



Assessing the Effective Communication Channels to Reduce Child and Adolescent Marriage in Rural Communities of Egypt

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Abstract

BACKGROUND: Low levels of scholarly achievement, poverty, and geographical isolation are all known to be linked to early marriage.

AIM: This study aimed at identifying the most credible and the best-suited communication channels (CCs) to reach rural communities for motivating them to reduce child and adolescent marriage.

METHODS: This study was a community-based cross-sectional systematic formative research. The study targeted 1000 wives who were ever married women in childbearing period aged 15–49 years and their husbands in 21 rural village units of two governorates of Upper Egypt through questionnaires. Decisions concerning the choice of the best-suited CCs were based on their reach, frequency, managerial feasibility, and effectiveness. The investigated CCs included: modern social media (search browser engine/Facebook group and/or twitter/YouTube or messaging through WhatsApp or any mobile app), traditional mass media (T.V/Radio/Reading), and interpersonal communication (talk with religious leaders/partners/friends/doctors/health promoters). Comparisons between different CCs were done using odds ratios (OR) and 95% confidence intervals (CI).

RESULTS: A vast majority of the surveyed wives (96.6%) were married at an age ranging from 15 to 24 years. The spread of social media through smartphones was limited to only one-third of wives and their husbands through mainly searching on YouTube (31.7% of wives and 27.8% of husbands). Television was the most accessible means of mass media for both wives and husbands (72.5% and 63.3%, respectively). The most credible and the best-suited CCs methods for wives were talking with the health promoters and doctors with 2 times significantly higher (OR = 2.0, CI = 1.7–2.4 for each one) than that with the search on YouTube and 3 times significantly higher (OR = 3.1, CI = 2.5–3.7 and OR = 3.1, CI = 2.6–3.8, respectively) than that for social media using browser engine. For husbands, the odds of the most credible and the best-suited CCs methods were more than 1½ times higher for the talk with the health promoters than the search on You Tube (OR = 1.6, CI = 1.3–2.0) or the search using browser engine (OR = 1.6, CI = 1.3–1.9). Whereas the odds were one and a third higher for the talk with the doctor than the search on You Tube (OR = 1.3, CI = 1.1–1.6) or the search using browser engine (OR = 1.6, CI = 1.1–1.6). Significant difference was detected in favor of the traditional media as the most credible source of information only for wives' intention to postpone their children early marriage.

CONCLUSIONS: Despite the availability of recent social media worldwide, rural communities with high illiteracy have limited access to the internet and limited availability of smartphones. Interpersonal communication is considered their most effective CCs for achieving equity in reducing child marriage. It seems vital during the implementation of any strategies toward reproductive health to use not only the media broadcasts, but also to rely on the channels that are most credible and suitable for the targeted communication to support meeting the unmet need.

Introduction

Adolescence is defined as the transition period between childhood and adulthood (between ages 10 and 22 years) although age categories vary among different cultures [1]. A recent viewpoint

defines the age between 10 and 24 years as age of adolescence [2].

One-third of girls in developing countries are married before the age of 18 and one in nine are married before the age of 15 [3]. Though the legal age of marriage has been set at 18 years old since 2008, child marriage is still frequently practiced in Egypt especially

in rural communities because the law prohibits but does not criminalize the practice.

Marriage of a young daughter in Egypt allows parents to reduce household expenses and to gain a source of income through the dowry paid to the bride's family. The percentage of women aged 20–24 years who were married before the age of 18 had declined from 19.5% in 2000 to 16.6% in 2005, remained steady at 16.6% from 2005 to 2008 and increased slightly to 17.4% in 2014 [4]. According to the Egypt Census of 2017, child marriage declined with nearly 1 in every 20 girls (5%) between age 15 and 17 years and 1 in every 10 (10%) adolescent girls 15–19 years are either currently married or were married before. Meanwhile, large significant differences were observed between rural and urban residence [5] indicating that child marriage remains an important issue among rural communities.

Early marriage deprives girls of education and employment opportunities and places them at risk of early and repeated pregnancy, gender-based violence, and sexually transmitted infections [6], [7]. Moreover, child and adolescent marriage can refrain economic empowerment in Egypt. Women's opportunity to learn and invade labor market in the future will decrease which can hinder Egyptian economic development, in addition to being a burden as they can experience more complications during pregnancy [8]. Moreover, many Egyptian studies concluded that young age at marriage is a cause of education deprivation and acts as a risk factor for child malnutrition and poor development [9], [10], [11], [12].

Women living in rural Upper Egypt have less access to high-quality obstetric care, making them about twice as likely to die from pregnancy as women in northern Egypt [13]. In 2013, Egypt developed the National Strategic Plan (NSP) for Prevention of Early Marriage, aiming to reduce the prevalence of early marriage by 50% within a 5-year timeframe. However, due to the political situation in Egypt, the plan was not implemented because of the sensitive nature of the problem [14], [15]. Meanwhile, it is each woman's right to enjoy healthy reproductive life and improving adolescents' care seeking behaviors to have healthy children and happy families [16], [17], [18], irrespective to the feasibility of implementing NSP for prevention of early marriage.

