

LAMPIRAN SOAP

A. Identitas Ibu dan Suami

| | | | |
|-------------|--------------------|-------------|------------------|
| Nama Ibu | : Ny. D | Nama Suami | : Tn. D |
| Umur | : 30 tahun | Umur | : 32 tahun |
| Suku Bangsa | : Jawa/Indonesia | Suku Bangsa | : Jawa/Indonesia |
| Agama | : Islam | Agama | : Islam |
| Pendidikan | : SMP | Pendidikan | : SMK |
| Pekerjaan | : Ibu rumah tangga | Pekerjaan | : Swasta |
| Nomor HP | : 083101367376 | | |

Alamat : Sumuran 01/03 Kemandang Tanjungsari Gunungkidul DIY

Riwayat menikah 1 kali, pada umur 20 tahun. Lama pernikahan 12 tahun.

B. Identitas Bayi

| | |
|---------------|-------------------|
| Nama bayi | : By. KZ |
| Tanggal lahir | : 06 Januari 2023 |
| Tempat lahir | : RSUD Saptosari |
| Jenis kelamin | : Perempuan |

ASUHAN ANTENATAL CARE (ANC 1)

Nama Pengkaji : Emi Rahmawati
Tempat Pengkajian : Rumah Pasien
Waktu Pengkajian : 13 Desember 2022, Pukul 13.30 WIB

DATA SUBJEKTIF

1. KELUHAN: Ibu mengatakan tidak ada keluhan. Ibu mengatakan sekarang berada dalam usia kehamilan 36⁺⁶ minggu
2. RIWAYAT MENSTRUASI
Menarche umur 12 tahun. Siklus 28-30 hari. Lama 6-7 hari. Sifat darah: encer. Flour albus: tidak. Bau khas darah. Dismenorea: tidak. Banyak darah: 2-3 kali ganti pembalut. HPHT : 28-3-2022. HPL : 4-1-2023.
3. RIWAYAT KESEHATAN
 - a. Ibu: Ibu mengatakan tidak sedang ataupun pernah menderita penyakit jantung, hipertensi, asma, gula, ginjal, batuk lamadan infeksi menular seksual. Ibu mengatakan pernah dilakukan curretase pada kehamilan ke 2 dan tidak memiliki alergi.
 - b. Keluarga: Ibu mengatakan keluarganya tidak sedang ataupun pernah menderita penyakit jantung, hipertensi, asma, gula, ginjal, batuk lama dan infeksi menular seksual.
4. RIWAYAT KEHAMILAN INI
 - a. Riwayat ANC
Ibu mengatakan sudah 10 kali ANC
Trimester I : 4 kali
Trimester II : 3 kali
Trimester III: 3 kali
ANC di Puskesmas Tanjungsari dan RSIA Allaudya.
Mendapatkan Obat: TTD, Kalsium Lactat
Pergerakan janin: Ibu mengatakan merasakan pergerakan janin sejak usia kehamilan ±18 minggu.

Hasil Lab pada saat ANC Terpadu di Puskesmas Tanjungsari, tanggal 4-8-2022, hasil:

Hb : 10,3 g/dl Rapid HBSAG : Negatif

Golongan darah: A Rapid Syphilis : Negatif

Rapid HIV: Non Reaktif

b. Keluhan yang dirasakan:

Trimester I : mual

Trimester II : tidak ada keluhan

Trimester III : tidak ada keluhan

c. Imunisasi

TT 1 SD kelas 1

TT 2 SD kelas 3

TT 3 caten Tahun 2010

TT 4 bulan Agustus 2022

5. RIWAYAT OBSTETRI

Ini adalah kehamilan ketiga, ibu mengatakan pernah mengalami keguguran pada kehamilan ke 2.

6. RIWAYAT KONTRASEPSI YANG DIGUNAKAN

Ibu pernah menggunakan alat kontrasepsi KB suntik pasca melahirkan naka pertama pada tahun 2010.

7. RIWAYAT POLA PEMENUHAN KEBUTUHAN SEHARI-HARI

- | | | | |
|----|----------------|----------------------------|------------------|
| a. | Pola Nutrisi | Makan | Minum |
| | Frekuensi | : 3-4 kali sehari | 6-8 gelas sehari |
| | Macam | : Nasi, sayur, lauk, buah. | air mineral, jus |
| | Jumlah | : 1 porsi sedang | 1 gelas |
| | Keluhan | : Tidak ada | Tidak ada |
| b. | Pola Eliminasi | : BAB | BAK |
| | Frekuensi | : 1 kali sehari | 4-5 kali |
| | Warna | : Khas | Khas |
| | Bau | : Khas | Khas |
| | Konsisten | : Lunak | Cair |

- c. Pola aktivitas
Kegiatan sehari-hari : ibu bekerja sebagai ibu rumah tangga.
Istirahat/Tidur : tidur malam 7-8 jam.
 - d. Personal Hygiene Kebiasaan mandi 2 kali/hari.
Kebiasaan membersihkan alat kelamin saat mandi, setelah BAB/BAK.
Kebiasaan mengganti pakaian dalam dua kali sehari (setelah mandi)
Jenis pakaian dalam yang digunakan katun.
8. Riwayat Psikologi Spiritual
- a. Pengetahuan ibu tentang kehamilan
Ibu mengatakan sudah tahu tanda bahaya ibu hamil, nutrisi ibu hamil, polaaktivitas sehari-hari ibu hamil dari buku KIA dan internet.
 - b. Pengetahuan ibu tentang kondisi/keadaan yang dialami sekarang Ibu mengetahui bahwa saat ini ia harus rajin melakukan pemeriksaan kehamilan. Ibu mengatakan bahwa ia dan janin nya dalam kondisi sehat.
 - c. Penerimaan ibu terhadap kehamilan saat ini
Ibu mengatakan bahwa ibu dan keluarga menerima kehamilan ini.
 - d. Tanggapan keluarga terhadap kehamilan Ibu mengatakan pada saat ini keluarga menyambut baik kehamilan ini.
 - e. Persiapan/rencana persalinan
Ibu mengatakan berencana bersalin di PMB Winarti (Klinik Cipta Husada).

DATA OBJEKTIF

1. PEMERIKSAAN UMUM

- a. KU: baik Kesadaran : Compos Mentis
- b. Tanda vital:

| | |
|-------------------|--------------------|
| TD: 100/70 mmHg. | N: 100 kali/menit. |
| R: 20 kali/menit. | S : 35,9 °C |
| TB: 159 cm | BB 63 kg |
| LLA: 26.5 cm. | |

- c. Kepala dan leher
- Oedem Wajah : tidak ada edema pada wajah
- Mata : conjungtiva merah muda, sklera putih
- Mulut : lembab, merah muda
- Leher : tidak ada pembengkakan dan pembesaran kelenjartiroid dan limfe
- d. Payudara
- Bentuk : bulat, tidak teraba masa/benjolan
- Areola mammae : hiperpigmentasi
- Puting : menonjol, bersih
- Colostrum : belum keluar
- e. Abdomen
- Bentuk : membesar, memanjang
- Bekas luka : tidak ada bekas luka operasi
- Striae gravidarum : tidak ada striae gravidarum
- Palpasi Leopold
- Leopold I : teraba bulat lunak (Bokong bayi)
- Leopold II : punggung bayi pada perut kiri ibu
- Leopold III : teraba kepala bayi
- Leopold IV : Divergen
- Tafsiran berat janin : 2.790 gram
- DJJ : 148x/menit terdengar Reguler
- f. Anus : tidak dilakukan
- g. Ekstremitas
- Oedem : tidak terdapat oedem
- Varices : tidak ada varices
- Reflek Patela : kaki kanan positif, kaki kiri positif
- Kuku : putih bersih, jika ditekan kembali <1 detik.

2. PEMERIKSAAN PENUNJANG

Pemeriksaan Laboratorium: Tidak dilakukan

Analisis

Diagnosa : Ny. D umur 30 tahun G₃P₁A₁Ah₁ Usia Kehamilan 36 minggu 6 hari dengan anemia ringan.

Masalah Potensial: Perdarahan

Kebutuhan : pemberian TTD

Penatalaksanaan :

- a. Memberitahu hasil pemeriksaan kepada pasien bahwa janin dalam keadaan baik dan menyampaikan bahwa dari hasil pemeriksaan laboratorium ibu mengalami anemia ringan. Pasien mengerti.
- b. Menganjurkan kepada ibu mengenai pola makan seimbang, memenuhi kebutuhan gizinya, makan makanan yang banyak mengandung zat besi seperti, tempe, daging, kacang, sayur-sayuran yang berwarna hijau (kacang panjang, bayam, dan lain-lain). Makanan dan minuman yang mengandung Vitamin C. Jenis makanan yang banyak mengandung vitamin C seperti buah jeruk, apel untuk membantu penyerapan zat besi. Ibu bersedia.
- c. Menganjurkan ibu untuk rutin meminum tablet tambah darah dosis 2 x sehari dan kalsium 1 x sehari. Tablet tambah darah tidak diminum bersamaan dengan kalsium, karena akan menghambat penyerapan obat. Pasien mengerti.
- d. Memberi KIE tentang cara minum tablet tambah darah yaitu diminum dengan air putih atau jus jeruk, tidak boleh diminum dengan air teh agar penyerapan zat besi tidak terhambat. Pasien mengerti.
- e. Memberikan KIE efek yang dapat terjadi apabila ibu mengalami anemia pada masa kehamilan. Pasien mengerti
- f. Memberikan KIE tanda bahaya nifas, KIE untuk istirahat cukup dan melakukan aktifitas ringan. Ibu bersedia.
- g. Menganjurkan ibu untuk kunjungan ulang 1 minggu lagi untuk pemeriksaan ulang kadar Hb atau anjurkan ibu untuk segera kontrol apabila ada keluhan terkait kehamilannya. Ibu bersedia dan mengerti.

ASUHAN ANTENATAL CARE (ANC) II

Nama Pengkaji : Emi Rahmawati
Tempat Pengkajian : Rumah Pasien
Waktu Pengkajian : 27 Desember 2022, Pukul 16.00

Data Subjektif

1. KELUHAN: Ibu mengeluh keputihan sedikit gatal tapi tidak berbau, ibu juga mengatakan perutnya sudah mulai tidak nyaman sehingga mengganggu istirahat.
2. RIWAYAT MENSTRUASI
 - HPHT : 28 Maret 2022
 - HPL : 4 Januari 2023
 - UK : 38+6 minggu
3. RIWAYAT KESEHATAN
 - a. Ibu: Ibu mengatakan tidak sedang ataupun pernah menderita penyakit jantung, hipertensi, asma, gula, ginjal, batuk lamadan infeksi menular seksual. Ibu mengatakan tidak pernah operasi dan tidak ada alergi.
 - b. Keluarga: Ibu mengatakan keluarganya tidak sedang ataupun pernah menderita penyakit jantung, hipertensi, asma, gula, ginjal, batuk lama dan infeksi menular seksual.
4. RIWAYAT KEHAMILAN INI

Ibu mengatakan sudah 11 kali ANC

 - TM I : 4 kali
 - TM II : 3 kali
 - TM III : 4 kali

ANC di Puskesmas Tanjungsari dan RSIA Allaudya
5. RIWAYAT OBSTETRI

Ini adalah kehamilan ketiga, ibu mengatatakan pernah mengalami keguguran
6. RIWAYAT KONTRASEPSI YANG DIGUNAKAN

Ibu pernah menggunakan alat kontrasepsi KB suntik 3 bulan.

7. RIWAYAT POLA PEMENUHAN KEBUTUHAN SEHARI-HARI

- | | | | |
|----|--------------|--------------------------|------------------|
| a. | Pola Nutrisi | Makan | Minum |
| | Frekuensi : | 3-4 kali sehari | 6-8 gelas sehari |
| | Macam: | Nasi, sayur, lauk, buah. | air mineral, jus |
| | Jumlah: | 1 porsi sedang | 1 gelas |
| | Keluhan: | Tidak ada | Tidak ada |
- b. Pola Eliminasi: BAB BAK
- | | | | |
|--|------------|---------------|----------|
| | Frekuensi: | 1 kali sehari | 4-5 kali |
| | Warna: | Khas | Khas |
| | Bau: | Khas | Khas |
| | Konsisten: | Lunak | Cair |
- c. Pola aktivitas
- Kegiatan sehari-hari: ibu bekerja sebagai inu rumah tangga.
Istirahat/Tidur: tidur malam 7-8 jam.
- d. Personal Hygiene Kebiasaan mandi 2 kali/hari
- Kebiasaan membersihkan alat kelamin saat mandi, setelah BAB/BAK.
Kebiasaan mengganti pakaian dalam dua kali sehari (setelah mandi) Jenis pakaian dalam yang digunakan katun.
- e. Riwayat Psikologi Spiritual
1. Pengetahuan ibu tentang kehamillan Ibu mengatakan sudah tahu tanda bahaya ibu hamil, nutrisi ibu hamil, polaaktivitas sehari-hari ibu hamil dari buku KIA dan internet.
 2. Pengetahuan ibu tentang kondisi/keadaan yang dialami sekarang Ibu mengetahui bahwa saat ini ia harus rajin melakukan pemeriksaan kehamilan. Ibu mengatakan bahwa ia dan janin nya dalam kondisi sehat.
 3. Penerimaan ibu terhadap kehamilan saat ini Ibu mengatakan bahwa ibu dan keluarga menerima kehamilan ini.
 4. Tanggapan keluarga terhadap kehamilan
Ibu mengatakan pada saat ini keluarga menyambut baik kehamilan ini.

5. Persiapan/rencana persalinan

Ibu mengatakan berencana bersalin di PMB Winarti.

