

Impact of Exposure to Mass Media on Utilization Modern Contraceptive Among Adolescent Married Women in Ethiopia: Evidence from EDHS 2016.

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Abstract

Introduction

More than one billion of world population was adolescent age group. Adolescent are high risk of unwanted pregnancy related to pregnancy is preventable. This complication can be preventing by use of family planning method. One of the challenges to use family planning was lack of information about contraceptive.

Objective

The objective of this study was to assess the impact of mass media on use of modern contraceptive among adolescent in Ethiopia, 2016 E.C.

Methods

This study conducted based on Ethiopia demographic and health survey 2016 data which was cross-sectional study design. EDHS adolescent married women sample size used was 588. The data were analyzed using propensity score matching and recursive biprobit probit model to determine impact and factor associated with mass media exposure on modern contraceptive utilization.

Result

The magnitude of modern contraceptive utilization among adolescent married women age group 15-19 years was 31.8 %. Exposed to family planning message has 16.8%, 13.2%, 17% and 21.9% more likely to use modern contraceptive than unexposed to mass media message. In this study significant factor affect modern contraceptive use include exposure to mass media message family planning, residence, wealth index, exposed to TV message, radio message and magazine message.

Conclusions

This study shows magnitude of contraceptive utilization was low and it might be due to lack of information about family planning. Therefore policy maker and concerned body should consider mass media to integrate family planning program.

Background

Adolescents age between 15-19 years comprise about one-sixth of all women of reproductive age globally. Adolescent estimated about 250 million live in developing countries. More than one in five of adolescent girls are currently married. Every year 16 million women aged 15–19 years give birth and 95% of these births take place in developing country(1). Child birth among adolescent face higher risks of maternal mortality obstructed labor, obstetric fistula, and low education attainment and unemployment (2).

Modern contraceptive is important to prevent unintended pregnancies and reducing the high adolescent birth rates in developing country(3, 4). Married adolescent women want to delay space or limit their births but many of adolescent not using contraceptive. Helping adolescent girls to use contraceptive would avoid unintended pregnancies that can have benefit life long that can have far-reaching benefits for them, their children and societies as a whole (5, 6).

Family planning encompasses the services, policies, information, attitudes, practices, and commodities, including contraceptives(4).Adolescent girls has long been neglected in the global health agenda but this period is pivotal for promoting health behavior that could have lasting impact on their future health and wellbeing (7).

The source of information and advice about how where to access of modern contraceptive and is important for adolescent that contributed by mass media. Mass media important in health promotion and disease prevention is well documented, since both routine exposure to and strategic use of mass media play a significant role in promoting awareness, increasing knowledge and changing health behaviors (8-10). Mass media create public awareness about family planning including knowledge, effectiveness and source about contraceptive methods (11). It was important components of information education and communication that can be effective to promote family planning programmes (12)

Mass media channels include such as radio, television and newspapers are important sources of information about contraceptive information. Radio is the major source of information in sub-Saharan Africa (76%), print materials (72%), television (62%), and outreach workers (52%). In this region there is increase of available of these mass media. In sub-Saharan Africa, 5.2% of all households now have a television and 36.9% of the population subscribes to mobile services(13).

Inadequate knowledge and perception regarding a disease is a major drawback to prevention and intervention of any public health challenge; this can be addressed greatly by strengthening health communication tools and disseminating health information through the conventional and/or digital media(14, 15). Media can play an important role in changing sexual behaviors, transforming negative beliefs and increasing family planning knowledge(9).

Yong people have indicated the media as a top source of information that young people are excessive users of media including Television, radio, and newspapers, are widely used to reach a large proportion of population but mass media focused on members of the general public, or more narrowly on youth(13, 16). Exposure to such messages about family planning is generally passive, resulting from an incidental effect of routine use of media. The great promise of mass media campaigns lies in their ability to disseminate well-defined behaviorally-focused messages to large audiences repeatedly, over time and at a low cost per head(17).

Mass media is particularly potent as it allows national and local program planners to reach a large proportion of an intended population within a relatively short time. Mass media is credible that have

generally aimed primarily to change knowledge, awareness and attitudes, contributing to the goal of changing behavior(8, 18).

This study assessed the prevalence and effect of exposure to mass media on contraceptive behaviors. It will examine whether observed differences in the levels of modern contraceptive use signified a positive relationship between exposure to family planning messages and use. General, this evidence provides justification for recommending that these types of interventions be implemented more widely in future.

