Pregnancy-related health status in a remote rural area of Bangladesh: results from a clinic-based cross-section of antenatal check-up visits

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Background: Assessing and monitoring the pregnancy-related health status through antenatal check-up are important for successful pregnancy outcomes. However, there is a substantial paucity of relevant information among women in rural Bangladesh. The objective of this paper was to determine pregnancy-related health status among women in a rural primary care center to facilitate necessary clinical and public health measures.

Methods: We used cross-sectional secondary data obtained through antenatal check-up of all pregnant women (n=109) who visited Ekhlaspur Center of Health, Matlab North, Chandpur district of Bangladesh. We extracted socio-demographic, behavioral risk factors and pregnancy-related information, and related health statuses such as blood pressure, pitting edema, urinary albumin, capillary blood glucose, and blood hemoglobin. Then, we used hypertension (blood pressure ≥140/90 mmHg), albuminuria, impaired blood glucose (≥7.8–<11.1 mmol/L) and diabetes mellitus (≥11.1 mmol/L), and anemia (hemoglobin <11.0 g/dL) for profiling the health status of the pregnant women.

Results: The mean (standard deviation) age was 23.5 (4.8) years. Nearly 3 in every 5 (58.7%) of them were in the second trimester of pregnancy, and 45.9% were in the first gravida. Albuminuria (5.9%), impaired blood glucose (9.1%), and anemia (8.6%) were the most prevalent conditions, while hypertension, edema, and diabetes mellitus were found in 0.9%, 2.8%, and 2.0% cases, respectively.

Conclusions: Almost one in 10 pregnant women in this rural setting have impaired blood glucose and anemia. Grassroot level health settings should be equipped for diagnosis and provision of services for these two conditions.

Keywords: Antenatal care (ANC); health status; pregnant women; rural Bangladesh

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Introduction

Antenatal care (ANC) check-up and monitoring the pregnancy-related health status are essential for successful pregnancy. Screening for pre-existing conditions and potential complications in pregnancy allows appropriate management whenever needed. This is vital for protecting the health of pregnant women and fetuses (1). The ANC screening includes hypertension, albuminuria, and edema related to preeclampsia, anemia, gestational diabetes, urinary tract infection, etc. (2). Worldwide, hypertensive disorders in pregnancy (including preeclampsia, gestational hypertension, and chronic hypertension) affects 5–10% of pregnant women (3,4). According to the World Health Organization (WHO), anemia is the single most prevalent condition in pregnancy, accounting for nearly 42% of pregnancies during 1993–2005 (5). Another important clinical condition is gestational diabetes that can be found in nearly 5% of pregnant women (6).

In Bangladesh, a South Asian developing country, despite substantial progress in primary health care over the last few decades, only 64% of the pregnant women receive one or more ANC visits with a skilled health care provider (7), while only 37% receive four or more visits (8). In addition, the quality of the care has always been a concern. There are reports indicating that out of a total eleven listed ANC service categories, there was a prominent lack of service contents or provision in several areas including essential routine tests in rural areas. Low compliance coverage was observed in the physical examination (e.g., edema), routine tests (e.g., blood grouping and urine test), and advice on high risk pregnancy (9). Therefore, the ANC in terms of its coverage, quality and comprehensiveness still appears to be inadequate in remote rural areas (9,10).

Available reports to indicate the prevalence of pregnancy induced hypertension is 7.5% in urban areas (11) and 5–9% in rural areas (12,13). Half of the pregnant women are anemic in rural areas, a bit higher than the urban counterparts (14). Gestational diabetes is ranged from 7–13% (13,15,16) with an observed higher rate (7.5–13%) in urban areas (15,16) than rural (7–8%) (13,15). However, comprehensive information about the pregnancy-related health status is still quite limited in rural areas of Bangladesh. Such data are necessary for the health manager's better understanding of pregnancy-related health conditions in remote outlying areas, and also for taking necessary clinical and public health measures in order to ensure the optimum health and well-being of the pregnant women and their fetuses. The objective of this paper was to determine comprehensively the pregnancy-related health status through ANC check-up findings in a remote rural primary care center in Bangladesh.