Data Objektif

1. PEMERIKSAAN UMUM

- a. KU: Baik, Kesadaran: Compos Mentis
- b. Tanda vital

| | |
|-------------------|---------------------|
| TD: 100/70 mmHg. | N : 101 kali/menit. |
| R: 21 kali/menit. | S: 36,1 °C |
- c. TB: 159 cm BB sekarang : 65 kg
- d. Kepala dan leher

| | |
|-------------|--|
| Oedem Wajah | : tidak ada edema pada wajah |
| Mata | : conjungtiva merah muda, sklera putih |
| Mulut | : lembab, merah muda |
| Leher | : tidak ada pembengkakan dan pembesaran kelenjartiroid dan limfe |
- e. Payudara

| | |
|---------------|-------------------------------------|
| Bentuk | : bulat, tidak teraba masa/benjolan |
| Areola mammae | : hiperpigmentasi |
| Puting | : menonjol, bersih |
| Colostrum | : belum keluar |
- f. Abdomen

| | |
|-------------------|--------------------------------|
| Bentuk | : membesar, memanjang |
| Bekas luka | : tidak ada bekas luka operasi |
| Striae gravidarum | : tidak ada striae gravidarum |

Palpasi Leopold

- | | |
|------------|---|
| Leopold I | : TFU 1 jari bawah px, pada fundus teraba bulat,tidak melenting (bokong) |
| Leopold II | : Pada bagian kanan teraba keras, memanjang (punggung), pada bagian kiri teraba bagian-bagian kecil janin |

(ekstremitas)

Leopold III : teraba bulat, keras, dan melenting (kepala)

Leopold IV : tangan pemeriksa divergen/sudah masuk panggul

TFU McDonald : 31 cm

TBJ : (30-11)x155 :3.100 gram

DJJ : 140 kali/menit

g. Anus : tidak dilakukan.

h. Ekstremitas

Oedem : tidak terdapat oedem

Varices : tidak ada varices

Reflek Patela : kaki kanan positif, kaki kiri positif

Kuku : putih bersih, jika ditekan kembali <1 detik

2. PEMERIKSAAN PENUNJANG

Pemeriksaan Laboratorium : Tidak dilakukan

Analisis

Diagnosa : Ny. D umur 30 tahun G₃P₁A₁Ah₁ Usia Kehamilan 38 minggu 6 hari dengan Riwayat anemia ringan.

Masalah Potensial: Perdarahan Antepartum dan partus prematurus

Kebutuhan : pemberian TTD

Masalah saat ini : Keputihan dan sulit tidur

Kebutuhan : tidak ada

Penatalaksanaan

a. Memberitahu Ny. D tentang hasil pemeriksaan bahwa saat ini usia kehamilan sudah 38+6 minggu, kepala janin sudah masuk panggul. Selain itu, memberitahu ibu bahwa keputihan yang dialami ibu disebabkan karena hormon hamil dan tidak berbahaya, ibu mengalami sulit tidur karena kehamilan yang semakin besar dan sering mengalami kontraksi palsu yang wajar dialami ibu hamil TM 3. Ibu sudah mengerti akan hasil pemeriksaan yang telah dilakukan.

- b. Memberikan KIE pada ibu cara mengatasi sulit tidur yaitu menggunakan bantal untuk mendapatkan posisi yang nyaman, tidur miring kiri dan sesekali miring kanan kemudian letakkan bantal diantara kaki dan di belakang punggung. Kemudian gunakan baju tidur yang longgar dan menyerap keringat. Pada saat makan malam, makan makanan yang ringan dan hindarkan makanan pedas. Serta biarkan tubuh dan pikiran rileks 15 menit sebelum tidur dan dapat juga dengan melakukan yoga. Ibu mengatakan paham dan bersedia melakukannya.
- c. Memberikan KIE pada ibu cara mengurangi keputihan yaitu dengan menjaga kebersihan organ vital dengan menggunakan celana dalam yang agak longgar tidak ketat, serta sering mengganti celana dalam/pembalut yang digunakan. Ibu mengerti dan bersedia melakukannya.
- d. Menganjurkan ibu tetap rutin minum vitamin kalsium dan TTD yang sudah diebikan oleh dokter ataupun bidan saat ANC sebelumnya. Ibu bersedia dengan anjuran tersebut.
- e. Mengingatkan ibu untuk menyiapkan peralatan dan perlengkapan ibu bersalin dan bayi sebelum persalinan tiba. Ibu bersedia dengan anjuran tersebut.
- f. Memberitahu ibu kunjungan ulang satu minggu lagi atau apabila ada keluhan. Ibu bersedia dengan anjuran tersebut.

ASUHAN ANTENATAL CARE (ANC) III

Nama Pengkaji : Emi Rahmawati
Tempat Pengkajian : Rumah Pasien
Waktu Pengkajian : 5 Januari 2023, pukul 06.00 WIB

Data Subjektif

1. KELUHAN : Ibu mengatakan sudah mengeluarkan cairan berwarna putih rembes baru saja sekitar pukul 05.30 WIB dan mengeluarkan lendir darah. Ibu belum merasakan kenceng-kenceng.
2. RIWAYAT MENSTRUASI
 - HPHT : 28 Maret 2022
 - HPL : 4 Januari 2023
 - UK : 39+6 minggu
3. RIWAYAT KESEHATAN
 - a. Ibu: Ibu mengatakan tidak sedang ataupun pernah menderita penyakit jantung, hipertensi, asma, gula, ginjal, batuk lamadan infeksi menular seksual. Ibu mengatakan tidak pernah operasi dan tidak ada alergi.
 - b. Keluarga: Ibu mengatakan keluarganya tidak sedang ataupun pernah menderita penyakit jantung, hipertensi, asma, gula, ginjal,batuk lama dan infeksi menular seksual.
4. RIWAYAT KEHAMILAN INI

Ibu mengatakan sudah 11 kali ANC

 - TM I : 4 kali
 - TM II : 3 kali
 - TM III : 4 kali

ANC di Puskesmas Tanjungsari dan RSIA Allaudya
5. RIWAYAT OBSTETRI

Ini adalah kehamilan ketiga, ibu mengatatakan pernah mengalami keguguran

6. RIWAYAT KONTRASEPSI YANG DIGUNAKAN

Ibu pernah menggunakan alat kontrasepsi KB suntik 3 bulan.

7. RIWAYAT POLA PEMENUHAN KEBUTUHAN SEHARI-HARI

- | | | |
|-----------------|--------------------------|------------------|
| a. Pola Nutrisi | Makan | Minum |
| Frekuensi : | 3-4 kali sehari | 6-8 gelas sehari |
| Macam: | Nasi, sayur, lauk, buah. | air mineral, jus |
| Jumlah: | 1 porsi sedang | 1 gelas |
| Keluhan: | Tidak ada | Tidak ada |
- b. Pola Eliminasi:
- | | |
|------------|---------------|
| BAB | BAK |
| Frekuensi: | 1 kali sehari |
| Warna: | Khas |
| Bau: | Khas |
| Konsisten: | Lunak |
| | Cair |
- c. Pola aktivitas
- Kegiatan sehari-hari: ibu bekerja sebagai ibu rumah tangga.
Istirahat/Tidur: tidur malam 7-8 jam.
- d. Personal Hygiene Kebiasaan mandi 2 kali/hari
- Kebiasaan membersihkan alat kelamin saat mandi, setelah BAB/BAK.
Kebiasaan mengganti pakaian dalam dua kali sehari (setelah mandi) Jenis pakaian dalam yang digunakan katun.
- e. Riwayat Psikologi Spiritual
1. Pengetahuan ibu tentang kehamilan Ibu mengatakan sudah tahu tanda bahaya ibu hamil, nutrisi ibu hamil, polaaktivitas sehari-hari ibu hamil dari buku KIA dan internet.
 2. Pengetahuan ibu tentang kondisi/keadaan yang dialami sekarang Ibu mengetahui bahwa saat ini ia harus rajin melakukan pemeriksaan kehamilan. Ibu mengatakan bahwa ia dan janin nya dalam kondisi sehat.
 3. Penerimaan ibu terhadap kehamilan saat ini Ibu mengatakan bahwa ibu dan keluarga menerima kehamilan ini.

4. Tanggapan keluarga terhadap kehamilan

Ibu mengatakan pada saat ini keluarga menyambut baik kehamilan ini.

5. Persiapan/rencana persalinan

Ibu mengatakan berencana bersalin di PMB Winarti.

Data Objektif

1. PEMERIKSAAN UMUM

a. KU: Baik, Kesadaran: Compos Mentis

b. Tanda vital

TD: 100/70 mmHg. N : 101 kali/menit.

R: 21 kali/menit. S: 36,1 °C

c. TB: 159 cm BB sekarang : 65 kg

d. Kepala dan leher

Oedem Wajah : tidak ada edema pada wajah

Mata : conjungtiva merah muda, sklera putih

Mulut : lembab, merah muda

Leher : tidak ada pembengkakan dan pembesaran kelenjartiroid dan limfe

e. Payudara

Bentuk : bulat, tidak teraba masa/benjolan

Areola mammae : hiperpigmentasi

Puting : menonjol, bersih

Colostrum : belum keluar

f. Abdomen

Bentuk : membesar, memanjang

Bekas luka : tidak ada bekas luka operasi

Striae gravidarum : tidak ada striae gravidarum

Palpasi Leopold

Leopold I : TFU 1 jari bawah px, pada fundus teraba bulat,tidak melenting (bokong)

- Leopold II : Pada bagian kanan teraba keras, memanjang (punggung), pada bagian kiri teraba bagian-bagian kecil janin (ekstremitas)
- Leopold III : teraba bulat, keras, dan melenting (kepala)
- Leopold IV : tangan pemeriksa divergen/sudah masuk panggul
- TFU McDonald : 32 cm
- TBJ : (30-11)x155 :3.255 gram
- DJJ : 136 kali/menit
- g. Genitalia : tampak keluar cairan bening dari jalan lahir
Pemeriksaan dalam : V/U tenang, dinding vagina licin, portio tebal lunak pembukaan 2 cm, presentasi kepala, hodge 1, selaput ketuban negative, UUK jam 12, moulage-, tidak ada bagian menumbung, , STLD +, AK positif mengalir warna jernih.
- h. Anus : tidak terdapat hemoroid.
- i. Ekstremitas
- Oedem : tidak terdapat oedem
- Varices : tidak ada varices
- Reflek Patela : kaki kanan positif, kaki kiri positif
- Kuku : putih bersih, jika ditekan kembali <1 detik

2. PEMERIKSAAN PENUNJANG

Pemeriksaan Laboratorium : Tidak dilakukan

Analisis

Diagnosa : Ny. D umur 30 tahun G₃P₁A₁Ah₁ Usia Kehamilan 39 minggu 6 hari dengan ketuban pecah dini

Masalah : Ketuban pecah , kenceng kenceng belum terasa

Masalah Potensial : Infeksi

Tindakan segera : motivasi pasien untuk segera ketempat pelayanan persalinan yang dituju.

Penatalaksanaan :

- a. Memberitahu Ny. D tentang hasil pemeriksaan bahwa saat ini usia kehamilan sudah 39+6 minggu, kepala janin sudah masuk panggul. Selain itu, memberitahu ibu bahwa ibu mengalami ketuban pecah dini, ketuban sudah pecah, sudah terdapat pembukaan 2 sehingga ibu harus segera menuju faskes yang akan dituju. Ibu sudah mengerti akan hasil pemeriksaan yang telah dilakukan dan ibu serta keluarga segera menuju klinik cipta husada/ bidan winarti untuk memeriksakan kondisinya dan Bersiap untuk bersalin.
- b. Memberikan motivasi kepada ibu untuk tidak perlu khawatir dengan keadaannya dan bayinya karena saat ini kondisi ibu dan bayi sehat dan akan segera mendapatkan penanganan. Ibu dan keluarga mengerti dan lebih lega.
- c. Mahasiswa mendampingi Ny. D menuju klinik cipta husada. Sesampainya diklinik mahasiswa menyampaikan kondisi pasien kepada bidan. Bidan melakukan pemeriksaan dan menyampaikan hasil pemeriksaan kepada pasien dan keluarga.
- d. Hasil pemeriksaan bidan kondisi ibu dan janin baik, akan tetapi karena kondisi ketuban ibu sudah pecah maka bidan winarti memutuskan untuk melakukan evaluasi pembukaan selama 8 jam. Apabila pembukaan masih sama maka pasien akan segera dirujuk ke RS untuk dilakukan Tindakan lebih lanjut oleh dokter Sp.OG. pasien dan keluarga mengerti.

ASUHAN INTRANATAL CARE (INC)

Nama Pengkaji : Emi Rahmawati
Tempat Pengkajian : Melalui WA
Waktu Pengkajian : 5 Januari 2023, pukul 17.00

Subjektif

Suami mengatakan saat ini Ny. D dirujuk ke RSUD Saptosari karena pada saat pemantauan 8 jam di bidan/ klinik cipta husada tidak ada kemajuan dalam proses persalinan. Saat ini sudah dilakukan pemeriksaan USG oleh dokter Sp.OG hasil janin dalam kondisi baik akan tetapi ketuban tinggal sedikit, kemudian dilakukan pemeriksaan dalam dan hasil masih sama pembuaan 2 cm. dokter Sp.OG menyarankan untuk dilakukan induksi dikarenakan pembukaan tidak bertambah, akan tetapi pasien menolak karena takut dan menginginkan untuk menunggu sampai pagi kemudian dokter memberikan izin tetapi apabila besok pagi tidak lahir maka akan dilakukan operasi SC.

Objektif

Analisis: Ny. D usia 30 tahun G3P1A1A1 uk 39+6 minggu dalam inpartu dengan KPD dan kala 1 memanjang

Penatalaksanaan via Handphone:

1. Memberitahu ibu bahwa ibu sudah dalam persalinan, dan sebaiknya ibu memperhatikan gerakan janin selama proses ini, serta ibu dianjurkan untuk aktif bertanya apabila ada keluhan. Ibu mengerti dan bersedia melakukannya.
2. Memberitahu ibu teknik relaksasi dengan menghirup napas dalam dan keluarkan. Ibu mengerti dan bersedia melakukannya.
3. Memotivasi ibu agar tidak khawatir meskipun harus dilakukan operasi SC dan harus tetap semangat karena bayinya akan segera lahir. Ibu mengerti dan termotivasi. Bayi lahir secara normal tanpa induksi pada tanggal 06 Januari 2023 jam 06.00 WIB. Bayi lahir langsung menangis. Setelah bayi lahir plasenta

kemudian lahir \pm 5 menit setelahnya dan dokter mengatakan plasenta sudah lengkap. Setelah itu, ibu mengatakan bayi langsung di IMD selama 1 jam dan setelah itu dilakukan rawat gabung dengan ibu. Kondisi ibu dan bayi dalam batas normal dan boleh pulang pada tanggal 7 Januari 2023 jam 09.00 WIB.

