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General Health Status of Women of Reproductive Age in Nepal

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ABSTRACT

Background: Women of reproductive age in Nepal are vulnerable to different health problems, which can jeopardize physical and mental development of fetus and mother. The aim of this study was to explore the general health status of reproductive aged women of Nepal.

Methods: Household survey and health camps were conducted in selected Village Development Committees of nine districts in three ecological regions of Nepal in 2011-2012. Structured questionnaires were used to collect the required information from women of reproductive age (15 to 49 years) group. Measurement of blood pressure, anthropometry and presence of thyroid swelling, jaundice and edema of the participants were performed.

Results: In total, 21111 women were interviewed. Women having hypertension (9.4%, n=85) and jaundice (0.9%, n=8) were predominant in the Mountain. Prevalence of Grade 2 thyroid (6.3%, n=320) was found higher in Terai. Prevalence of underweight women was significantly higher in women of Terai (26.6%, n=1235) ($p<0.001$). Prevalence of anemia was 26.0% (n=2165) in Hills and 24.7% (n=1232) in Terai. Among the pregnant women more than half were anemic and more underweight women were anemic (25.4%, n=619). Anemia was significantly associated with pregnancy ($p<0.001$), Hill and Terai ecological regions ($p<0.001$) and underweight women ($p<0.001$).

Conclusions: General health status of women of reproductive age is still poor. Thus, such high-risk population should be the focus of the government and concerned bodies to improve the general health status of women and children.

Keywords: Anemia; health problems; hypertension; pregnancy; reproductive age.

INTRODUCTION

Reproductive and maternal health is of particular concern among Nepali women. About 70% of women of reproductive age are anemic and malnourished.[1] It is estimated that 41.8% of pregnant women worldwide are anemic[2] and at least half of this anemia burden is assumed to be due to iron deficiency.[3] Similarly, pregnancy induced hypertension (PIH) affects about 7% of first pregnancies and is a leading cause of maternal morbidity and mortality.[4,5] Anemia in pregnancy and pregnancy-induced hypertension contribute significantly to maternal morbidity and mortality in developing countries.[6] In addition, problems preventable diseases like jaundice and iodine deficiency disorders still exist in Nepal.

In most of rural Nepal, people have very little knowledge about the health and nutritional problems. In the national health policy and programs, women's health issues remain inappropriately addressed. Therefore, it is judicious to study and evaluate the general health problems of reproductive age women and to make communities aware of their basic rights to health.

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METHODS

This research is a part of an intervention study (2011-2014) conducted to determine the prevalence of neural tube defects (NTDs) at birth as well as perinatal health outcome after a year of multivitamin mineral supplementation. These findings are from the baseline survey and health research camps (2011-2012) conducted prior to intervention of multivitamin mineral supplementation. This study was conducted in nine districts (Illam, Dolakha, Kavrepalanchowk, Sarlahi, Kathmandu, Lamjung, Kaski, Nawalparasi and Kailali) covering three ecological regions of Nepal. From nine districts, four to eight Village Development Committees (VDC) were selected in consultation with District Public/ Health Offices. Interview of reproductive age women was done in the household survey using structured questionnaires prior to health camp. The women were invited to attend health camp through field supervisor at the time of survey. The health camps were conducted in the health facilities of the concerned VDCs for clinical assessment. The qualified doctor conducted physical examination of women focusing on heart rate, jaundice, edema, thyroid enlargement and status of pregnancy. Nurse and health facility staffs were involved in the assessment of women including measuring height, weight, blood pressure and general condition of the women. After physical examination, blood samples were tested for hematocrit determination by laboratory technician. Similarly, structured nutrition education program was also conducted highlighting the requirement of micro nutrients for reproductive aged women specifically on prevention of NTDs and other birth defects.

The sample size was calculated for the prevalence of Neural Tube Defect (NTD) which was the main variable of interest of the study. It was assumed that 4000 to 11000 people were living (mean 8000) in each VDC. Out of that population about 2000 (25% of population would be of reproductive age)[7] women of each district were included in the study (total 18000 in 9 districts). After supplementing multivitamin for one year, those women were followed to assess perinatal outcome. It was expected that about ten percent (10% birth rate)[7] of the multivitamin-mineral supplemented women can be followed for perinatal outcome. Therefore, about 1800 women and newborn infants will be assessed for perinatal outcome.

The birth rate was 29.94/1000 or approximately 900,000 births per year. The estimated rate of NTD's was likely to be 2.5/1000 live births, which shows that at least 2200 babies will be born per year with NTDs in Nepal (Preliminary estimates based on central hospitals case record, 2009).