The achievement of the global Sustainable Development Goals (SDGs) that are needed for the realization of the national development priorities requires that the beneficiaries and communities are informed about and engaged in the issues that most affect them. Moreover, empowering their decision-makers with knowledge to influence their decisions and improve their lives is necessary. Mass media is one of the popular and cost-effective global public health promotion (HP) tools [19] as well local one [18]. Mass media (including radio, television, newspapers,

magazines, leaflets, posters, and pamphlets) is proved to influence the use of health services. Many interesting findings showed that lack of access to mass media played a pivotal role for increasing child marriage, yet more effort is needed to highlight the implications and consequences of child marriage in low-income communities [20], [21].

In response to these findings, it was important to access our target audience and their direct influential decision makers and to dig deeper for identifying the most favorite and credible communication channels (CCs) that are essential for success of strategies needed for effective reproductive HP (RHP) for women in general and future adolescents' mothers.

The idea of the present study raised from the belief that any change requires recognizing the voices of those who would be targeted by the development of this change. The realization of equity in health through reducing child and adolescent marriage as a national development priority requires suitable strategies to achieve social movement.

The rationale of our study was that to achieve the reduction of high prevalence of the child and adolescent marriage in rural communities, and it was crucial to investigate which CCs could be trusted and carry credibility for people living in these communities. Our research question was to what extent the information for RHP received by modern social media (through search browser engine and YouTube) are creditable as that received by the traditional way of communication (interpersonal and traditional communication).

For achieving this, our study aimed at assessing the suitable channels of communication that could be used in the future as cost-effective channels helping in changing the behaviors of the target population and achieving the reduction in the high child and adolescent marriage in rural communities.

Methods

Study design

This study was a community-based cross-sectional systematic formative research. The study was conducted over 2 years through formative quantitative assessment research for CCs.

Setting

This study was conducted in 21 villages of two of the governorates of Upper Egypt namely, Benisuef and Fayoum governorates, which were ranked as the second and the third poorest governorates, respectively. The choice of the 22 villages of these two governorates

was based of two facts: Poverty is heavily concentrated in the upper rural region of Egypt, where 63.5% of individuals are poor. The study governorates ranked low in socioeconomic standard and high in maternal mortality [22].

Participants and inclusion criteria

Two groups were targeted and included in this study. **First group:** Ever married women in childbearing period aged 15–49 years within the targeted villages in the selected governorates.

The second group: Women's husbands who were the main decision makers. Husbands were chosen as a second target group in the present study because most women reported that they followed the beliefs of their husbands for all the life decisions and even for HP related issues. Accordingly, women and their husbands were considered as the priority target groups for the study.

Variables/data sources and measurements

Quantitative data were obtained through a designed standardized questionnaire that was constructed to determine the favorite channels for communication out of the traditional mass media, modern social media, and interpersonal communication. The investigated CCs included: modern social media (search browser engine/Facebook group and/or twitter/YouTube or messaging through WhatsApp or any mobile app), traditional mass media (T.V/Radio/Reading), and interpersonal communication (talk with religious leaders/partners/friends/doctors/health promoters). The questionnaire included sociodemographic characteristics of the study group about the current age of wife and husband and their age at first marriage, background information for the education level of the woman and her husband, and their employment status and their types of residencies. Decisions concerning the choice of these media were based on reach; what proportion of the target group is exposed to the media? Frequency: how often is the target group exposed to the media? Managerial feasibility: will it be possible for the future interventions to manage the use of the three most exposed media over time? and Effectiveness; what are the most credible information sources, the best-suited CCs methods, and means to reach the target group?

The questionnaire was designed according to UNICEF guidelines 2008, 1999a and b, and World Bank 2003 [23], [24], [25], [26], [27], with some modifications including the addition of social media as modern channel of communication.

The main questionnaire was subjected to pilot testing after its modification on women at their childbearing period attending the rural health units in the same villages that were targeted in Benisuef

and Fayoum governorates (50 women from each governorate). Data from these women were not included in the analysis. The pilot test was performed aiming at testing feasibility of the study implementation and assessing the validation of the prepared questionnaire, and its internal consistencies. Based on pilot test, some modifications were done to the questionnaire.

Data collection was conducted by a research team from the National Research Centre of Egypt who were public health and adolescent health specialists. The health promoters who were belonging to the rural units within the selected villages guided the researchers during the household community-based survey.

Sample technique and size

Sampling

Two-stage random sampling was used; households were randomly selected from the targeted villages in the selected governorates, and then one ever married woman during her childbearing period aged 15–49 years was randomly selected from each household. Selection of the targeted participants was selected after obtaining the map of each village to cover the catchment areas of the targeted 21 villages. Such selection ensured accuracy and reliability of the obtained data.

