Health Education to Prevent Anemia Among Women of Reproductive Age in Southern India

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In this study, we used a narrow, but easily measured, indicator of how communication proceeded among health workers and women in Southern India. Anemia prevention during pregnancy was studied using a semistructured questionnaire. Participants included 5 nurses, 10 health aides, and 10 (traditional birth attendants) TBAs working with maternal health care and education, as well as 32 women seeking maternal health care. Those women who received health education where they lived, from health workers they knew, and together with participants familiar to them learned more about anemia prevention than others.

Communication involves the transfer of information between people including ideas, emotions, knowledge, and skills. The components of communication include the sender, receiver, educational factors, sociocultural factors, patterns of communication, perception, and understanding (Hubley, 1993). In health communication, the sender affects the receiver (Hubley, 1993; Olsson, Sandman, & Jansson, 1996); educational factors affect both the sender and the receiver (Abraham, Rubaale, & Kipp, 1995); and sociocultural factors (such as attitudes, beliefs, and significant others) affect both the sender and the receiver (Hubley, 1993). Research is needed to identify such “disturbing

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factors" and to recommend how to minimize the effects of these factors or to use them to enhance communication.

Health education is one of the most important factors in preventing illness (Essén, 2001). Many women lack information on their own health and risk factors. Women are often the main health providers in the family and are eager to get health information that is relevant to their needs and experience and will help in taking care of their family. Health communication must therefore be adapted to the varied conditions and cultural constraints under which women live and seek health care (Galloway, et al., 2002; World Health Organization [WHO], 1997).

For message effectiveness, information ideally should be delivered to women through groups that they are comfortable with and that already exist (Ingram, Johnson, & Hamid, 2003) and in a way that women find appropriate, as, for example, face-to-face dialogue (Laitinen, Olsson, & Karlberg, 1999; Xihn, Binh, Phuong, & Goto, 2004). Preventive care and health education during pregnancy is of great importance, both for the health of the mother and the child (Van Ginneken, Lob-Levyt, & Gove, 1996; Pallikadavath, Foss, & Stones, 2004). What women actually learn from health education, however, has not received much attention (Renkert & Nutbeam, 2001).

In most countries pregnant women have access to some kind of health information during pregnancy and birth, but the professionals delivering the information and its quality can vary. One problem is that we as health staff do not know if the women in our care understand and act on the information they receive. From the perspective of a midwife, it is also important during antenatal care that communication between the midwife and the woman flows smoothly and creates a sense of security (Bredmar, 1999).

One of the health problems in pregnancy where health education can in theory make a big impact is iron deficiency anemia. Iron deficiency anemia is one of the most severe and important nutritional deficiencies in the world (WHO, 2001). Low iron levels during pregnancy can increase the risk for intrauterine growth retardation and premature delivery, resulting in an increased perinatal mortality. Severe anemia, often largely due to iron deficiency, is associated with increased maternal mortality, and reducing anemia during pregnancy is a key component of safe motherhood programs (Massawe, 2002; Pallikadavath, Foss, & Stones, 2004; WHO, 2001).

In most low-income settings it is not possible to discriminate between types of anemia and likely causes, but iron deficiency in pregnancy is nearly always a substantive problem and the measures taken to prevent it will not harm the women even if they are not anemic. Simple ways of preventing anemia thus should be included in the information health workers convey on a regular basis to pregnant women, including the importance of taking iron tablets regularly during pregnancy, sometimes with a combination of folic acid tablets; the need to eat iron-rich foods on a daily basis during and after pregnancy; and the value of prolonging the interval between pregnancies.

All of these behaviors can assist women in restoring their iron stores (WHO, 2001). The purpose of this study is to use a narrow but easily measurable indicator of how communication between health workers—nurses, health aides, and TBAs—and a population of women in Southern India proceeded concerning how to prevent anemia during pregnancy.

SUBJECTS AND METHODS

This study was conducted at a hospital in rural India where there is a functioning health education program to pregnant women. This made it possible for us to investigate the process of the health communication between the different staff and the pregnant women. A simple communication task was chosen for this purpose: How the women themselves can be an active part in preventing anemia, including changing cooking behaviors, taking iron tablets, and eating iron rich foods. The method used was basically a cross-sectional rapid appraisal utilizing a questionnaire in order to illuminate how the communication proceeded between health workers and their female target audience.

Setting

In India, despite nationwide anemia intervention programs, up to 88% of pregnant and 74% of nonpregnant women are affected (WHO, 2001). The supply of iron tablets often is irregular (Galloway, et al., 2002), women do not always go to antenatal care, and health workers are often poorly trained and motivated to counseling women (Galloway, et al., 2002; Rajaratnam, Rajaratnam, Ganesan, & Jayaseelan, 2000).