We present the following article in accordance with the STROBE reporting checklist (available at https://jxym.amegroups.com/article/view/10.21037/jxym-21-36/rc).

Methods

Study design, settings and population

We used cross-sectional secondary data obtained through ANC check-up of pregnant women from the database of Ekhlaspur Center of Health (ECOH). The ECOH is a non-governmental and nonprofit healthcare organization situated in Ekhlaspur village, a remote rural area of Matlab North in Chandpur district around 60 km to the southeast of capital city Dhaka. The ECOH was founded in 1999 by one of us (MMZ). Since its establishment, this center has been providing general healthcare services to the grassroot level village people with a nominal fee using a multidisciplinary outdoor setting (17). Along with other health records, the ECOH has been continuously keeping every ANC check-up record of those who attended its 'pregnant women's clinic'. From 2014 to 2021, a total of 109 pregnant women attended the ECOH to seek ANC. For this analysis, we used the 1st ANC check-up data only.

Data collection instrument:

The data record included socio-demographic (such as age, age at marriage, and personal and husband's education); behavioral risk factors [such as smokeless tobacco use e.g. jarda/sadapata/gul, exposure to secondhand smoking by family members (but we did not use smoking because it is extremely rare in women of this community), and added salt intake during meal]; existing comorbidities [such as history of hypertension, diabetes mellitus (DM), and asthma or chronic obstructive pulmonary disease (COPD)]; physical examinations (pitting ankle edema and sitting blood pressure); pregnancy-related basic information [gravida, gestational age (through last menstrual period history), and history of abortion]; and a few biochemical measurements that related to ANC (albumin in the urine, random capillary blood glucose, and blood hemoglobin and blood group) as these are some common maternal health conditions or problems that women may experience during pregnancy (18).

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Data collection technique

In the outpatient department of ECOH, concerned staff interviewed the pregnant women those who visited for seeking services. Self-reported data on socio-demographic, behavioral risk factors, existing comorbidities, and pregnancy-related basic information were collected and recorded. The techniques to assess other components are as follows:

(I) Clinical examination. Left arm brachial artery pressure was measured using an aneroid sphygmomanometer to assess systolic blood pressure (SBP) and diastolic blood pressure (DBP) using standard methods (19). Edema was identified through a visual inspection if pitted on the lower legs and/or forefeet when fingertip pressure applied.

(II) Biochemical tests. Capillary blood (using digital glucometer and strip) glucose (irrespective of prandial status) and hemoglobin levels were estimated to identify impaired blood glucose and anemia, respectively. Hemoglobin level was estimated using the Cyanmethemoglobin (Hemoglobin-Cyanide) method in the laboratory (20). A dipstick urinalysis was done to identify albuminuria to indicate the possible presence of preeclampsia (21,22). Blood groups were identified using the slide agglutination method for 'ABO-Rh blood grouping' (23).

(III) Definition of hypertension, impaired blood glucose and anemia. Hypertension was determined when there was a previous history, or SBP and/or DBP were ≥140 and/or ≥90 mmHg, respectively (19). Impaired blood glucose and DM were determined when random capillary blood glucose levels were ≥7.8–<11.1 and ≥11.1 mmol/L, respectively, according to the International Diabetes Federation guideline (24). Anemia was determined when the blood hemoglobin level was <11.0 g/dL (25). Additionally, the American Family Physician's defining criteria (presences of hypertension and albuminuria with/without edema after 20 weeks of gestation) were used to identify preeclampsia (26).