Sampling was conducted to meet the division of reproductive health's standards (DRH) at the center for disease control and prevention of point estimates within $\pm 3.5\%$ (two-sided width = 0.07) of the true population prevalence, with 95% confidence and estimated response rate of 80%. Accordingly, a sample size of 810 produces a two-sided 95% confidence interval (CI) with a width equal to 0.07, when the sample proportion is 0.5 [28], [29].

The exact sample size was $(810 + 20\% \text{ losses}) = 972$ which was rounded up to 1000. The households were selected randomly. 1000 childbearing women (aged 15–49) and 1000 of their husbands completed the survey.

Quantitative variables and statistical methods

All completed questionnaire forms were entered in the computer. Statistical Package of Social Science Software program (SPSS), version 22.0 software (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp). Descriptive statistics in the form of mean, Standard deviation, frequency, and percentage were used for data summarization. The analysis was done using, t test between means, chi-square test, and Z-test between proportions. Comparisons between different social media channels versus traditional media channels was done using odds ratios (OR) and 95% CI. Multivariate logistic regression (Enter Wald) was

done for CCs that showed statistical significance in the univariate logistic regression analysis, to adjust and control the effect of confounding variables to prioritize the most exposed and credible CCs between wives and husbands. Significant association is considered if the 95% CI does not include the value 1.0. In this study, a cut-off $p < 0.05$ is used for all tests as a measure of statistical significance and considered statistically highly significant if $p < 0.01$ [30].

Ethics approval and consent to participate

The study complied with the International Ethical Guidelines for Biomedical Research Involving Human Subjects [31]. Medical Research Ethical Committee - National Research Centre of Egypt has cleared the study protocol with ethical approval registration number 10,140. Informed written consent was obtained from all participants involved in the study. Information obtained at the individual level was kept strictly confidential. A worthy note to mention that although the study was looking for the child marriage with the age of both wives and their husbands < 18 years, yet the actual current age of the surveyed women and their husbands were in the age range (19–40 years) and (21–45 years), respectively. All participants were above the age of 18 at the time of their enrollment for the study. Accordingly, there were no need for their parents/guardians' consent on their behalf. The information disclosure "Making sure patients understand" was guaranteed according to the recommendations of the Egyptian patients and guardians' perception about clinical informed consent as preferred purposes for IC practices [32].

Results

The study segmented the surveyed women and their husbands regarding their demographic characteristics. Table 1 shows that more than half of the surveyed women (63.7%) were < 25 years old which lies in the adolescent age versus one third of their husbands (30.1%) with a mean age of 23.9 ± 5.8 for wives versus 31.2 ± 8.4 for husbands with statistically significant difference ($p < 0.001$). As regards the age at the first marriage, it was noticed that almost two thirds of women (69.5%) and one-third of husbands (40.7%) married at an age < 19 years with statistically significant difference ($p < 0.001$). Moreover, most surveyed women (96.6%) were married at an age ranging from 15 to 24 years versus 83.4% of husbands, which lies in the adolescent age.

Forty percent of surveyed wives were illiterate versus 20.6% of their husbands followed by 30.7% and 37.2% had secondary or equivalent education for wives

Table 1: Demographic characteristics of the surveyed women and their husbands, Upper Egypt

Demographic characteristics*	n	%
Current wives age		
< 25 years	637	63.7
25–<35 years	287	28.7
≥ 35 years	76	7.6
Mean current age of wives \pm SD (range)	23.89 \pm 4.8 (19–40)	
Current husbands Age		
< 25 years	301	30.1
25–<35 years	111	52.3
≥ 35 years	176	17.6
Mean current age of husbands \pm SD (range)	28.2 \pm 6.4 (21–45)	
Wives age at first marriage		
< 19 years	695	69.5
≥ 19 years	305	30.5
Mean age at 1st marriage for wives \pm SD (range)	19 \pm 3.0 (16–22)	
Husbands age at first marriage		
< 19 years	407	40.7
≥ 19 years	593	59.3
Mean age at 1st marriage for husbands \pm SD (range)	25.6 \pm 4.9 (15–30)	
Wives' Education		
Illiterate	403	40.3
Read & write/Primary/Prep	253	25.3
Secondary or equivalent (technical-vocational)	307	30.7
University or higher	37	3.7
Husbands' Education		
Illiterate	206	20.6
Read & write/Primary/Prep	399	39.9
Secondary or equivalent (technical-vocational)	372	37.2
University or higher	23	2.3
Wives' employment		
Employed	41	4.1
Unemployed	959	95.9
Husbands' employment		
Employed	873	87.3
Unemployed	127	12.7
Type of residence immediately after marriage		
Nuclear family	315	31.5
Joint family	685	68.5

*Surveyed wives and their husbands 2000 (1000/each).

and husbands, respectively, with statistically significant difference between their pattern of distribution ($p < 0.001$). The great majority of studied women (about 96%) were housewives while about 60% of their husbands had paid work as craftsmen or builders. About two-thirds of the surveyed groups lived as joint family with the husband's or wife's parents, or one of them or with their relatives. On the other hand, about one-third of wives had their house alone with their husbands.

