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The impact of including husbands in antenatal health education services on maternal health practices in urban Nepal: results from a randomized controlled trial

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Abstract

Observational studies suggest that including men in reproductive health interventions can enhance positive health outcomes. A randomized controlled trial was designed to test the impact of involving male partners in antenatal health education on maternal health care utilization and birth preparedness in urban Nepal. In total, 442 women seeking antenatal services during second trimester of pregnancy were randomized into three groups: women who received education with their husbands, women who received education alone and women who received no education. The education intervention consisted of two 35-min health education sessions. Women were followed until after delivery. Women who received education with husbands were more likely to attend a postpartum visit than women who received education alone [RR = 1.25, 95% CI = (1.01, 1.54)] or no education [RR = 1.29, 95% CI = (1.04, 1.60)]. Women who received education with their husbands were also nearly twice as likely as control group women to report making >3 birth preparations [RR = 1.99, 95% CI = (1.10, 3.59)]. Study groups were similar with respect to attending the recommended number of antenatal care checkups, delivering in a health institution or having a skilled provider at birth. These data provide evidence that educating pregnant women and their male partners yields a greater net impact on maternal health behaviors compared with educating women alone.

Introduction

The limited progress in meeting the fifth United Nations Millennium Development Goal of reducing maternal mortality in developing countries, particularly in South Asia, necessitates new approaches to maternal health interventions [1]. Education and health services provided during the antenatal period can reduce pregnancy and delivery complications and improve birth outcomes in resource-poor settings; however, these benefits are contingent upon user compliance [2, 3]. At the same time, women's ability to seek health care or implement lessons learned from health education interventions is often determined by the household head, usually the husband [4–6].

The important role that male partners play in women's reproductive health is becoming increasingly recognized, and, especially as a result of the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) epidemic, more attention is being focused on how to incorporate men into reproductive health education interventions. Male involvement in reproductive health decisions and practice has been shown to be considerable, particularly related to abortion [7, 8], sexually transmitted diseases/HIV [9, 10], family planning [11–14] and breast-feeding [15–17].

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Educational interventions for pregnancy health have traditionally been inadequate in addressing a woman's degree of influence within the household on health-related decisions, particularly as compared with her husband [18]. Observational studies have shown that educating men about the importance of health care for the family increases the promotion of some health-seeking behaviors, such as antenatal care (ANC) and child immunizations [19–22], and enhances communication and support of female partners [11, 23, 24]. A recent study in Indonesia found that men who were exposed to a multimedia entertainment–education intervention regarding birth preparedness responded favorably by exhibiting new knowledge gains and birth preparations [25].

While such evidence indicates that men can influence health care utilization during pregnancy and thereby the outcome of an obstetric emergency [26–29], few interventions have targeted men directly in ANC, birth preparedness or obstetric decision making [26, 30, 31], and randomized trials of the impact of involving men in such interventions are scarce. Using a randomized controlled design, we evaluated the impact of including husbands in antenatal health education sessions on birth preparedness and maternal health care utilization in urban Nepal.

Methods

Setting

Urban centers comprise ~15% of the total Nepali population [32]; the largest of these is the capital city of Kathmandu. While ANC coverage is high (82% of women attend at least one visit), anemia [33, 34], inadequate weight gain [35], high rates of home delivery (30–40%) [36, 37] and low postnatal care utilization (only 12% of women receive a checkup within 1 week after delivery) [36] contribute to lingering poor maternal and infant health outcomes in urban Nepal [36].

Prashuti Griha Maternity Hospital (PGMH), Kathmandu is the largest such health facility in the country and the most widely utilized source of ANC and labor and delivery care in Kathmandu Valley [38]. With the exception of some high-risk cases, usual ANC procedures for patients at PGMH do not include a health education component. On occasion, nursing student volunteers dispense fliers or brief health education messages to patients in the waiting area (PGMH Director, personal communication). Approximately 40% of ANC clinic patients at PGMH are accompanied by their husbands, who normally wait on the hospital grounds during the duration of their wives' visits.

