Research Article

Comparison of the influence of couple nutritional counselling versus maternal nutritional counselling on maternal knowledge about proper maternal dietary practices and weight gain monitoring during pregnancy in Goma town, DR Congo

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Abstract

Background: Community-based interventions are crucial in addressing maternal health disparities, particularly in low-resource settings. This study employed a cluster-randomized controlled trial design to evaluate the efficacy of maternal and couple counselling interventions on maternal dietary practices and weight gain monitoring during pregnancy.

Objective: The study aimed to assess the impact of maternal and couple counselling interventions on maternal dietary practices and weight gain monitoring among pregnant women attending the Reproductive and Child Health (RCH) clinic in Goma town, DR Congo, and their partners.

Methods: Three study groups, comprising 84 participants each, were formed: a control group receiving standard counselling, a maternal counselling group, and a couple counselling group. Sample size determination and randomization were conducted according to established guidelines. Microsoft Office Excel 2007 was utilized for random allocation. The interventions involved varying degrees of counselling sessions tailored to the specific needs of each group. Data was collected through Focus Group Discussions, In-depth Interviews, and analysed using Chi-square, ANOVA, and T-test.

Results: Preliminary findings suggest that both maternal and couple counselling interventions positively influenced maternal dietary practices and weight gain monitoring. Participants in the intervention groups demonstrated improved knowledge and adherence to recommended dietary practices compared to the control group. Statistical analyses revealed significant differences among the study groups, indicating the effectiveness of the interventions.

Conclusion: Maternal and couple counselling interventions hold promise in enhancing maternal nutrition and weight gain monitoring during pregnancy. These findings underscore the importance of targeted community-based interventions in promoting maternal and child health in resource-constrained settings.

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Introduction

Undernutrition during pregnancy poses significant risks, including higher reproductive complications and increased rates of maternal mortality

and poor birth outcomes. Inadequate obstetric care further exacerbates these challenges, linking maternal undernutrition to intrauterine growth retardation, low birth weight, and pre-maturity. This not only affects immediate health but also diminishes productivity, with broader implications for families and communities. Maternal nutrition plays a critical role in the health outcomes of both mothers and their babies, impacting economic and social development [1]. To promote maternal nutrition during pregnancy for improved birth outcomes, the utilization of maternal nutrition counselling has become common practice in healthcare facilities globally. Similarly, there is growing recognition of the effectiveness of couple counselling in improving maternal nutrition and pregnancy outcomes. Couple counselling interventions aim to involve both partners in the decision-making process regarding maternal nutrition and health, fostering shared responsibility and mutual support [2]. By targeting couples, these interventions have the potential to address cultural and social barriers to dietary diversity and nutritional supplementation, promoting healthier behaviours and improving pregnancy outcomes. In regions like sub-Saharan Africa and parts of Asia, where a substantial percentage of women suffer from undernutrition and anaemia, the need for targeted interventions addressing dietary deficiencies and lifestyle behaviours is paramount to improve maternal and child health outcomes. In Goma Town, DR Congo, as in many low-resource settings, addressing maternal malnutrition remains a challenge. Limited interventions, primarily centred on routine antenatal counselling sessions and maternal nutritional counselling for specific health conditions, underscore the need for comprehensive targeted counselling interventions both pre-conception and during pregnancy [3]. Informed by this background of information, the study aimed to assess the effectiveness of maternal nutritional counselling versus couple counselling interventions in improving maternal nutrition and pregnancy outcomes, thereby informing future strategies to address maternal malnutrition and enhance maternal and child health in the region.

Material and Methods

Study design: This was a community-based cluster-randomized controlled trial. There were three study groups of 84 participants each: two intervention groups and a control group. One intervention group received maternal counselling and the other received couple counselling. The control group received the usual standard counselling from the health facility.

Study area and target population: The study was conducted in Goma town, DR Congo. The target population was pregnant women in their first trimester attending Reproductive and Child Health (RCH) clinic in Goma town and their partners.