The hospital studied was located in Tamil Nadu. It works mainly with maternal and child health care, serving 60 villages. Outreach to each takes place three times a month, twice by the community nurses alone and once accompanied by a medical doctor. There is one TBA with no formal education for each village, and 16 health aides who have at least a few years of education supervise the TBAs. All of them are familiar with the area, the families, and the culture, and have a long history of deliveries as well. The nurses at the hospital who have a diploma in education provide regular counseling and supervision mainly concerning hygiene during deliveries and in detecting risk pregnancies.

In the villages, health education is performed nearly once a week at a familiar place by a known nurse accompanied by a health aide or a local TBA or both (both are well known and respected by the women). These sessions are followed up with personal meetings with the health aides and TBAs on a regular basis. Thus in the village setting health education largely is based on interaction between the health staff and the village women.

At every clinic at the hospital and in the villages, health education about illness and health during pregnancy is offered to all women. Women not included in the outreach program can come to (maternity health care) MHC clinics at the hospital once a month. At the hospital the health education is in the form of lectures given by nurses whom the attending women typically do not know. The group size is larger than in the village setting.

Every pregnant woman gets a "pink card," which is the antenatal record that she brings on every visit, preferably once a month. Hemoglobin is measured for most women during their first visit in early pregnancy. If they are anemic, a second value is taken at 32 weeks of gestation.

The people in the area are mostly peasant farmers (50% of the women in Tamil Nadu are illiterate; Navaneetham & Dharmalingam, 2002), but some are teachers and shopkeepers with different religious backgrounds. Approximately 30% live below the poverty line and do not have a regular income. Ninety-eight percent of women in the 60 outreach villages register their pregnancy, and there are around 2,000 deliveries per year in the area covered by the hospital.

Study Participants

All 5 of the nurses who work in the hospital agreed to participate in the current study. All 10 of the 16 health aides and all 10 of the 60 TBAs who visited the hospital during the month of November 1998 also agreed to participate. Of 25 women 17–35 years old living in the villages who were asked by the nurses if they wanted to participate, 14 accepted. Twenty-three women waiting in line for the physician at MHC clinics at the hospital during this period were asked by the interpreter if they wanted to participate, and 18 accepted.

The study area had a well-established system for getting informed consent from the five groups in question. The respondents were informed that answers would be handled confidentially. The nurses, health aides, TBAs, and women were informed that participation was voluntary and that not participating would have no effect on their health care. The study protocol was approved by the Research Ethics Committee at Uppsala University.

Procedure

A standardized interview using a semistructured questionnaire with open-ended opinion questions was administered to the nurses, health aides, and TBAs, and a similar process using a modified questionnaire was followed with women in the villages and those attending the MHC clinic. Nurses, health aides, and TBAs were asked what information they provided to mothers regarding how to prevent anemia and if this information was passed on accurately by those they supervised. The women were asked what information they had received on this topic, their understanding of the information

conveyed to them, and whether they had any problems getting iron-rich foods. During interviews in the villages, a significant other, often the mother-in-law, always was present. At MHC clinics, mothers-in-law were present in only 3 cases.

The questions were constructed by the research team based on established knowledge of how to prevent anemia in women of reproductive age. The questions were pretested, both in Sweden and in India, before conducting the study. The Tamil language interpreter got rich information both about the purpose of the study and the meaning of the questions to reduce the risk of misunderstandings occurring. The terms used by the different health workers to describe birth control ("contraceptives," "spacing births," and "family planning") were used in turn in administering the questionnaire to the respective groups. Both the content and the words used in the final questionnaire were deemed appropriate for the study population, and the questionnaire was culturally validated by the professor at the maternity health care clinic at the hospital in India.

Visits to the villages took place with a nurse on her routine trips. Interviews with the women in the villages took place in their homes with a nurse, health aide, and TBA present. Women at MHC clinics were interviewed in an office at the hospital mostly alone, but sometimes a female relative was present. The interviews with the nurses, health aides, and TBAs took place individually at the hospital in an office where responses could not be heard by others.

Since the nurses spoke English, one of the authors (PN) conducted those interviews. A female interpreter conducted the other interviews in Tamil. Using female interpreters was a prerequisite when talking to women in this setting about family planning and pregnancy-related problems. The presence of a coauthor (PN) in all interviews made it possible, by looking at body language and hearing the responses, to judge if the person seemed to understand the question and to give a frank response.