Eligibility criteria

Currently married women attending their first ANC visit at PGMH (gestational age 16–28 weeks) whose husbands were present at the hospital compound were eligible. Women were excluded if they were <18 years of age or lived >90 min away from PGMH. Systematic random sampling techniques were used to approach eligible women for recruitment.

Design

Using the statistical software program Stata 8.0 (Stata Corp., College Station, TX, USA), a list was generated randomizing the sequence of recruitment of study groups for each day of the recruitment period. Six women were recruited each day. Upon administration of written, informed consent procedures, individual participants were assigned randomly to one of three study arms:

Group A—husband and wife received health education together,
Group B—wife received health education alone and
Group C—wife received no education (control).

At enrollment (baseline) and post-partum visits, information was collected on women's maternal health knowledge and practices and husband's involvement in maternal health. The baseline questionnaire also included sociodemographic background and reproductive history. All women were requested to attend the hospital for a final ANC checkup at ~36-week gestational age. Additionally,

all women were encouraged to deliver in the hospital and to attend a post-partum checkup within 2 weeks of delivery at PGMH. To minimize loss to follow-up, post-partum questionnaires were completed either immediately prior to discharge (after delivery) or at the post-partum checkup. For those not returning within 2 weeks of delivery, research assistants administered questionnaires during household follow-up visits. Transportation costs and infant diapers were offered as nominal incentives for participation.

Intervention

The health education intervention was designed based on findings from a formative qualitative research phase that examined pregnant women's, husbands' and providers' attitudes toward the frequency, length and content of such an intervention [51]. The intervention consisted of two 35-min sessions administered in a private room in the hospital with pregnant women and their husbands when applicable. Participants in the intervention groups received the first health education session on the day of enrollment and were asked to return to PGMH for the second health education session ~4–6 weeks later. In addition, one detailed health education flier that reviewed main curriculum points was made for each session for the two intervention groups. A brief flier was designed for women in the control group, made to resemble and standardize the limited health education messages that regular ANC patients (may) receive at PGMH.

The intervention was based on principles from the theory of reasoned action, which stipulates that an individual's intention to perform an action (or behavior) is essentially a function of that individual's attitude toward that action and of that individual's perceptions of social subjective norms [39] and the health belief model, which describes how health beliefs interact with modifying factors (e.g. perceived seriousness of problem) to determine health behaviors [40]. The present study was not designed to test any one specific theoretical model; rather, the models were useful in offering direction for what types of variables and processes may be important in shaping maternal health behaviors and thus needed to be addressed in the intervention.

The curriculum covered a number of maternal health topics (Fig. 1), and the information was delivered in ways that recognized factors, such as the impact of knowledge levels on attitudes and the influence of partners, other family members and peer groups. Female study nurses and male auxiliary health workers summarized health information on each of the topics from Fig. 1 into talking points supplemented with culturally adapted, easy-to-follow graphic materials. The curriculum was extensively pre-tested and revised according to feedback from ANC clients and nurses, and service providers at PGMH were consulted to ensure that all concepts were translatable into Nepali. All health educators received a standardized training course including education and counseling techniques and role-playing, and structured intervention protocols were followed. For delivery of the intervention, individual couples received a face-to-face education session administered jointly by one male and one female worker. Women in the woman-alone group received an individual face-to-face education session with a female worker. Both intervention groups received the same curriculum messages.

Main outcome measures

Birth preparedness was assessed based on the number of arrangements a woman had made, including (i) purchased a safe delivery kit, (ii) saved money for delivery, (iii) arranged for a blood donor, (iv) arranged for transportation to delivery and (v) made an emergency plan. Women were considered 'highly' prepared if >3 arrangements were reported. Binary health care utilization indicators included whether a woman received >3 ANC visits, delivered in a health institution, had a skilled birth attendant or attended a post-partum visit at PGMH within 2 weeks of delivery.

