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HEALTH LITERACY AND MASS-MEDIATED
INTERVENTIONS
EFFECTS OF *TARU*, A REPRODUCTIVE HEALTH SOAP OPERA
IN INDIA

This empirical study investigates the impact of *Taru*, a reproductive health entertainment-education radio drama aired in India, on a number of health literacy-related outcomes. Following a discussion of the design and implementation of this mass-mediated health promotion project, the study focuses on the relationship between a foundational element of health literacy—the ability to read written information — and the effects of the entertainment-education (E-E) radio drama in overcoming disparities between low and high literacy groups as well as improving reproductive health. Results suggest that the entertainment-education project positively impacts outcomes and reduces literacy disparities. However, literacy apparently influences exposure to this health communication project in spite of the fact that, by nature, the mass-mediated E-E intervention does not demand the ability to read written information.

Keywords: health literacy, entertainment-education, reproductive health, soap operas, India.

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Health literacy has been defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Rogers et al. 2001). Overcoming the barriers associated with inadequate health literacy is central to the purposes of health promotion interventions, and more specifically of mass-mediated entertainment education projects. *Entertainment-education* (E-E) is the process of purposely designing and implementing a media message to both entertain and educate, in order to increase audience members’ knowledge about an educational issue, create favorable attitudes, shift social norms, and change overt behavior (Singhal and Rogers 1999). Entertainment-education interventions — comprising of radio and television soap operas, popular music, or participatory theater — have helped improve health outcomes in various contexts (Bouman et al. 1998; Singhal et al. 2004a; Slater & Rouner 2002). However, inadequate health literacy on part of audience members may serve as a barrier to the positive health outcomes that E-E practitioners seek to achieve.

Unfortunately, relatively little research has been conducted regarding the relationship between health literacy and activities related to health promotion, health protection, and disease prevention (Rudd 2001), including E-E interventions. The present article addresses this gap by considering the relationship between literacy, a functional component of health literacy, and the outcomes of a health promotion intervention — an E-E radio drama whose narrative nature and aural format should aid in overcoming barriers to literacy. As adequate literacy is a foundational skill for all levels of health literacy, inadequate or low literacy is a major barrier to improvement in overall health literacy (Kickbusch 2001; Parker et al. 1995; Pfizer Inc. 1998; Williams et al. 1995). For these reasons, this study focused on the radio listeners’ levels of functional literacy — their ability to read written information. Specifically, it explored the influence of their functional literacy on family planning outcomes as well as on exposure to *Taru*, a reproductive health radio drama in India. Not only is a revelation of such influence informative in and of itself, establishing its existence is an important prerequisite for determining *Taru’s* impact. Once established, the study then asked whether exposure to *Taru* may mitigate literacy-related influence on outcomes, by improving listeners’ knowledge, awareness, intentions, attitudes, and practice of family planning health behaviors.

1. Design and Implementation of the *Taru* Health Promotion Intervention

The *Taru* health promotion intervention integrated the on-air broadcasts of an E-E radio drama called *Taru* with existing on-the-ground reproductive health service delivery activities (offered through Janani, a non-governmental organization) in four Indian states — Bihar, Jharkhand, Madhya Pradesh, and Chattisgarh. *Taru*, a 52-episode E-E soap opera focusing on reproductive health, was broadcast in these four Indian states from February, 2002 to February, 2003. These four states, with a combined population of 190 million people, have the highest fertility, infant mortality, and maternal death rates in India; and the lowest literacy and contraceptive prevalence rates (Singhal et al. 2004b). Appropriately, *Taru*'s purpose was to promote gender equality, small family size, and reproductive health in its broadcast area. One episode was broadcast each week on Friday at 8:00 p.m., with a repeat broadcast each Sunday at 3:40 p.m. Five audience tracking surveys, conducted every two months during the one year that *Taru* was broadcast, estimated the radio serial's listenership at about 10 percent of all households in the general population in Bihar (Singhal et al. 2003).

