Quality Maternity Care: Implementation of the Guidelines for Hypertensive Disorders in Pregnant Teenagers in KwaZulu-Natal, South Africa

Zwelihle B. Shongwe
https://orcid.org/0000-0001-9952-5023
KwaZulu-Natal College of Nursing, South Africa
36100617@mylife.unisa.ac.za

Simangele Shakwane
https://orcid.org/0000-0002-7228-4183
University of South Africa
shakws@unisa.ac.za

Abstract

The government of a country is responsible and accountable for the provision of quality healthcare services to its citizens. Teenage pregnancy and its complications occur worldwide. Hypertensive disorders in pregnancy (HDP) are considered the third leading cause of maternal mortality in South Africa. The current study investigated the implementation of the 2016 Department of Health *Guidelines for Maternity Care in South Africa* for HDP in teenagers. A retrospective quantitative research design was used. A sample of 173 maternity records of pregnant teenagers diagnosed with hypertension were systematically sampled from the period of January 2019 to December 2019 in six district hospitals and one community health centre in one district in KwaZulu-Natal (KZN), South Africa. The respondents were aged between 13 and 19 years. A pretested structured checklist was used to record the data. The Social Sciences Statistics Software IBM SPSS version 26.0 was used to analyse the data, and simple descriptive statistics to present the findings. The findings revealed that maternity care for pregnant teenagers with hypertension was not implemented according to the prescribed GMCSA. None of the pregnant teenagers received aspirin as prophylaxis against the development of hypertension; 82% were not assessed for oedema during the initial visit; and 90.17% were not assessed during antenatal care (ANC) periods. Mental state assessment was done on only 1.7% of the pregnant teenagers. The study found discrepancies in the implementation of the GMCSA for HDP, compromising

UNISA
Africa Journal of Nursing and Midwifery
https://unisapressjournals.co.za/index.php/AJNM
Volume 24 | Number 1 | 2022 | #10112 | 14 pages
https://doi.org/10.25159/2520-5293/10112
ISSN 2520-5293 (Online)

maternity care among teenagers. Strategies for improving the quality of maternity care for pregnant teenagers are deemed necessary.

Keywords: hypertension; hypertensive disorders in pregnancy; morbidity and mortality rate; pregnancy; teenager

Introduction

The pregnancy of young women aged 13 to 19 years is regarded as a teenage pregnancy (Abebe et al. 2021, 1). Teenage pregnancy occurs while the body, particularly the reproductive system, is in the process of growth and is not ready for pregnancy. Teenagers start having sex before the age of 19 years while their reproductive system, particularly the uterus, is still in the process of growth (Bezuidenhout 2015, 75; Dewau, Mekonnen and Seretew 2021, 1). Teenage (teen) pregnancy is a pandemic phenomenon that is expected to increase worldwide by the year 2030 (Sanchez and Favara 2019, 6).

Teenage pregnancy is associated with maternal morbidity and mortality, aggravated by diseases like anaemia, hypertension, and so forth. These diseases develop due to the physiological immaturity of the body (Bezuidenhout 2015, 75). European countries, for example, the United Kingdom (UK), and also the United States (US), have increased maternal mortality for teenagers aged 20 years and below and adults aged 30 years old and above. In the US, the maternal mortality ratio is 24 births per 1 000 girls, whereas in the UK the ratio is 15 births per 1 000 girls aged 15 to 19 years per annum (Cronje, Cilliers and Du Toit 2016, 734; Reddy, Sewpaul and Jonas 2016).

The World Health Organization (WHO 2018, 1) indicates that Africa is the third continent recording 115 births per 1 000 teenagers in Western Africa, compared to 7 births per 1 000 teenagers in Eastern Asia. A maternal mortality ratio of 119 per 100 000 live births was recorded in South Africa during 2017 (Statistics South Africa 2020, 1). Maternal mortality in KwaZulu-Natal (KZN) increased from 220 to 245 deaths during the 2016–2017 fiscal year (South Africa 2017, 3). In 2017, the causes of maternal mortality included eclampsia, severe bleeding, sepsis, obstructed labour and unsafe abortions (Statistics South Africa 2020, 2). In South Africa, as a developing country, maternal morbidity and mortality are caused by various diseases, for instance, Human Immunodeficiency Virus (HIV), obstetric haemorrhage and hypertension (South Africa 2017, iv).

