: Urban	3126					3864				
Husband Age	7822	37.58	8.36	17	54	8225	37.91	8.33	16	54
Husband Education Level	7812	8.34	4.19	0	18	8207	9.00	4.31	0	18
Respondent's Husband Working Status	7822	0.98	0.13	0	1	8225	0.99	0.12	0	1
0: Not Working	125					114				
1: Working	7697					8111				
Mass Media Exposure										
TV Exposure	7794	1.68	0.62	0	2	8219	1.79	0.52	0	2
0: Not at all	640					432				
1: Less than once a week	1214					887				
2: At least once a week	5940					6900				
Radio Exposure	7796	0.91	0.80	0	2	8219	0.66	0.75	0	2
0: Not at all	2854					4181				
1: Less than once a week	2785					2629				
2: At least once a week	2157					1409				
Print Media Exposure	7791	0.65	0.72	0	2	8207	0.62	0.71	0	2
0: Not at all	3868					4249				
1: Less than once a week	2785					2861				
2: At least once a week	1138					1097				

Variable	2007					2012				
	Obs	Mean	S.D	Min	Max	Obs	Mean	S.D	Min	Max
Exposure to Family Planning campaign few Months earlier										
On TV	7822	0.30	0.57	0	1	8213	0.45	0.50	0	1
0: Not at all	5577					4554				
1: Yes	2233					3659				
On Radio	7822	0.14	0.50	0	1	8215	0.10	0.30	0	1
0: Not at all	6861					7384				
1: Yes	947					831				
On Print Media	7822	0.14	0.47	0	1	8216	0.15	0.35	0	1
0: Not at all	6818					7015				
1: Yes	993					1201				
Direct Visit	7822	0.06	0.34	0	1	8222	0.06	0.24	0	1
0: Not at all	7389					7718				
1: Yes	427					504				

References

Ainsworth, M., Beegle, K., & Nyamete, A. (1996). The impact of women's schooling on fertility and contraceptive use: A study of fourteen sub-Saharan African countries. The World Bank Economic Review, 10(1), 85-122.

Angeles, G., Guilkey, D. K., & Mroz, T. A. (2005). The effects of education and family planning programs on fertility in Indonesia. Economic Development and Cultural Change, 54(1), 165-201.

Ball-Rokeach, S. J., & DeFleur, M. L. (1976). A dependency model of mass-media effects. Communication research, 3(1), 3-21.

Barber Jennifer S, Axinn William G. 2004. New ideas and fertility limitation: The role of mass media. Journal of Marriage and Family. 66:1180–1200.

Bandura, A. (2001). Social cognitive theory of mass communication. Media psychology, 3(3), 265-299.

Behrman, J. R., Kohler, H. P., & Watkins, S. C. (2002). Social networks and changes in contraceptive use over time: Evidence from a longitudinal study in rural Kenya. Demography, 39(4), 713-738.

Bickman, L. (1975). Bystander intervention in a Crime: The Effect of a Mass-media Campaign1. Journal of Applied Social Psychology, 5(4), 296-302.

Cleland, J., Bernstein, S., Ezeh, A., Faundes, A., Glasier, A., & Innis, J. (2006). Family planning: the unfinished agenda. The Lancet, 368(9549), 1810-1827.

David A Grimes, Janie Benson, Susheela Singh, Mariana Romero, Bela Ganatra, Friday E Okonofua, Iqbal H Shah. (2006). Unsafe abortion: the preventable pandemic. The Lancet, Volume 368, Issue 9550, Pages 1908-1919, ISSN 0140-6736.

David Canning, T Paul Schultz. (2012). The economic consequences of reproductive health and family planning. The Lancet, Volume 380, Issue 9837, Pages 165-171, ISSN 0140-6736,

Debpuur C, Phillips JF, Jackson EF, Nazzar A, Ngom P, Binka FN. (2002). The impact of the Navrongo project on contraceptive knowledge and use, reproductive preferences, and fertility. Stud Family Plann; **33:** 141–64.

DeGraff, D. S., Bilsborrow, R. E., & Guilkey, D. K. (1997). Community-level determinants of contraceptive use in the Philippines: a structural analysis. Demography, 34(3), 385-398.

Family Planning 2020. (2015). FP2020 Focus Countries. Retrieved from: http://www.familyplanning2020.org/entities

Fleming, S., Goodman, H., Geraghty, A., West, W., & Lancaster, L. (2002). A survey of patients' education and support needs while waiting for cardiac surgery. Clinical Effectiveness in Nursing, 5,143–151

Gertler, Paul J., and John W. Molyneaux. (1994). "How Economic Development and Family Planning Combined to Reduce Fertility in Indonesia." Demography 31:33–64.

Godwin, William (1820). Of Population: An Enquiry Concerning the Power of Increase in the Numbers of Mankind, Being an Answer to Mr. Malthus's Essay on That Subject. Longman, Hurst, Rees, Orme and Brown. p. 648.

Goldstone, J. A. (1986). State breakdown in the English revolution: A new synthesis. American Journal of Sociology, 257-322.

Hazlitt, W. (1807). A reply to the Essay on population: by the Rev. T.R. Malthus; in a series of letters. London: Longman, Hurst, Rees, and Orme.

Heath, L. (1984). Impact of newspaper crime reports on fear of crime: Multimethodological investigation. Journal of Personality and Social Psychology, 47, 263–276.

Heath, L., & Gilbert, K. (1996). Mass media and fear of crime. American Behavioral Scientist, 39(4), 379-386.