Materials And Methods

Study design

Ethiopia demographic health survey (EDHS) 2016 was cross-sectional study design and used multistage sampling technique. It includes all regions and two administrative cities. EDHS study period from January 18, 2016 to June 27, 2016 (19).

Study area

Ethiopia was study area since EDHS was national representative data. Ethiopia located in at horn of Africa. Ethiopia second most populous country most that estimated about 108,805,142 in 2018 (20) . (21). In country 24% of population constitute reproductive ages constitute and family planning service provide 24hour.

Data source and extraction

The data for this analysis were extracted from the 2016 Ethiopian Demographic and Health Survey (EDHS). The data sets were downloaded in STATA format with permission from the Measure DHS website (<http://www.dhs program.com>). After understanding the detailed data sets, further data cleaning and recording were carried out. Required data sets were joined to Global Positioning System (GPS) coordinates of EDHS.

Sample size determination and sampling procedures

Ethiopia demographic and health survey 2016 collect 588 adolescent married women (weighted sample) age between 15-19 years(19). Stratified and two-stage sampling technique was used. In first stage primary sampling unit selected and in second stage household was selected with different probability of selection. (19).

Data management, data processing and analysis methods

Data was downloaded from measure DHS website in STATA format. Data management and cleaning was done using STATA. All needed variable was selected and recoded in convenient way. After managing adolescent related data, sampling weight was employed to produce the proper representation of family planning information in analysis of data. STATA 14 used for data extraction, descriptive and summary

statistics and impact assessment model. The descriptive statistics report summarizes data and respondent characteristics while inferential data analysis using chi square tests report relationship of characteristic. Impact of mass media exposure on modern contraceptive utilization is analyzed by propensity score matching and recursive bivariate probit model regression.

Impact assessment

We use PSM and recursive bivariate probit model to assess impact (22, 23). Recursive bivariate probit model was used for addressing the issue of endogeneity(24).

Propensity Score Matching

Treatment effect refers to the causal effect of a given treatment or intervention on an outcome variable of interest. Treatment effect is defined for each individual unit in terms of two "potential outcomes." Mass media is treatment variable and modern contraceptive (Y1) the potential outcome or no modern contraceptive (Y0) counterfactual for that subject. Those exposed to mass media would observe Y1, so Y0 would be the counterfactual outcome for that subject. The "treatment effect" is the difference between these two potential outcomes. However, this individual-level treatment effect is unobservable because individual units can only receive the treatment or the control, but not both.

Propensity score matching clarifies the effects of campaigns on contraceptive use. Propensity score matching allows the researcher to "create" an unexposed, matched control group that is statistically equivalent. The main attribute of the matching procedure is the creation of the conditions of randomized experiment in order to evaluate a causal effect as in a controlled experiment (25-27).

The impact of mass media on modern contraceptive utilization is estimated using the endogenous regression model where model can be used to compare observed and counterfactual mass media. PSM estimated in Stata using command `psmatch2`. The `psmatch2` implements full Mahalanobis matching and a variety of propensity score matching methods to adjust for pre-treatment observable differences between a group of treated and a group of untreated. It is used to estimate ATT, ATU and ATE (28-30).

Recursive Bivariate Probit

Recursive Bivariate Probit (RBP) processes the resulting Bivariate Probit correlation parameter as a recursive model of simultaneous equations. It is important because of handling of endogenous binary repressor on two binary outcome variables. It also estimates maximum-likelihood two-equation probit models by allowing two binary outcome variables correlated with each other. The bivariate probit model is frequently used to determine factor, impact and test endogeneity of treatment variable(24, 31).

The exogeneity of exposure to mass media family planning message is tested in recursive bivariate probit model by ρ . The Wald test, which is reflected by statistical significance, was used to determine whether the models would be best estimated jointly in a recursive manner or not. Likelihood-ratio test is available

after bivariate probit to detect the presence of endogeneity and rule out using a simple single-stage binary probit(32, 33).

Outcome variable

The outcome variable modern contraceptive recorded in measured DHS as modern method, traditional and no method. It categorize as “modern method” and “no modern method”. Traditional method user consider as none modern method user. It classified as “yes” (coded as 1) and “no” (no coded as 0).