Sample size determination and randomization: The sample size was calculated for a two-sided significance of 5%, power of 80% and a moderate anticipated standardized effect of 0.5 as recommended by Cohen (1988) and Lipsey (1990). This was the formula used: N= 16 (σ plan/ δ plan)² = 16/ Δ²plan. Microsoft Office Excel 2007 was used to randomly allocate the three sub-locations into the 3 three study groups.

Description of the study interventions: Control group (study group 1): in this group no schedule, no counselling session was given from the research team. Maternal counselling (study group 2): In this study group each participant had a minimum of eight contacts with a counsellor (7 ante-natal and 1 post-natal). Couple counselling (study group 3): The couples (pregnant women and their partners) in this group were counselled together and in privacy. The counselling sessions were almost like those of the maternal counselling group in terms of venue, steps and content. However, fathers were given additional messages on benefits of paternal contributions into the promotion of maternal nutrition during pregnancy.

Data collection and analysis: Focus Group Discussion guide and In-depth interview were used to collect data on the knowledge regarding maternal dietary practices and weight gain monitoring before and after the intervention. Chi-square, ANOVA and T-test were used to analyse data. P-value of 0.05 were used to check the influence among groups.

Results

Maternal demographic and socio-economics characteristics by study group

The mean age of pregnant women across all groups averaged at approximately 26 years, with slight variations noted among the intervention groups: 25 years for the Control group, 27 years for the Maternal group, and 26 years for the Couple group. A minority (4%) of the participants had no formal education, with marginal differences observed across the groups: 6% for the Control group, 5% for the Maternal group, and 2% for the Couple group. Less than a quarter (22%) had primary education, with relatively consistent percentages across the intervention groups and less than half (40%) had completed secondary education, while about a third (33%) had tertiary education, with similar distributions across the groups.

Nearly half (43%) of the participants earned a living through small-scale trading, while about a quarter (21%) were employed, and similarly unemployed (27%); with relatively consistent percentages observed across the intervention groups. All households were headed by males and the mean household size was approximately 4.7 individuals, displaying consistency across the intervention groups. Nearly all (90%) of the households relied on purchasing for their foods; while only a minority (10%) got food from farming and buying. (Table 1).

Table 1: The sociodemographic attributes of participants

Characteristics	Total n=252	Control n=84	Maternal n=84	Couple n=84	ANOVA/Chi-square
	n(%)	n(%)	n(%)	n(%)	p-value/Chi square
Age of the pregnant women (means ±SD)	26±6	25±6	27±5	26±5	0.071
Education level of the mother					
No education	11(4)	5(6)	4(5)	2(2)	χ2= 0.989
Primary	55(22)	17(20)	15(18)	23(27)	
Secondary	102(40)	37(44)	33(39)	32(38)	
Tertiary	84(33)	25(30)	32(38)	27(32)	
Occupation of the pregnant women					
Not employed	68(27)	23(27)	20(24)	25(30)	χ2=0.791
Employed	54(21)	16(19)	24(29)	14(17)	
Small scale trading	108(43)	37(44)	31(37)	40(48)	
Casual labour	22(9)	8(10)	9(11)	5(6)	
Sex of the house head					
Male	252(100)	84(100)	84(100)	84(100)	χ2=0.333
Female	0(0)	0(0)	0(0)	0(0)	
Household size (means ±SD)					ANOVA
Household size (means ±SD)	4.7±1.2	5±2	5±1.7	4±1.3	0.172
Number of under five years old children (means ±SD)					ANOVA
Number of under five years old children (means ±SD)	1±0.3	1±0.12	1±0.21	1±0.43	0.097
Ways of getting food					
Farming and buying	26(10)	9(11)	4(5)	13(15)	χ2=0.267
Buying	226(90)	75(89)	80(95)	71(85)	
Food aid/donation	0(0)	0(0)	0(0)	0(0)	
Percentage of household income allocated to food (means ±SD)					ANOVA
Percentage of household income allocated to food (means ±SD)	37.5±9.2	37.5±11	38.3±7.8	36.8±7.7	0.343
Access to safe water and sanitation facilities					
Yes	169(68)	57(68)	49(58)	63(75)	χ2=0.567
No	83(32)	27(32)	35(42)	21(25)	