ASUHAN POSTNATAL CARE (PNC) II

Nama Pengkaji : Emi Rahmawati
Tempat Pengkajian : Rumah Pasien
Waktu Pengkajian : 8 Januari 2023, Pukul WIB

DATA SUBJEKTIF

1. KELUHAN: Ibu mengatakan puting sebelah kiri lecet
2. POLA AKTIVITAS POST PARTUM
 - a. Kebutuhan Makan dan Minum:

Frekuensi makan : Ibu makan 3-4 kali sehari. Ibu mengatakan sudah banyak makan. Jenis Makanan : Nasi, lauk, sayur, buah.
Frekuensi minum : 6-7 kali (1-2 gelas). Jenis Minuman Air putih.
Keluhan Tidak ada
 - b. Istirahat Post Partum

Lama tidur Ibu mengatakan tidur berkurang karena terkadang bayinya rewel dimalam hari tetapi masih bisa istirahat. Keluhan Tidak ada
 - c. Aktivitas postpartum

Aktivitas Ibu sudah bisa berjalan dan melakukan aktifitas rumah tangga sedikit demi sedikit, Ibu sudah menyusui kurang lebih 2-3 jam sekali.
 - d. Eliminasi postpartum

BAK Sudah BAK teratur, kurang lebih sehari 6-7 kali per hari BAB Sudah BAB 1 kali.
3. RIWAYAT PSIKOSOSIAL
 - a. Ibu mengatakan merasa bahagia atas kelahiran putrinya dan saat ini sangat menikmati proses menyusui bayinya
 - b. Ibu mengatakan suami dan keluarga sangat mendukung ibu dan membantu ibu mengurus bayi.

PENGAJIAN DATA OBJEKTIF

1. Pemeriksaan Umum

- a. Keadaan Umum: Baik, Kesadaran: Composmentis
- b. Tanda Vital
 - TD: 110/80 mmHg Pernapasan: 21 x/menit
 - Nadi: 86 x/menit Suhu : 36,9 °C

2. Pemeriksaan Fisik

- a. Rambut : bersih, hitam, tidak mudah rontok, tidak ada ketombe.
- b. Muka : Tidak pucat, tidak terdapat oedema.
- c. Mata : simetris, konjungtiva sedikit pucat, sklera putih, tidak ada pengeluaran sekret.
- d. Hidung : simetris, tidak terdapat polip.
- e. Telinga : simetris, tidak ada pengeluaran serumen
- f. Mulut : bersih, tidak ada stomatitis, ada caries gigi
- g. Leher : tidak ada pembesaran kelenjar tiroid dan kelenjar limfe.
- h. Dada : payudara membesar, tidak terdapat bendungan ASI, ada pengeluaran ASI, terdapat puting lecet sebelah kiri
- i. Abdomen : TFU pertengahan pusat-symphisis, kontraksi uterus keras.
- j. Genitalia : Pengeluaran darah dalam batas normal \pm 20 cc, lochea rubra, normal, tidak ada tanda infeksi.
- k. Ekstremitas Atas dan Bawah: normal, tidak oedema, kuku tidak pucat
Tidak ada oedema.

3. Pemeriksaan Penunjang: Tidak dilakukan pemeriksaan penunjang.

ANALISA (A)

Diagnosa: Ny. D umur 30 tahun P2A1Ah2 postpartum spontan hari ke 2 dengan payudara bengkak dan puting susu lecet

Masalah: Posisi dan perlekatan menyusui kurang tepat

Kebutuhan: KIE perawatan payudara bengkak dan puting lecet

Masalah potensial: Mastitis

Rencana tindakan segera: Memberi KIE pada ibu tentang perawatan puting lecet

PENATALAKSANAAN

1. Memberitahu ibu bahwa kondisi ibu mengalami puting susu lecet. Hal ini mungkin disebabkan karena posisi dan perlekatan menyusui ibu yang masih perlu diperbaiki. Menjelaskan pada ibu bahwa putting susu yang lecet jika tidak diatasi dengan baik dapat menyebabkan infeksi payudara. Sehingga tidak boleh dibiarkan begitu saja dan harus segera dilakukan perawatan. Ibu mengerti apa yang sudah dijelaskan.
2. Mengingatkan ibu tentang teknik menyusui dan posisi perlekatan bayi yang baik. Ibu mengerti dan bersedia melakukannya.
3. Menganjurkan ibu untuk mengoleskan ASI untuk dioleskan pada putting sebelum dan sesudah menyusui. Hal ini karena ASI mengandung antibodi yang dapat mempercepat penyembuhan luka. Ibu mengerti dan bersedia melakukannya.
4. Menganjurkan ibu untuk memberikan ASI Eksklusif kepada bayi selama 6 bulan dan rutin menyusui bayi maksimal setiap 2 jam sekali. Ibu mengerti dan bersedia.
5. Memberikan KIE
6. Menganjurkan ibu untuk segera periksa apabila terdapat demam dan lecet pada puting susu ibu semakin parah. Ibu mengerti dan bersedia melakukannya.

ASUHAN POSTNATAL CARE (PNC) II

Nama Pengkaji : Emi Rahmawati
Metode Pengkajian : WA
Waktu Pengkajian : 10 Maret 2023, Pukul 15.00 WIB

DATA SUBJEKTIF

1. **KELUHAN:** Ibu mengatakan saat ini sudah mendapatkan haid dan ibu mengatakan ingin segera ber KB, ibu sudah memutuskan untuk menggunakan KB suntik 3 bulan.
2. **POLA AKTIVITAS POST PARTUM**
 - a. **Kebutuhan Makan dan Minum**

Frekuensi makan Ibu makan 3-4 kali sehari. Ibu mengatakan sudah banyak makan. Jenis Makanan Nasi, lauk, sayur, buah.
Frekuensi minum 6-7 kali (2 gelas) Jenis Minuman Air putih
Keluhan Tidak ada.
 - b. **Istirahat Post Partum**

Lama tidur Ibu mengatakan tidur berkurang tetapi masih bisa istirahat. Keluhan Tidak ada
 - c. **Aktivitas post partum**

Aktivitas Ibu sudah bisa berjalan dan melakukan aktifitas rumah tangga seperti biasa. Ibu sudah menyusui kurang lebih 2-3 jam sekali.
 - d. **Eliminasi post partum**

BAK Sudah BAK teratur, kurang lebih sehari 5-6 kali
BAB Sudah BAB 1 kali per hari.
3. **RIWAYAT PSIKOSOSIAL**

Ibu mengatakan sudah merasa lebih baik dan merasa bahagia

PENGAJIAN DATA OBJEKTIF

1. Pemeriksaan Umum

- a. Keadaan Umum: Baik Kesadaran: Composmentis
- b. Tanda Vital
- TD: 110/85 mmHg, Pernapasan: 22 x/menit
- Nadi: 85 x/menit Suhu : 36,6 °C

2. Pemeriksaan Fisik

- Rambut : bersih, hitam, tidak mudah rontok, tidak ada ketombe.
- Muka : Tidak pucat, tidak terdapat oedema.
- Mata : simetris, konjungtiva merah muda, sklera putih, tidak ada pengeluaran sekret.
- Hidung : simetris, tidak terdapat polip.
- Telinga : simetris, tidak ada pengeluaran serumen
- Mulut : bersih, tidak ada stomatitis, ada caries gigi.
- Leher : tidak ada pembesaran kelenjar tiroid dan kelenjar limfe
- Dada : simetris, puting susu menonjol, areola mammae hiperpigmentasi, ASI sudah keluar puting susu tidak lecet.
- Abdome : simetris, tidak terdapat luka bekas operasi, kontraksi uterus keras, TFU tidak teraba.
- Genetalia : lochea alba, normal, tidak ada tanda infeksi.

3. Pemeriksaan Penunjang: Tidak dilakukan

ANALISA

Diagnosa: Ny. D umur 30 tahun P1A0Ah1 postpartum spontan hari ke 63 dengan nifas normal dan rencana KB suntik 3 bulan

Masalah: ingin segera ber KB karena sudah haid

Kebutuhan: KIE KB

Masalah potensial: tidak ada

PENATALAKSANAAN

- a. Memberitahu ibu bahwa kondisinya normal dan sehat. Ibu mengerti dan mengucapkan terima kasih.

- b. Menjelaskan pada ibu mengenai tujuan penggunaan alat kontrasepsi yaitu untuk mengatur jarak kelahiran sehingga ibu tidak terlalu dekat jarak antar kehamilannya yang dapat berisiko terhadap kesehatan ibu dan bayi. Setelah masa nifas berakhir yaitu 6 minggu kesuburan ibu dapat kembali. Sehingga sebelum ibu melakukan hubungan seksual dengan suami sebaiknya ibu berKB terlebih dahulu. Ibu mengerti dan mau berKB.
- c. Menjelaskan pada ibu macam-macam jenis alat kontrasepsi, efektivitas, keuntungan dan kerugian, serta efek samping dari berbagai jenis alat kontrasepsi. Kemudian menganjurkan ibu untuk berdiskusi dengan suami tentang penggunaan KB apa yang akan digunakan. Ibu mengerti yang dijelaskan dan bersedia berdiskusi dengan suami tentang alat kontrasepsi apa yang digunakan dan ibu memutuskan tetap ingin menggunakan KB suntik 3 bulanan.
- d. Mengatur jadwal untuk pertemuan dengan ibu di RSIA Allaudya untuk melakukan KB suntik terhadap ibu. Ibu menginginkan datang pada tanggal 17 februari 2023 pukul 15.00 wib

ASUHAN BAYI BARU LAHIR

Nama Pengkaji : Emi Rahmawati

Tempat pengkajian : Rumah Pasien

Waktu Pengkajian : 8 Januari 2023

Subjektif: Ibu mengatakan bayinya telah lahir tanggal 23 Maret 2021 jam 13.30 WIB. Dari buku KIA dapat dilihat bahwa bayi lahir langsung menangis, tonus otot baik, dan warna kulit kemerahan. Kemudian dilakukan perawatan bayi barulahir hingga tahap awal. Setelah itu bayi langsung di IMD selama satu jam. Dari buku KIA juga didapatkan bahwa bayi telah diberikan salep mata, injeksi vitamin K1, pemeriksaan antropometri, dan telah diimunisasi vaksin Hepatitis B. Pemeriksaan antropometri dengan hasil sebagai berikut:

BB: 3450 g

PB: 49 cm

LK: 33 cm

Kemudian ibu mengatakan bahwa setelah perawatan bayi selesai bayi dirawat gabung dengan ibu.

Objektif: KU Baik, Kesadaran CM.

Nadi: 135 kali/menit, Suhu : 36,6°C, Pernapasan : 48,kali/menit Bayi tampak bergerak aktif, kulit kemerahan, Mata normalsimetris dan tidak ada cekungan di mata, hidung dan mulut normak, dada bernapas dengan simetris dan tidak ada tarikan dinding dada kedalam, perut tampak normal tidak ada distensi dan tali pusat bersih mulai mengering, perut tidak tampak tanda infeksi, genitalia normal. Reflek moro, rooting, sucking, swallowing terlihat baik

Analisis: By. Ny. D usia 2 hari BBLC, CB, SMK dalam kondisi Normal
Penatalaksanaan:

1. Memberi selamat pada ibu bahwa bayinya telah lahir dan sehat.
Ibu berterima kasih
2. Memberi KIE pada ibu untuk selalu menjaga kehangatan bayi dengan mengenakan topi, sarung tangan dan kaki, dibedong atau diselimuti, dan mengganti pakaian basah sesegera mungkin. Ibu bersedia melakukannya

3. Memberi KIE pada ibu untuk menyusui secara on demand dan maksimal 2 jam sekali. Ibu bersedia melakukannya
4. Memberi KIE pada ibu perawatan bayi baru lahir. Ibu mengerti dan bersedia melakukannya

LAMPIRAN SURAT KETERANGAN

INFORMED CONSENT (SURAT PERSETUJUAN)

Yang bertanda tangan di bawah ini:

Nama : Desi Setyawati
Tempat/Tanggal Lahir : Cununghidul, 24 Desember 1992
Alamat : Semuran 01/03 Kemadang Tanjung Sari


Bersama ini menyatakan kesediaan sebagai subjek dalam praktik Continuity of Care (COC) pada mahasiswa Prodi Pendidikan Profesi Bidan T.A. 2020/2021. Saya telah menerima penjelasan sebagai berikut:

1. Setiap tindakan yang dipilih bertujuan untuk memberikan asuhan kebidanan dalam rangka meningkatkan dan mempertahankan kesehatan fisik, mental ibu dan bayi. Namun demikian, setiap tindakan mempunyai risiko, baik yang telah diduga maupun yang tidak diduga sebelumnya.
2. Pemberi asuhan telah menjelaskan bahwa ia akan berusaha sebaik mungkin untuk melakukan asuhan kebidanan dan menghindari kemungkinan terjadinya risiko agar diperoleh hasil yang optimal.
3. Semua penjelasan tersebut di atas sudah saya pahami dan dijelaskan dengan kalimat yang jelas, sehingga saya mengerti arti asuhan dan tindakan yang diberikan kepada saya. Dengan demikian terdapat kesepahaman antara pasien dan pemberi asuhan untuk mencegah timbulnya masalah hukum di kemudian hari.


Demikian surat persetujuan ini saya buat tanpa paksaan dari pihak manapun dan agar dipergunakan sebagaimana mestinya.

Yogyakarta,13 Desember 2022

Mahasiswa


Emi Rahmawati

Klien


Desi Setyawati

SURAT KETERANGAN

Yang bertanda tangan di bawah ini:

Nama Pembimbing Klinik : Meiliana, Amd. Keb.
Instansi : Puskesmas/PMB ...Tanjungsari

Dengan ini menerangkan bahwa:

Nama Mahasiswa : Eni Rahmawati
NIM : 09124522095
Prodi : Pendidikan Profesi Bidan
Jurusan : Kebidanan Poltekkes Kemenkes Yogyakarta

Telah selesai melakukan asuhan kebidanan berkesinambungan dalam rangka praktik kebidanan holistik Continuity of Care (COC)

Asuhan dilaksanakan pada tanggal 13/12²⁰²² sampai dengan 17/02²⁰²³
Judul asuhan: Asuhan Berkesinambungan COC pada Ny. D umur 30 Tahun
G1P1A1H1 U4 10 minggu di Puskesmas Tanjungsari

Demikian surat keterangan ini dibuat dengan sesungguhnya untuk dipergunakan sebagaimana mestinya.

Yogyakarta, 18-02-2023
Bidan (Pembimbing Klinik)

Meiliana, Amd. Keb.