Explanatory variables

The predictor variable for modern contraceptive utilization was taken from previous studies. It consider as control variable to determine effect of mass media. Variable include in study were education, wealth quintile , respondent religion, living children, partner education(coded as no education, educated) ,working status of respondent , desire more children , visit to health facility and exposed to mass media by radio, TV and magazine message .

Endogenous treatment variable

Mass media exposure to family planning message is considers as treatment variable. It was generated by aggregating family planning message exposed to one of media television, radio and magazine (coded as yes and no).

Ethical consideration

After request EDHS Program for dataset, permission was granted to download and use the data for this study and data were used solely for the purpose of the current study. The consent was obtained from participant before study. Individual identification was not used to treat data confidential. Further the study approved by institutional ethical review board of Dessie Health Science Collage (IRB), Ethiopia.

Patient and public involvement (PPI)

Since the analysis was based on secondary analysis of EDHS 2016 there was no Patient and public involvement (PPI). But during data collection by measure DHS PPI participation was considered.

Results

Description of Scio-demographic and mass media coverage among adolescent

In EDHS 2016, a total of 588 adolescent married women were interviewed. The mean age of the respondents was 17 years (SD \pm years). One third of the respondent 171(29.07 %) has no formal education. Most of respondent 526(89.48) were resident in rural area. About 272 (46.43%) of respondents had more than two children. Mass media accessibility among married adolescent in Ethiopia DHS were radio and television 147(24.95) and 33(5.67) respectively. About 147(25) of respondent own mobile phone but most of respondent not use internet in 12 last month. Regarding to mass media exposure,

about 181 (30.88%) of respondent frequently listen radio message, 119(20.25%) of respondent frequently watch TV message and 71(12.11%) of respondent frequently read magazine message (Table 1).

Exposure to mass media family planning message among married adolescent

Exposure to family planning message among modern contraceptive use and intention to use for future were assessed by chi square test. Modern contraceptive utilization is associated with exposure to mass media message. Contraceptive behavior like intention to use for future and knowledge about family planning message also associated with mass media exposure (Table 2).

Impact of Mass media exposure on modern contraceptive utilization

Propensity score matching analysis

Treatment effect estimation based on psmatch2 estimation has output before matching and after matching. Unmatched estimate show difference between average utilization modern contraceptive among mass media exposed and unexposed respondent before matching is arranged. After matching average treatment effect for the treated (ATT), average treatment effect for the controlled (ATU) and average treatment effect for the population (ATE) on utilization of modern contraceptive utilization and intention to use for future is reported (figure1). As a result those exposed to mass media family panning message had 16 % and 18 % more likely to utilize modern contraceptive and intention to use for future (Table 3).

Determinant of mass media exposure, and contraceptive use

In this study both univariate probit and recursive bivariate probit model was used to estimate determinant of modern contraceptive use. Recursive bivariate probit model was better explaining the relationship than univariate probit model. The results of the recursive bivariate show exposure to mass media message increases the probability of modern contraceptive utilization. Modern contraceptive utilization is significantly affected by mass media exposure to family panning message, richest wealth index and residence positively. But respondent no educated were negatively affect modern contraceptive utilization. Exposure to mass media message about family planning is significantly affect by presence of TV in household, exposé to TV message, expose to radio message , expose to magazine message, internet user and visit heath facility (Table 4).

Similarly for intention to use recursive bivariate probit model better explain model. Recursive bivariate probit model was better explaining the relationship. Those respondents exposed to family planning message and partner education positively affect intention to use modern contraceptive use (Table 5). Over all, the univariant probit model is insignificant in both outcome but recursive bivariate probit is significant to explain the outcome. Because of endogenous factor it exhibit different output so we used recursive bivariate probit to explain the relationship between exposed to family planning message and both outcome.

Discussion

This study assessed the influence of mass media exposure about family planning message on contraceptive behavior based on national representative data of EDHS 2016. Mass media can be used promoting family planning program successfully.

Exposure to family planning message is low among adolescent married women. This is due to low accessibility of radio, TV, mobile and internet access. Exposure to family planning message is associated with modern contraceptive utilization and the intention to use. This indicates that the accessibility of mass media is important to disseminate knowledge and attitude about of family planning program(9, 34).