TV was the most accessible mean of mass media for both husbands and wives (92.7%) followed by reading then the radio. The least accessibility was to android mobiles (31.7% of wives and 34.3%) of husbands with insignificant difference between them followed by computers and/or laptops (24.0%). When comparing the frequency of exposure of wives to their husbands, wives were significantly more exposed to both watching TV (72.5% vs. 63.3%) and to reading (31.3% vs. 18.4%) with statistically significant difference between them (p of z test < 0.05). Whereas exposure to the android mobiles was the same for both wives and husbands, the exposure to computers and/or laptops was limited to a small percentage (18.2% of husbands and 10.5% of wives). When comparing the exposure to traditional media versus modern social media, the exposure of wives and husbands to television were nearly 6 and 5 times than that to the android mobiles (OR = 5.6 and 4.7, respectively) with high statistical significance. On the contrary, exposure to reading and android mobiles was nearly equal among wives (OR = 0.9) and insignificantly lower among husbands

(OR= 0.6). Reading sources included newspapers and magazines. Meanwhile, for both wives and husbands, the exposure to radio were equally significantly less than that of the android mobiles (OR = 0.3) (Table 2).

Table 2: Reach (accessibility) and Frequency of the exposure to mass media and social media channels

Channels	Wives N = 1000 No (%)	Husbands N = 1000 No (%)
Accessibility to Media		
Reach to Traditional Mass Media		
Availability of T.V	920 (92.7)	
Reading (Newspapers/Magazines/Booklets/Posters) [®]	565 (56.7)	774 (77.4)**
Radio	326 (32.6)	
Reach to Social Media		
Mobiles [®]	890 (89.7)	986 (98.6)**
Availability of Android mobiles	317 (31.7)	343 (34.3)
Computer and/or lap top	240 (24.0)	
Frequency of Exposure to Media		
Frequency of exposure to Traditional Mass Media		
T.V [®]	725 (72.5)	633 (63.3)**
Reading (Newspapers/Magazines/Booklets/Posters)	313 (31.3)	184 (18.4)**
Radio	140 (14.0)	126 (12.6)
Frequency of exposure to Social Media		
Functioning Mobiles	890 (89.7)	986 (98.6)**
Android mobiles	317 (31.7)	266 (26.6)
Computer and/or lap top	105 (10.5)	182 (18.2)**
Odds of Exposure		
OR (95%CI) for exposure to TV vs android mobiles	5.6 (4.6–6.8)**	4.7 (3.9–5.7)**
OR (95%CI) for exposure to reading vs android mobiles	0.9 (0.8–1.1)	0.6 (0.5–0.7)**
OR (95%CI) for exposure to radio vs android mobiles	0.3 (0.2–0.4)**	0.3 (0.3–0.5)**

[®]z test between proportions, *p<0.05, **p<0.001. OR: Odds ratio.

Assessing the managerial feasibility found that 81.5% of wives and 74.2% of husbands who watched TV spent <3 h/day with significant difference between wives and their husbands. Meanwhile, half of the wives and their husbands (48.5% vs. 47.0%, respectively) spent > 5 h/day on android mobiles for the use of the social media with insignificant difference. For reading, there are insignificant preferences for both wives and their husbands (Table 3).

Table 3: Managerial feasibility of the three most exposed mass and social media among target audience, Upper Egypt (time of watching TV or using social media)

Favorite channels [®]	Wives No (%)	Husbands No (%)	p-value of z test
Watching TV			
Less than 3 h/day	No = 725 591 (81.5)	No = 633 470 (74.2)*	< 0.05*
3–5 h/day	86 (11.9)	94 (14.8)	< 0.05*
> 5 h/day	48 (6.6)	69 (11.0)	< 0.001**
Exposure to Social Media on Mobiles			
Less than 3 h/day	No = 317 130 (41.1)	No = 266 87 (32.7)	< 0.001**
3–5 h/day	33 (10.4)	54 (20.3)	< 0.001**
> 5 h/day	154 (48.5)	125 (47.0)	> 0.05
Reading			
Once a month	No = 313 82 (26.2)	No = 184 41 (22.3)	< 0.001**
Once a week	96 (30.7)	49 (26.6)	< 0.05*
2–3 times a week	32 (10.2)	18 (9.8)	> 0.05
Almost every day	58 (18.5)	38 (20.7)	> 0.05
Once per day or more	11 (3.5)	14 (7.6)	< 0.001**
Irregular	34 (10.9)	24 (13.0)	> 0.05

[®]Calculated out of the most exposed channel, *p<0.05, **p<0.001.

Among both husbands and wives who watched TV, satellite channels were much more preferred than local channels with significant statistical difference between them (p < 0.05) (Figure 1).