While the South African statistics indicate a reduction in maternal mortality rates associated with obstetric haemorrhage, HIV, and so forth, there were no changes in fatalities caused by hypertensive disorders in pregnancy (HDP) during 2017 (South Africa 2017, iii). The maternal morbidity and mortality associated with hypertension in obstetrics occur despite the knowledge applied by the obstetric practitioners, and the implementation of various protocols and guidelines such as the GMCSA (DoH 2016) to assess and manage hypertension among pregnant teenagers (KZN DoH 2018).

Hypertensive disorders in pregnancy are the third leading cause of maternal morbidity and mortality in South Africa (South Africa 2017, iv; Statistics South Africa 2015, 2). The World Health Organization (WHO) recommends booking for antenatal care (ANC) before 20 weeks' gestation for assessment, diagnosis and management of diseases affecting maternal and foetal outcomes (WHO 2016). Some of the teenagers start ANC later than 20 weeks' gestation due to various factors, such as undertaking strategies attempting to hide their pregnancy, negative attitudes of staff towards pregnant teenagers, physical and verbal abuse by staff, and so forth (Bezuidenhout 2015, 75; Selala 2017).

According to the GMCSA (DoH 2016), Sellers (2018, 289) and WHO (2019), teenagers have increased risk of developing hypertension in pregnancy than adults above 20 years old. This emanate from physiological immaturity of the body require special assessment, diagnosis, management including classification of teenagers as a high risk group for specific maternity care during pregnancy, labour and after delivery. The GMCSA (DoH 2016) support the strategies proposed by the WHO (2011) to assess and manage hypertension in pregnancy; but, implemented in the same manner in both adults and teenagers. Implementation of the guidelines should be assessed for the management of various diseases in maternity care – to determine the effectiveness and efficiency of improving the quality of life of pregnant women, especially teenagers. The current study aimed to investigate the implementation of GMCSA (DoH 2016) for effective management of hypertension among pregnant teenagers in KZN, South Africa.

Study Design

Non-experimental retrospective quantitative research was conducted. The retrospective design uses past information to study the current phenomenon. The current conditions are described according to past information to identify possible cause/s of the research problem (McGregor 2018, 257). The researcher does not undertake any experiment but uses previously recorded information to investigate the phenomenon, draw conclusions and generalise research findings (McGregor 2018, 257; Patten and Newhart 2018, 17).

In the current study, the maternity records of teenagers who suffered from HDP were used. The maternity records dated from January 2017 to December 2019 and were retrieved to retrospectively assess the implementation of the GMCSA (DoH 2016) for pregnant teenagers in KZN regarding HDP.

Study Setting and Sampling

The study was conducted in six district hospitals and one community health centre in a rural district in KZN that provided maternity care services. The selected district comprised urban, semi-urban and deep rural areas under traditional tribal authorities. The study population comprised maternity records of teenagers who suffered from HDP. The researcher used admission and discharge registers kept in the labour ward to identify and record the admission numbers of teenagers who were admitted between January 2017 and December 2019, in order to develop a sampling frame. Systematic random sampling was

conducted to select the maternity records from the sampling frame. The first element was randomly selected; thereafter, every third element was chosen from the sampling frame until the required sample size was achieved.

The maternity records were retrieved by the administrative personnel of the respective participating public health institutions using the admission numbers provided by the researcher. The sample size was calculated using a margin error of 0.005% and a 95% confidence level; 159 maternity records were sampled and 15% of non-responses were added. The final sample size was 173 maternity records.

Data Collection

The data was collected by way of a structured checklist. The checklist was developed using the elements imperative in HDP, the GMCSA (DoH 2016) and the latest obstetric literature. The checklist was arranged systematically and consisted of six sections, which were biographic information, history of ANC, morbidity during pregnancy, pregnancy problems, history of labour and postpartum data. The structured checklist was pretested using Cronbach's alpha test, which presented a score of 0.711. The score was considered good and the instrument was considered reliable.

The data was collected between September and November 2020. A structured checklist for each maternity record was allocated a unique code for anonymity. The data was collected from the sampled maternity records and was recorded in the spaces provided using a black pen.