The impact of exposure to mass media on modern contraceptive use and intention to use for future is assessed by using propensity score matching using four matching estimator after balancing of propensity score. Exposure to family planning message has 16.8% and 14.2% more likely to use modern contraceptive and plan to use contraceptive for future by using KM.

The predictor of exposure to family planning message and modern contraceptive assessed by recursive biprobit model since univariate probit model is insignificant to explain the relationship. Recursive biprobit model result shows mass media exposure increase use and intention to use modern contraceptive among married adolescent. Factors associated with modern contraceptive utilization were exposure to mass media family planning message, residence, wealth index and educational level. In other side factors associated with intention to use for future include exposure to mass media family planning message, residence, educational level and partner educational level. Exposure to mass media message about family planning and determinant for both utilization of modern contraceptive and intention to use for future by controlling covariant. It was supported by different previous research (35, 36).

Educational level, household wealth index and place of residence significantly associated with utilization of modern contraceptive and it supported by different study (37, 38). Significant factors associated with exposure to family planning message include presence of radio in household, presence of TV in household, use of internet, health facility visit, frequently listening radio, frequently watching TV and frequently read magazine.

Frequently watching TV was strongly associated with exposure to family planning message. It increases the probability of hearing family planning message even more powerful than other media. It was supported by other studies in Nigeria (18) and Central Asia(39). The possible explanation may be television is a powerful medium for appealing to mass audiences and reaches people regardless of age, sex, income or educational level. In addition, television offers sight and sound and makes dramatic and lifelike presentations of people and products. We mostly believe what we see rather than what we hear(36).

Frequently watching radio is second most important type of mass media that had strong relationship with exposure to family planning message. Previous studies indicate that radio was low cost to access

and reach to mass audience. Radio is less efficient than television in transmitting message it might be because of TV has visual image. Radio can increase public health messages about family planning in detail (39, 40). Frequency of listening to radio amongst married women in this study was lower than other developing countries(35).

Frequently read magazine significantly associated with family planning use especially it give detail health reporting that not feasible with other media. It was detail, flexibility that can be read frequently and share to other (35).

Frequent use internet increase exposure to family planning message. The reason may be use of internet might retrieve information about family planning based on their interest.

Conclusion

This study assesses the impact of mass media exposure about family planning message on modern contraceptive use and intention to use. It showed exposure to mass media family planning message affect both utilization of modern contraceptive and intention to use for future.

This study suggests low prevalence of contraceptive utilization associated with lack of information about family planning. Since adolescent was under influence of partner and community to give appropriate information about family planning mass media has advantage. Therefore policy maker and concerned body should consider mass media to integrate family planning program.

Strength and limitation

- Strength include Demographic Health Survey is national representative data that used multistate sampling technique.
- The DHS data was collected with international standard and trained data collectors. The data quality was assessed in different stage of data collection and entry process.
- Limitation include that DHS is nonrandomized data and not include all variable needed for analysis of this study. As result of data were collected for survey the variable may not include nor needs some efforts to select the variable of interest.
- DHS dataset not include or incomplete of some of the variables focusing on mass media and family planning were incomplete or not filled as the will of the investigator.

Abbreviations

PSM: property score matching; **DHS:** Demographic and Health Survey, **EDHS:** Ethiopian Demographic and Health Survey

Declarations

Availability of data and materials

DHS data available in Measure DHS which is download in STATA format. It extracted and coded as wanted to select variable needed for model. The material would be accessed upon request.

Ethics approval and consent to participate

Informed consent was taken from the participant prior to study by measure DHS. Ethical approval obtains from DHS measure International Program which authorized the data-sets and GPS coordinate files upon request. The study further approve by Dessie health Science College after submitting proposal to IRB and it approved with ID number of 0525/12.

Consent to Publication

Not applicable

Availability of data and materials

The data is available from DHS program. All relevant data are included in the manuscript. However, the minimal data underlying all the findings in the manuscript will be available upon request. The data was taken from DHS website (<http://www.dhs program.com>). The data would be accessed by contact with correspondent author.

Competing interest

The authors declare that they have no competing interest.

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Authors' contributions

K.A.; acquired the data, performed the analyzed the study, interpreted the results and drafted the manuscript. A.D and A.K; participated in the conceptualization and design of the study and reviewed the manuscript critically. All authors read and approved the final manuscript.

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Tables

Table1: Description of Scio-demographic and mass media coverage among adolescent married women in Ethiopia, 2016.