The story of the radio drama revolved around Taru, a young, educated woman who works in a community-based health organization that provides reproductive health care services to women, and carries out village-level self-help activities. Taru's co-worker is Shashikant, a man, who like Taru, is educated, intelligent, and also involved in community development work. Taru and Shashikant fight multiple social evils in a series of intersecting storylines, including preventing a child marriage, female feticide, and encouraging girls to be treated on par with boys. A subplot involves Naresh, his wife Nirmala, his mother Ramdulari, and his four daughters. Ramdulari insists on a fifth child, arguing for the importance of having a grandson. Nirmala uses female contraceptive pills to avoid an unwanted pregnancy. Nirmala's character models the importance of women exercising more control over their reproductive health.

The year-long (2002-2003) broadcasts of *Taru* were dove-tailed with a series of on-the-ground activities in 25,000 villages of four Indian States — Bihar, Jharkhand, Madhya Pradesh, and Chattisgarh — through Janani, a non-governmental organization that promotes reproductive health care services in the region (Singhal et al. 2004b). Janani's reproductive health service delivery approach in these four Indian states is noteworthy. Janani identifies respected village-based rural health

providers (RHPs), and trains the RHP and his spouse by providing a crash course in reproductive health care, maternal and child health, and diagnosis and treatment of STIs/RTIs (sexually-transmitted infections and reproductive tract infections). Janani knows that most rural women in India are embarrassed to seek reproductive health services from a male RHP. Now with a trained woman in their midst, rural women feel comfortable to seek prenatal and antenatal care services, as well as contraceptives. Once the RHP couple has successfully completed their training, Janani brands their clinic and incorporates it in its franchisee network of Titly (Butterfly) Clinics, enhancing the visibility of the local RHP and his spouse. Furthermore, after registering in Janani's rural health network, the RHPs begin to stock Janani's branded *Mithun* ("Bull") condoms, *Apsara* ("Angel") oral contraceptive pills, pregnancy dipsticks, and a whole host of reproductive health services.

Prior to *Taru*'s broadcasts, pre-program publicity was conducted on-the-air by All India Radio, the Indian national radio network (which broadcast the program), and on-the-ground by Janani's 25,000 strong network of RHPs (in the four Indian states). Such pre-program publicity involved the posting of over half-a-million *Taru* posters, over 700 strategically-placed wall paintings at major highway intersections in the four Indian states, and word-of-mouth promotion through the 25,000 RHP couples.

2. Assessing Impact of *Taru*

To assess the impacts of literacy level of radio listeners and its effect on exposure to and impact of *Taru*, a sentinel site district was chosen in India's Bihar State. Within three weeks of the conclusion of the radio drama, *Taru* respondents ($n = 764$) were randomly selected¹ from the general population of District Begusarai, an "average district" in India's Bihar State, one of the poorest states in India. District Begusarai, accord-

¹ This survey randomly selected households in Bihar's Begusarai District, a sentinel site which received broadcasts of *Taru*. Within each household, all eligible persons (ages 15 to 49) were listed, and only one person per household was randomly selected for the interview. To ensure that literacy level was not confounded with access to the radio drama, respondents were screened for access to a radio. Respondents who answered "yes" to all three of the following questions were included: (1) Do you own a radio?; (2) Is it in working condition?; and (3) does anyone in your household who is above 15 years listen to the radio at least once a week? These random selection and screening processes were continued until a sample of at least 750 respondents was achieved.

ing to the 2001 census figures, has a population of 2.4 million people of which 95 percent lives in rural areas. District Begusarai ranked 534 among all 590 Districts of India in the Reproductive Health Composite Index. Its sex ratio is 911 women to 1000 men. Its male literacy rate is 60 percent and female literacy rate is 36 percent. Fifty-nine percent of girls get married before the legal age of 18. Its total fertility rate (TFR) is 5.4. Its contraceptive prevalence rate (CPR) is 23 percent among all eligible couples. Only 16 percent of its children are completely immunized, and 69 percent of its children are underweight.