Data Analysis

A descriptive analysis was conducted. Using descriptive statistics allows the researcher to summarise the data in various ways including how the data is distributed (Patten and Newhart 2018, 203). According to McGregor (2018, 323), descriptive data is represented numerically and graphically using contingency tables, as well as bar and pie charts. In the current study, the data was analysed numerically and described in simple terms for common understanding. Codes such as 1, 2, 3, 4 and 5 were used to categorise the data and were entered into an Excel spreadsheet.

The completeness and correctness of the data were checked and analysed using the latest computer program, Social Sciences Statistics Software IBM SPSS version 26.0. The services of a statistician were used to conduct descriptive statistics. The results are presented in frequency tables with percentages.

Ethical Considerations

The researcher obtained an Ethical Clearance Certificate from a university in South Africa with a certificate number (HSHDC/994/2020). The permission to conduct the study was obtained from the KZN Department of Health, District Managers and Health Institution Managers of the selected public health institutions. The confidentiality agreement between

the statistician and the researcher was signed. The codes were allocated and used for each Public Health Institution. In addition, the maternity records were coded to maintain anonymity.

The data was collected and recorded within public health institutions, using available spaces provided for the researcher in the admission and discharge office. The maternity records of teenagers diagnosed with HDP between January 2017 and December 2019 were retrieved by administration clerks using admission numbers extracted from the admission and discharge books kept in the labour ward. The researcher signed the register before and after using the maternity records.

Validity and Reliability

According to Brink, Van der Walt and Van Rensburg (2018, 151), validity is the accuracy of a data collection instrument to measure what is supposed to be measured by an instrument – meaning that the instrument should measure exactly what is supposed to be measured and that questions and statements are not ambiguous. The validity of a newly developed structured checklist was pretested on 10 maternity records of teenagers who suffered from HDP. The findings revealed that the structured checklist measured intended variables.

Reliability refers to the consistency of the data collection instruments to yield the same results if used repeatedly over time on the same person or when used by different researchers (Brink, Van der Walt and Van Rensburg 2018, 155). The correlation measure determines the reliability of the data collection instrument. It varies between 0 and 1, thus a score closer to 1 signifies high correlation. The most frequently used test is Cronbach's alpha to determine if all items in the data collection instrument measure the same variable (Brink, Van der Walt and Van Rensburg 2018, 156). Cronbach's alpha test was used to test the consistency of the structured checklist; a good score of 0.711 signified the accuracy and consistency of the instrument.

Findings

Sample Characteristics

A total of 173 maternity records were assessed for the implementation of the GMCSA (DoH 2016) for HDP – the summary of the sample characteristics is presented in Table 1. The maternity records were selected from seven public health institutions. The age distribution of the respondents was grouped into three categories, with 3.47% (n = 6) in the age group of 13–14; 14.45% (n = 25) in the age group of 15–16; and 82.08% (n = 142) in the age group of 17–19. The majority of the respondents were in their first pregnancy; whereas 7.51% (n = 13) were having their second pregnancy with 5.20% (n = 9) with viable births. While 96.53% (n = 167) had no previous history of miscarriages, 3.45% (n = 6) had experienced a miscarriage in their previous pregnancy.

Table 1: Socio-demographic characteristics of the sample

Characteristics	**Frequency**	**%**
Sample per public health institution		
Facility 1 – district hospital	48	27.75
Facility 2 – district hospital	25	14.55
Facility 3 – district hospital	30	17.34
Facility 4 – district hospital	11	6.36
Facility 5 – district hospital	26	15.02
Facility 6 – district hospital	13	7.51
Facility 7 – community health centre	20	11.56
Total	**173**	**100**
Age (years)		
13–14	6	3.47
15–16	25	14.45
17–19	142	82.08
Total	**173**	**100**
Gravidity		
Gravida 1	160	92.49
Gravida 2	13	7.51
Total	**173**	**100**
Miscarriage		
No history of miscarriage	167	96.53
With a history of miscarriage	6	3.47
Total	**173**	**100**

Test Results

Antepartum Maternal Assessment: History Taking and Maternal Assessment

The maternal assessment is imperative to determine risk factors for the development of HDP. These assessments start from simple tasks like history taking to more sophisticated evaluations, such as maternal nutritional status, and oedema (South Africa 2016, 30). Table 2 provides various maternal assessments such as medical history, mental health, nutritional status, gestational age, oedema and baseline blood tests.