Statistical analysis

An anonymized Excel data sheet obtained from ECOH was transferred to the SPSS software (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.) for analysis after necessary cleaning. Descriptive statistics were used to illustrate the pregnant women's socio-demographics, behavioral risk factors, existing comorbidities, and pregnancy-related basic information and health status, and expressed as frequency and percentage for categorical variables; and mean, standard deviation (SD), or median and interquartile range as appropriate for quantitative variables. Inferential statistics (e.g., Chi-square or Fisher's Exact tests for categorical and *t*-tests for quantitative variables) were used to assess the factors associated with the health status. A P value <0.05 was considered statistically significant.

Ethical statement

This work was conducted in accordance with the Declaration of Helsinki (as revised in 2013). This work was exempted from ethical approval, subject to anonymity, because it used existing data of routine services, as per the IRB manual of Bangladesh Medical Research Council. Informed consent was taken from all the participants.

The ECOH's ANC program is run by the local community. Community consent is obtained first through periodic meetings for better planning of the services. All pregnant women of the community are targeted by yearly campaigns to avail ECOH's ANC services. Informed consents are routinely being obtained for possible use of the data for preparing reports for the general and scientific community maintaining anonymity. Only the service providers retain access to the individual's identifications.

Results

Socio-demographics, behavioral risk factors, and obstetrical characteristics

Their mean age was 23.3±4.8 years and they got married at their age around 18 years. Over half (51.5%) were exposed to secondhand smoking by any of their male family members (*Table 1*). However, none of them practiced any form of smokeless tobacco products. Added salt intake behavior during meal was noticeable (1.5±0.9 teaspoon daily). None of them had a history of hypertension, DM and asthma/COPD. Nearly three in every five (58.7%) were in the second trimester, and 45.9% were in the first gravida.

The 'B' group was the leading blood group (40.0%).

Health status

Mean blood pressure, capillary blood glucose, and hemoglobin levels stratified into the first trimester and

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Table 1 Socio-demographics, behavioral risk factor, pregnancy-related basic information, and blood group of the pregnant women (n=109)

Variables	Results
Age, years, mean ± SD	23.5±4.8
Age at marriage, years, mean ± SD	18.3±2.3
Personal schooling years, median [interquartile range]	9 [8–10]
Husband's schooling years, median [interquartile range]	9 [8–12]
Age <25 years, n (%)	71 (65.1)
Marriage age <18 years, n (%)	34 (31.2)
Personal and husband's combined education <10 schooling years, n (%)	75 (68.8)
Exposure to secondhand smoke at home (n=103), n (%)	53 (51.5)
Added salt intake during meal (n=106), n (%)	83 (78.3)
Gestational age (n=104), n (%)	
1st trimester (1–12 weeks)	13 (12.5)
2nd trimester (13–26 weeks)	61 (58.7)
3rd trimester (27 weeks and above)	30 (28.8)
Gravida, n (%)	
First	50 (45.9)
Second	33 (30.3)
Third	26 (23.9)
History of abortion (n=59, excluding women with the first gravida), n (%)	14 (23.7)
Blood group (n=100), n (%)	
A	18 (18.0)
B	40 (40.0)
AB	11 (11.0)
O	31 (31.0)

Primary education consists of 5 schooling years. SD, standard deviation.

the second-third trimesters are presented in *Table 2*. No statistically significant difference was observed. Albuminuria, impaired blood glucose, and anemia were found as the most prevalent pregnancy-related health conditions among them, accounting for 5.9%, 9.1%, and 8.6%, respectively (*Table 2*). Negligible proportions of them were identified with hypertension, edema, and diabetes mellitus (0.9%, 2.8%, and 2.0%, respectively). The proportions of albuminuria, impaired blood glucose, and anemia tended to rise with higher gestational age (2nd and 3rd trimesters), although the differences weren't statistically significant (P>0.10). Nobody was identified with preeclampsia (not shown in table). Furthermore, none of the pregnancy-related health outcomes (hypertension, albuminuria, impaired blood glucose and anemia) was significantly associated (P>0.10) with age, age at marriage, education, second-hand smoking, gravida, and history of abortion (*Table 3*).