FOTO-FOTO D OKUMENTASI PELAKSANAAN COC







Article

Maternal Dietary Intakes, Red Blood Cell Indices and Risk for Anemia in the First, Second and Third Trimesters of Pregnancy and at Predelivery

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Abstract: As anemia remains a major public health problem in Ghana, we examined the effect of dietary intakes, and antenatal care (ANC) practices on red cell indices and

1. Introduction

Globally, maternal anemia remains a public health problem and progress towards reduction is marginal as 38% of women still experience anemia during pregnancy, accounting for 20% of maternal mortality [1]. Africa and Asia account for over 85% of the absolute burden [2], but 43% of pregnant women in low- and middle-income countries are anemic [2]. Like most nutrients, iron needs increase during pregnancy to support increasing expansion in hemoglobin and red cell mass, basal iron losses, growth of fetal tissues and placenta and blood loss during delivery [3]. Anemia in pregnancy increases maternal vulnerability to suboptimum gestational weight gain, antepartum and puerperal infections

anemia prevalence during the pregnancy continuum for 415 women. Dietary history was taken using the Food and Agriculture Organization minimum dietary diversity indicator for women (MDD-W). Intake of ≥ 5 food groups was a proxy for micronutrient adequacy. Odds for anemia and meeting the MDD-W were estimated using ordinal and binary logistic regressions respectively. Intakes of 41.4% were micronutrient inadequate. At any time point in pregnancy, 54.4% were anemic (mild = 31.1%; moderate = 23.1%; severe = 0.2%) with 10%-point variation across the first (57.3%), second (56.4%) and third (53.3%) trimesters and pre-delivery (47.7%); 27.8% were anemic throughout pregnancy while 17.1% were never anemic. Morphologically, microcytic (79.4%) and hypochromic (29.3%) anemia were most prevalent, indicating nutritional deficiencies. Planning the pregnancy was a significant determinant for meeting the MDD-W. Overall, adolescence, poor diet, suboptimum ANC and underweight were associated with moderate and severe anemia. In specific time-points, dietary counselling, malaria, iron-folic acid supplementation, sickle cell disease and preeclampsia were observed. Decline of anemia during pregnancy suggests the positive impact of ANC services and supports strengthening education on dietary diversification during ANC.

Keywords: anemia in pregnancy; hemoglobin; iron deficiency anemia; dietary diversity; red blood cell; food intakes; dietary iron; micronutrients; malnutrition; Ghana

and postpartum hemorrhage while the newborn is likely to have shorter gestation, small-for-gestation, low birth weight and length and poor Apgar [4–6].

According to the Ghana demographic and health survey report, 70.0% pregnant women were anemic in 2008 (mild: 23.4%; moderate: 40.0% and severe: 6.6%) [7] and reduced to 44.6% in 2014 (mild: 20.1%; moderate: 24.0% and severe: 0.5%) [8]. The 25.4% reduction has been attributed to strengthening implementation of nutrition-specific interventions that address the immediate determinants of maternal malnutrition and fetal growth during antenatal care, particularly iron-folic acid supplementation, nutrition education, treatment of helminths, food fortification and supplementation [8,9]. In addition, attributed are nutrition-sensitive interventions that incorporate nutrition objectives with the aim to influence the underlying determinants of malnutrition such as malaria prevention, improved water, sanitation and hygiene, family planning services, agriculture and food security, women's empowerment, among others.

In developing countries, suboptimal dietary intakes during pregnancy remain the primary cause of nutritional anemia in pregnancy [10,11]. Habitual intakes that are imbalanced in macro- and micronutrients as result of being heavily cereal- and plant-based protein-sources with little vegetables and animal products are important contributors to nutritional anemia culminating in micronutrient deficiencies, especially folate and iron [10,11]. Lack of chicken and dark green leafy vegetables in the diet are associated with two- and five-folds odds for anemia [12]. In Ghana, food intakes during pregnancy are driven by food beliefs and practices, unfounded knowledge on the functions of foods and supplements, maternal health status, physiological changes during pregnancy and access to nutrition information [13].

Evidence suggests that intake of diversified diets is a reliable measure to assess the micro- and macronutrient adequacy of intakes of women of reproductive ages [14,15]. A simple population-level tool to assess diet quality is the Food and Agriculture Organization's (FAO) minimum dietary diversity indicator for women (MDD-W) of reproductive age (15–49 years) [16]. The MDD-W is estimated from ten food groups based on a dichotomous indicator and is summarized across eleven micronutrients that reflects diet quality as a proxy for higher micronutrient adequacy [14]. Although consumption of diversified diets of at least four food groups daily during pregnancy is significantly associated with higher hemoglobin (Hb) concentrations [11], achieving dietary diversity among disadvantaged populations is challenging. In northern Ghana, out of a mean dietary diversity score of nine, urban dwelling pregnant women (4.42 ± 0.10) had significantly higher scores compared to their counterparts in the rural dwellers (3.84 ± 0.14) [17].

In line with the second target of the 2012 World Health Assembly Resolution to reduce anemia by 50% in women of reproductive age [18], efforts have intensified in Ghana to improve maternal counselling during antenatal care (ANC), consumption of nutrient-rich diversified local foods as

well as strengthen implementation of nutrition-specific maternal and newborn health interventions. On this premise, we investigate the association of maternal dietary intakes and ANC practices on anemia prevalence in the first, second and third trimesters of pregnancy and at pre-delivery and the morphology of the red blood cells.

2. Materials and Methods

2.1. Design

In this prospective study, an association of maternal dietary intakes, anthropometric indices and antenatal care practices on Hb levels were assessed in four-time points; in the first, second and third trimesters of pregnancy and at the point of admission for labor and delivery. At the first ANC booking in the first trimester, information was taken on maternal socio-demographic status, medical and obstetric history, dietary intakes, anthropometry and Hb. Red blood cell (RBC) indices were repeated in the three subsequent time points.

2.2. Study Setting

Study participants were recruited from five public hospitals in four districts in the Volta Region, Ghana, representing healthcare delivery at the primary, secondary and tertiary levels. As ANC and delivery services are provided predominantly in secondary facilities in Ghana, one primary facility, three secondary facilities and the only teaching hospital in the region were included. All the study facilities provide both basic and comprehensive emergency obstetric care. The purposeful selection was to provide an overview of maternal health care services among urban, peri-urban and rural populations and ensure that socio-demographic characteristics of the study population are similar as in the region.

Rural inhabitants constitute 66.3% of the region's population. Females in the reproductive ages (15–49 years) represent 47% of the total 1,098,854 female population and the total fertility rate is 3.2 children per woman [19]. The region is unique for having all the ecological zones and ethnic groups in Ghana inhabiting as indigenes but has one of the poorest health indicators. The region has the highest burden of anemia (48.7%) in Ghana, above the national average (44.6%) [8]. Regarding anthropometric status, 7.2% and 9.3% of women in the region are underweight and obese, respectively. Only about a third take iron supplements for 90 days or more (38.9%) or deworming medications (32.2%) during pregnancy compared to the national average of 59.4% and 39.4% respectively [8].

2.3. Sample Size and Sampling

The sample size was determined based on a target population of over 500,000 women in their reproductive age in the study area. A 95% confidence level corresponding to 1.96 alpha, an error margin of 0.05 and a default population proportion of 50% to account for lack of information on the percentage of women who achieve adequate dietary diversity during pregnancy in Ghana were used yielding a minimum sample size of 384. Almost all pregnant women in Ghana receive ANC from skilled providers but 33.4% register after three months of gestation, 12.8% record fewer than four ANC visits throughout pregnancy while health facility delivery is 73.1% [8]. Therefore, we doubled the sample size to account for participants' drop-out. Participants were recruited consecutively, in that every pregnant woman who visited any of the five facilities during the study period whose pregnancy

was less than 13 weeks old and who intended to deliver in the study facility were enrolled. An initial 807 pregnant women were recruited of which 415 participants who had complete data on RBC indices in the first, second and third trimesters and at the point of admission for labor and delivery were reported in this paper. Seventy-four percent of the participants were proportionately recruited from three secondary facilities ($n = 598$) while about 13% were each recruited from one primary ($n = 108$) and one tertiary ($n = 101$) facility in proportion to size.

2.4. Data Collection

2.4.1. Dietary Intakes

Dietary patterns were derived a priori, using a food frequency questionnaire (FFQ) designed based on typically consumed foods in Ghana. We took information on intakes of fats and oils, snacks, confectionaries, fizzy drinks, fruit juices, alcohol, smoking, non-nutritive pica, supplements as well as food cravings, aversions and taboos. The dietary data was modified into a ten-food-group FFQ according to the FAO MDD-W: staple foods (grains, white roots, tubers and plantains); pulses (beans, peas and lentils); nuts and seeds; dairy; fleshy foods (meat, poultry and fish); eggs; dark green leafy vegetables; other vitamin A-rich fruits and vegetables; other vegetables; and other fruits [16]. The

FFQ had seven frequency of consumption categories ranging from at least once daily; 3–6 times per week; 1–2 times per week; 2–3 times per month; once monthly; rarely to never. The data was validated with a non-quantitative 24-h recall of foods eaten the day and night prior to the survey. Based on the FAO MDD for women of reproductive age [16], consumption of at least five out of the ten FAO-defined food groups the day prior to the survey was used as a proxy measure to assess the micronutrient adequacy of intakes of the pregnant women [14,15].

2.4.2. Maternal Anthropometry

At registration, maternal weight, height and mid-upper arm circumference (MUAC) were measured following standard WHO guidelines. Body mass index (BMI) was classified as underweight (<18.5); normal weight (18.5–24.9); overweight (25.0–29.9); and obese (≥ 30) [20]. Since no optimal MUAC cut-off is currently available for use during pregnancy, population-specific cut-off values based on the median was used. Values below the 10th percentile were presumed to be associated with a high risk of undernutrition, whereas values above the 90th percentile indicated obesity. At pre-delivery, weight change was determined based on weight measured at booking and at subsequent monthly ANC visits.

2.4.3. Red Blood Cell Indices

As a routine ANC practice in Ghana, Hb is measured at registration, 36 gestational weeks and at admission for delivery. The procedure usually involves the collection of venous blood which is analyzed on a hematology analyzer. Therefore, these routine surveillance data were extracted from the hand-held maternal health record. We did a full blood count between 20 to 28 gestational weeks. One milliliter of venous blood was withdrawn and analyzed on the Sysmex Europe GmbH XS-500i hematology analyzer (Bornbarch Germany), which is factory calibrated against the hemiglobincyanide method.

Red blood cell (RBC) indices measured included Hb, hematocrit (Hct), RBC count, mean corpuscular volume (MCV), mean corpuscular Hb (MCH), mean corpuscular Hb concentration (MCHC) and red cell distribution width (RDW). Diagnosis of iron deficiency anemia was based on the WHO criteria of Hb concentration <11.0 gram/deciliter (g/dL). Its severity was classified as mild (10.0–10.9 g/dL), moderate (7.0–9.9 g/dL) and severe (<7.0 g/dL) [21]. To determine other RBC abnormalities, second trimester reference ranges suggested by Abbassi-Ghanavati et al. was used: RBC count $2.81\text{--}4.49 \times 10^{12}/\text{L}$, Hct 30%–39%, MCV 85.8–99.4 fl, MCH 30–33 pg/cell, MCHC 32.4–35.2 g/dL and RDW: 12.3%–14.7% [22].

2.5. Statistical Analysis

Data were analyzed using descriptive statistics, including frequencies, interquartile ranges, means (\bar{x}) and standard deviations (SD) in Stata software (version 14.2). Background characteristics of participants were described according to micronutrient adequacy of

dietary intakes. Categorical variables were compared using Pearson’s chi-squared test (χ^2), whereas continuous variables were compared using t-test. Post hoc analysis was conducted for categorical variables with more than two response levels using the Bonferroni correction, whereas inter-subject variability resulting from the comparison at different time points was reduced using the McNemar’s test.

We checked for multicollinearity and singularity among exposure variables. Where the correlation was >0.7 , one of the variables was omitted from the multivariate model. Factors that predicted the likelihood of a pregnant woman meeting the MDD indicator were estimated in univariate and multivariate binary logistic regression models. Unadjusted odds for anemia was estimated through ordinal univariate logistic regression. Outcomes were classified as moderate, mild and non-anemic. Severe anemia was combined with moderate anemia due to small number of cases (0.2%). Incomplete cases were deleted listwise. Afterwards, we fitted a multivariate model to control for potential confounding variables. Selection of variables for the adjusted model was based on evidence of association with anemia from literature, clinical practice and correlation with the outcome variable ($\chi^2 < 0.10$). The model was built on the assumption that as the value of the latent variable increased, the observed outcome monotonically increased. p -values < 0.05 at 95% confident level (CI) were statistically significant.

2.6. Ethical Considerations

The study was approved by the Ghana Health Service Ethics Review Committee (GHS-ERC-GM 04/02/16) and the Institutional Review Board of the Heidelberg University Medical Faculty (S-042/2016). Teenagers were included as they were ethically considered as emancipated adults. All participants provided written informed consent, either by signing or thumb-printing the consent form as evidence of willingness to participate.

3. Results

3.1. Dietary Diversity

Diets of 58.6% ($n = 243$, 95% CI: 54.2–63.4) of the 415 participants contained at least five food groups thus meeting the MDD indicator, whereas diets of the remaining 41.4% ($n = 172$, 95% CI: 36.6–45.8) contained less than five food groups and were therefore classified as micronutrient inadequate. Out of ten food groups, mean MDD score was 5.08 food groups (standard deviation (SD = 1.82)). Mean MDD score for the micronutrient adequate and inadequate groups were 5.86 (SD = 1.63) and 3.99 (SD = 1.49) food groups, respectively ($p < 0.0001$).

3.2. Socio-Demographic, Health and Anthropometry Characteristic

Presented in Table ² is a description of the study participants according to the adequacy of micronutrient intakes. Higher proportion of women whose intakes were micronutrient poor received ANC care in primary facilities (9.1% vs. 24.4%, $p < 0.0001$),

| | | | |
|--------------------------|------|------|------------------------------|
| ² –2 children | 51.4 | 50.4 | 53.0 [≥] 3 children |
| | 19.4 | 21.9 | 15.2 |

did not plan the index pregnancy (32.2% vs. 43.8%, $p = 0.012$) and had more helminths (0.0% vs. 10.3%, $p = 0.021$) but fewer had hepatitis B infection (6.3% vs. 1.1%, $p = 0.047$).