Medical History

According to Cífková et al. (2020, 386), a past medical history, such as anaemia and HDP, increases the risk of hypertension in repeat pregnancies. The current study found that 98.84% (n = 171) of the pregnant teenagers presented had no past medical conditions, while 1.16% (n = 2) were known to be HIV positive. Regarding their present medical history, 94.22% (n = 163) of the respondents had no present medical history; 4.62% (n = 8) were newly diagnosed with HIV during antepartum assessment; and 1.16% (n = 2) were known to be HIV positive.

Mental State Examination

Pregnant teenagers tend to suffer from psychological disturbances due to a variety of factors including unwanted pregnancy. These factors result in depression and psychotic symptoms that commonly manifest in the first and second trimester (Shigemi et al. 2021, 103). The current study found that mental assessment was done in 1.73% (n = 3) of the respondents of whom 0.57% (n = 1) were treated for attempted suicide.

Nutritional Status

Dietary intake determines the incidence for the onset of HDP among pregnant teenagers (Fu et al. 2018, 7); therefore, nutritional status should be assessed by measuring mid-upper arm circumference (MUAC) using a tape measure at the first ANC visit for good maternal and foetal outcomes. Of the pregnant teenagers, 90.75% (n = 157) had normal findings with their MUAC ranging from 23–33 cm; 6.36% (n = 11) had an MUAC < 23 cm suggesting low nutritional status; and 2.89% (n = 5) had an MUAC > 33 cm, indicating obesity. According to South Africa (2016, 31) and Fakier, Petro and Fawcus (2017, 606), the normal MUAC range is from 23–32 cm.

Gestational Age Assessment

The study found that pregnant teenagers started ANC at different gestational ages but some were not recorded: 23.69% (n = 41) started at 12–13 weeks; 42.77% (n = 74) started at 14–26 weeks; 4.05% (n = 7) started between 27–37 weeks; while the gestational age of 29.48% (n = 51) was not recorded.

Assessment of Oedema

Oedema during pregnancy is normal when it develops in the last two weeks of pregnancy, and it is regarded as physiological if only the ankles are involved (Sellers 2018, 291). In the current study, oedema was assessed and graded in 17.91% (n = 31), while 82.08% (n = 142) were not assessed during the period of pregnancy.

Blood Investigations

Blood tests are performed during pregnancy to investigate and establish the progression of hypertension among pregnant teenagers. Investigations include liver function tests (LFTs), full blood count (FBC), urea and electrolytes (U and E), international normalisation ratio (INR), uric acid, and creatinine (Brown et al. 2018, 28; Sellers 2018, 290). The study found that in 92.48% (n = 160), blood was not collected; and only collected from 7.51% (n = 13) for investigations related to HDP.

Table 2: Antepartum maternal assessment

Assessment	**Frequency**	**%**
1. History of illnesses		
Past medical history		

No medical condition/s	171	98.84
With a history of medical condition (HIV)	2	1.16
Current medical history		
No medical condition/s	165	95.37
Newly diagnosed with HIV	8	4.62
Mental health condition/s		
Assessment not done	170	98.27
Assessed and diagnosis confirmed	3	1.73
2. Nutritional status (MUAC)		
Normal 23–33 cm	157	90.75
Malnourished < 23 cm	11	6.35
Obesity ≥ 33 cm	5	2.89
3. Gestational age		
Commencement of antenatal care		
12–13 weeks	41	23.70
14–26 weeks	74	42.77
27–37 weeks	7	4.05
Gestational age not recorded	51	29.48
4. Oedema		
Assessed and graded	31	17.92
Not recorded	142	82.08
5. Baseline blood tests		
FBC, U and E, LFT, INR done	13	7.51
Blood tests not done	160	92.49

Blood Pressure Measurement: First and Subsequent ANC Visits

During the first ANC visit, blood pressure (BP) was measured in the majority of the respondents. Less than 1% (n = 1) of the respondents' BP was not measured; 4.05% (n = 7) had elevated BP – between 140–159 mmHg systolic blood pressure (SBP) and 50–99 mmHg diastolic blood pressure (DBP); and only 2.31% (n = 4) had their BP rechecked. During their subsequent ANC visit, their BP was not measured in 26.59% (n = 46). The BP measurements ranges were 140–189 mmHg SBP and 60–115 mmHg DBP in 24.86% (n = 43) of the respondents and BP was rechecked in 11.56% (n = 20).