Discussion

This analysis of samples of the selected rural pregnant women reports that almost one in ten of them have glucose intolerance and anemia. Some of them have albuminuria too but none have preeclampsia. Since its establishment, the ECOH has been continuing ANC services with a variety of additional service component items along with the essential services, indicating a sound provision of comprehensive ANC services for the women in such a remote rural community. The pregnant women are also up-taking the ANC-related screenings and counseling from the center, which also indicates a good level of ANC service coverage in this community.

Although the situation is changing day-by-day, a substantial number of rural women got married and had babies in unexpectedly early in their ages. Although, their own tobacco consumption was nil, a notable exposure to secondhand smoking by any of their family members suggest still a lack of awareness or lackadaisical phenomenon for caring of the pregnant women in this rural community. Noticeably higher intake of added salt during meals also indicates a lack of awareness among them. Resulting, these vital factors might have a substantially negative impact on their pregnancy-related health outcomes. Nobody had pre-existing hypertension, DM and asthma/COPD that reflect a supportive health condition for pregnancy. A noticeable proportion of women with abortion history indicates a significant demand and intervention for improvement in the provision of reproductive healthcare services including family planning and maternal health with essential ANC facilities in this community. Moreover, the proportions of albuminuria, impaired blood glucose, and anemia tended to increase with higher gestational ages, suggesting a demand for extra care for the management of possible preeclampsia, glycemic status, and anemia in the mid to terminal period of pregnancy.

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Table 2 Antenatal check-up findings and health statuses of the pregnant women according to the gestational age

Variables	Numbers (excluding missing values)	Overall	1st trimester	2nd & 3rd trimesters	P-value
Blood pressure in mmHg					
Systolic blood pressure, mmHg	103	103±13	103±10	103±13	0.97
Diastolic blood pressure, mmHg	103	65±9	65±10	65±9	0.89
Random capillary blood glucose, mmol/L	99	5.8±2.1	6.0±2.7	5.8±2.0	0.77
Hemoglobin, g/dL	93	12.5±1.2	12.9±1.5	12.4±1.1	0.18
Hypertension[ǂ]	103	1 (0.9%)	0	1 (1.1%)	
Edema	103	3 (2.8%)	0	3 (3.3%)	
Presence of albumin in urine	101	6 (5.9%)	1 (7.7%)	5 (5.7%)	0.78
Impaired blood glucose[¶]	99	9 (9.1%)	0	9 (10.5%)	
Diabetes mellitus[ǂ]	99	2 (2.0%)	1 (7.7%)	1 (1.2%)	0.25
Anemia[§]	93	8 (8.6%)	2 (15.4%)	6 (7.5%)	0.35

Independent sample t-tests and Chi-square tests were done where appropriate. [ǂ]: hypertension, systolic or diastolic blood pressures ≥140 or ≥90 mmHg, respectively. [¶]: impaired blood glucose, random capillary blood glucose ≥7.8–<11.1 mmol/L; [ǂ]: diabetes mellitus, random capillary blood glucose ≥11.1 mmol/L; [§]: anemia, hemoglobin <11.0 g/dL.

Table 3 Associated factors of pregnancy-related health statuses

Independent variables	Hypertension[ǂ], %	Albumin in urine, %	Impaired blood glucose & DM[¶], %	Anemia[§], %
Age (n=109)				
Below 25 years	1.4	4.4	7.6	8.2
25 years and above	0	10.5	15.8	11.1
Marriage age, years (n=109)				
Below 18	0	8.8	6.3	6.7
18 and above	1.0	5.6	12.5	10.4
Combined education, schooling years (n=109)				
Below 10	1.0	5.4	10.8	8.7
10 and above	0	9.4	10.0	10.7
Secondhand smoking (n=103)				
No	1.0	8.0	12.8	13.6
Yes	0	5.9	7.8	6.1
Gravida (n=109)				
First pregnancy	0	4.3	8.7	7.1
Second and above pregnancy	1.0	8.5	12.1	10.9
History of abortion (n=59)*				
No	0	6.7	11.4	12.2
Yes	1.0	14.3	14.3	7.1