The most favorite programs through which messages could be received by wives and husbands were drama and series (48.4% and 85.6%, respectively) followed by cooking programs for wives (32.6%) and specialized programs (talk show) (65.1%) for husbands with highly significant difference between the wives and their husbands concerning the preference of the favorite programs (< 0.001) (Figure 2).

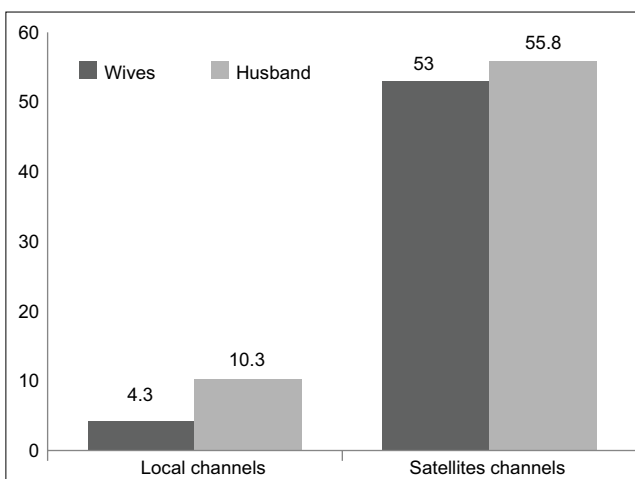


Figure 1: Favorite TV channels (managerial feasibility)[®]. #Percentage calculated out of those who reported that they are watching.

Assessment of the effectiveness for the most credible information sources and the best-suited CCs methods and means to reach the target groups was shown in the Table 4. The assessment revealed that the most credible sources of information for receiving messages by most husbands and wives were interpersonal communication with health promoters (39.3% for husbands and 49.1% for wives, (p < 0.05) followed by doctors (48.7% of wives), and nurses (35.5% of husbands) with significant difference between wives and their husbands (p < 0.05). A high percentage of the target group expressed their desire to receive messages through direct talk with doctors (58% of husbands and 65.3% of wives) or with health promoter (44.2% of husbands and 57% of wives), with significant difference (p < 0.001). TV (as a traditional channel) followed by YouTube videos was the second source (38.3% and 27.8% for husbands and 42.6% and 31.7% for wives, respectively (p > 0.05). The third most desirable channel was messaging with friends/relatives/neighbors through “Whats app” application (27.3% of husbands and 30.7% of wives) with insignificant difference. Furthermore, for wives, talk with doctors or health promoters was 2 times significantly higher as the most credible and favorite channels than that with search on you tube (OR = 2.0 and OR = 2, respectively)

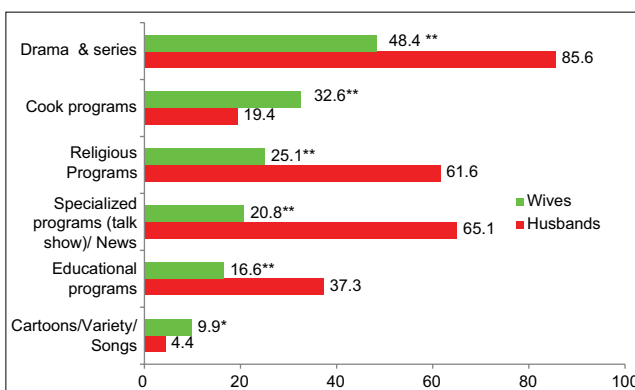


Figure 2: List of Favorite Programs in TV, Upper Egypt. N.B. **Highly significant statistical difference, *Significant statistical difference

Table 4: Listing of channels through which messages for reproductive health promotion were received by target audience (most credible information source vs. the most favorite), Upper Egypt