Sample size calculation was done with formula for relative risk, from Epi-info version-6. For sample size estimation, confidence interval 95%, power 80%, unexposed: exposed, 1:1= conventional: interventional, estimated protection in intervention 0.60%, 0.30% NTD incidence in non intervention group and risk ratio= 2.00 were used and this gave the minimum sample size of 8466 in each intervention and control group. Considering 10% (1,693) dropout, the total sample size was 18,625 from both the groups.

A total of 21111 women participated in the survey. However, not all were included in the study because of the exclusion of missing values, non-response and some had incomplete information.

Regarding the validity of the tools, the clinical assessment tools were produced in consultation with physicians, gynecologists and nurses. The study tools were pre-tested among 30 women of the ward of the VDC of similar population before conducting the actual study. The feedback from the pre-testing was used for the modification of the tools. To maintain the reliability, expert physicians from the study team were involved in the survey camps. In addition, the locally hired health workers were trained to work in the survey camps. The research assistants for data collection were trained for consistency and accuracy of data collection.

Ethical clearance was taken from Ethical Committee of the Nepal Health Research Council (NHRC reg. no. 5/2011) as per national health research policy. The protocol for informed consent developed by NHRC was strictly followed.

Blood pressure of participant women were measured in the health camps by attending nurse using Microlife Blood Pressure cuffs. Weights of the women were measured to the nearest 0.1 kg on a battery powered digital scale (Seca GmBH & Co.kg. Model No. 869 1321004, Germany) and heights were measured to the nearest centimeter using a height scale following standard anthropometric techniques.[8] For weight and height measurements, study subjects removed their shoes, removed their jackets and wore light clothing. To avoid variability among the data collectors, all the anthropometric measurements were taken by the trained persons. Body mass index (BMI) of the study subjects was calculated by dividing the weight in kilogram to the height in meter squared (kg/m^2).

Qualified laboratory technician collected capillary blood sample and analyzed by hematocrit machine (Heamata STAT-II, STI Separation Technology Inc., USA) for hematocrit. The results were recorded and the used capillaries were safely disposed in the local health facilities.

Data entry and analysis was performed by using SPSS for windows version 11.5 (SPSS Inc.). Descriptive analysis was done and the result was expressed in percentage, ratio and rate. Inferential statistics was calculated using chi-square test and p-value less than 0.05 was considered significant.

Severe anemia was defined as a hematocrit value <30%; anemia as 30-35% and normal as >35%.[9,10] Body Mass Index (BMI) as defined by Centers for Disease Control and Prevention (CDC) was used.[11] BMI less than 18.5 was considered as the "underweight" range, 18.5 to 24.9 was considered as the "normal" or healthy weight range, more than 25.0 was considered as the "overweight" range. Thyroid enlargement were classified as according to WHO modification as Grade 0 (Not palpable), Grade 1 (Palpable but not visible) and Grade 2 (Palpable and visible).[12] Hypertension was defined according to the guidelines of the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure[13], that is, systolic blood pressure ≥140mmHg or diastolic blood pressure ≥90mmHg and/or concomitant use of antihypertensive medications. Bradycardia in adults was defined as a pulse rate <60 beats per minute.

RESULTS

The total number of women enrolled in the household survey was 21111, among which, 2320 were from Mountain, 12372 from Hill and 6419 from Terai region. The mean age (±SD) was 27.0±10.1, 26.2±8.5, and 25.0±8.0 years in Mountain, Hill and Terai respectively. Majority of women involved in the survey had formal education. Women from disadvantaged janajati and upper caste were present in higher proportion. Majority of women enrolled in the survey had agriculture as their occupation. The mean height (±SD) was 151.3±6.5, 151.1±6.0 and 152.2±6.0 in Mountain, Hill and Terai respectively. Similarly, the mean weight (±SD) was 52.4±7.9, 50.1±8.5 and 47.3±7.5 in Mountain, Hill and Terai respectively (Table 1).

Women having hypertension (9.4%, n=85), bradycardia (4.5%, n=41) and jaundice (0.9%, n=8) were predominant in the Mountain region. However, prevalence of ankle edema was higher in the Hill (0.6%, n= 53). Similarly, palpable and visible thyroid (Grade 2) was found in higher percentage in Terai region (6.3%, n= 320). However, prevalence of palpable and not visible thyroid was higher in Hill (9.2%, n= 768) (Table 2).