This screened sample ($n = 764$) was made up of 447 males (58.5%) and 317 females (41.5%). Respondents ranged in age from 15 to 49, with a median age of 26 years. Some 72% of respondents were married, 26% were single, and 1% were widowed or separated. Almost all respondents (99%) were Hindu. The most frequently reported occupation was housewife (31%) followed by "other" (15%), self-employed (11%), and cultivator (11%). Finally, 75 of respondents had at least a 6th grade education, 10% had some primary education, and 15% had no formal schooling.

The present study used a survey questionnaire in which the constructs of interest were measured (often employing Likert scales) by single or multiple items (as appropriate) — selected from previously validated scales and studies. Family planning outcomes consisted of measures of awareness, knowledge, intention, and behavior. Specifically, these outcomes were measured with regard to female contraceptive pills as *Taru* was especially designed to empower women to exercise more control over their reproductive lives. Family planning behavior was additionally measured by asking respondents whether or not they were covered by a contraceptive during their most recent sexual intercourse.

Exposure to *Taru* was measured by a question asking respondents to identify the number of times they had listened to the program. Non-listeners were identified as those who indicated that they had never listened to the program; listeners were identified as those who indicated that they had listened to the program at least once.

For this initial exploration of the relationship between functional literacy and an E-E intervention, level of literacy was measured on the survey by a standard literacy question, "Can you read a letter or newspaper easily?" In our sample, 13.1% of respondents answered "not at all," 4.8% said "with difficulty," 3.4% reported "average ability," 22.8% answered "very easily," and 55.9% replied "very fluently." Respondents

who replied with “not at all” or “with difficulty” were combined to form the “low literacy” group. Respondents who replied “very fluently” formed the “high literacy” group. Anticipating some of the subjectivity of this standard question and to ensure clear distinctions between high and low literacy groups, respondents replying that they read a letter or newspaper with “average ability” or “easily” were *not* included in the study’s two-group analyses (Two-Way Analysis of Variance). The number of respondents for the two-group analyses was 564 with 137 respondents in the low literacy group and 427 in the high literacy group.

In terms of demographic differences between respondents at high and low literacy levels, results indicated that the target audience for radio-mediated interventions (that is, radio listeners) was more likely to fall into the category of high literacy than low literacy. Although the two levels of literacy did not differ in terms of gender, low literacy listeners were older and more likely to be married than high literacy listeners. As expected, low literacy listeners were more likely to be housewives or wage labourers.²

3. Results of Study

The following results section first presents functional literacy’s influence by revealing literacy-related disparities on *Taru*’s outcomes of interest (including exposure to the intervention). It then presents findings regarding the degree to which *Taru* reduced any of these health disparities, thus mitigating the influence of functional literacy.

3.1. *Influence of Literacy on Family Planning Health Outcomes*

The study revealed the existence of disparities in health related outcomes between high and low literacy individuals. With regard to adopting fam-

² Both high literacy (HL) and low literacy (LL) groups of radio listeners were similarly composed of more males (LL, 53.3%; HL, 59.5%) than females (LL, 46.7%; HL, 40.5%). The low literacy group ($M = 31.4$), on average, was significantly older than the high literacy group ($M = 27.0$), $t(562) = 5.6$, $p = .001$. Low literacy radio listeners (91.2%) also were more likely than were high literacy radio listeners (68.1%) to be married, $\chi^2(3, N = 564) = 44.4$, $p = .001$. The occupation of respondents also differed by literacy level, $\chi^2(10, N = 564) = 108$, $p = .001$. Low literacy respondents more frequently reported that they were housewives than did high literacy respondents (LL, 42.3%; HL, 26.7%). Low literacy respondents were also more likely to be wage laborers (24.8%) compared to high literacy respondents (3.5%).

ily planning methods, disparities were observed for levels of awareness, knowledge, and intentions to adopt methods. Although most individuals at both levels of literacy reported awareness of the family planning methods, especially female contraceptive pills,³ high literacy individuals were more likely to be aware of these contraceptives. Differences in degree of knowledge of female contraceptive pills were even greater between the two groups. Low literacy individuals less frequently demonstrated accurate, complete knowledge of the methods, and more frequently demonstrated no knowledge whatsoever.⁴