Variable	Weight Frequency	Weight percent
Mass media exposure	133	22.71
No formal educated	171	29.07
Richer wealth index	106	18.00
Richest wealth index	60	10.15
Rural Residence	526	89.48
Respondent has children	272	46.43
Partners formally educated	386	65.96
Respondent working status	117	19.90
Desire to have more children	62	10.53
Undecided to have children	14	2.23
Household has Radio	147	24.95
Household has Television	33	5.67
Mobile ownership	147	25
Use of internet in last 12 months	13	2.16
Health facility visit in last 12 months	267	45.34
Field worker visit in last 12 months	123	20.94
Frequently listen radio	181	30.88
Frequently watch TV	119	20.25
Frequently read Magazine	71	12.11
Total	588	100 %

Table 2: Description of exposure to mass media family planning message among adolescent married women in Ethiopia, 2016

Variable	Un exposed to FP N= 455		Exposed to FP N=133		χ^2	
	Number	N	%	N		%
Modern contraceptive	187	126	67.32	61	32.68	30.72****
Intention to use	280	218	76.11	61	23.89	14.46***
Knowledge about FP	443	75.87	76.87	133	23.13	14.0***

Table 3: Treatment effect of exposure to mass media family planning message with in the common support region among adolescent married women in Ethiopia, 2016

Variable	Sample	Treated	Controlled	Difference	SE	t-test
Modern contraceptive utilization	Unmatched	0.4	0.178	0.221	0.038	5.70
	ATT	0.388	0.219	0.168	0.051	3.25
	ATU	0.175	0.335	0.335		
	ATE			0.161		
Intention to use for future	Unmatched	0.670	0.443	0.227	0.058	3.87
	ATT	0.662	0.475	0.187	0.067	2.75
	ATU	0.431	0.594	0.163		
	ATE			0.167		

Table4: Univariate and Recursive Bivariate Probit Estimates of modern contraceptive utilization and expose to FP message among adolescent married women in Ethiopia, 2016

Variable	Univariate probit		Recursive bivariate probit			
	Modern contraceptive		Modern contraceptive		Expose to FP message	
	Coef.	St. error	Coef.	St. Error	Coef.	St. error
Media exposure	0.20	0.18	0.91*	0.30		
N formal educated	-0.40*	0.15	-0.40*	0.15	0.23	0.19
Richer wealth index	0.08	0.16	0.04	0.16	0.11	0.21
Richest wealth index	0.59*	0.22	0.44*	0.22	0.37	0.26
Residence	0.91*	0.27	0.75*	0.27	0.21	0.32
Respondent has no children	0.18	0.13	0.18	0.12		
Partners formally educated	-0.15	0.14	-0.12	0.14	-0.44*	0.18
Respondent working status	0.26	0.15	0.14	0.15	0.33	0.18
Desire to have more children	0.20	0.23	0.35	0.22		
Undecided to have children	0.58	0.47	0.74	0.45		
Household has Radio	-0.08*	0.15	-0.10*	0.14	0.25*	0.18
Household has Television	-0.89	0.30	-0.92	0.30	1.20	0.41
Mobile ownership	-0.19	0.16	-0.20	0.16	0.32	0.19
Use of internet in last 12 months	0.15	0.42	-0.06	0.43	2.15*	1.02
Health facility visit	0.21	0.12	0.11	0.13	0.71*	0.16
Radio message	0.20	0.15			0.76*	0.18
TV message	0.45*	0.18			0.96*	0.19
Magazine message	-0.40	0.21			0.83*	0.23
Constant	-0.93*	0.26	-1.00	0.25*	-2.00	0.21*
Rho			-0.43*	0.19		
Wald chi2			65.35*			
Log likelihood			-316.2			
LR test			4.33*			

Table 5: Univariate and Recursive Bivariate Probit Estimates of modern contraceptive utilization and expose to FP message among adolescent married women in Ethiopia, 2016