Chi-square test and Fisher's Exact tests were done where appropriate. [ǂ]: hypertension, systolic or diastolic blood pressures ≥140 or ≥90 mmHg, respectively; [¶]: impaired blood glucose & DM, random capillary blood glucose ≥7.8 mmol/L; [§]: anemia, hemoglobin <11.0 g/dL; *, excluding first gravida. All P values were >0.10.

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Our findings in the light of other studies

A single number of newly diagnosed hypertensive subject in our finding may suggest a very negligible rate of pregnancy-induced gestational hypertension, in contrast to the other relevant studies done in Bangladesh (5–9%) (11-13) as well as those done in two neighboring countries, India (10.3%) and Pakistan (9.3%) (27). The presence of edema and albuminuria in a small proportion of women in our study also suggest a favorable pregnancy-related health outcome. However, we found albuminuria a bit higher than the same study from India and Pakistan (around 1%) (27). Small proportions of women with impaired blood glucose and DM in our study reflect a good glycemic status among them, which is almost similar to the prevalence of gestational diabetes in Indian women (1.3%) (28). Our DM prevalence is noticeably less compared to the gestational diabetes reported in other studies of this country, even irrespective of the rural-urban context (7–13%) (13,15,16). Surprisingly, the anemia prevalence in our sample is much less than many studies done in Bangladesh (37-49%) (14,29) and India (62%) (30). This large variation might be due to the favorable socio-demographic and small number of gravid women than that of other studies (14,29,30). However, it is also important to be noted that the pregnant women who attend ECOH usually receive general health and dietary counseling as well as supplementary medications if necessary (e.g., iron and folic acid), which might be a protective factor for not developing pregnancy-related adverse conditions. On the other hand, 'B' and 'O' blood groups still remained dominant in our findings similar to the ECOH's previous paper (31), and the findings may be useful for the 'The Safe Blood Transfusion Programme' of Bangladesh (32) for record keeping and maximizing their capacity.

Limitation and strength

The notable limitation of this paper is its small sample size. Although a larger proportion of pregnant women had albuminuria, anemia and impaired blood glucose with higher age, age at marriage and gravida, the statistical tests may not have enough power to detect the differences. We did not have necessary data to define preeclampsia more precisely. Although we use here data from all women who attended the outpatient of ECOH during the data collection period, they may not represent rural women of Bangladesh at large given that a long-term community intervention for pregnant women's wellbeing has been ongoing. However, most probably this paper is the first ever document in the country reporting a wide-range of pregnancy-related health outcomes and status in a comprehensive approach in a rural area of Bangladesh.

Implication of findings

This present analysis explored a list of comprehensive ANC check-up findings indicating the pregnancy-related several health outcomes, imposing a priority among the pregnant women in rural Bangladesh. This may show an avenue for the provision of implementing a large extent of ANC screening coverage comprehensively in the rural context. The findings will enrich the existing literature in the similar domain, most importantly by reporting a few new findings. Also, the findings can help the concerned authorities to intervene and strengthen the ANC service system enriching with the screening component items in a comprehensive approach. All rural facilities in Bangladesh that provide ANC should consider provisions of urine testing for albumin, and blood testing for glucose and hemoglobin.

Conclusions

Although our data come from a small sample, we report that the albuminuria, impaired blood glucose, and anemia deserve special attention for rural Bangladeshi pregnant women. Further large-scaled studies with extended ANC service components to define preeclampsia more precisely are required to provide better insight into the situation and management related to the whole array of pregnancy-related conditions.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://jxym.

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://jxym.amegroups.com/article/view/10.21037/jxym-21-36/coif). The authors have no conflicts of interest to declare.

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