Table 1. Demographic variables of women of reproductive age in Nepal (n=21,111).

Variables	Mountain (n=2320)	Hill (n=12372)	Terai (n=6419)
***Age** (in years)*			
15-24	1167 (50.3)	6012 (48.6)	3432 (53.5)
25-34	563 (24.3)	3948 (31.9)	1965 (30.6)
35-49	590 (25.4)	2412 (19.5)	1022 (15.9)
Mean age (in years) (±SD)	27.0±10.1	26.2±8.5	25.0±8.0
Education			
Illiterate	643 (27.7)	1663 (13.4)	2172 (33.8)
Informal education	291 (12.5)	1732 (14.0)	804 (12.5)
Formal education	1386 (59.7)	8977 (72.6)	3443 (53.6)
Ethnicity			
Dalit	109 (4.7)	1347 (11.3)	604 (9.4)
Dis-advantaged janajati	1549 (66.8)	3870 (31.3)	2709 (42.2)
Dis-advantaged non-dalit Terai caste	0 (0.0)	16 (0.1)	1212 (18.9)
Religious minorities	0 (0.0)	35 (0.3)	81 (1.3)
Relatively advantaged janajati	58 (2.5)	1862 (15.1)	121 (1.9)
Upper caste	604 (26.0)	5215 (42.2)	1692 (26.4)
Occupation			
Unemployed	630 (27.2)	4356 (35.2)	2568 (40.0)
Formal employment*	263 (11.3)	725 (5.9)	141 (2.2)
Agriculture	1420 (61.2)	7025 (56.8)	3653 (56.9)
Manual work	7 (0.3)	266 (2.2)	57 (0.9)
Anthropometric parameters			
Mean height (in cm) (±SD)	151.3±6.5	151.1±6.0	152.2±6.0
Mean weight (in Kg) (±SD)	52.4±7.9	50.1±8.5	47.3±7.5

* Includes government service, business and teaching.

Table 2. Physical examination of women of reproductive age.

Characteristics	Mountain n (%)	Total	Hill n (%)	Total	Terai n (%)	Total
Hypertension	85 (9.4)	907	432 (5.2)	8355	431 (8.6)	5038
Bradycardia	41 (4.5)	907	258 (3.1)	8358	219 (4.3)	5040
Jaundice	8 (0.9)	907	66 (0.8)	8360	4 (0.1)	5042
Edema	0 (0.0)	907	53 (0.6)	8360	18 (0.4)	5039
Appearance of thyroid						
Not palpable	899 (99.1)	907	7503 (89.8)	8356	4529 (89.9)	5040
Palpable, not visible	8 (0.9)	907	768 (9.2)	8356	191 (3.8)	5040
Palpable and visible	0 (0.0)	907	85 (1.0)	8356	320 (6.3)	5040

In Terai region, proportion of underweight women was higher (26.6%, n=1235) as compared to that in Hill and Mountain. Almost a quarter of women were overweight in Mountain region. Measurement of BMI was significantly different among three ecological regions and associated with the regions (p<0.001) (Table 3).

Table 3. BMI of women of reproductive age (n=13369)*.

Characteristics (BMI in Kg/m^2)	Mountain (n=888) (%)	Hill (n=7831) (%)	Terai (n=4650) (%)	p-value
Underweight	54 (6.1)	1161 (14.8)	1235 (26.6)	<0.001
Normal	617 (69.5)	5262 (67.2)	3083 (66.3)	
Overweight	217 (24.4)	1408 (18.0)	332 (7.1)	

* Pregnant women and those not confirmed of their pregnancy were excluded.

The prevalence of anemia in women of Terai was 24.7% (n=1232) while in Hill it was 26.0% (n=2165). The prevalence of severe anemia was higher in women of Hill (5.1%, n=424) followed by women of Terai region (4.3%, n=213) (Table 4).

Hematocrit was highly associated with pregnancy of participating women. Among the pregnant women, more than half were anemic (p<0.001). Similarly, ecological regions were also associated with anemia in women as more than a quarter (26.0%, n=2165) of women had anemia in the Hill followed by women in Terai (24.7%, n=1232) (p<0.001). Higher prevalence of anemia (25.4%, n=619) was found among the underweight women. This showed that there was association between BMI and anemia in women (p<0.001) (Table 5).

Table 4. Hematocrit of women of reproductive age.