Channels	Wives N = 1000		Husbands N = 1000	
	No (%)		No (%)	
	Most credible	Most favorite	Most credible	Most favorite
Social Media				
Search on YouTube	317 (31.7)	317 (31.7)	278 (27.8)	268 (26.8)
messaging with friends/relatives/neighbors through WhatsApp	132 (13.2)	307 (30.7)	113 (11.3)	273 (27.3)
Social media through Facebook group and/or twitter	233 (23.3)	192 (19.2)	285 (28.5)	314 (31.4)
Search through search browser engine (e.g. Google, Microsoft edge...etc.)	10 (1.0)	70 (7.0)	35 (3.5)	85 (8.5)
Traditional Mass Media				
T.V	426 (42.6)	74 (7.4)	383 (38.3)	163 (16.3)
Newspapers/Magazines/Booklets/Posters	104 (10.4)	537 (53.7)	99 (9.9)	545 (54.5)
Radio	91 (9.1)	90 (9.0)	66 (6.6)	101 (10.1)
OR (95%CI) for TV vs search on You Tube	1.5 (1.3–1.9)**		1.6 (1.3–1.9)**	
OR (95%CI) for TV vs search on social media	2.4 (2.0–2.9)**		1.5 (1.2–1.8)**	
Interpersonal communication				
Religious leaders	150 (15.0)	246 (24.6)	181 (18.1)	316 (31.6)
Talk with partner	257 (25.7)	279 (27.9)	241 (24.1)	292 (29.2)
Talk with Doctors	487 (48.7)	653 (65.3)	348 (34.8)	580 (58.0)
OR (95%CI) for Talk with the doctor vs search on You Tube	2.0 (1.7–2.4)**		1.3 (1.1–1.6)**	
OR (95%CI) for Talk with the doctor vs Search using browser engine	3.1 (2.5–3.7)**		1.3 (1.1–1.6)**	
• Talk with Nurses	417 (41.7)	498 (49.8)	355 (35.5)	446 (44.6)
OR (95%CI) for Talk with the nurse vs search on You Tube	1.5 (1.2–1.8)**		1.4 (1.1–1.7)**	
OR (95%CI) for Talk with the nurse vs search using browser engine	2.3 (1.9–2.8)**		1.3 (1.1–1.6)**	
• Talk with health promoters	491 (49.1)	570 (57.0)	393 (39.3)	442 (44.2)
OR (95%CI) for Talk with the health promoter vs search on You Tube	2.0 (1.7–2.4)**		1.6 (1.3–2.0)**	
OR (95% CI) for Talk with the health promoter vs search using browser engine	3.1 (2.6–3.8)**		1.6 (1.3–1.9)**	

*p<0.05, **p<0.001.

and 3 times higher than that for social media using browser engine (OR = 3.1 for each). For husbands, the odds were nearly one and half for all (Table 4). The second most credible and favorite channels for both wives and husbands were TV which carry more than 1 ½ times significantly higher incidence than that with search on you tube (OR = 1.5 and 1.6, respectively) or social media (OR = 2.4 and OR = 1.5 respectively).

RHP messages that were most received by the target group were those about risky pregnancy (58.6% of wives and 48.7% of husbands) and family planning (31.6% of husbands and 51.6% of wives). Statistically significant difference was observed for all the messages received in favor of wives except the messages related to reproductive tract infection (Table 5).

Table 5: Messages for reproductive health promotion received by husbands and wives, Upper Egypt as reported by participants

Channels	Wives	Husbands	p-value of z test
	N = 1000 No (%)	N = 1000 No (%)	
Pregnancy and labor and their risks including risk of abortion	586 (58.6)	487 (48.7)	< 0.001**
Messages about family planning and spacing	516 (51.6)	316 (31.6)	< 0.001**
Messages about antenatal care, and safe delivery	456 (45.6)	75 (7.5)	< 0.001**
Reproductive tract infection health education messages	286 (28.6)	275 (27.5)	> 0.05
Guidelines to safe delivery	32 (3.2)	52 (5.2)	< 0.05*

*p<0.05, **p<0.001.

Table 6 showed the intention of wives and husbands toward postponing the early marriages for their children and postponing pregnancy of their daughters > 19 years according to their most credible source of information. Most of wives reported that they are going to postpone their daughters' marriage after their 18 years and more than half of them encourage postponing their daughters' first pregnancy compared to less than half of the husbands. More than one-third of husbands were not certain about their intentions for either of them. Significant difference was detected in favor of the traditional media as the most credible

source of information only for wives' intention to postpone their children early marriage. There was insignificant influence of the type of the most credible source of information on encouraging the postponing of the pregnancy of their daughters for more than 19 years.

Multivariate logistic regression analysis was done to priorities and identify the likelihood of the exposure and most credible CCs for both wives and husbands (Table 7). While the exposure to reading and to android mobiles were the same for wives and their husbands, exposure to radio was significantly higher for husbands by nearly 50% (Exp (B) = 0.46). Exposure of wives to T.V was nearly twice that of husbands (Exp (B) = 1.87). The most credible channels that reported by wives and husbands (Table 4) were investigated. Talk with the health promoters was nearly 3 times higher for wives than that of husbands (Exp (B) = 3.67) as most credible source of information followed by talk with nurses (Exp (B) = 1.74). Meanwhile talk with physicians was nearly the same for both wives and husbands

Discussion

Important decisions in our lives are not necessarily made by the right, the best or the smartest person but rather by the person who has the power to make that decision especially in young age groups where individuals cannot give consent as in adolescence. Decision makers in any society are a key group that must be targeted and approached due to their direct influence on changing the beliefs and awareness of people living in that society. Many wives in the current study reported that they follow the beliefs

Table 6: Intention of wives and husbands towards early marriages and postponing pregnancy according to the most credible information source (social vs. traditional media)

Factors	Wives [§]			Husbands [§]		
	Definitely do	May be	Definitely do not	Definitely do	May be	Definitely do not
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Postponing their children's marriage to >18 years						
Social media	261 (82.3)	56 (17.7)	-	132 (47.4)	124 (44.4)	23 (8.2)
Traditional media	450 (91.6)	41 (8.4)		196 (49.9)	160 (40.7)	37 (9.4)
p-value for X ²	p<0.001**			P>0.05		
Encourage postponing 1 st pregnancy of their daughters >19 years						
Social media	194 (61.2)	52 (16.4)	71 (22.4)	94 (33.7)	107 (38.4)	78 (28.0)
Traditional media	311 (63.3)	98 (20.0)	82 (16.7)	152 (38.7)	160 (40.7)	81 (20.6)
p-value for X ²	p>0.05			p>0.05		