Maternal knowledge toward nutrition requirements during pregnancy at baseline

A mere minority of participants demonstrated understanding of critical factors such as the minimum number of food groups and meals necessary during pregnancy, with higher rates of awareness observed in the Maternal and Couple groups compared to the Control group, with 12%, 0%, and 0% respectively being aware of the minimum number of food groups, and 33.7%, 32.9%, and 42.4% being aware of the minimum number of meals. Conversely, awareness regarding the minimum quantity of water intake, negative consequences of alcohol, tobacco, and food taboos during pregnancy, and the significance of weight gain monitoring was low across all groups, with only 15.9%, 13.9%, 4.4%, and 2.8% of participants respectively demonstrating knowledge. Furthermore, none of the participants were knowledgeable about the recommended weight gain according to trimester, underscoring a significant gap in maternal understanding across all intervention groups. These findings underscore the imperative for targeted educational efforts aimed at enhancing maternal comprehension of vital nutritional practices during pregnancy across all intervention groups (Table 2).

The influence of counselling on maternal knowledge about proper maternal dietary practices and weight gain monitoring by study group

The study established significant disparities in awareness levels among participants. Notably, a considerable proportion of participants in the Maternal and Couple groups demonstrated awareness of crucial factors such as the minimum number of food groups, meals, and the minimum quantity of water intake during pregnancy, with 100%, 100%, and 100% respectively in the Maternal group, and 100%, 100%, and 100% respectively in the Couple group, compared to notably lower awareness levels in the Control group, with 17%, 87%, and 94% respectively demonstrating knowledge. Furthermore, awareness regarding the negative consequences of alcohol, tobacco, and food taboos during pregnancy, as well as the importance of weight gain monitoring, was significantly higher in the Maternal and Couple groups compared to the Control group, with 96%, 92%, 96%, and 100% respectively in the Maternal group, and 100%, 99%, 100%, and 100% respectively in the Couple group, compared to lower rates of awareness in the Control group, with 42%, 8%, 6%, and 6% respectively demonstrating knowledge.

Table 2: Maternal knowledge toward nutrition requirements during pregnancy at baseline

Aspect of maternal knowledge	Total N=252	Control n=84	Maternal n=84	Couple n=84	P-value
	n (100)	n (33 .3)	n (33 .3)	n (33 .3)	
Minimum number of food group to eat during pregnancy	252				
Knows	3(12)	0(0)	0(0)	3(100)	0.923
Don't know	249(98.8)	84(33.73)	84(33.73)	81(32.53)	
Minimum number of meals to take during pregnancy	252				
Knows	85(33 .7)	28(32 .9)	36(42 .4)	21(24 .7)	0.053
Don't know	167(66 .3)	56(33 .5)	48(28 .7)	63(37 .8)	
Minimum quantity of water to ding during pregnancy	252				
Knows	40(15 .9)	21 (52 .5)	13(32 .5)	6(15)	0 .99971
Don't know	212(84 .1)	62(29 .2)	72(34 .0)	78(36 .8)	
Negative consequences of Alcohol and tobacco during pregnancy on birth outcomes	252				
Knows	35(13 .9)	17(48 .6)	8(22 .9)	10(28 .6)	0 .552
Don't know	217(86 .1)	67(30 .9)	76(35 .0)	74(34 .1)	
Negative consequences of food taboos and restriction during pregnancy on birth outcomes and mother health	252				
Knows	11(4 .4)	3 (27 .3)	0(0.0)	8(72.7)	0.832
Don't know	241(95 .6)	81(33 .6)	84(34.9)	76(31.5)	
Importance of weight gain monitoring during pregnancy	252				
Knows	7(2.8)	2(79 .4)	0(0.0)	5(71 .4)	0 .765
Don't know	245(97.2)	82(32 .5)	84(33.3)	79(31.3)	
weight to gain month according to pregnancy's trimester	252				
Knows	0(0)	0(0)	0(0)	0(0)	0 .9203
Don't know	252 (100)	84(3 .3)	84(33.3)	84(33.3)	

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Additionally, all participants in the Maternal and Couple groups were knowledgeable about the recommended weight gain according to trimester, whereas none of the participants in the Control group demonstrated awareness, indicating a substantial gap in maternal understanding across the intervention groups. These findings underscore the critical need for targeted educational interventions to enhance maternal comprehension of essential nutritional practices during pregnancy, particularly among participants in the Control group (Table 3).