Sample size

In total, 145 women in each group were required to detect a 15% increase in institutional delivery (the minimum justifiable effect size) under the

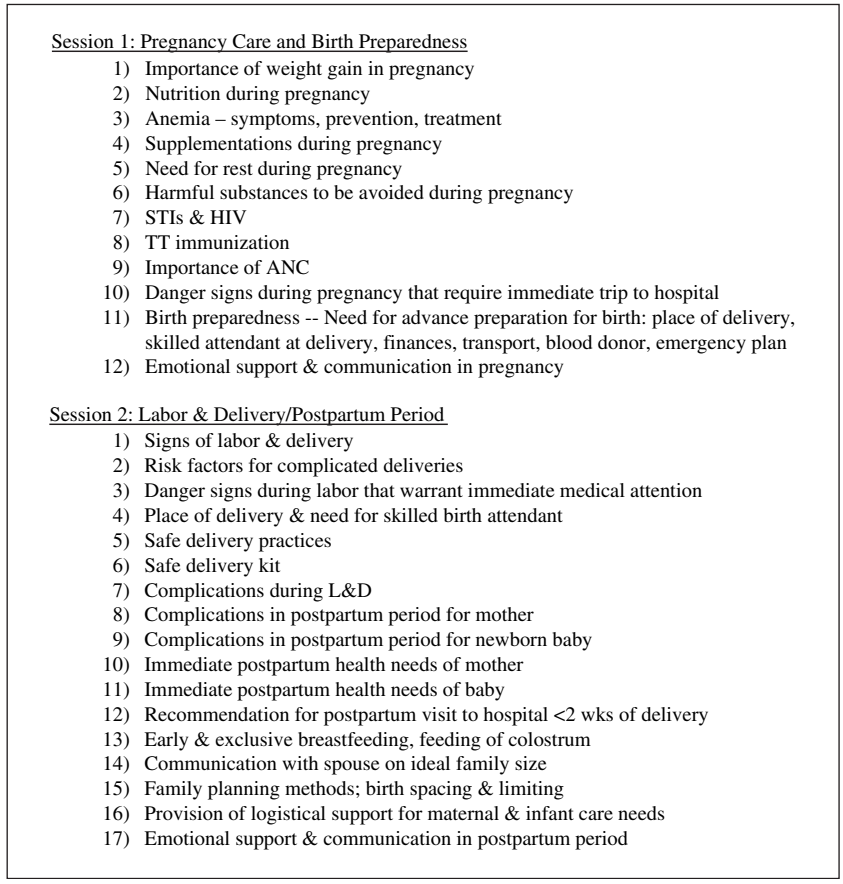

Fig. 1. Health education curriculum for intervention sessions at ANC visits. Curriculum content was the same for women in couples and woman-alone groups.

following assumptions: 70% deliver in hospital, 80% power and 5% Type I error.

Ethical approval

The free and informed consent of each individual participant was obtained at the start of this study. All study procedures were approved by the Johns Hopkins Committee on Human Research (Baltimore, MD, USA) and the Nepal Health Research Council (Kathmandu, Nepal).

Analysis

We hypothesized that all outcomes would be highest in the couples group, followed by the woman-alone group, and lowest in the control group. Study participants were coded as lost to follow-up if no post-partum questionnaire was completed. Data entry and decisions regarding coding of questionnaire responses and construction of variables were made in the absence of participant's study group information. Baseline variables were compared between groups using the student's *t*- (continuous) and chi-squared (binary/categorical) tests. Similarly, differences between participants versus non-participants, as well as between those who completed the study versus those who did not, were examined.

Crude and adjusted relative risks with 95% confidence intervals were calculated for all study outcomes. As coresidence with mother-in-law and the presence of maternal complications were

a priori expected to modify the intervention effect, stratified risk ratios were estimated for all outcomes but are only reported when found to be statistically significant. Analyses were conducted with Stata 8.0 and followed an intent-to-treat approach.