Urinalysis Test: First and Subsequent ANC Visits

Urine testing is significant in the diagnosis of HDP. At the first ANC visit, urinalysis was conducted in 94.22% (n = 163) of the respondents of which there were no traces of protein in 68.79% (n = 119) and traces of protein were found in 19.65% (n = 34). Urinalysis was not tested in 5.78% (n = 10) of the respondents due to urinalysis test strips not being available. During the subsequent antenatal visit, urinalysis was done on all the respondents, and only 7.51% (n = 13) had traces of protein.

Clinical Features Associated with Hypertension Manifested during Pregnancy

The clinical manifestations of pregnant teenagers are imperative for the diagnosis of hypertension in pregnancy. The current study revealed that the majority of pregnant teenagers did not present with clinical features associated with HDP, and 3.46% (n = 6) presented with oedema. While other pregnant teenagers manifested with hypertension-related signs and symptoms, 17.91% (n = 31) manifested with lower abdominal pains; and 2.31% (n = 4) had decreased foetal movements.

Diagnosis of Hypertension

Diagnosis of HDP may be confirmed during subsequent ANC visits. At the first ANC visit, 1.16% (n = 2) had their HDP diagnosis confirmed. In subsequent ANC visits, 13.87% (n = 24) of the respondents were diagnosed with HDP.

Medication Prescribed at First ANC Visit

Of the 173 respondents, 87.70% (n = 150) received iron supplements during pregnancy. Calcium carbonate (1 g as the recommended dose in KZN) was prescribed for 13.87% (n = 24) pregnant teenagers, while 28.32% (n = 49) received 500 mg of calcium carbonate. As other pregnant teenagers did not receive calcium, 2.89% (n = 5) received calcium carbonate without recorded doses in the maternity records. The antihypertensive drugs (i.e. methyldopa, nifedipine and magnesium sulphate, as determined by the severity of the hypertensive state) were prescribed for 2.89% (n = 5).

Discussion

The findings revealed that teenagers fall pregnant at a young age, between 13 and 19 years. In contrast, Section 28(3) of the Constitution of the Republic of South Africa (South Africa, 1996) states that a child is a person under the age of 18 years. This means that girls under 18 years fall pregnant before reaching the legal age. Falling pregnant at 15 years or younger increases the risk of HDP, making it three times higher than with repeated pregnancies, and teenagers aged 10–19 years have a higher risk of preeclampsia than those aged 20–24 years (Sellers 2018, 289; WHO 2019). According to Chandio et al. (2020, 55), primigravidae (i.e. women who are pregnant for the first time) aged 13–16 years are the most vulnerable groups in the development of HDP. The study findings affirmed that pregnant teenagers are at risk of developing hypertension as 15.0% (n = 26) of the respondents suffered from HDP during their pregnancy. The BP for the respondents ranged from 90–139/50–101 mmHg. Thus, the diagnosis of HDP was in line with the GMCSA (DoH 2016, 70) for hypertensive disorders, which state that the diagnosis of hypertension among pregnant teenagers can be confirmed if SBP increases by > 30 mmHg and/or DBP increases by > 15 mmHg.

Repeated pregnancies contribute to the adverse maternity outcomes; about 3.47% (n = 6) of the pregnant teenagers in the study had previous pregnancies with bad obstetric outcomes of miscarriage and were diagnosed with HDP. MacDonald and Magill-Cuerden

(2015, 789) and South Africa (2016, 72) allude that repeated pregnancies in teenagers increase the risks of abortions or miscarriages and HDP. Pregnancy may be stressful for teenagers; therefore, their mental state should be assessed. Unfortunately, in the current study, the mental status of the pregnant teenagers was assessed done for 1.16% (n = 2) at the first ANC visit. The GMCSA (DoH 2016, 30) emphasise the need for pregnant women's mental state to be examined to identify mental issues and provide mental healthcare accordingly early.