Influence of counselling on maternal knowledge scores by study group

The study established notable variations in knowledge acquisition across the intervention groups. Initially, participants in the Control group exhibited a mean knowledge score of 9.4 ± 10.95 at baseline, which significantly increased to 30.5 ± 29.83 at end line, indicating a substantial improvement of 21.1 points (p = 0.008). Similarly, participants in the Maternal group demonstrated a baseline mean knowledge score of 8.1 ± 13.32, which markedly rose to 81.1 ± 2.47 at end line, representing a significant enhancement of 73 points (p = 0.012). Likewise, participants in the Couple group displayed a baseline mean knowledge score of 8.7 ± 7.11, which notably elevated to 82.8 ± 0.349 at end line, reflecting a significant increase of 74.1 points (p = 0.001). Moreover, the analysis of baseline and end line differences within each group indicates substantial improvements in knowledge scores over the intervention period. Specifically, the mean difference between baseline and end line scores was 51.9

Table 3: The influence of counselling on maternal knowledge about proper maternal dietary practices and weight gain monitoring by study group

Aspect of maternal knowledge	Total	Control	Maternal	Couple	P-value
	n=250 (%)	n=83(%)	n=83(%)	n=84(%)	chi square
Minimum number of food group to eat during pregnancy	250(100)				< 0,001
Knows	181(72)	14 (17)	83 (100)	84 (100)	
Don't know	69(28)	69 (8)	0 (0)	0 (0)	
Minimum number of meal to take during pregnancy	250 (100)				
Knows	239 (96)	72 (87)	83 (100)	84 (100)	
Don't know	11 (4)	11 (13)	0 (0)	0 (0)	
Minimum quantity of water to ding during pregnancy	250 (100)				
Knows	245 (98)	78 (94)	83 (100)	84 (100)	
Don't know	5 (2)	5 (6)	0 (0)	0 (0)	
Negative consequences of Alcohol and tobacco during pregnancy on birth outcomes	250 (100)				< 0,001
Knows	199 (80)	35(42)	80 (96)	84 (100)	
Don't know	51 (20)	48 (58)	3 (4)	0 (0)	
Negative consequences of food taboos and restriction during pregnancy on birth outcomes and mother health	250 (100)				< 0,001
Knows	166 (66)	7 (8)	76 (92)	83 (99)	
Don't know	84 (34)	76 (92)	7 (8)	1 (1)	
Importance of weight gain monitoring during pregnancy	250 (100)				< 0,001
Knows	169 (68)	5 (6)	80 (96)	84 (100)	
Don't know	81 (32)	78 (94)	3 (4)	0 (0)	
weight to gain monthly according to pregnancy's trimester and pre pregnancy BMI	250 (100)				< 0,001
Knows	170 (68)	3 (4)	83 (100)	84 (100)	
Don't know	80 (32)	80 (96)	0 (0)	0 (0)	

Table 4: Influence of counselling on maternal knowledge scores by study group

Maternal	Mean knowledge score			T-test
Study group	**Baseline mean**	**End line mean**	**Difference**	
	score ±SD	**score ± SD**	**(^{1}SE)**	
Control (group 1)	9.4±10.95	30.5±29.83	21.1	**0.008**
Maternal (group 2)	8.1±13.32	81.1±2.47	73	0.012
Couple (group 3)	8.7±7.11	82.8±0.349	74.1	0.001
	Baseline Difference	**End line Difference**	**Difference in Difference**	
Mean of group 2 minus mean of group 1	-1.3	50.6	51.9	0.001
Mean of group 3 minus mean of group 2	0.6±	1.7	1.1	0.042
Mean of group 3 minus mean of group 1	-0.7	52.3	53	0.076

for the Control group, 51.9 for the Maternal group, and 53 for the Couple group, suggesting considerable knowledge acquisition across all intervention groups. Additionally, the comparison of differences between study groups reveals variations in knowledge enhancement rates, with the Maternal group exhibiting a slightly lower difference compared to the Control group (1.3 points) and the Couple group showing a negligible difference compared to the Maternal group (1.1 points). However, the difference between the Control and Couple groups was relatively higher at 52.3 points (Table 4).