Results

Participants

Fig. 2 depicts the flow of participants throughout the trial. Of 1100 women assessed for eligibility between August 2003 and January 2004, 470 women were eligible and approached for study enrollment. In total, 442 (95%) women agreed to participate and were randomized to one of three study arms. With the exception of analysis of the post-partum visit outcome, which was based on all randomized women ($n = 442$), the analytic sample was restricted to all women who completed the post-partum questionnaire ($n = 386$).

Mean gestational age of the 28 non-participants (23 weeks) was slightly higher than participants (21 weeks); otherwise excluded and included women were comparable. Background characteristics by study groups are shown in Table I. There were no significant differences (at the $P < 0.05$ level) in these characteristics, indicating that the randomization was effective in evenly distributing background factors, as well as (presumably) other unidentified confounding factors, between the study groups. Adherence to the intervention education sessions was high, with 92% and 88% of women from the couples and woman-alone groups, respectively, returning for the second education session. At least 81% of women in each study group returned for the visit shortly before delivery and follow-up rates for the post-partum questionnaire were also high (ranging from 86–92% for all groups). Approximately 80% of post-partum questionnaires were administered before discharge from the hospital (after delivery), and the timing of post-partum questionnaire administration was not related to the likelihood of return for post-partum visits. Women who were lost to follow-up ($n = 56$) had lower parity than those who completed the post-partum questionnaire (proportion primiparous 84 versus 71%, respectively, $P < 0.05$).

Intervention efficacy

Women in the couples group were nearly twice as likely as control group women to report making >3 birth preparations (Table II). Among women who did not live with their mothers-in-law, those who received education with their husbands were more likely to be highly prepared for birth than control group women [23 versus 4%, RR = 5.19, 95% CI = (1.86, 14.53)]. In addition, women who received education alone (and lived separately from their mothers-in-law) were significantly more likely to make >3 birth preparations as compared with control group women [RR = 4.44, 95% CI = (1.56, 12.69)]. None of the birth preparedness outcomes was different between women in the couples group versus women in the woman-alone group.

Study groups were similar with respect to attending the minimum number of ANC checkups, delivering in a health institution or having a skilled provider at birth. Women assigned to the couples group were more likely to attend the post-partum visit than participants assigned either to the control group [61 versus 47%, RR = 1.29, 95% CI = (1.04, 1.60)] or to the woman-alone group [61 versus 49%, RR = 1.25, 95% CI = (1.01, 1.54)]. There was no evidence that complication status or coresidence with mother-in-law modified the relationship between study group and these health care utilization outcomes.

For all outcomes, multivariate models were constructed including any background characteristics that appeared imbalanced between study groups or were suspected of having potential confounding effects, such as woman's age, education level, caste, parity/gravida, mother-in-law coresidence and experience of maternal complications as covariates. As there was no evidence of confounding found, only crude estimates are shown.

Discussion

This randomized trial in urban Nepal has shown that an antenatal health education intervention