On outcomes related to intentions to adopt family planning methods, results suggest low literacy is related to a greater resistance toward adoption of the female contraceptive pill. Not only were low literacy individuals less likely to indicate that they planned incorporating female contraceptive pills, they were nearly twice as likely to be resistant to adoption, indicating that they plan never to use female contraceptive pills.⁵ In terms of present or past behaviors, however, literacy did not appear to be related to either current or former use of female contraceptive pills or to the use of a contraceptive during a respondent's most recent sexual intercourse. Approximately one in ten respondents in each group reported that they either use or have used female contraceptive pills. Although the difference did not reach significance for use of contraception to cover the act of last sexual intercourse, the pattern of results may be of interest in that low literacy respondents (52.6%) were more likely than their high literacy counterparts (44.5%) to have used a contraceptive at last sex.⁶

Disparities among a number of attitudes and beliefs regarding family planning were also apparent between respondents with high and low literacy levels. High literacy respondents were more likely to agree that

³ For the sake of brevity and specificity, discussion of awareness, knowledge, intention, and ever/current use of contraceptive methods throughout this study will focus on female contraceptive pills. It is important to note that a similar pattern of survey results was found across several other types of contraceptive methods, including condoms, male pills, loop/copper T, injection, rhythm, withdrawal, tubectomy and vasectomy. However, the discussion of the use of contraception to cover the last sexual intercourse as well as other beliefs and attitudes pertain to all family planning methods in general.

⁴ Awareness: $F(1, 563) = 7.73, p < .01, \eta^2 = .13$; LL: $M = .95, SD = .22$; HL: $M = 1.0, SD = .07$; Knowledge: $F(1, 554) = 8.79, p < .01, \eta^2 = .15$; LL: $M = 1.58, SD = .74$; HL: $M = 1.92, SD = .82$

⁵ Intention: $F(1, 389) = 7.653, p < .01, \eta^2 = .019$; LL: $M = 2.13, SD = .96$; HL: $M = 2.61, SD = .9$

⁶ Use or have used female contraceptive pills for LL was 9.2% and for HL was 10.1%. Contraceptive use during their last sexual intercourse neared significance at $p = .053$.

family planning would improve the health of the mother.⁷ High literacy respondents disagreed more strongly that family planning methods both cost too much and were inconvenient.⁸ In addition, the high literacy group disagreed more strongly that it was embarrassing to get family planning services.⁹

The literacy-related disparities observed in this study offer support for the argument that the functional literacy dimension of health literacy as measured here may play a role in influencing health outcomes related to awareness, knowledge, and intention, but not outcomes related to current practice. In addition, functional literacy may influence beliefs about the impact of family planning on both the mother and family. Functional literacy also may influence attitudes relating to cost and inconvenience of family planning methods as well as feelings of embarrassment relating to services.

3.2. Influence of Literacy Level on Exposure to Taru

Results suggest that literacy level may predict exposure to the mass-mediated entertainment-education intervention. In the overall sample of radio listeners, approximately one in three respondents (33.9%) had listened to at least one episode of *Taru*. An analysis of exposure on all five levels of literacy revealed that those who were not exposed to *Taru* had a significantly lower literacy level than those who were exposed to *Taru*.¹⁰ In the two group analysis (see methods section), high literacy respondents (38.4%) were nearly twice as likely as low literacy respondents (19.7%) to have listened to at least one episode of the radio drama. Future research should inquire into reasons for the observed disparity regarding exposure to radio-mediated interventions between high and low literacy levels of radio listeners, especially when access is available as it was to respondents in this study.