Discussion

The findings from this study underscore the significance of targeted counseling interventions in improving maternal knowledge regarding dietary practices and weight gain during pregnancy. Before the interventions, a considerable proportion of participants lacked awareness of fundamental dietary requirements, such as the minimum number of food groups to consume and the importance of adequate water intake as was established in a similar study [3]. This baseline data indicates a gap in knowledge that could potentially lead to suboptimal maternal nutrition and adverse pregnancy outcomes. However, the implementation of both maternal and couple counseling interventions resulted in notable improvements in participants' understanding of these crucial aspects of maternal health. Nutritional counseling, whether maternal or couple, is found to be useful in improving maternal dietary knowledge on dietary practices during pregnancy to improve birth outcomes [7]. The observed increase in knowledge scores among participants in both intervention groups suggests the effectiveness of targeted counseling in enhancing maternal awareness and promoting healthy dietary practices during pregnancy. Notably, the significant

reduction in the percentage of participants who were unaware of essential dietary recommendations highlights the impact of the interventions in bridging knowledge gaps and empowering pregnant women with the information necessary for optimal maternal and fetal health, as further supported by previous research [2,3].

These findings align with existing literature emphasizing the importance of maternal nutrition education in improving pregnancy outcomes and reducing the risk of maternal and neonatal complications [1]. Moreover, the comparison between the maternal and couple counseling interventions revealed interesting insights into the potential benefits of involving partners in maternal health education. While both interventions led to substantial improvements in knowledge scores, the couple counseling group exhibited slightly higher mean knowledge scores and greater differences in knowledge acquisition compared to the maternal counseling group. This suggests that the collaborative approach involving both expectant mothers and their partners may have synergistic effects, enhancing the effectiveness of the intervention by addressing familial dynamics and promoting shared responsibility for maternal health. Overall, the study findings underscore the importance of targeted counseling interventions in promoting maternal health and improving pregnancy outcomes. By addressing knowledge gaps and empowering pregnant women and their partners with essential information, such interventions have the potential to positively impact maternal and neonatal health, contributing to the reduction of maternal mortality and morbidity rates [8,9]. Moving forward, further research and implementation efforts are warranted to scale up these interventions and integrate them into routine antenatal care services to maximize their impact on maternal and child health outcomes.

Conclusion

The study concluded that both maternal and couple counseling interventions were effective in enhancing maternal knowledge regarding dietary practices and weight gain during pregnancy. Specifically, the findings revealed significant improvements in participants' understanding of crucial factors such as the minimum number of food groups and meals necessary during pregnancy. For instance, before the interventions, only 12% of participants in the Control group were aware of the minimum number of food groups, compared to 100% in both the Maternal and Couple groups, indicating a substantial improvement post-intervention. Similarly, awareness regarding the minimum number of meals increased from 0% in the Control group to 33.7% in the Maternal group and 32.9% in the Couple group, further highlighting the effectiveness of counseling interventions in addressing knowledge gaps among pregnant women. Moreover, the study highlighted the potential of the couple counseling intervention in involving partners and promoting collaborative learning. Notably, the Couple group exhibited slightly higher mean knowledge scores and greater differences in knowledge acquisition compared to the Maternal group. These findings align with statistics indicating higher rates of awareness regarding essential nutritional requirements among participants in the Couple group compared to the Maternal group. For instance, while only 42% of participants in the Control group were aware of the negative consequences of alcohol during pregnancy, this rate increased to 96% in the Maternal group and 100% in the Couple group. These findings underscore the importance of education and support from partners in maternal health. The statistics further emphasize the significance of a comprehensive approach involving both mothers and their partners in improving pregnancy outcomes and reducing maternal and neonatal morbidity and mortality. Efforts to integrate targeted counseling interventions into routine antenatal care services are warranted to maximize their impact and ensure equitable access to maternal health education for all pregnant women and their families. By addressing knowledge gaps and promoting collaborative learning, such interventions have the potential to enhance maternal and neonatal health outcomes and contribute to overall improvements in maternal and child health.

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