[§]317 wives and 279 husbands who considered at least one social media as their most credible source, 491 wives and 393 husbands who considered at least one traditional channel as their most credible source. **Highly sig.

of their husbands for all life decisions and even for HP related issues. Meanwhile, in rural communities, refusal of husbands was reported by many wives to be the most common barrier to their referral to health services [17], [18], [33]. Based on all the above findings and facts, women and their husbands were considered as the priority target groups for the current study.

Table 7: Multivariate Logistic regression model for prioritization of the exposure and credible communication Channels between wives and husbands

Parameters#	COR (CI 95%)	AOR	CI 95% C.I.
Exposure to radio (wives)	0.79 (0.62-0.88)*	0.46	0.35-0.56*
Exposure to reading (wives)	2.0 (1.6-2.48)*	1.00	0.99-1.01
Exposure to android mobiles (wives)	1.28 (1.05-1.55)*	0.90	0.75-1.08
Exposure to TV (wives)	1.53 (1.27-1.84)*	1.87	1.35-2.59*
Most credible Talk with nurses (wives)	1.78 (1.40-2.13)*	1.74	1.45-2.10*
Most credible Talk with physicians (wives)	1.30 (1.08-1.56)*	1.00	0.98-1.02
Most credible Talk with health promoters (wives)	1.50 (1.24-1.78)*	3.67	2.80-4.80*
Constant		0.043	

#Wives were the base of the study, *p<0.05.

In the field of health, substantial evidence shows that people are willing to change their health behavior irrespective to the health condition. It is therefore important to identify channels of communications through which HP messages that contribute to promotion of reproductive health should be disseminated to the specific target audience. Nowadays, health care messages, including reproductive health, are increasingly being delivered through digital channels such as the internet, mobile phone messaging, social media, apps, voice/video messaging, and telemedicine. These ways have proven to be effective in developed countries, yet in developing countries many barriers such as infrastructure, lack of equipment, and technology gap hinder their successful implementation [34], [35], [36], [37].

Although social media is an acceptable and usable among multiple audiences and appeared to be promising in promoting health equity among disadvantaged populations especially low-income communities [38], [39], yet, the effectiveness of social media in improving public health outcomes including RHP and reduction of child marriage is questionable in rural communities compared to urban settings. In rural areas, there is negative association with computer access and use of modern technology that can be attributed to variables as poor internet connections, poverty, and lower level of education [40]. Traditional media is therefore fundamental in rural communities as

it disseminate the information which shapes the public, so it plays a major role in changing the risky attitudes and behaviors of the targeted audience [20].

In the current study, the internet was not a first choice for the participants as a source of reproductive health information as only one-third of them had access to android phones. Interpersonal communication appeared to be the most credible source of information and the most favorite channel through which RHP messages could be received by target audience. Talking with health promoter (39.3% for husbands and 49.1% for wives) and talking with doctors (48.7% of wives) came as the most important means for both wives and husbands followed by TV (42.6% of wives and 38.3% of husbands). This result is like that of many previous old and recent studies as well, who assessed the effectiveness of broadcasted media versus interpersonal channels in delivering health messages to the public [41], [42], [43], [44], [45], [46]. They reported that in low and moderate socioeconomic societies, interpersonal communication serves as primary health information sources for health-oriented individuals with strong health beliefs and commitment to healthy activities, while passive consumption channels such as television and radio serve as primary health information sources for individuals in low socioeconomic societies and who are not health-oriented. Unfortunately, neither one of these studies assessed the reach, frequency, managerial feasibility nor the effectiveness of the recent social media channels versus the traditional ones as tool for HP.

In the present study, on investigating the channels of communication through which RHP messages could be disseminated, the percentages of wives who had accessibility to TV, radio and reading media were 72.5%, 14% and 31.3%, respectively, while for the husbands the percentages were 63.3%, 12.6%, and 18.4%, respectively. This indicates more accessibility of wives and their husbands to TV as a main source for health information within Egyptian families. TV serials have been proven as a very successful means of 'edutainment' as well. They usually convey a particular theme which can possibly influence viewers' behavior [47], [48], [49].