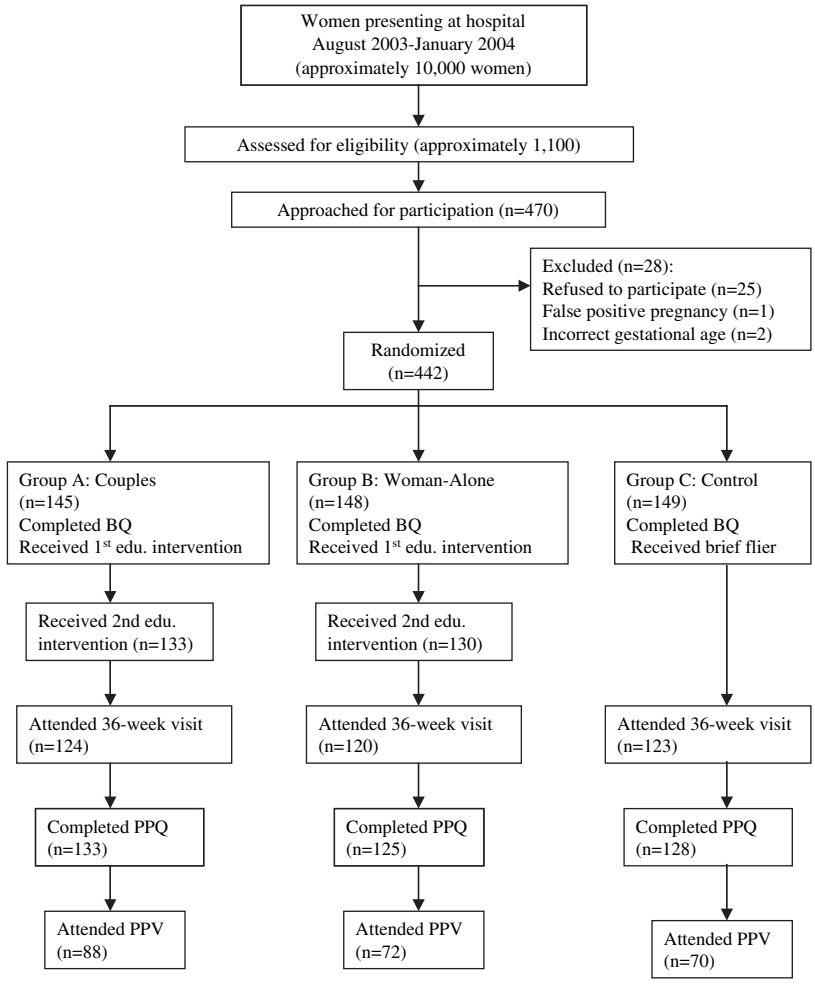

Fig. 2. Flow diagram of the progress of study participants through the phases of the randomized trial (BQ = baseline questionnaire, PPQ = post-partum questionnaire, PPV = post-partum checkup visit). Numbers may increase in the flow diagram because participants may have missed one visit and returned later.

involving husbands increased post-partum care utilization among women compared with women who received antenatal health education alone and with women who received no education. In addition, women educated with their husbands were more likely to be highly prepared for birth compared with women receiving no education. Providing education to women with or without husbands had no impact, however, on ANC utilization or institutional delivery, and only limited impact on having a skilled attendant at delivery.

Based on these findings, it is difficult to speculate on whether the benefits seen from including husbands were a result of simply educating men (as primary decision makers in families) or educating men with their wives. Social cognitive theory suggests that successful health promotion depends more on the format and style of learning (e.g. interactions with others) than on the information *per se* [41]. Increased communication and interaction between couples regarding health practices during or after the education sessions may,