Table 1. Socio-demographic, nutritional status and health characteristics of the study participants stratified according to the adequacy of micronutrient intakes.

| Variable | Sub-Groups | Overall % | | Micronutrient | | χ^2 |
|-----------------------|------------------------|------------|-----------|---------------|-----------|----------|
| | | Dense Diet | Poor Diet | Dense Diet | Poor Diet | |
| Maternal age | <20 years | 8.4 | 54.0 | 8.8 | 7.9 | 0.753 |
| | 20–29 years | 32.9 | 4.7 | 52.7 | 56.0 | |
| | 30–39 years | 32.9 | 4.7 | 33.3 | 32.1 | |
| | ≥ 40 years | 4.7 | 4.7 | 5.2 | 4.0 | |
| | | | | | | |
| Parity | No child | 29.2 | 27.7 | 31.8 | 0.070 | |
| Marital status | Married | 73.0 | 76.3 | 68.5 | 0.054 | |
| Place of residence | Rural | 32.8 | 30.8 | 35.7 | 0.335 | |
| Employment status | Employed | 77.7 | 79.3 | 74.0 | 0.145 | |
| Educational level | None/primary | 13.8 | 11.6 | 17.0 | 0.212 | |
| | Secondary | 70.9 | 74.0 | 66.7 | | |
| | Tertiary | 15.3 | 14.5 | 16.4 | | |
| Level of care | Primary ^a | 15.4 | 9.1 | 24.4 | <0.0001 | |
| | Secondary ^a | 69.4 | 78.6 | 56.4 | | |
| | Tertiary | 15.2 | 12.3 | 19.2 | | |
| Pregnancy intention | Unplanned | 37.1 | 32.2 | 43.8 | 0.012 | |
| HIV status | Positive | 2.1 | 2.2 | 1.9 | 0.553 | |
| Hepatitis B status | Positive | 4.2 | 6.3 | 1.1 | 0.047 | |
| VDRL status | Positive | 3.4 | 2.8 | 4.2 | 0.342 | |
| Malaria infection | Positive ^b | 10.3 | 7.2 | 14.5 | 0.081 | |
| Worm infestation | Positive | 4.0 | 0.0 | 10.3 | 0.021 | |
| Sickling status | Positive | 14.0 | 13.4 | 14.9 | 0.437 | |
| Table 1. Cont. | | | | | | |
| Blood group | A a B | 19.7 | 16.2 | 24.7 | 0.051 | |
| | AB O | 24.6 | 24.9 | 24.1 | | |
| | a | 4.8 | 3.5 | 6.6 | | |
| | | 50.9 | 55.5 | 44.6 | | |
| Rhesus status | Negative | 6.6 | 5.7 | 7.8 | 0.263 | |
| BMI ^c | Underweight | 9.6 | 9.7 | 9.5 | 0.786 | |
| | Overweight | 23.9 | 24.1 | 23.7 | | |
| | Obese | 9.4 | 6.2 | 3.2 | | |
| MUAC ^c | <24 cm | 8.2 | 6.4 | 10.8 | 0.130 | |
| Counselled on diet | Yes | 51.7 | 52.3 | 50.8 | 0.446 | |
| Counselled on IFA | Yes | 28.8 | 25.7 | 33.1 | 0.105 | |
| Takes daily IFA | Yes | 96.8 | 97.0 | 96.6 | 0.566 | |
| Food taboos | Yes | 17.7 | 16.1 | 20.4 | 0.169 | |

^a Bonferroni adjustment indicating the column proportions that differed significantly at <0.05 level. ^b Malaria was tested using rapid diagnostic test or blood microscopy. ^c BMI, body mass index was estimated only in the first trimester; whereas MUAC, mid-upper arm circumference was measured throughout pregnancy. IFA, iron-folic acid.

3.3. Habitual Dietary Patterns

Daily meals were mostly prepared from corn accompanied by fish and vegetables. Eggs and dairy products were combined with the fleshy foods group. Corn (70.6%) and rice (41.2%) were the most daily consumed staple. Fish (84.9%) and poultry (21.6%) were the most consumed fleshy food. Egg and milk were consumed by 20.5% and 17.6% participants daily. Groundnut was the most daily consumed (21.6%) nuts. Pulses were the least consumed group with black eye beans (11.0%) being the most consumed in that group. About one-fourth of the participants took dark green leafy vegetables daily. The main varieties were ‘kontomire’ (cocoyam/taro leaves), ‘gboma’ (African eggplant leaves) and ‘ayoyo’ (Corchorus leaves). Intake of other vitamin A-rich vegetables, particularly chilli pepper (83.4%) and tomatoes (74.2%) followed a similar pattern as for the staple foods because they are usual accompaniments. Banana and orange, which were the most consumed fruits, were eaten by about a third daily. While smoking and intake of alcohol were rare, daily consumption of sweetened foods

(35.7%) and beverages (21.1%) was relatively high. Overall, 17.7% adhered to some food taboos and 18.8% had some food aversions. Foods tabooed were mainly high iron bioavailable animal food sources (pork, mutton, mudfish, catfish, crab, snail, beef) and okro. Meals averted included beans, cassava flour, fermented corn products, eggs, fresh fish, oily nuts (particularly groundnuts and palm nuts) and alcohol. Although 24.0% had peculiar food cravings, apart from one pregnant woman who ate white clay, all the foods craved for were healthy.

3.4. Predictors for Meeting the Minimum Dietary Diversity Indicator

In the univariate analysis, informal sector employment (UOR: 1.93, 95% CI: 1.16–3.21, $p = 0.011$), receiving ANC in a secondary facility (UOR: 7.32, 95% CI: 4.10–13.09 $p < 0.0001$) and planning the index pregnancy (UOR: 1.77 95% CI: 1.19–2.61, $p = 0.004$) predicted eating according to the FAO MDD-W. In the multivariate analysis, ANC in a secondary facility (AOR: 5.12, 95% CI: 2.12–12.37, $p < 0.0001$) and having planned the index pregnancy (AOR: 2.31, 95% CI: 1.07–4.92, $p = 0.031$) remained the significant predictors for meeting the FAO MDD-W (Table 2).

Table 2. Binary logistic regression showing the determinants for meeting the minimum dietary diversity indicator.

| Variable (Reference) | Sub-Groups | Unadjusted | | Adjusted | | | |
|-------------------------|------------|------------|-----------|---------------------|------|---------------|---------------------|
| | | UOR | 95% CI | <i>p</i> - Value | AOR | 95% CI | <i>p</i> - Value |
| | 20–29 | 0.83 | 0.41–1.68 | 0.622 | 0.43 | 0.09– 2.04 | 0.293 |
| | 30–39 | 0.99 | 0.48–2.04 | 0.996 | 0.57 | 0.10– 3.11 | 0.518 |

| | | | | | | | |
|---------------|-----------------|------|-----------|--|-------|-----------|-------|
| | ≥40 | 2.12 | 0.64–6.96 | | 0.214 | 0.620.05– | 0.701 |
| | | | | | | 6.76 | |
| | 1–2 | 1.61 | 0.92–2.83 | | 0.098 | 1.930.50– | 0.821 |
| | children | 0.83 | 0.54–1.25 | | 0.382 | 1.952.36 | 0.192 |
| (≥3 children) | No | | | | | 0.71– | |
| | child | | | | | 5.33 | |
| | Married | 1.61 | 0.95–2.72 | | 0.076 | 2.460.94– | 0.065 |
| | Single | 1.5 | 0.73–3.07 | | 0.269 | 1.966.40 | 0.322 |
| | | | | | | 0.51– | |
| | | | | | | 7.47 | |
| (Cobabiting) | | | | | | | |
| | Informal sector | 1.93 | 1.16–3.21 | | 0.011 | 1.490.54– | 0.436 |
| | Formal sector | 1.31 | 0.67–2.56 | | 0.427 | 0.594.14 | 0.586 |
| | Student | 1.62 | 0.59–4.41 | | 0.344 | 0.550.09– | 0.532 |
| | | | | | | 3.82 | |
| | | | | | | 0.08– | |
| | | | | | | 3.48 | |
| (Unemployed) | | | | | | | |
| | Informal sector | 0.86 | 0.28–2.65 | | 0.803 | 0.240.03– | 0.136 |
| | Formal sector | 0.91 | 0.28–2.90 | | 0.884 | 0.541.55 | 0.569 |
| | Student | 0.39 | 0.08–1.93 | | 0.253 | 0.060.06– | 0.088 |
| | | | | | | 4.36 | |
| | | | | | | 0.00– | |
| | | | | | | 1.51 | |
| (Unemployed) | | | | | | | |
| | JHS | 1.23 | 0.70–2.17 | | 0.465 | 1.070.40– | 0.877 |
| | | | | | | 2.84 | |
| | SHS | 1.08 | 0.56–2.07 | | 0.804 | 2.130.64– | 0.212 |
| | | | | | | 7.00 | |

Tertiary 1.02 0.944 3.74

0.49–28.60 0.203

4.10–13.09 0.000 5.12 2.12–12.37 0.000

0.73–15.77 0.116 1.20 0.11–13.12 0.880

| | | | | | | | | |
|-----------|-------------------|------|----------------|--|-------|------|-----------|-------|
| | JHS | 1.80 | 0.84–3.85 | | 0.125 | 1.26 | 0.37–4.21 | 0.707 |
| | SHS | 1.85 | 0.86–4.01 | | 0.114 | 2.13 | 0.60–7.53 | 0.238 |
| | Tertiary | 1.52 | 0.70–3.28 | | 0.286 | 0.69 | 0.13–3.55 | 0.663 |
| | Secondary | 7.32 | | | | | 0.20– | |
| (Primary) | Tertiary | 0.72 | 0.30–1.68 | | 0.448 | 0.80 | 0.30–3.09 | 0.747 |
| | Underweight | 1.65 | 0.80–3.37 | | 0.171 | 2.76 | 0.77–9.83 | 0.097 |
| | Overweight | 0.76 | 0.48–1.21 | | 0.259 | 0.71 | 0.32–1.56 | 0.415 |
| | Obese | 0.97 | 0.49–1.89 | | 0.930 | 0.72 | 0.22–2.31 | 0.585 |
| | Diet counselling | Yes | 1.42 0.89–2.28 | | 0.137 | 1.63 | 0.85–3.11 | 0.136 |
| | IFA counselling | Yes | 0.71 0.42–1.18 | | 0.194 | 1.00 | 0.47–2.11 | 0.990 |
| | Pregnancy planned | Yes | 1.77 1.19–2.61 | | 0.004 | 2.31 | 1.07–4.92 | 0.031 |
| | Food taboos | Yes | 1.31 0.80–2.14 | | 0.267 | 1.09 | 0.49–2.44 | 0.821 |

| | | | | | |
|----------|--------------|------|-----------|-------|---------------|
| Sickling | Positive | 3.41 | | | |
| | Hypertension | 0.97 | 0.57–1.65 | 0.915 | 0.410.16–1.08 |
| | Diabetes | 0.58 | 0.21–1.54 | 0.278 | 0.320.04–2.53 |
| | Both | 1.44 | 0.49–4.24 | 0.506 | 0.950.19–4.57 |

Model summary: $n = 364$, $\text{Prob} > \chi^2 = 0.0000$; $R^2 = 0.2323$, $\text{Log likelihood} = -131.54212$. UOR, unadjusted odds ratio; AOR, unadjusted odds ratio; JHS, junior secondary school (ninth grade); SHS, senior secondary school (12th grade); IFA, iron-folic acid; NCDs, non-communicable diseases.

3.5. Anemia Levels by Hemoglobin, Red Blood Cell Morphology and Mean Red Blood Cell Indices

Higher mean Hb concentrations were seen in the third trimester (10.79 ± 1.43 g/dL) and at pre-delivery (10.91 ± 1.26 g/dL) while Hb concentrations in the first (10.65 ± 1.51 g/dL) and second (10.70 ± 1.42 g/dL) trimesters were lower. Overall, the mean Hb for the four-time points was 10.80 ± 1.20 g/dl. Mean change in Hb from the first trimester to pre-delivery was 0.268 g/dL. Between the micronutrient inadequate and adequate groups, except for MCHC (33.35 ± 2.82 vs. 33.69 ± 2.28 g/dL) and RDW (40.82 ± 7.373 vs. $40.35 \pm 8.12\%$) where no differences were found, all other RBC indices including Hct ($30.74\% \pm 3.42\%$ vs. $33.80\% \pm 3.41\%$), RBC (3.96 ± 0.49 vs. $4.18 \pm 0.46 \times 10^{12}/L$), MCV (77.87 ± 8.38 vs 81.20 ± 7.89 fl) and MCH (26.07 ± 3.19 vs 27.34 ± 2.30 g/dL) were significant below the 1%-level. Interquartile ranges and mean RBC indices for the micronutrient adequate and inadequate groups is presented in Figure 1. Overall, anemia prevalence was 54.4% (mild = 31.1%; moderate = 23.1%; severe = 0.2%). Except at the point of delivery where anemia was relatively lower (47.7%), anemia at first (57.3%), second (56.4%) and third (53.3%) trimesters were all above 50% (Figure 2).

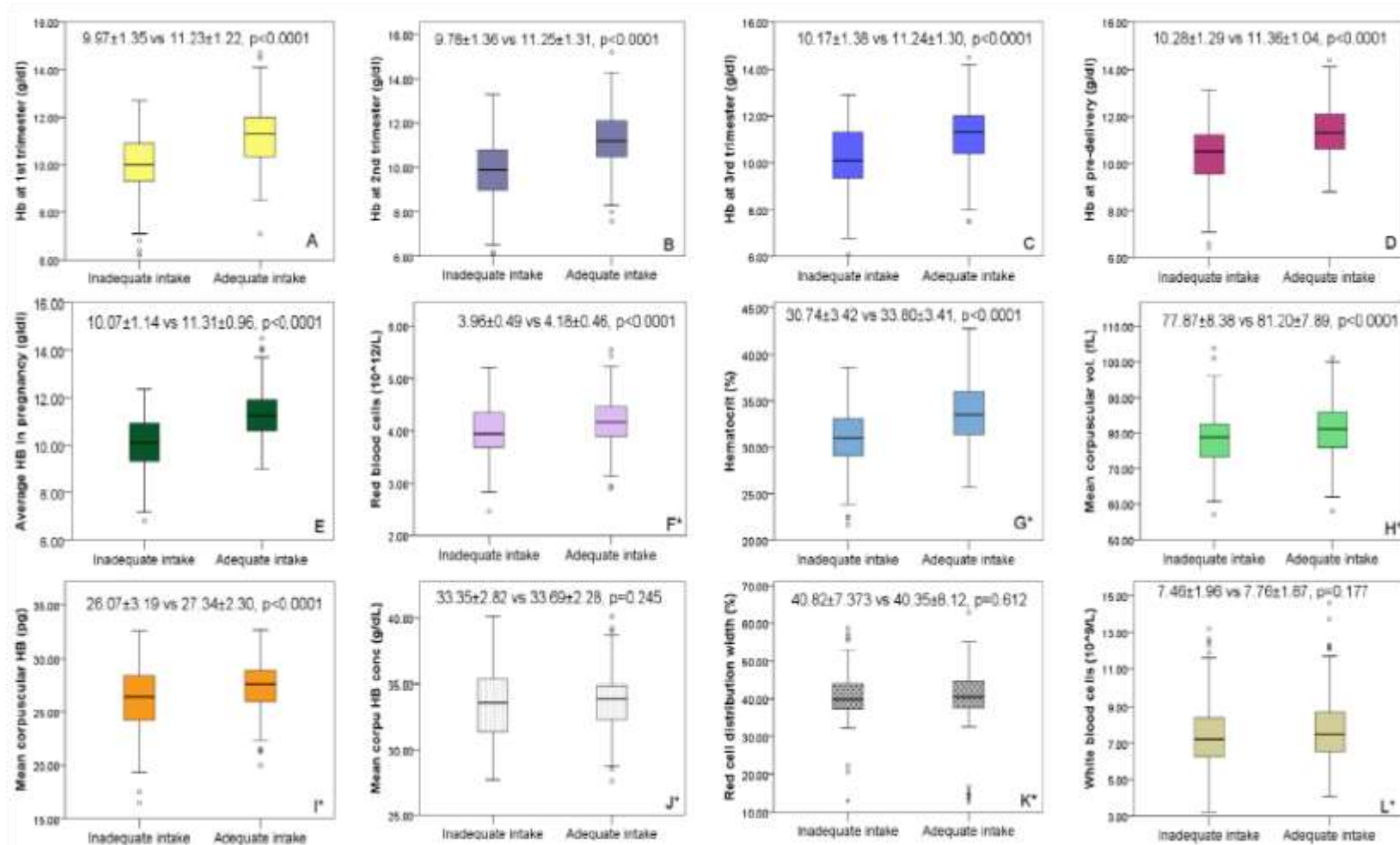


Figure 1. Inter-quartile and mean values for hemoglobin and other red blood cell indices classified according to the adequacy of micronutrient intake. *RBC indices were measured only in the second trimester. Footnote: Hemoglobin in the (A) first, (B) second, (C) third trimesters of pregnancy and (D) at the point of admission for labor and delivery, (E) mean

hemoglobin during pregnancy, (F) red blood cells (G) hematocrit, (H) mean corpuscular volume, (I) mean corpuscular hemoglobin, (J) mean corpuscular hemoglobin concentration, (K) red cell distribution width and (L) white blood cells.