⁷ $F(1, 559) = 6.47, p <.05, \eta^2=.01$, Low Literacy: $M = 3.72, SD = 1.08$; High Literacy: $M = 4.08, SD = .88$

⁸ High cost: $F(1, 557) = 9.03, p <.01, \eta^2=.02$, Low Literacy: $M = 1.99, SD = 1.12$; High Literacy: $M = 1.69, SD = .92$; Inconvenience: $F(1, 552) = 4.21, p <.05, \eta^2=.01$, Low Literacy: $M = 1.84, SD = .8$; High Literacy: $M = 1.73, SD = .78$

⁹ $F(1, 557) = 5.94, p <.02, \eta^2=.01$, Low Literacy: $M = 1.99, SD = 1.0$; High Literacy: $M = 1.74, SD = .88$

¹⁰ Not exposed to *Taru* ($M = 3.88, SD = 1.47$) versus exposed to *Taru*: ($M = 4.36, SD = 1.17$), $t(586) = -4.82, p < .001$

3.3. Mitigating Effect of *Taru* on Literacy Related Disparities in Family Planning Health Outcomes

Overall disparities between listeners and non-listeners did not exist for outcomes related to awareness, intention, or behaviors related to birth control use, while disparities regarding knowledge of female contraceptive pills did exist between *Taru* listeners and non-listeners. Knowledge about female contraceptives was greater for *Taru* listeners compared to those who did not listen to *Taru*.¹¹

Further investigation revealed, however, that disparities did exist between literacy levels of non-listeners that did not exist at significant levels for those exposed to *Taru*. Specifically, low literacy non-listeners were less likely to be aware of female pills compared to high literacy non-listeners, while *Taru* listeners at high and low literacy levels did not differ in their awareness of female contraceptive pills.¹² Likewise, low literacy non-listeners were less likely to be knowledgeable compared to high literacy non-listeners, while no significant disparity existed for low and high literacy listeners.¹³ In addition, literacy-related disparities related to intentions were not apparent for *Taru* listeners but were apparent for non-*Taru* listeners. Fewer low literacy non-listeners than high literacy non-listeners expressed some degree of intention to adopt female contraceptive pills.¹⁴ In contrast, while no disparity was present for non-listeners regarding use of contraceptive at last sex, low literacy *Taru* listeners were significantly more likely to have used a female pill at last intercourse compared to high literacy *Taru* listeners.¹⁵

Finally, listening to *Taru* did appear to impact family planning attitudes, beliefs, and communication. *Taru* listeners, compared to non-listeners, were more likely to agree that family planning would improve both the health of the mother and the economic well being of the family.¹⁶ An

¹¹ $F(1, 554) = 7.14, p <.01, \eta^2=.01$, Non-listeners: $M = 1.75, SD = .78$; Listeners: $M = 2.03, SD = .87$

¹² $t(115.7) = -2.3, p <.05$; Non-listener Low Literacy, $M = .95, SD = .23$; Non-listener High Literacy, $M = 1.0, SD = .06$

¹³ $t(364) = -3.58, p <.01$; Non-listener Low Literacy, $M = 1.52, SD = .7$; Non-listener High Literacy, $M = 1.84, SD = .79$

¹⁴ $t(248) = -4.04, p <.01$; Non-listener Low Literacy, $M = 2.06, SD = .91$; Non-listener High Literacy, $M = 2.59, SD = .91$

¹⁵ $t(183) = 2.06, p <.05$; Listener Low Literacy, $M = .58, SD = .5$; Listener High Literacy, $M = .36, SD = .48$

¹⁶ Health of mother: $F(1, 559) = 6.47, p <.02, \eta^2=.01$; Non-listener: $M = 3.70, SD = .93$; Listener: $M = 4.19, SD = .94$ Economic well being of family: $F(1, 563) = 12.15, p <.01$,

interaction occurred between literacy level and listening such that listening was associated with stronger agreement that family planning would improve the economic well being of the family among low literacy level respondents and with weaker agreement among high literacy respondents.¹⁷ Listening to *Taru* also was associated with an increased belief in the effectiveness of contraception in preventing pregnancy.¹⁸ Once again, an interaction occurred such that low literacy listeners' belief in the effectiveness of contraception was higher compared to non-listeners, while high literacy listeners' belief in effectiveness was lower compared to non-listeners.¹⁹ In addition, *Taru* listeners were more likely to agree that the quality of family planning services was good and that they knew where to go to get family planning services.²⁰ An interaction occurred regarding communication about family planning with one's spouse. Once again, listening to *Taru* was associated with an increase in the likelihood that respondents had spoken with their spouse in the low literacy group but with a decrease for the high literacy group.²¹