Table I. *Baseline characteristics among randomized study groups (*n = *442)*

Characteristics	Study groups		
	Couples (n = 145)	Woman alone (n = 148)	Control (n = 149)
Woman's characteristics			
Age, years (mean, SD)	22.1 (3.1)	22.0 (3.6)	22.6 (3.3)
Age at marriage, years (mean, SD)	19.5 (2.9)	19.0 (2.8)	19.5 (3.0)
Married ⩽ 1 year (%)	55.9	57.4	53.0
Pregnancy history (%)			
Primigravida	67.6	66.2	66.4
Prior pregnancy, with no complications	22.8	23.0	23.5
Prior pregnancy, with complications	9.7	10.8	10.1
Primiparous (%)	73.8	72.3	70.5
Education (%)			
None	17.9	31.1	22.1
Primary (Grades 1–7)	20.7	23.6	22.8
Secondary or higher (Grades 8+)	61.4	45.3	55.0
Current pregnancy characteristics			
Gestational age at recruitment, weeks (mean, SD)	23.2 (2.8)	23.3 (2.6)	23.1 (2.6)
Pregnancy was unplanned (%)	25.5	25.0	24.8
Intend on hospital delivery (%)	84.1	83.1	85.2
Experienced any pregnancy, delivery or post-partum complications in current pregnancy (%)[a]	30.8	29.6	24.2
Separated from husband for >2 weeks during current pregnancy (%)[a]	11.1	10.0	8.2
Household characteristics			
Hindu religion (%)	84.8	81.8	82.5
Caste (%)			
Brahmin/chettri	61.4	46.0	50.3
Newar	20.7	25.7	25.5
Hills tribes/low caste groups	17.9	28.4	24.2
Own radio (%)	82.8	78.4	79.9
Own telephone (%)	16.6	17.6	22.8
Exposed to mass communication campaign about husbands' roles in maternal health (%)	13.1	11.5	11.4
Index score, household items (mean, SD)	4.8 (4.8)	5.3 (5.4)	5.2 (5.3)
Reside with mother-in-law (%)	28.3	28.4	29.5
Travel time to hospital, minutes (mean, SD)	34.7 (20.4)	38.8 (20.1)	36.6 (22.7)

There were no statistical differences between the groups at the $P < 0.05$ level.
[a]Data collected from post-partum questionnaire (n = 386).

therefore, have led to a greater understanding and/or retention of new information.

While the provision of social support in the form of visitation by nurses or counselors has not been found to significantly improve maternal health practices in most cases [42], involving sources of support from women's social networks other than male partners also merits further examination. The enhanced knowledge attainment seen in women receiving education with their husbands in this trial might, for instance, also be seen if another individual important to the woman is present. In this setting, however, only 9% and 4% of pregnant women are accompanied by mothers-in-law or friends/other relatives, respectively [43].

Table II. *Percent of women with given outcome, relative risk estimates and 95% confidence intervals for birth preparedness and maternal health care utilization outcomes, by study group and comparison* (n = 386)

Outcomes	Study group			Comparison		
	Couples (n = 133)	Woman alone (n = 125)	Control (n = 128)	Couples versus control	Woman alone versus control	Couples versus woman alone
	Percent			Relative risk (95% confidence interval)		
Made >3 birth preparations	21.8	16.8	10.9	1.99 (1.10, 3.59)	1.54 (0.82, 2.89)	1.30 (0.78, 2.15)
Not live with mother-in-law (n = 270)	22.8	19.5	4.4	5.19 (1.86, 14.53)*	4.44 (1.56, 12.69)*	1.17 (0.66, 2.06)
Live with mother-in-law (n = 116)	19.5	10.5	27.0	0.72 (0.32, 1.63)	0.39 (0.13, 1.13)	1.85 (0.61, 5.65)
Made >3 ANC visits	85.7	80.8	87.5	0.97 (0.88, 1.07)	0.93 (0.84, 1.04)	1.06 (0.95, 1.18)
Delivered in health institution	91.7	93.6	90.6	1.01 (0.94, 1.09)	1.03 (0.96, 1.11)	0.98 (0.91, 1.05)
Attended by a skilled provider at birth	90.2	89.6	82.8	1.09 (0.99, 1.20)	1.08 (0.98, 1.19)	1.00 (0.93, 1.09)
Attended post-partum visit (n = 442)	60.7	48.6	47.0	1.29 (1.04, 1.60)	1.03 (0.82, 1.31)	1.25 (1.01, 1.54)

Asterisk indicates results for Mantel–Haenszel test of homogeneity of strata (*$P < 0.01$).

Among health care utilization outcomes, the impact of male involvement was most evident in post-partum care. Given that overall post-partum care utilization is low, and that post-partum care promotion has recently been added to maternal health programs [44], this particular message may have had greater resonance than longer standing Nepal Safe Motherhood program recommendations regarding ANC, institutional delivery or having a skilled provider at birth [36]. Men's roles during the post-partum period are traditionally more limited than in the antenatal period because female family members more commonly assist the woman at this time [51]. It is possible, therefore, that taking his wife to a post-partum checkup may provide a concrete way for a husband to feel less 'left out' and to become involved during the post-partum period. Alternatively, husbands may perceive the post-partum checkup as being important for the baby, and may therefore express greater interest in this after learning about its importance.