Hematocrit percent	Mountain (n=901) (%)	Hill (n=8332) (%)	Terai (N=4989) (%)
<30	2 (0.2)	424 (5.1)	213 (4.3)
30-35	18 (2.0)	1741 (20.9)	1019 (20.4)
35-40	225 (28.3)	4733 (56.8)	3278 (65.7)
40-45	519 (57.6)	1377 (16.5)	471 (9.4)
>45	107 (11.9)	57 (0.7)	8 (0.2)

Table 5. Factors associated with hematocrit of women of reproductive age.

Characteristics	Hematocrit: Anemic (< 35 percent) (%)	Hematocrit: Normal (≥ 35 percent) (%)	p-value
Pregnancy status (n=14222)			
Yes	443 (55.6)	354 (44.4)	<0.001
No	2974 (22.2)	10451 (77.8)	
Ecological regions (n=14222)			
Mountain	20 (2.2)	881 (97.8)	
Hill	2165 (26.0)	6167 (74.0)	<0.001
Terai	1232 (24.7)	3757 (75.3)	
BMI (n=13298)*			
Underweight	619 (25.4)	1814 (74.6)	
Normal	1978 (22.2)	6940 (77.8)	<0.001
Overweight	340 (17.5)	1607 (82.5)	

* Pregnant women and those not confirmed of their pregnancy were excluded.

DISCUSSION

The present study showed that prevalence of hypertension was almost 8% in average in three ecological regions (Table 2). Hypertension in women, especially during pregnancy plays an important role in physical and mental development of the child.[14] Therefore, hypertension should be considered as an important morbidity factor during pregnancy and be focused in national health policy and strategy. About 4% of women had bradycardia in three regions of Nepal (Table 2). Measurement of heart rate is an important indicator of cardiovascular risk in women particularly during pregnancy.

In this study, less than a percent of women had jaundice and ankle edema. Although less in number, jaundice can have negative impact in maternal and fetal health.[15] The cause may vary, but can be attributed to poor nutrition[16] and appropriate preventive measures should be taken to assure safe health of women. Edema in women can be the sign of low protein intake among other causes, which can be prevented by proper nutrition. Therefore,

special attention regarding prevention, management and treatment should be given towards such health conditions of Nepalese women.

Our study also shows that 10.2% women of reproductive age in Hill and 10.1% in Terai are suffering from different forms of thyroid related problems (Table 2). In the present study, palpable and visible thyroid was found in higher number in women of reproductive age in Terai followed by Hill. Although Nepal government has targeted to eliminate iodine deficiency disorders (IDD) by 2017,[17] problems regarding thyroid enlargement still exist in Nepal. Women of reproductive age and newborn are considered high risk group of IDD. This correlates with a study conducted in the three ecological regions of Nepal.[18] Therefore, there is the need of focused programs in this risk population to achieve the elimination target.

Majority of women who were underweight (or malnourished) lived in Terai region (Table 3). This is comparable with the national data of Nepal.[19] This might be due to poverty and lack of knowledge regarding nutritious food in the Terai region. A woman's nutritional status has important implications for her health as well as for the health of her children. Malnutrition in women results in reduced productivity, slowed recovery from illness and increased susceptibility to infections and risk of adverse pregnancy outcomes. Therefore, to improve health of Nepalese women, knowledge regarding nutrition should also be provided.

In Nepal, severe anemia as well as mild anemia in women was higher in Hilly region followed by terai region. Higher hematocrit value in Mountain region is attributed to the fact that there is modification in hemoglobin functions to the hypoxic conditions in higher altitude. Although there are different forms of anemia, iron deficiency anemia is the important one in context of Nepal as it can reflect the status of micronutrients in food of Nepalese women. Anemia is of particular concern in pregnant women as it can have negative effect in the fetal growth and can pose risk to mother during delivery. In the present study,[20] hematocrit value was less in pregnant women than in normal ones in all three ecological regions ($p<0.001$). One possible reason might be poor nutrition. Other studies show the effects of low hematocrit during pregnancy can predispose the mother to infections, hypoxia or oxidative stress and thereby lead to preterm delivery.[21,22]

Likewise, relatively higher percent of underweight women were anemic ($p<0.001$). This suggests that poor nutrition can lead to low BMI, which consequently can have negative impact in hemoglobin level and health of the women. The consequence of low BMI in reproductive age women will have adverse generational effects. So, in order to have better health status of future generation improvement in nutritional status of these women is important.

CONCLUSION

Nepalese women of child bearing age still suffer from general health problems like anemia, hypertension, thyroid enlargement, underweight, which may have effect in future generation. This suggests that such high risk population should be the focus of the government and concerned bodies to improve the health and nutritional status of women.

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