Joshi S, Schultz TP. (2012). Family planning and women's and children's health: long term consequences of an outreach program in Matlab, Bangladesh. IZA discussion paper no. 6551. Retrieved from: http://ftp. iza.org/dp6551.pdf

John Cleland, Stan Bernstein, Alex Ezeh, Anibal Faundes, Anna Glasier, Jolene Innis. (2006). Family planning: the unfinished agenda, The Lancet, Volume 368, Issue 9549, 18–24, Pages 1810-1827, ISSN 0140-6736, http://dx.doi.org/10.1016/S0140-6736(06)69480-4.

Leydon, G., Boulton, M., Moynihan, C., Jones, A., Mossman, J., & Boudioni, M. (2000). Cancer patients' information needs and information seeking behaviour: In-depth interview study. British Medical Journal, 320, 909–913.

Lomborg, Bjorn. 2001. The Skeptical Environmentalist. Cambridge UP, London. Chapter 5 Food and hunger, p60–69; and note also Part III: "Can human prosperity continue?" p91–160.

Malthus. T.R. (1798). An Essay on the Principle of Population As It Affects the Future Improvement of Society with Remarks on the Speculations of Mr. Godwin, M. Condorcet and Other Writers (1 ed.). London: J. Johnson. in St Paul's Church-yard.

Mc Nicoll, G., and M. Singarimbun. (1983). Fertility Decline in Indonesia: Analysis and Interpretation. Washington DC: National Academy Press.

Mill, J. S. (1848). Principles of Political Economy With Some of Their Applications to Social Philosophy. 1857. George Routledge and Sons, Manchester.

Mutz, D. C. (2001, March). Facilitating communication across lines of political difference: The role of mass media. In American Political Science Association (Vol. 95, No. 01, pp. 97-114). Cambridge University Press.

Pitt, Mark M., Mark R. Rosenzweig, and Donna Gibbons. (1993). "The Determinants and Consequences of the Placement of Government Programs in Indonesia."World Bank Economic Review 7:319–48.

Rees, C. E., & Bath, P. A. (2000). The psychometric properties of the Miller Behavioural Style Scale with adult daughters of women with early breast cancer: A literature review and empirical study. Journal of Advanced Nursing, 32(2), 366–374

Rogers EM,. (1971). A Field Study of Family Planning Incentives and Field Staff in Indonesia, Jakarta, Indonesia: BKKBN and the Indonesian Planned Parenthood Association.

Retherford Robert D, Mishra Vinod. (1997). Media exposure increases contraceptive use. National Family Health Survey Bulletin, No. 7. Honolulu: International Institute for Population Sciences, Mumbai and East-West Center Program on Population.

Shi, H.-J., Nakamura, K., & Takano, T. (2004). Health values and health information-seeking in relation to positive change of health practice among middle-aged urban men. Preventive Medicine, 39, 1164–1171

Tuominen, K. (2004). "Whoever increases his knowledge merely increases his heartache." Moral tensions in heart surgery patients' and their spouses' talk about information seeking. Information Research, 10(1). Retrieved from http://informationr.net/ir/10-1/paper202.html

United Nations Population Fund Indonesia (UNFPA-Indonesia). (n.d.). Family Planning. Retrieved from: http://indonesia.unfpa.org/family-planning

United Nations Women. (n.d.). World Conference of the International Women's Year 1975 Report. Retrieved from: http://www.un.org/womenwatch/daw/beijing/otherconferences/Mexico/Mexico%20conference%20report%20optimized.pdf

O'Bryant, S. L., & Corder-Bolz, C. R. (1978). The effects of television on children's stereotyping of women's work roles. Journal of Vocational Behavior, 12, 233–244.

Schultz TP. (2009). How does family planning promote development? Evidence from a social experiment in Matlab, Bangladesh 1977–1996. Population Association of America Annual Meeting, Detroit, MI.

Siegel, A. E. (1958). The influence of violence in the mass media upon children's role expectation. Child Development, 29, 35–56

Steven W. Sinding. (2008). What has happened to family planning since Cairo and what are the prospects for the future?, Contraception, Volume 78, Issue 4, Supplement, Pages S3-S6, ISSN 0010-7824, http://dx.doi.org/10.1016/j.contraception.2008.03.019.

Suyono H et al. 1976. Village Family Planning, the Indonesian Model Institutionalizing Contraceptive Practice, Jakarta, Indonesia: BKKBN.

The world's women 1995: trends and statistics, United Nations, New York (1995) Social statistics and indicators Series K, No.12

Thomas Bella. (2003). What the world's poor watch on TV. World Press Review: 50(3)

Warwick, D. P.. (1986). The Indonesian Family Planning Program: Government Influence and Client Choice. Population and Development Review, 12(3), 453–490. Retrieved from: http://doi.org/10.2307/1973219

Westoff, Charles F. and Akinrinola Bankole. 1997. Mass media and reproductive behavior in Africa. DHS Analytical Reports No. 2. Calverton, Maryland: Macro International Inc. WHO Statistical Information System.

Westoff, Charles F. and Akinrinola Bankole. 1999. Mass Media and Reproductive Behavior in Pakistan, India, and Bangladesh. DHS Analytical Reports No. 10. Calverton, Maryland: Macro International Inc. WHO Statistical Information System

WHO estimates of disability adjusted life years (DALYs) by sex, cause and WHO mortality sub-region. Available at: http://www.who.int/whosis/en/. Accessed February 10, 2015.