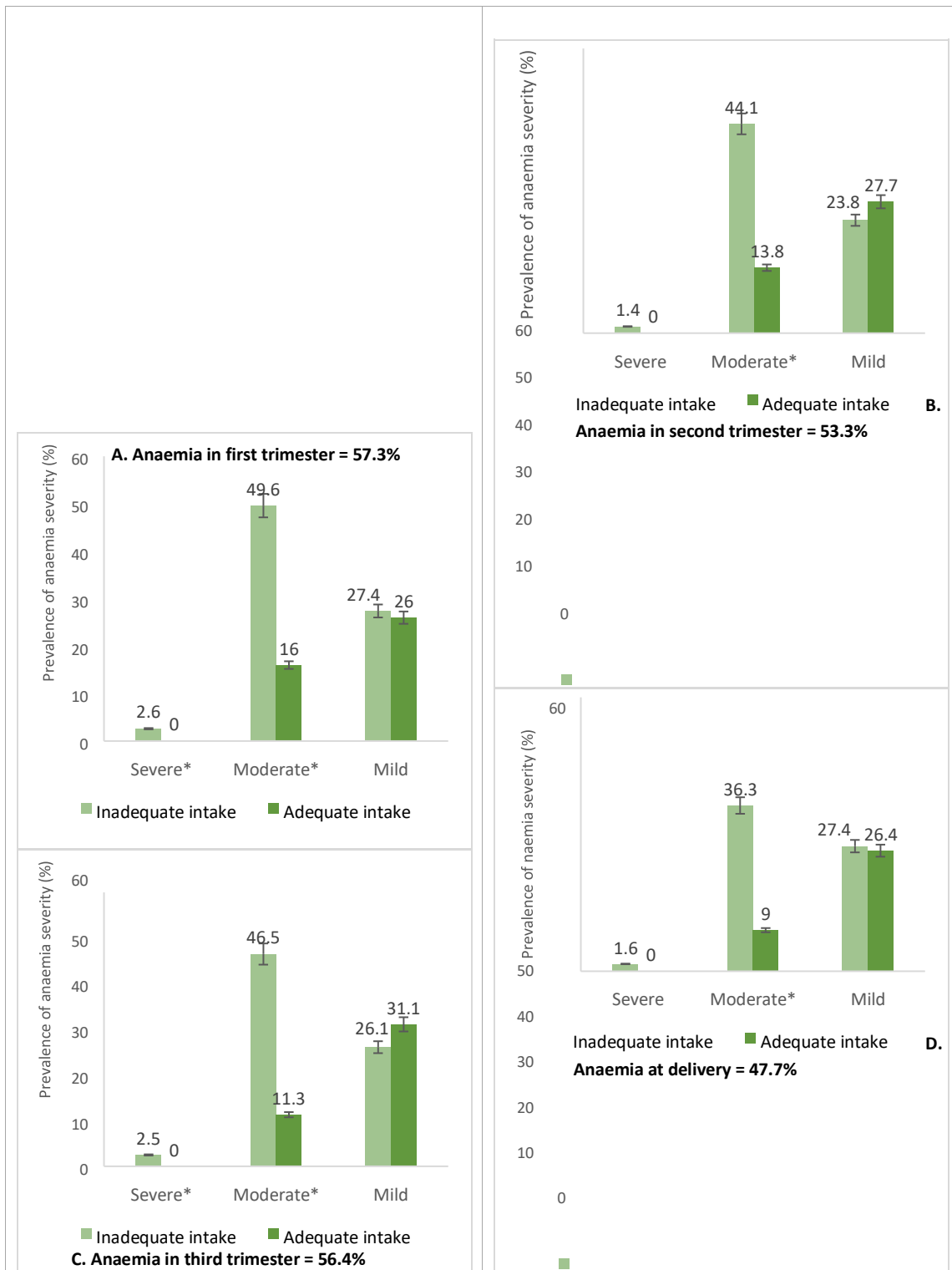


Figure 2. Prevalence and severity of anemia in the(A) first, (B) second and (C) third trimesters of pregnancy and (D) at the point of admission for delivery stratified according to the adequacy of micronutrient intake.

Footnote: *Multiple comparison shows the categories that differed significantly ($p < 0.05$). Anemia classified as mild (10.0–10.9 g/dL), moderate (7.0–9.9 g/dL) and severe (<7.0 g/dL) (WHO, 2011).

At all the time points, anemia was significantly higher ($p < 0.0001$) in women whose intake was micronutrient inadequate. Only 17.1% were non-anemic at all the time points assessed, whereas 27.8% were anemic throughout pregnancy. Prevalence was significantly higher among primary (60.9%) and secondary (58.7%) facility users compared to tertiary (27.0%) facility users. Similar trends were observed in the first (primary: 64.0%; secondary: 59.7%; tertiary: 34.3%; $p = 0.011$), second (primary: 61.5%; secondary: 60.8%; tertiary: 28.8%; $p < 0.0001$) and third trimesters (primary: 48.8%; secondary: 58.1%; tertiary: 32.7%; $p = 0.004$) but not at pre-delivery (primary: 47.2%; secondary: 50.0%; tertiary: 36.6%; $p = 0.121$). Between the micronutrient inadequate and adequate groups, the proportion with mild anemia was statistically similar, but women whose intake were micronutrient inadequate experienced more moderate and severe forms of anemia. The RBC morphology showed hypochromic and microcytic and hyperchromic anemia indicating nutritional anemia mainly from iron, folic acid and vitamin B₁₂ deficiencies (Table 3).

Table 3. Distribution of anemia by red blood cell morphology stratified according to adequacy of micronutrient intakes.

| RBC Index | Reference Range ^a | Interpretation of RBC Morphology | Overall $\bar{x} \pm SD$ | Overall % | Micronutrient Dense | Micronutrient Poor | p-Value |
|------------------------|------------------------------|----------------------------------|--------------------------|-----------|---------------------|--------------------|---------|
| Hb (g/dL) ^b | <7.0 | Severe | 10.80 ± 1.20 | 0.2 | 0 | 0.6 | <0.0001 |
| | 7.0–9.9 | Moderate ^c | | 23.1 | 6.2 | 47.1 | |
| | 10.0–10.9 | Mild | | 31.1 | 32.5 | 29.1 | |
| | ≥11.0 | Non-anemic ^c | | 45.5 | 61.3 | 23.3 | |
| Hct (%) | <30 | Low ^c | 33.72 ± 18.20 | 22.3 | 15.7 | 39.3 | <0.0001 |
| | 30–39 | Normal ^c | | 74.7 | 80.6 | 59.5 | |
| | >39 | High | | 3.0 | 3.7 | 1.2 | |
| RBC count /L) | <2.81 | Low | 6.75 ± 29.88 | 0.3 | 0.5 | 0 | 0.788 |
| MCV (fl) | <85.8 | Microcytic ^c | 83.45 ± 46.46 | 79.4 | 73.6 | 94.1 | 0.007 |
| | 85.8–99.4 | Normal ^c | | 18.9 | 24.1 | 5.9 | |
| | >99.4 | Macrocytic | | 1.7 | 2.3 | 0 | |
| MCH /cell) | <33 | Low | | 88.4 | 86.6 | 92.9 | |
| MCHC (g/dL) | <32.4 | Hypochromic ^c | 33.90 ± 13.26 | 29.3 | 24.9 | 35.8 | 0.021 |
| | 32.4–35.2 | Normal ^c | | 47.7 | 54.2 | 38.2 | |
| | >35.2 | Hyperchromic | | 23.0 | 20.9 | 26.0 | |
| RDW (%) | <12.3 | Low | 41.75 ± 19.71 | 0 | 0 | 0 | 0.365 |
| | 12.3–14.7 | Normal | | 2.3 | 2.8 | 1.2 | |
| | >14.7 | High | | 97.7 | 97.2 | 98.8 | |
| (pg | 30–33 | Normal | 27.76 ± 15.34 | 11.6 | 13.4 | 7.1 | 0.089 |

(×10¹² 2.81–4.49 Normal 81.1 80.6 82.4 >4.49 Polycythemia 18.6 19.0 17.6

^a Morphologic types determined using references suggested by Abbassi-Ghanavati [22]. ^b Anemia determined using WHO classification [21]. ^c Adjusted Bonferroni statistics shows column proportions differ significantly at <0.05. x, mean; SD, standard deviation; Hb, hemoglobin; Hct, hematocrit; RBC, red blood cell; MCV, mean corpuscular volume; MCH, mean corpuscular hemoglobin; MCHC, mean corpuscular hemoglobin concentration; RDW, red cell distribution width.

3.6. Risk Factors for Anemia in Pregnancy

In the univariate analysis, higher odds for anemia were associated with maternal age below 19 years (UOR:3.69 95% CI: 1.83–7.41), being a single mother (UOR: 1.76 95% CI: 1.17–2.67), not planning the pregnancy (UOR:1.50 95% CI: 1.03–2.19), receiving ANC in lower-level facilities (UOR:3.71 95% CI: 2.05–6.73), little formal education of both the women (UOR:2.07 95% CI: 1.07–4.02) and her partner (UOR: 2.40 95% CI: 1.14–5.06), poor dietary intake (UOR: 3.30 95% 2.18–4.99), malaria infection (UOR:

3.61 95% CI: 1.58–8.25) and belonging to the AB blood group (UOR: 3.48 95% CI: 1.41–8.59) (Table S1). In addition, the fewer the ANC contacts (UOR: 0.86 95% 0.78–0.94) and the lower the BMI (UOR: 0.37 95% CI: 0.18–0.74), the higher the risk.

In the multivariate analysis (Table 4), overall, higher odds for anemia was associated with poor dietary intake (AOR: 2.73 95% CI: 1.35–5.50), whereas women who were housewives had a lower risk (AOR: 0.31 95% CI: 0.12–0.80). In addition, the lower the maternal age (AOR: 0.90 95% CI: 0.84–0.96), the fewer the ANC contacts (AOR: 0.85 95% CI: 0.75–0.96) and the lower the BMI (AOR: 0.87 95% CI: 0.82–0.94), the higher the risk. The associations were observed for moderate and severe anemia but not mild anemia. Specific risk factors for each time point are shown in Table 4.

Table 4. Ordinal regression showing the adjusted odds for anemia in the first, second and third trimesters of pregnancy and at admission for labor and delivery.

| Maternal Risk Factors (Reference in Square Brackets) | Adjusted Odds Ratio (95% Confidence Interval) for Anemia | | | | |
|---|---|---|---|---|--|
| | Overall | 1st Trimester | 2nd Trimester | 3rd Trimester | Pre-Delivery ^c |
| Maternal age ^a | 0.90 (0.84–0.96) * | 0.92 (0.86–0.98) * | 0.99 (0.95–1.05) | 0.94 (0.89–0.99) * | 1.01 (0.94–1.09) |
| BMI/MUAC ^{a,b} | 0.87 (0.82–0.94) * | 0.91 (0.85–0.98) * | 0.97 (0.86–1.09) | 0.99 (0.97–1.02) | 0.96 (0.84–1.10) |
| Housewife (self/formal job) | 0.31 (0.12–0.80) * | 0.67 (0.27–1.69) | 0.57 (0.16–2.05) | 0.64 (0.24–1.72) | 0.61 (0.23–1.64) |
| Primary education (tertiary) | 1.45 (0.44–4.86) | 2.31 (0.65–8.19) | 0.08 (0.01–0.76) * | 1.40 (0.36–5.47) | 0.08 (0.01–1.25) |
| Secondary education (tertiary) | 1.00 (0.38–2.63) | 1.13 (0.40–3.18) | 0.03 (0.00–0.28) * | 0.76 (0.27–2.09) | 0.21 (0.02–2.64) |
| Poor diet intake (adequate diet) | 2.73 (1.35–5.50) * | 2.53 (1.28–4.99) * | 2.99 (1.12–8.02) * | 4.18 (1.97–8.87) * | 1.63 (0.65–4.08) * |
| No dietary advice (counselled) | 1.14 (0.63–2.09) | 2.07 (1.07–3.98) * | 1.98 (0.78–4.99) | 1.48 (0.77–2.81) | 3.52 (1.11–11.15) * |
| No IFA advice (counselled) | 1.23 (0.63–2.39) | 0.84 (0.42–1.67) | 1.74 (0.24–12.77) | 2.40 (1.13–5.09) * | 1.27 (0.44–3.67) |
| Non-routine IFA use (daily IFA) | 1.08 (0.10–11.54) | 2.08 (0.42–10.17) | 2.24 (0.25–19.89) | 7.05 (1.06–46.81) * | 3.42 (0.31–37.37) |
| Positive sickle cell (negative) | 1.30 (0.53–3.19) | 1.26 (0.53–3.03) | 1.14 (0.39–3.37) | 2.55 (1.07–6.08) * | 1.33 (0.44–4.06) |
| Positive malaria (negative) | 1.64 (0.52–5.17) | 5.32 (1.35–20.90) * | 3.42 (1.11–10.54) * | 3.06 (0.84–11.18) | 2.05 (0.47–8.97) |
| No. antenatal care visits ^a | 0.85 (0.75–0.96) * | - | 0.77 (0.63–0.95) * | 0.80 (0.76–0.96) * | 0.76 (0.62–0.94) * |
| No. of IPT in pregnancy ^a | 1.06 (0.74–1.50) | - | 1.02 (0.64–1.60) | 0.95 (0.65–1.39) | 1.01 (0.67–1.52) |
| Preeclampsia (No) | 0.94 (0.45–1.93) | - | 0.86 (0.31–2.40) | 2.71 (1.23–5.99) * | 3.38 (1.17–9.76) * |
| Gestational diabetes (negative) | 0.93 (0.41–2.10) | - | 0.76 (0.32–1.79) | 1.03 (0.32–3.38) | 2.13 (0.54–8.35) |
| Model summary | $n = 250$; Prob > $\chi^2 =$ 0.0000; $R^2 = 0.2205$; Log likelihood = -122.113 | $n = 291$; Prob > $\chi^2 =$ 0.0000; $R^2 = 0.2112$; Log likelihood = -161.213 | $n = 244$; Prob > $\chi^2 =$ 0.0000; $R^2 = 0.1963$; Log likelihood = -112.009 | $n = 248$; Prob > $\chi^2 =$ 0.0000; $R^2 = 0.1898$; Log likelihood = -129.755 | $n = 245$; Prob > $\chi^2 =$ 0.0022; $R^2 = 0.1858$; Log likelihood = -90.505 |