Variable	Univariate probit		Recursive bivariate probit			
	Intention to use		Intention to use		Expose to FP message	
	Coef.	St. Error	Coef.	St. Error	Coef.	St. error
Mesia	0.45	0.27	1.64*	0.33		
N formal educated	-0.32*	0.17	-0.35*	0.17	0.37	0.24
Richer wealth index	-0.14	0.22	-0.12	0.21	0.06	0.30
Richest wealth index	0.08	0.34	-0.07	0.32	0.39	0.38
Residence	-1.20*	0.48	-1.04*	0.44	0.03	0.52
Respondent children	-0.19	0.16	-0.16	0.15		
Partners formally educated	0.60*	0.17	0.66*	0.16	0.51	0.23
Respondent working status	0.36	0.23	0.31	0.21	0.16	0.25
Desire to have more children	-0.14	0.30	-0.12	0.27		
Undecided to have children	-0.56	0.59	-0.54	0.56		
Household has Radio	0.08	0.20	0.10	0.18	-0.24	0.25
Household has Television	0.37	0.61	0.13	0.56	1.24*	0.56
Mobile ownership	-0.29	0.24	-0.33	0.22	0.31	0.28
Use of internet in last 12 months	0.06	0.90	0.04	0.85	1.11	1.23
Health facility visit	0.22	0.16	0.12	0.15	0.51*	0.19
Radio message	0.16	0.23			0.93*	0.25
TV message	0.84*	0.39			1.06*	0.27
Magazine message	0.21	0.34			0.91*	0.30
Constant	0.31	0.32	0.23	0.29	-1.90*	0.24
Rho			-0.68*	0.19		
Wald chi2			176.8*			
Log likelihood			-311.3			
LR test			7.45*			

Figures

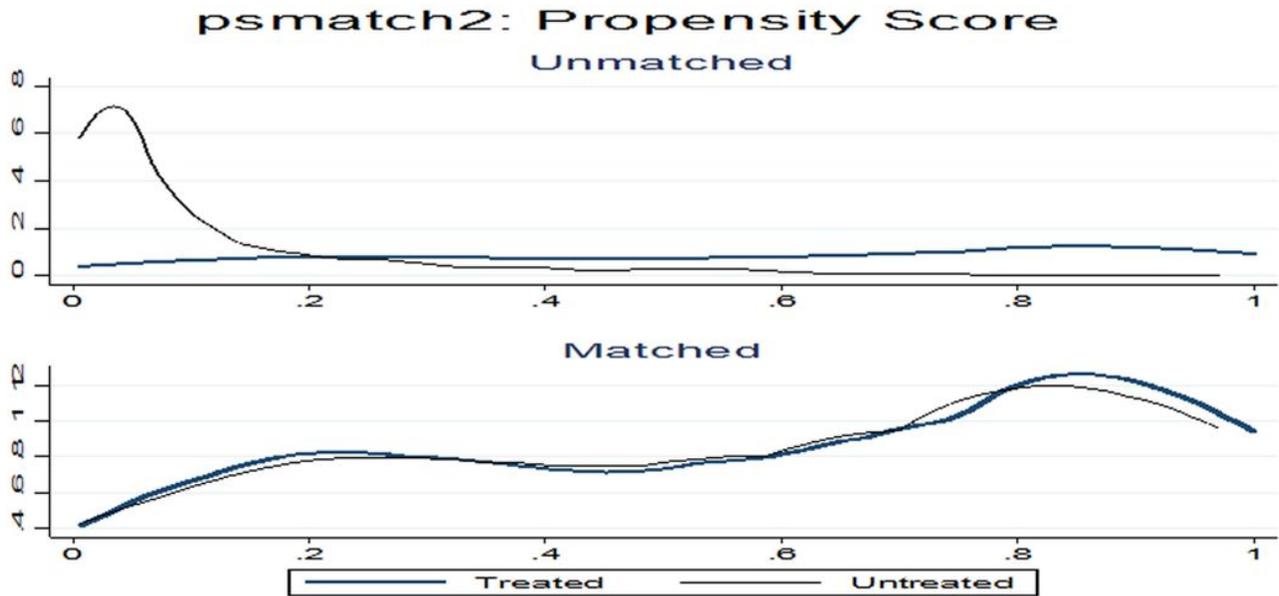


Figure 1

Treatment effect estimation based on psmatch2 estimation has output before matching and after matching. Unmatched estimate show difference between average utilization modern contraceptive among mass media exposed and unexposed respondent before matching is arranged. After matching average treatment effect for the treated (ATT), average treatment effect for the controlled (ATU) and average treatment effect for the population (ATE) on utilization of modern contraceptive utilization and intention to use for future is reported