Analysis

Questionnaire responses were organized according to how many in each group of respondents mentioned each response (Table 1; Patton, 1990). It was thus possible to follow the answers to a given question on how to prevent anemia from the different senders to the different receivers. The structure of the analysis and the results were discussed within the Swedish research team (Giacomini & Cook, 2000). When most respondents mentioned the same answer among both the senders and receivers, this was taken to indicate that there was a good flow of information (Figure 1). When few mentioned the same answer among the receivers, the flow was considered to be disturbed. If the receivers gave answers not mentioned by the senders, the

TABLE 1 Actions to Prevent Anemia About Which Information Was Said to Have Been Provided by a Health Worker to the Mothers, by Type of Respondent

Number (%)	Nurses 5	Health aides 10	TBAs 10	Village women 14	MHC women 18
Eating iron-rich foods	5 (100)	10 (100)	9 (90)	13 (93)	0 (0)
Cooking correctly	3 (60)	3 (30)	0 (0)	0 (0)	0 (0)
Taking iron tablets	4 (80)	7 (70)	3 (30)	13 (93)	12 (67)
Taking folic acid tablets	2 (40)	1 (10)	2 (20)	0 (0)	0 (0)
Spacing birth	5 (100)	1 (10)	6 (60)	6 (42)	10 (56)
Using contraceptives	4 (80)	0 (0)	6 (60)	3 (21)	0 (0)
Family planning	5 (100)	3 (33)	0 (0)	6 (43)	4 (22)
Checking for hookworm infections	4 (80)	6 (60)	5 (50)	0 (0)	0 (0)
Checking for other infections	0 (0)	0 (0)	1 (10)	0 (0)	0 (0)
Breastfeeding for 2 years or more	0 (0)	2 (20)	0 (0)	2 (14)	17 (94)
Seeking help if bleeding	0 (0)	0 (0)	0 (0)	1 (7)	0 (0)
Recognizing symptoms of anemia	5 (100)	2 (20)	1 (10)	1 (7)	0 (0)

receivers were assumed to have received the information from somewhere else, and a disturbed information flow also was considered possible.

RESULTS

Health Workers

All the health workers (senders) mentioned to mothers "eating iron-rich foods" as a method to prevent anemia. The nurses stressed in addition the importance of exemplifying how and how often the women should eat iron-rich food and which foods are high in iron. Other examples mentioned were "taking iron tablets," "using contraceptives," "family planning," "checking for other infections," "cooking correctly," and "recognizing symptoms" of anemia (Table 1). The nurses were asked how well they thought the health aides

FIGURE 1 The Flow of Information.

passed on the information. One of the nurses thought that the health aides' lack of an advanced education meant that they sometimes may have provided incomplete information.

One of the nurses also mentioned that it is important to know when to inform the women about what, and this requires knowledge about the culture in which the women live. For example, most of the women in this area want two children. Therefore, there was no point in talking about contraceptives until they have two. But it was important to talk about the benefits for the mother and the child of breastfeeding and thus the need for birth spacing, since women cannot breastfeed while pregnant, according to local custom.

Family planning and contraception are regarded as sensitive topics, and the health aides tend to avoid mention of them. They were not very accurate in their advice to the women regarding which foods are rich in iron and were not precise in how often these foods should be eaten. Iron-rich foods according to the health aides included greens, dates, liver, milk, millet, chapati (flat wheat bread), sugarcane, and ripe fruit. Iron-rich foods according to the WHO (2001) are meat and organs from cattle, fowl, fish, and poultry, and to a lesser extent nonanimal foods such as legumes and green leafy vegetables. Iron-rich foods should be eaten with vitamin A and C, together with folic acid-rich sources such as fruits and vegetables. Milk and grains are not helpful for iron status. Most of the health aides advised the TBAs and the women to take iron tablets and to check for hookworm infections, caused by an intestinal parasite that can lead to blood loss (WHO, 2001). They mentioned that their role was to identify symptoms of anemia. The health aides trusted the TBAs' great experience in pregnancies and birthing, and therefore thought the TBAs passed on all information to the women in an accurate way.

Nearly all the TBAs mentioned the importance of eating iron-rich food to prevent anemia and where to find them. The TBAs also discussed birth spacing and contraceptives but did not use the word "family planning." Only a few had mentioned iron tablets. Two of the TBAs said they passed on all information they got from the nurses and health aides; they had no difficulty in understanding the information they received. The other 8 TBAs, however, did not understand the question. The TBAs volunteered accurate information on symptoms of anemia and said they referred apparently anemic women to the nurses.