Assessing the managerial feasibility will help in the identity of the possibilities to be targeted for any future interventions depending on the exposure over

time through detecting the top three types of media and platforms to which the target audience were most exposed. The current study found television stations as key partners in disseminating messages for promoting public health. The current study revealed that the more than three quarters of wives (81.5%) and husbands (74.2%) spent <3 h/day watching televisions watching drama and series (48.4% and 85.6%, respectively). This finding was in accordance with an old study dated 1999 that was done by the National Research Council (US) and Institute of Medicine (US) Board on children, youth, and families [49], indicating that the situation still the same in rural communities despite of the nowadays widespread of the social media, whereas only half of those reported to have android mobiles spent up to 5 h/day on android mobiles. This finding indicate that future programs should rely on mass media rather than social media for the large and broad campaigns to target rural communities. An example in Egypt that is proved to be successful one with the use of mass media is a soap opera called "The Family House" which reached out to millions of Egyptians with health messages on issues such as AIDS, drugs, child spacing, home accidents, and hygiene [50], [51]. Another example is a soap opera on the South African television that was run by public health activists over 70% of the population addressing, from HIV and AIDS to rape [52].

For wives, talk with doctors or health promoters was 2 times significantly higher as the most credible information sources and the best-suited CCs methods than that with search on you tube (OR = 2.0 and OR = 2, respectively) and 3 times higher than that for social media using browser engine (OR = 3.1 for each). For husbands, the odds were nearly one and half for all. This was in accordance with many Egyptian studies which have achieved their goals for improving behaviors for many health-related diseases and issues with the aid of the health promoters, community leaders or health care workers; for example, reduction of maternal mortality [17], [18], [53], improving environmental health [54], [55], alleviating children anemia [56], counteracting barriers against diabetes [57], and accelerating HCV elimination [59], [60], [61]. These studies are mainly community-based studies in rural communities respecting the culture and believe within their communities. Other Egyptian studies that relay on the nurses and physician for facility-based studies addressing several health issues from improvement of cognitive function [62], children's nutritional habits [9], [63], [64], improving response of HBV among children [65], [66], and improving compliance with hemodialysis patients [67], [68]. All these health communication programs were proved to be helping aid for people make these changes especially for rural communities of Egypt using the most credible and favorite channels. In accordance with these facts, the intention of wives toward postponing their children early marriage was significantly higher among those who considered traditional channel as their most credible source than social media. For husbands and

for intention of encouraging the postponing of their daughters' first pregnancy to more than 19 years was similar between the two types of media indicating that once the target group is reached, he can be persuaded by certain idea. This indicates that the problem is not with the channel use or the most credible one, but it is related to the accessible type that is influenced by the locality.

Conclusion

Application of cost-effective strategies for tackling rural health problems required CCs assessment to identify the on-ground situation to meet the unmet need for not only the problem of child and adolescent marriage but also facing any health problem. Despite the availability of recent social media worldwide, what worked worldwide was not the situation for rural communities, with high illiteracy, limited access to the internet, and limited availability of smartphones. For rural communities and with the widespread of many health problems, the most credible information sources and the best-suited CCs methods for delivering reproductive health messages are interpersonal communication through health promoters followed by doctors and nurses. Television, being the most favored and most accessible mass media channel, plays important roles in terms of conveying information, stimulating thought, informing, and developing ideal behavior.

Recommendations

It seems vital during the implementation of any preset strategies for reproductive health to use not only the media broadcasts to promote reproductive health but also to rely on the channels that are most credible and suitable for the targeted communication. For rural communities in special, the used media must be embedded in the settings in which people live through the health promoters in the community setting and by professionals in clinics rather than being delivered through social media. These types of efforts would improve women's and men's abilities to meet their childbearing goals and empower country directions toward fulfillment of the global SDGs to ensure equality by 2030.

Strengths of the study

The current study serves as an exemplary model for facilitating the implementation of the national

strategies for RHP mainly in rural communities and support meeting the unmet need. The study did not only assess the availability and accessibility of different CCs but also assess their managerial feasibility and credibility as a crucial step for limiting child and adolescents' marriage.

With the still high adolescents' marriage in rural communities of Egypt, this study reports on the problem situation from the holistic point of view and did not dig deeper into linking wives and husbands' characteristics to the use of channels type as it is well known that the use of social media is highly linked with education level and young age.

Limitation of the study

The study was limited to study only the beneficiaries, without evaluating the impact of CCs use on the reduction of child and adolescent marriage.

Availability of data and materials

The datasets used and/or analyzed concerning the current study are not publicly available due to the privacy of the studied women and their husbands as any topic related to reproductive health in the rural communities is considered taboo. Meanwhile, all data of the current study are available from the corresponding author on reasonable request.

Authors' Contributions

AMM conceived and designed the study. RMS, MME, HAA, MHA, HMM1, MAA, HMM2, AM, GAA conducted the field work and data collection. AMM, NAI, HE, AMA, WAF oversaw the implementation. HMM1, MAA, HMM2, MME provided clinical examination for all child and adolescents during the clinical conveys during conduction of the field work. RMS, AM, DME, SIS & IIS did the statistical analyses. RMS, DME, MME shared in the interpretation of the results. RMS drafted the manuscript. AMM & LEE reviewed the manuscript. RMS & MME submitted the manuscript. All authors reviewed the manuscript and approved the final version.

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