* $p < 0.05$; ^a These are continuous variables; ^b BMI was used for the overall and first trimester models while MUAC was used in later trimesters. ^c This is at the point of admission for labor and delivery. BMI, body mass index; MUAC, mid-upper arm circumference; IFA, iron-folic acid; IPT, intermittent preventive treatment for malaria in pregnancy.

4. Discussion

Maternal anemia was a severe public health problem in the study setting as Hb of half of the participants was below 11.0 g/dL at any one time-point during pregnancy, whereas only 17% were never anemic throughout the pregnancy continuum. Globally, anemia affects over 50% of pregnant women in developing countries [23]. Adequate diet supported by iron-folic acid supplementation (IFA) is shown to reduce anemia [11], fetal growth restriction, preterm and neonatal mortality [17,24]. Planning towards the pregnancy significantly reduced the likelihood for inadequate micronutrient intakes. Studies show that women who prepare towards pregnancy become more health-conscious, and thus have better birth outcomes [25] since they are more likely to take iron-folic acid supplements before pregnancy, achieve optimal ANC attendance and adhere to health and nutrition advice given.

Morphologically, microcytic and hypochromic anemia was prevalent, being significantly higher among participants whose dietary intakes was poor, an indication of micronutrient deficiencies. A major cause is iron deficiency plus vitamin B₆, folate and B₁₂ deficiencies. However, hypochromic anemia may also be caused by hookworms which we found to be 4%. Low levels of vitamin B₁₂, for instance, can lead to pernicious anemia which is common among vegetarians. No participant was a vegetarian. In fact, 85% consumed fish the day before the survey, whereas about 20% consumed poultry, eggs and milk, which are rich sources of vitamin B₁₂ and folate. Sparingly consumed were iron-rich food sources, particularly legumes (<10%) and dark green leafy vegetables (≈25%). Despite reported intakes, the actual quantity consumed might be sub-optimum, reflecting in the high nutritional anemia.

Although physiological adjustment during pregnancy results in 2–3 folds increase in intestinal iron absorption [21], poor dietary diversity increases risk by 3–4 folds in all the trimesters [26]. During pregnancy, Hb concentrations change in healthy, iron-sufficient women to accommodate the increasing maternal blood volume and fetal metabolism [21], causing expansion of red cell mass and depletion of iron stores [2,27]. Typically, Hb and Hct concentrations decline in the first trimester, reaching the lowest point in the second trimester, and begin to rise again in the third trimester [21]. We noted a steady decline in anemia prevalence throughout pregnancy continuum vis-a-vis an increase reported in China (11.2%, 20.1% and 26.2% in the first, second and third trimesters respectively) [28]. A global meta-analysis in 2016 reported a 70% prevalence in Ghana [2] compared to the 54% overall prevalence we found. Effects of malaria and deworming strategies, IFA supplementation, nutrition education, referral of severely anemic women to higher facilities, blood transfusion, and provision of higher iron doses via faster intramuscular and intravenous routes could account for the downward trend.

Generally, risk for anemia was reduced significantly among women who consumed diversified diets, were older than 20 years, had lower parity, were housewives and had optimal ANC contacts. Elsewhere, lower risk for anemia were associated with higher formal education [28], large family size [29], gainful employment and high income

[26,30]. Food intakes in Ghana are increasingly becoming monotonous and energy-dense and less diversified in fruits, vegetables and animal sources across the lifespan with infants [31], school-age children [32] and the elderly [33] being affected. Interestingly, 20% of the participants averted iron-rich foods; only 25% consumed dark green leaves daily, whereas pulses were the least eaten. Maternal nutrition is affected by food beliefs, socio-cultural practices and falsehood on the functions of foods and supplements [13], thereby retarding nutritional interventions. Adolescent girls are known to have a higher risk for anemia due to monthly blood loss, which could become severe during pregnancy owing to increased iron needs for the growth of both mother and developing fetus [2]. Intensifying family planning services to reduce unplanned pregnancies among adolescents and older women who risk being anemic due to high parity and closed birth spacing is crucial. Reduced risk among unemployed women, possibly signifies investments into food preparation at home compared with their employed counterparts who might buy unhealthy food

while busy at work.

Regarding specific trimesters, nutrition counselling, for instance, reduced anemia in the first trimester and at delivery. Content-specific education targeted at increasing intake of iron, folic acid, vitamins A, B₁₂ and C is key [11]. Counselling on hematopoietic nutrients including iron absorption enhancers (vitamin C-rich foods), inhibitors (foods high in inositol, phytates, iron-binding phenolic compounds like tannins), and practices like avoiding tea, coffee and dairy products during meals is needed. Education should also include food processing methods like soaking, fermentation, germination or thermal preparation which improves bioavailability and absorption of iron [34]. Concerning anthropometric indices, women with lower BMI had increased odds for anemia [28]. Like other studies [26,28], non-adherence to counselling on IFA increased odds for anemia at 36 weeks. Maternal undernutrition affects nutrient–nutrient interactions, immune function and metabolism and is associated with preterm delivery, small-for-gestational-age and perinatal death [4,5,35]. In addition, malaria significantly increased risk for anemia in the first and second trimesters, implying that the chemoprophylaxis for the intermittent prevention of malaria administered after 16 gestational weeks is effective at reducing anemia in the later trimesters. In the wake of the obstetric transition, we observed that non-traditional causes such as pregnancy-induced hypertension has become a significant risk factor [28,35] and could be attributed to anemia of chronic disease [34], oxidative stress or placental hypoxia [28].

Limitations and Strengths

In interpreting these findings, we acknowledge some potential limitations. Per routine ANC practice in Ghana, Hb is measured at booking, 36 weeks and pre-delivery. Except in the second trimester where RBC indices were measured following standardized procedures, we were ethically restricted from collecting the same information at the other time points. Due to increased red cell turnover and hemodilution, which makes determining iron deficiency anemia less reliable, more sensitive methods such as serum iron, total iron-binding capacity and transferrin could have been measured, but we did

not have the capacity to measure these parameters. Considering the complexity of assessing dietary intakes, we admit that diagnosing specific anemias caused by nutrient deficiencies is not as simple as presented in this paper. Most women were unaware of their pre-pregnancy body

weight; hence the use of first-trimester weight to assess BMI. Dietary data were collected only once; at first ANC booking. Dietary practices could change as pregnancy advanced. Taking quantitative dietary data would have provided insight into the nutrient content of intakes. Establishing a causal relationship requires more methodologically robust designs like randomization, which is difficult in nutritional studies.

Despite these limitations, this study adds evidence on anemia at the various trimesters of pregnancy and particularly at the point of delivery which is a novel contribution. Assessing anthropometry by BMI, MUAC, weight gain and change in weight provided alternatives for monitoring nutritional status as the pregnancy progressed. Anemia is likely to be underestimated in persons residing at high altitudes and among smokers [21], but the effect was nullified in that the study was conducted in a similar geographical location and in a population where smoking was highly uncommon (<1% smoked per week). Study participants were recruited from primary, secondary and referral facilities providing an overview of the burden in urban, peri-urban and rural populations. Unlike most studies where retrospective data are used, we collected data prospectively allowing us to explore the role of

diverse factors.

5. Conclusions

Fifty percent of the participants were anemic, making it a severe public health problem in Ghana with the levels no better than that reported in the 2014 demographic and health survey. Diets were energy-dense and monotonous, resulting in over one-third not meeting the FAO minimum dietary diversity indicator; a main significant risk factor for anemia in all the pregnancy trimesters. Therefore, microcytic and hypochromic anemias which point to micronutrient deficiencies were highly prevalent. Reducing anemia by 50% in women of reproductive age as per the second target of the 2012 World

Health Assembly Resolution [18] will take concerted effort to achieve starting with promoting dietary diversification, food fortification, nutrition education and iron-folic acid supplementation not just for pregnant women but for all vulnerable groups.

Supplementary Materials: The following are available online at <http://www.mdpi.com/2072-6643/12/3/777/s1>, Table S1: Ordinal regression showing associations between maternal risk factors and the unadjusted odds for anemia in the first, second and third trimesters of pregnancy and at the point of admission for labor and delivery.

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Validation, F.A., A.A. and A.J.; Formal Analysis, F.A. and A.A.; Investigation, F.A., J.D. and A.A.; Resources, F.A., J.D. and A.J.; Data Curation, F.A., A.A., J.D. and A.J.; Writing—Original Draft Preparation, F.A.; Writing—Review

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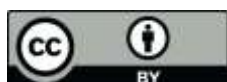
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GUEST EDITORIAL



Sleep disturbances in pregnancy: Why and how should we manage them?

Maternal sleep quality worsens during pregnancy, already from the first trimester on and especially in the third trimester.^{1,2} Nevertheless, the sleep quality is often ignored by both physicians as well as by women themselves as sleep quality is generally assumed to improve after delivery. However, sleep disturbances may continue during postpartum period or even become chronic. The most important sleep disturbances during pregnancy are primary insomnia, sleep disordered breathing (SDB) and restless legs syndrome (RLS).^{2,3} Sleep disturbances typically cause sleep fragmentation and deterioration of sleep architecture leading to sleep loss and daytime sleepiness, tiredness, fatigue, cognitive difficulties and increase risk for accidents.^{2,3} The algorithm of the diagnose and treatments of the most important sleep disturbances in pregnancy is illustrated in Figure 1.

Primary insomnia includes both initiation insomnia, which shows as difficulties to fall asleep, and maintenance insomnia, which includes nightly awakenings and too early morning awakenings (being unable to fall asleep again). The etiology of primary insomnia during pregnancy is multifactorial, and might be associated with physical (hyperemesis, nocturia, joint and back pain, heartburn, nasal congestion, thermoregulatory problems, contractions, fetal movements, uncomfortable or unusual sleeping positions, dreams and nightmares) and mental (especially depression and anxiety) causes. Poor sleep quality has shown to be associated with the increased risk of complications such as gestational diabetes, preterm delivery, prolonged labor and increased risk of cesarean section.^{2,3}

Constant snoring is a typical feature of SDB, which includes sleep apnea and partial upper airway

obstruction. In pregnant women, SDB is often caused by partial upper airway obstruction rather than of episodes of frank obstructive apnea.² Gestational weight gain and estrogen-induced hyperemia, mucosal edema and mucus hypersecretion lead to the narrowing of upper airways exacerbating the risk for SDB. However, progesterone-induced stimulation of breathing, sleeping in lateral position, and decrease in the duration of rapid eye movement sleep (during which breathing is more unstable) may protect against SDB. Furthermore, micrognathia and loose throat and larynx are important risk factors for SDB. In addition to snoring, other typical symptoms are headache and

dry mouth in the morning and daytime sleepiness (most typically irresistible falling asleep when inactive). SDB has shown to be in association with increased risk for gestational diabetes, pregnancy-induced hypertension, preeclampsia, intrauterine growth retardation, preterm delivery, cesarean section and neonatal intensive care unit admissions.^{2,4}

RLS is a nocturnal neurosensory movement disorder, which is connected with dopaminergic dysfunction. Although the etiology is still unclear, RLS may be idiopathic, genetic, or linked to various disorders, especially iron deficiency. RLS is characterized by unpleasant irritation, creeping, crawling, burning, pins-and-needles or itching sensations, most commonly in the legs. The sensations occur at rest and worsen towards the evening and night. Also smoking, use of caffeine, some medications or alcohol may initiate or exacerbate the symptoms. Transient RLS in previous pregnancies is associated with an elevated risk of new transient symptoms in future pregnancies, as well as with an increased risk for future development of chronic idiopathic RLS.^{2,5} An association between RLS and hypertensive pregnancy disorders has been shown.²

Sleep disturbances during pregnancy are known risk factors for anxiety/depression both during pregnancy and postpartum period.^{1,2,6} Sleep disturbances often herald mood disturbances, and pregnant and postpartum women with mood symptoms typically suffer from sleep disturbances, especially from primary insomnia which may increase recurrence of a preexisting mental illness.⁶

Detection of the origin of the symptoms is the crucial first step in the management of maternal sleep disturbances. For the diagnosis of primary insomnia, questionnaires are feasible and sufficiently adequate tools in clinical practice. Because of the mismatch between subjective symptoms and objectively measured sleep quality, polysomnography, which measures sleep stages, is rarely needed.² Of note is, that the patient may express having “worse sleep quality” or “insomnia symptoms”, which may not stem from primary insomnia, but are secondary for instance for SDB (maintenance insomnia), RLS (initiation insomnia) or mental symptoms (initiation and maintenance insomnia). If SDB is suspected, ambulatory sleep polygraphy, which measures breathing and blood oxygen level is necessary.² In RLS, type and occurrence time of the symptoms and relief of the