Health Education in Practice

There were two major differences in health education between the two samples—women in the villages and women at MHC clinics at the hospital. First, at MHC clinics, group size was often around 200 women who do not know one another; in the villages the groups were smaller and the participants knew one another. Thus at MHC clinics there are likely to be difficulties in asking questions and discussing sensitive matters. Second, the women at

the MHC clinics got health information from nurses once a month at the hospital, whereas the women in the villages met their nurses once a week and their health aides and TBAs even more frequently. In addition, significant others more often got involved in health education in the villages than at the hospitals.

All the village women had ideas about what to eat to prevent anemia. Iron-rich foods most commonly mentioned by the women were dates, other fruits, sugarcane, greens, milk, eggs, and fish. Taking iron tablets was also well known to nearly everyone, but less than half mentioned family planning, as shown in Table 1. The TBAs had talked about the importance of not having too many children and always spoke in a way that was easy to understand. Six of the village women and 10 of the women visiting MHC clinics knew about this, having heard the expression "spacing birth." The importance of using contraceptives, which both the nurses and TBAs said they discuss with mothers, was mentioned by only 3 of the women in the villages. Only 1 of the village women mentioned the importance of seeking help if bleeding while pregnant and if "recognizing symptoms of anemia." None of the health care workers mentioned bleeding in pregnancy; all the nurses had mentioned symptoms of anemia. Hookworm infection is a common problem in the area, and nearly all nurses, health aides, and TBAs mentioned the importance of "checking for hookworm infection in stool," but none of the women referred to this.

The nurses and health aides said they communicated about "cooking correctly," but neither the TBAs nor the women mentioned this. Some of the senders said they communicated about "taking folic acid tablets," but none of the receivers recalled hearing about this.

Most of the MCH clinic women stated they ate "normally" during pregnancy, and they were not familiar with which foods were iron-rich. Normal foods according to MHC clinic women were greens, fruits, dates, milk, fish, meat, and eggs. Several of them took iron tablets, thinking they were "vitamin tablets." This group mentioned "spacing birth" and to "breastfeed for more than 2 years" as ways of avoiding anemia, compared with 6 and 2 village women, respectively, in the other group (Table 1). The nurses did not mention communicating about breastfeeding; only 2 health aides did so, but neither of them conducts health education.

DISCUSSION

Relevance of Health Education in Cultural Context

The health education described here, at least when provided in the hospital setting, could perhaps better be described as health information than health communication, since the women often were passive participants. Exchange of information seemed to be minimal, especially at the MHC clinics, where the women did not know one another or the health workers. Decision making in

response to a message is done in the mothers' real-life context. Health workers would do a better job of communicating if they understood this context. They need to cooperate with the women in the community, helping them to understand, accept, and act according to new knowledge. But the women themselves must decide if they are willing and able to change factors affecting their lives (Bredmar, 1999; Currie & Wiesenbergs, 2003; Pallikadavath, Foss, & Stones, 2004).

At the MCH clinic the health workers and mothers were from different levels in society and did not communicate on equal terms. This can make it difficult to understand one another (Gjernes, 2003). The receiver also was affected by the communication skills of the sender; formal education alone is not enough to assure that health workers possess such skills, let alone that recommended health behaviors will be adopted (Olsson, Sandman, & Jansson, 1996). Health education at MCH centers was offered once a month and the groups were large. Limitations in time at the antenatal classes may result in reliance on only the transfer of factual knowledge (information), rather than more time-consuming efforts to increase women's self-efficacy (Berg & Sarvimäki, 2003; Renkert & Nutbeam, 2001).

It takes effort and time to get people involved in preventive health issues. As long as there is no urgent health problem to be solved, there often is no cue to action encouraging people to seek information or to reflect on their own health attitudes and behaviors (Bouman, Maas, & Kok, 1998). A woman might not see the connection between whether she eats iron-rich foods before and during her pregnancy and the symptoms of anemia later on. (And the symptoms of anemia often are not perceived by those suffering from it or not recognized as being due to anemia.) The "reward" is in the distant future, and dietary improvement alone may not be sufficient to achieve it, particularly once a woman is anemic (WHO, 2001). Other factors affecting a woman's health behavior can be her own attitude to the "problem." Is it a health problem? Lack of authority in the household; costs for maternity health care; accessibility; attitudes toward the female body, the gender, and maturity of health practitioners; and the opportunity all may constrain access to health care. Time for self-care is usually a scarce resource for women (Currie & Wiesenbergs, 2003).