Overall, these results offer support for employing mass-mediated, E-E, health promotion interventions to address health literacy barriers. Many of the disparities apparent between high and low literacy respondents who were not exposed to *Taru* seemed to disappear for those exposed to *Taru*. In fact, the likelihood of female contraceptive pill use during most recent intercourse was even better for low literacy listeners than for high literacy listeners. In terms of general family planning beliefs, attitudes, and communication, this radio intervention may have impacted low literacy listeners even when the same was not evident among high literacy listeners.

$\eta^2=.02$, Non-listener: $M =4.51$, $SD =.58$; Listener: $M =4.66$, $SD=.52$

¹⁷ $F(1, 563) = 5.94$, $p <.02$, $\eta^2=.01$; Non-listener Low Literacy, $M =4.35$, $SD =.63$; Listener Low Literacy, $M = 4.74$, $SD = .45$; Non-listener High Literacy, $M =4.58$, $SD=.54$; Listener High Literacy, $M =4.65$, $SD =.53$

¹⁸ $F(1, 536) = 15.63$, $p <.01$, $\eta^2=.03$, Non-listener: $M =4.09$, $SD =.75$; Listener: $M =4.3$, $SD=.68$

¹⁹ $F(1, 536) = 7.37$, $p <.01$, $\eta^2=.01$; Non-listener Low Literacy, $M =3.93$, $SD =.82$; Listener Low Literacy, $M = 4.55$, $SD = .51$; Non-listener High Literacy, $M =4.15$, $SD=.71$; Listener High Literacy, $M =4.26$, $SD =.69$

²⁰ Quality of services: $F(1, 552) = 4.89$, $p <.03$, $\eta^2=.01$; Non-listener: $M =4.17$, $SD =.74$; Listener: $M =4.32$, $SD=.79$ Knowledge of services: $F(1, 558) = 8.93$, $p <.01$, $\eta^2=.02$, Non-listener: $M =4.43$, $SD =.71$; Listener: $M =4.64$, $SD=.59$

²¹ $F(1, 560) = 4.2$, $p <.05$, $\eta^2=.01$; Non-listener Low Literacy, $M =.87$, $SD =.33$; Listener Low Literacy, $M = 1.0$, $SD = 0$; Non-listener High Literacy, $M =.90$, $SD=.3$; Listener High Literacy,

4. Conclusions

This study was exploratory in nature since little research had been conducted regarding the relationship between health literacy—a barrier to health outcomes—and entertainment-education health promotion interventions. Results suggest that functional literacy level may influence a number of health outcomes as well as exposure to the E-E intervention. In addition, since disparities between high and low literacy listeners appeared to be reduced, results suggest that the intervention may have mitigated some of the literacy-related effects. Based on these results, the relationship between health literacy and entertainment-education warrants further investigation. Future studies should consider less subjective methods of measuring literacy as well as include measures of additional dimensions of health literacy.

Entertainment-education implementers may wish to investigate reasons for the lower proportion of low literacy individuals among radio listeners than what might be expected in the general population and consider ways of providing access to the medium, or consider alternatives to radio mediated interventions. In essence, they should seek methods to overcome the barriers associated with low literacy. Specifically, in the Indian context, entertainment educators should continue to target housewives in their radio related interventions since it is the most frequently identified occupation regardless of literacy level.

In conclusion, the encouraging findings regarding the positive relationship between exposure to an entertainment education intervention, reduction in literacy disparities, increases in health knowledge, and more positive family planning attitudes and intentions indicate that E-E has an important role to play in addressing barriers to health literacy.

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