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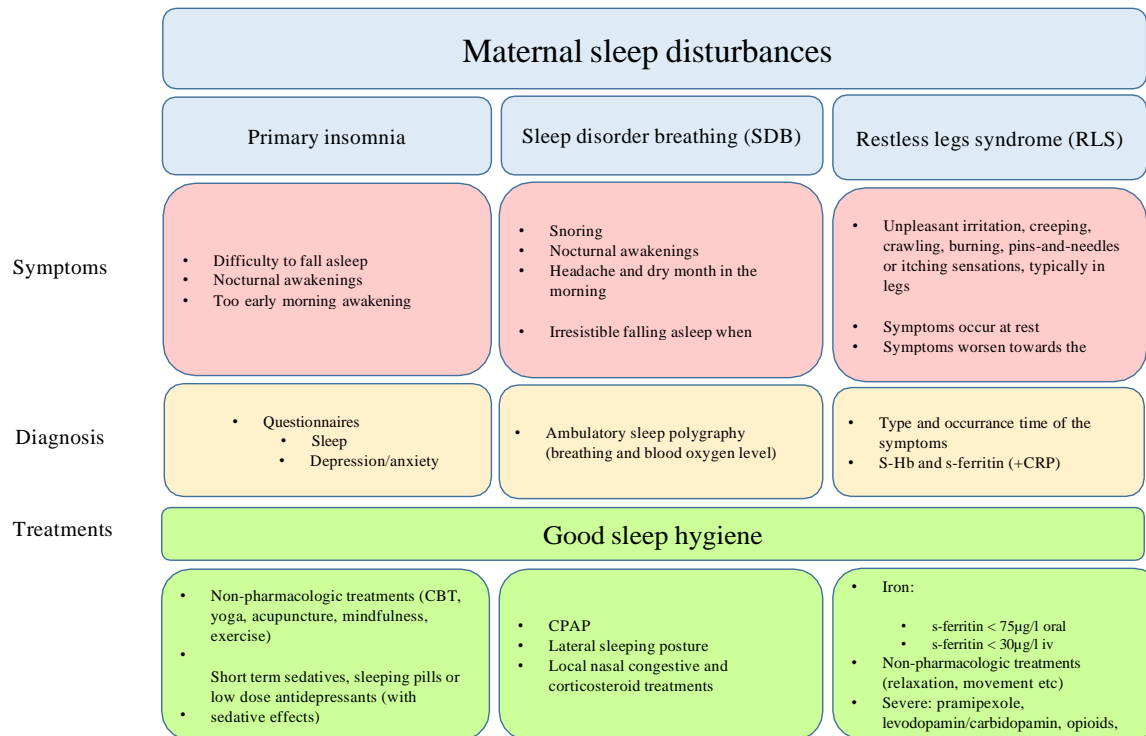


FIGURE 1 The algorithm of the diagnose and treatments of the most important sleep disturbances in pregnancy. CBT, cognitive behavioral therapy; CPAP, continuous positive airway pressure; CRP, C-reactive protein; SSRI, serotonin reuptake inhibitors

symptoms by movement, such as walking or stretching the limbs, are diagnostic. As iron deficiency may induce RLS, measurement of serum hemoglobin and ferritin (+C-reactive protein) is essential.⁵ To detect mental problems, especially depression and anxiety, structural questionnaires can be used.²

Good sleep hygiene is the basis of the treatment of all sleep disturbances. It includes convenient temperature in bedroom, reduced late fluid intake to prevent nocturia, suitable diet in case of gastroesophageal reflux, massage in case of muscular pain and use of comfortable mattress and pillows. For primary insomnia non-pharmacologic treatments, especially cognitive behavioral therapy, is recommended and effective. It can be carried out

as individual or group therapy. Additionally, yoga, acupuncture, mindfulness, and exercise are safe and effective. In case of severe or persistent insomnia, a short-term use of sedatives (including sedative antihistamines), sleeping pills (especially benzodiazepine-like drugs) or low dose antidepressants (with sedative properties) can be prescribed after risks and benefits consideration. However, all these drugs pass the placenta and although no teratogenic effects has been shown, they may be harmful for fetus and new-born. A long-term use of sedatives and sleeping pills should not be offered, since they often leads to noxious effects, like deterioration of sleep architecture and dependence on medication. Melatonin or herbal preparations, like valerian, are not recommended for treatment of

insomnia during pregnancy or lactation because of the lack of safety and efficacy data. In cases of insomnia due to aggravating of mood symptoms, antidepressants, especially serotonin reuptake inhibitors, may be warranted.²

The gold standard treatment for SDB is nasal continuous positive airway pressure (CPAP) and it is shown to be safe and effective also during pregnancy. After the diagnosis of SDB, CPAP treatment should be initiated without a delay. Positional treatment, especially lateral sleep posture, is recommendable. In general rule, surgical procedures should not be performed during pregnancy for the treatment of SDB. Local nasal congestive and corticosteroid treatments reduce nasal mucosal edema and thus improve nasal ventilation. In addition, treating respiratory infections effectively and gastro-esophageal reflux with tilted position of the upper body while in bed or proton-pump inhibitors, such as omeprazole, are also important.²

For the treatment of RLS, per oral iron supplementation (accompanied with C-vitamin for better iron absorption; serum ferritin level $<75 \mu\text{g/L}$) is recommended. However, in severe RLS (and with serum ferritin level $<30 \mu\text{g/L}$), oral iron is often insufficient or has a too slow effect and thus intravenous iron, safe also during pregnancy, may be needed. In addition, folate supplementation is favorable for RLS and it is also advisable during the periconception and early pregnancy period for fetal development. In addition, the use of magnesium may be beneficial, although the efficacy data is insufficient. Furthermore, relaxation procedures, walking, stretching, massage, use of compression stockings while sleeping or a warm bath before going to bed may also relieve the symptoms. In severe cases, pramipexole, levodopamin/carbidopamin, opioids, benzodiazepines or gabapentin beyond the first trimester may be needed under a consultation of a

neurologist, with the lowest efficient

dose, although all these medications may induce risks and side-effects for fetus and new-born.^{2,5}

Although sleep disturbances are frequent during pregnancy, the sleep quality is not systematically assessed during pregnancy follow-ups. Furthermore, the research evaluating the reasons and consequences of maternal sleep disturbances and the safety and efficacy of the treatments are scant. Good sleep quality is, nevertheless, essential for good quality of life and good health state and thus additional research in the field is indispensable.

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ORIGINAL ARTICLE



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Effectiveness of breast milk application on sore nipples among postnatal mothers

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ABSTRACT



Breast feeding is very important for the health and well-being of infants and mothers. It has been traditional way of feeding newborn in our country and is one of the most natural and beneficial acts a mother can do for her child. Areola irritation is regular in breastfeeding ladies during the initial not many days after conveyance. Most of the sore and broke areolas are the aftereffect of wrong situating and connection of the infant at the breast. The present study aims to assess the effectiveness of breast milk application on sore nipples among postnatal mothers in a Saveetha Medical College and Hospital, Chennai. A quantitative pre-experimental one group pretest and post-test research configuration was embraced and the examination was directed with 30 postnatal moms who were chosen by utilizing non-likelihood purposive inspecting method. The organized meeting was utilized to gather segment information and Nipple Trauma Checklist was utilized to survey the sensitive areola. Pretest was directed prior to overseeing the bosom milk by surveying the areola utilizing Nipple Trauma Checklist. Investigator expressed the mother's breast milk into a sterile gauze piece and gently

rubbed over the nipples, allowing it to air dry for 10-15 minutes. Intervention was given for thrice a day for two days and posttest was done on the third day. The study finding shows that critical improvement was seen which unmistakably derives that use of expressed breast milk over areola was discovered to be compelling in the administration of areola irritation among postnatal moms.

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INTRODUCTION

Breastfeeding is the most ideal approach to furnish infants with the supplements they need. (Kent *et al.*,

2015) WHO suggests select breastfeeding until an infant is a half year old and kept breastfeeding with the expansion of nutritious integral nourishments for as long as two years or past. (Tinker *et al.*, 2010)

Every mother who has to breast feed her baby is likely to come across various difficulties and problems. (Cantrill *et al.*, 2014) One among them is sore nipples. Two fundamental drivers of sore areolas are either the infant isn't situated and latched appropriately or the infant isn't sucking appropriately or both. (Dennis *et al.*, 2014) Parasitic disease (because of candida albicans) may likewise cause sore areolas. The resultant uneasiness or torment frequently makes the mother suspend the bosom feeding. (Wagner *et al.*, 2013)

Studies have demonstrated that 80 - 90 % of bosom

taking care of ladies encounters some areola irritation, with 26% advancing to breaking and outrageous areola pain. (McCann *et al.*, 2007) Sore areolas related with bosom taking care of are as yet a typical problem. (McClellan *et al.*, 2012) Many investigations show that bosom milk seems to have mending properties that can demonstrate helpful with regards to treating minor sickness and wounds. This is a direct result of the antibodies that the bosom milk contains. (Amir *et al.*, 1996)

A test study was led in America to recognize a successful readiness technique for breastfeeding and to create estimation devices for areola delicacy and bosom engorgement which will be helpful for evaluating the seriousness. 25 subjects filled in as their controls by setting one up areola and kneading one bosom, either the left or right, however not the other bosom or areola. (Tait, 2000)

Areola delicacy and bosom engorgement were recorded on five-point scales. Examination of the information uncovered that delicacy and engorgement were diminished in the readied, rubbed breast. (McClellan *et al.*, 2008) The examiner with her perception broke down that sensitive areolas are normal among the postnatal moms and the bosom milk application serves to the better recuperating of sore nipples. (Amir, 2014) Therefore, the point of this investigation was to survey the viability of bosom milk application on irritated areolas among postnatal moms in a Saveetha Medical College and Hospital, Chennai.

The purpose of the study is to assess the pretest and post-test level of nipple soreness among postnatal mothers, to determine the effectiveness of breast milk application on sore nipples among postnatal mothers and to associate post-test level of nipple soreness among postnatal mothers with selected demographic variables.

postnatal mothers were selected by using a non-probability purposive sampling technique. The criteria for sample selection are postnatal mothers who are with bilateral nipple soreness, willing to participate and available at the time of data collection. The exclusion criteria for the postnatal mothers who have bleeding on sore nipples and use any medications on sore nipples. The data collection period was done with prior permission from the Principal of Saveetha College of Nursing and DMO of the Saveetha Medical College

MATERIALS AND METHODS

A quantitative approach with pre-experimental one group pretest and post-test research design was used to conduct the study in postnatal wards of Saveetha Medical College and Hospital. 30

and hospital, Chennai. The purpose of the study was explained to the postnatal mothers and consent was obtained from them. The confidentiality of the data collected was assured to the samples. Structured interview was used to collect demographic data and nipple trauma checklist was used to assess the sore nipples. Pretest was done to assess the nipple soreness by using nipple trauma checklist. Investigator expressed the mother's breast milk into a sterile gauze piece and gently rubbed over the nipples, allowing it to air dry for 10-15 minutes. Intervention was given for thrice a day for two days and posttest was done on the third day. The data collection was terminated by thanking the caregivers for their participation and co-operation. The data were analyzed using descriptive and inferential statistics. The sample characteristics were described using frequency and percentage. Student paired 't' test was used to assess the effectiveness of breast milk application on sore nipples between the pretest and posttest. Chi-square was used to associate the post-test level of nipple soreness with the selected demographic variables.

RESULTS AND DISCUSSION

Sample characteristics

Among 30 samples, most of them 17(56.7%) were in the age group of 20 – 25 years, 14(46.7%) were in 3rd postnatal period, 16(53.3%) had only one delivery, 20(66.7%) were feeding every hourly and 17(56.7%) were feeding 5 – 10 minutes.

Assessment of level of nipple soreness among postnatal mothers

The statistical analysis of assessment of nipple soreness shows that in the pretest, 27(90%) had nipple soreness and 3(10%) had mild nipple soreness. Whereas in the post-test, after the application of breast milk 17(56.67%) had no nipple soreness and 13(43.33%) had mild level of nipple soreness. (Table 1)

Effectiveness of breast milk application on nipple soreness among postnatal mothers

The present study depicts that pretest mean score of nipple soreness was 9.63 with standard deviation

2.13 and the post-test mean score of nipple soreness was 2.0 with standard deviation of 2.45. The calculated paired 't' test value of $t = 25.337$ was found to be statistically highly significant at $p < 0.001$ level. This clearly infers that breast milk application on breast soreness among postnatal mothers was found to be effective and significant improvement was observed in the post-test level of nipple soreness among postnatal mothers. (Table 2)

Table 1: Frequency and percentage distribution of pre-test and post-test level of nipple soreness among postnatal mothers. N = 30

| Knowledge | No Nipple Soreness | | Mild | | Moderate | | Severe | |
|-----------|--------------------|----------|------|--------------|----------|---------------|--------|---------------|
| | No. | (0) % | No. | (1 – 6) % | No. | (7 – 13) % | No. | (14 -20) % |
| Pretest | 0 | 0 | 3 | 10.0 | 27 | 90.0 | 0 | 0 |
| Post Test | 17 | 56.67 | 13 | 43.33 | 0 | 0 | 0 | 0 |

Table 2: Comparison of pre-test and post-test level of nipple soreness among postnatal mothers. N = 30

| Nipple Soreness | Mean | S.D | Paired 't' test Value |
|-----------------|------|------|-----------------------|
| Pre-test | 9.63 | 2.13 | t = 25.337 |
| Post-test | 2.00 | 2.45 | p = 0.0001 S*** |

***p<0.001, S – Significant

The study was supported by Tamil Selvi (2017) which assessed the pretest and posttest level of grade of nipple soreness among primipara mothers in experimental and control group was assessed. In pretest among experimental group all the primipara postnatal mothers (100%) are in grade 0 (no nipple soreness). In posttest (Day5) among experiment group 28(93.3%) primipara postnatal mothers are in grade0 (no nipple soreness), and 2(6.7%) of them are in grade1 (Nipple slightly red and/or tender) of nipple soreness descriptive Assessment Scale. Statistically there is no significant difference between pretest and posttest ($\chi^2=3.08$, p=0.08). Statistical significance was calculated using chi-square test. (Selvi, 2017)

The present study also depicts that none of the demographic variables had shown statistically significant association with posttest level of nipple soreness among postnatal mothers.

CONCLUSIONS

The present study assessed the effectiveness of breast feeding technique among postnatal mothers. The results revealed that breast milk application had a significant effect in preventing

nipple soreness.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

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