Women receiving communication in their villages reported receiving more of these messages than those who received health education at the MHC clinics. Education in small groups by people known to the target group may convey more knowledge and better self-esteem compared with intermittent education sessions in larger groups (Norr, Tlou, & Matshidiso, 2004; Navaneetham & Dharmanlingam, 2002). The message is also more likely to be accepted by significant others such as mothers-in-law, husbands, and the village elderly. In the villages, women also had more opportunity to ask questions individually to the health workers; this kind of follow-up enhances the impact of health education (Navaneetham & Dharmanlingam,

2002), increasing the chance that the “new” knowledge is understood and accepted (Haddad & Umlauf, 1998). The health aides and TBAs are better able to function as role models because they are so well known in the villages (Currie & Wiesenbergs, 2003). They are also familiar with the culture in which health practices are embedded, which is one reason that such grassroots health workers better achieve health education objectives (bij de Vaate, Coleman, Manneh, & Walraven, 2002; Dunn, Pirie, & Hellerstedt, 2003; Larkey, *et al.*, 1999; Norr, Tlou, & Matshidiso, 2004; Pallikadavath, Foss, & Stones, 2004). Finally, women’s satisfaction with health care is also dependent on their level of interaction with the care providers (Lambke & Kavanaugh, 1999; Lendahls, Öhman, Liljestrand, & Håkansson, 2002; Olsson, Sandman, & Jansson, 1996; Sundby, Svanemyr, & Maehre, 1999).

The new knowledge that village women had received concerning their well-being seemed to make them more self-confident because someone with some status in the village found their health to be important. This has been noted elsewhere (Berg & Sarvimäki, 2003; Currie & Wiesenbergs, 2003).

Significant others can deny that health problems are associated with risky behaviors (Dunn, Pirie, & Hellerstedt, 2003). In these villages, the elderly accepted the anemia information provided, so the women knew they could act according to these new suggestions. Involving significant others who influence mothers such as mothers-in-law, husbands, and the elderly has been emphasized previously (Currie & Wiesenbergs, 2003; Haider, Ashworth, Kabir, & Huttly, 2000; Ingram, *et al.*, 2003).

Most of the MHC mothers, but few of the village mothers, listed a breastfeeding message as one they had received regarding anemia prevention. It would seem likely that the MHC women had indeed more often received a breastfeeding message than the village mothers, but the nurses had not intended this message to relate to anemia prevention and thus did not mention it to the interviewer. Interestingly, the MHC mothers are probably correct in a sense: more intense and longer periods of breastfeeding are likely to increase the period of lactation amenorrhea, which in turn will reduce overall iron loss in menstrual blood among those women most at risk—those who lose more than the average amount of blood in menstruation (Greiner, 1992).

Educational levels, literacy, and economic status alone are not accurate predictors of health-seeking behavior (Navaneetham & Dharmalingam, 2002). Women might worry how their husbands and society would look upon them if they learn too much or adopt new practices because of health education. This is connected to women’s roles in society (Currie & Wiesenbergs, 2003; Sundby, Svanemyr, & Maehre, 1999), a subject that is beyond the scope of this article.

People being interviewed may respond in a certain way because they know they are part of a study, particularly when the health worker who provided them with information is present during the interview. This was the case during the interviews with the TBAs and the village women. To

increase validity of responses, questions that were considered sensitive were embedded among not-so-sensitive questions (Patton, 1990), and local expressions were used (Smith & Morrow, 1996). It is not possible to generalize these results to other settings, but the results can serve as a guide to what can be happening in other similar settings concerning health communication between different health staff and women in maternal health care, since the results of the present study agree with earlier findings in this area.

CONCLUSIONS AND IMPLICATIONS

Women who received health education where they lived, together with others they knew, and from health workers familiar to them learned more about anemia prevention.

This study has pointed to some of the factors to consider in health communication intended to prevent anemia. In this setting in India, health aides and TBAs had a greater influence on the women's knowledge than nurses at MCH centers. Health aides and TBAs are respected and trusted both by the women themselves, but also by significant others such as mothers-in-law and village elders, who play an important role in the health-seeking behavior in women. These health workers are more likely to possess cultural awareness of relations affecting women's health-seeking behaviors, the cultural constraints under which women live, and women's ability to change and to decide about their own life situation. This allows them to focus on more actionable messages, empowering women to take care of themselves and their families' health and to use the existing health service efficiently and equitably (Detels, McEwen, Beaglehole, & Tanaka, 2002).

From the perspective of a nurse/midwife, two questions must be asked: (1) Who does the woman trust regarding health matters? (2) Whom is she depending upon in lifestyle changes?

In conclusion, we cite Rimer, McBride, and Crump (2001): "As women live longer, health promotion behaviors are a critical part of not just living but living well" (p. 532).

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