These findings suggest that receiving antenatal education with or without husbands can help women become more prepared for birth, though this was only found among women who did not live with their mothers-in-law. Since the time of birth has traditionally been viewed as mothers-in-law' domain in much of South Asia [45], it is conceivable that women (and their husbands) living apart from a mother-in-law are more receptive to learning about birth preparedness messages because they know no one else is there to take care of such matters.

This study had several limitations. Women could have attended a post-partum checkup elsewhere, yet there is no reason to suspect that the rate of non-PGMH post-partum attendance varied by study groups. This intervention targeted poor urban women seeking antenatal services, an important and growing population in Nepal. While women at PGMH are likely to be poorer than those seeking services at private hospitals or antenatal clinics in Kathmandu, they are also likely to be wealthier, better educated and/or more motivated than women receiving no ANC. In order to avoid resource-intensive home visits to recruit husbands not

present at PGMH (reaching men in their homes would require a different strategy), women were only eligible for this study if their husbands were present at the hospital. Since previous research at PGMH has shown that women accompanied by husbands to ANC are similar with respect to most background characteristics to women unaccompanied by husbands, the impact of this eligibility criterion on the generalizability of these findings is minor [46]. Furthermore, since almost half of women receiving ANC at PGMH are accompanied by their husbands, this study sample represents an important group of women.

Cost-effectiveness studies are needed to assess to what extent the improved maternal health practices in women educated with husbands are worth the additional resources required as compared with educating women alone. Though not formally recorded in the current study, the additional resources required for including men in the health education sessions in this setting were relatively minimal. Only two male health educators were hired in addition to the female health educators, and the duration of the health education sessions administered to couples was the same as for sessions administered to women alone.

Future research should compare the impact of different formats of male involvement; perhaps, reaching men in peer groups may increase maternal health practices even more. Varkey *et al.* [11] recently conducted a clinic-randomized study of the impact of male involvement in ANC in India. As their tested interventions included both group and couples education components for the same women, it is unclear how these varying formats may have influenced study outcomes differently. Additionally, the role in maternal health of men who do not attend ANC with their wives and of men in rural areas should be examined. The feasibility of reaching these types of men through home- or community-based education programs deserves further exploration. Manandhar *et al.* [47] recently demonstrated that women in Nepal who met in regular women's groups that encouraged participatory action and health care utilization experienced considerably higher maternal health practices as well as better birth outcomes. The addition of men's groups in their intervention may have produced an even greater impact.

Conclusion

Many current maternal health recommendations are based on 'theoretically promising' but untested interventions [48]. We focused on whether the inclusion of husbands in maternal health education programs could increase the adoption of these theoretically promising behaviors. As seen in the child survival field, having the proper interventions in hand is not enough; the main challenge is transferring what is known into action through appropriate behavior change and health system development [49].

While research continues to identify the interventions with maximal impact on maternal health outcomes, concurrent research must determine the optimal delivery methods and programmatic approaches. Only evidence-based male involvement interventions with a cost-effective positive impact on health outcomes above and beyond what is seen by intervening with women alone should be adopted. The findings presented in this paper are among the first to show that educating women and their partners may yield a greater net impact on pregnancy-related health behaviors.

Given the high proportion (40–50%) [43, 50] of pregnant women being accompanied by male partners to ANC clinics in many areas of Nepal, implementing this study on a larger scale is feasible. We recommend that replication and cost-effectiveness studies of this type of intervention be conducted, expanding outcomes to include other maternal health indicators and infant health outcomes, such as birth weight and infant care practices.

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Conflict of interest statement

None declared.

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