The diagnosis of HDP includes measuring BP, urine and baseline blood tests. In the study, 15.02% (n = 26) respondents were diagnosed using the measured BP values and findings from urinalysis test strips during the antepartum period. Preeclampsia shows elevated BP of 140/90 mmHg with proteinuria or organ dysfunction indicated by a platelet count of ≤ 100 000/mm^3 and a creatinine level of 1.1 mg/dlv (Lai, Coulter and Woodruff 2017). Baseline blood tests, such as FBC, U & E, LFT and INR, were collected 7.51% (n = 13) respondents. Brown et al. (2018, 28) recommend that the healthcare practitioners should do the baseline blood tests to ensure early execution of intervention, thereby delaying complications associated with hypertension in pregnancy. Five of the seven selected public healthcare institutions conducted urinalysis for pregnant teenagers. In one institution, urine testing was not done in 5.78% (n = 10) pregnant teenagers, citing the shortage of urinalysis test strips. The GMCSA (DoH 2016, 31) recommend that urinalysis be done on all pregnant women during their ANC visits. Urinalysis is a reliable test to detect proteins in the urine of pregnant women (Shreya et al. 2015, 55).

History taking and determination of gestational age during the first ANC visit assist in defining the care and treatment required by the pregnant teenagers to prevent HDP. The WHO (2011) recommends prescribing calcium carbonate (1.5 to 2 mg) as prophylaxis against the development of HDP in all pregnant women. In KZN, 1 000 mg of calcium carbonate is given due to the increased incidence of teenage pregnancy (South Africa 2017, 72). However, the study observed irregularities in the prescription of calcium bicarbonate, such that 28.3% (n = 49) of the respondents received 500 mg; 2.89% (n = 5) doses were not recorded in the maternity records; and 39.9% (n = 69) did not receive calcium carbonate. These findings suggest that the GMCSA (DoH 2016, 32) regarding HDP in pregnant teenagers were not implemented accordingly.

Once a diagnosis of HDP is confirmed, antihypertensive medication is prescribed to allow the foetus to mature (Cronje, Cilliers and Du Toit 2016, 550). BP should be maintained below 135/85 mmHg, but antihypertensive drugs should be stopped when the BP is ≤ 110/70 mmHg (Battarbee et al. 2020, 536; Braunthal and Brateanu 2019, 6) to prevent hypotension in pregnancy. Pregnant teenagers diagnosed with HDP should receive the first-line antihypertensive drugs such as methyldopa, nifedipine, and labetalol (DoH 2016, 72). However, out of seven pregnant teenagers with BP values ranging from 140–159/50–99 mmHg, only 2.89% (n = 5) received antihypertensive drugs, while 1.16% (n = 2) pregnant teenagers were not treated for hypertension.

Thus, the study concluded that treatment irregularities are typical in managing hypertension among pregnant teenagers within the selected rural district. The poor implementation of the GMCSA (DoH 2016) for HDP compromises maternal and foetal outcomes. The universal assessment, diagnosis and management of hypertension in pregnancy help to reduce maternal emergencies in obstetric departments.

Recommendations

To strengthen the effective implementation of the GMCSA (DoH 2016) for HDP need to be reviewed and care for pregnant teenagers with HDP must be integrated into the guidelines. Continuing professional development for accurate implementation of the GMCSA is required. Further studies should be conducted on the knowledge and skills of midwifery practitioners to effectively implement guidelines for the treatment of hypertension among pregnant teenagers.

Limitations

The study was conducted in a rural district of KZN and focused on pregnant teenagers during their ANC. A retrospective design was applied, using a checklist to collect the data from maternity records. This limited the researchers as the errors on the records were not verified with the obstetric practitioners. The presented findings can only be generalised to the seven public health institutions that participated in the study, and pregnant teenagers. Future studies should include obstetric practitioners in order to validate their knowledge and understanding of the GMCSA (DoH 2016) for HDP in pregnant teenagers.

Conclusion

The inaccuracy in the implementation of the GMCSA (DoH 2016) has led to incomplete assessments of HDP, shortage of material resources, and only partial adherence to principles of record-keeping thereby compromising quality maternity care among teenagers suffering from hypertension during pregnancy. In order for quality assurance to be guaranteed during maternity, obstetric practitioners should strive for excellence by appropriately implementing all relevant protocols and guidelines to assess, diagnose and manage obstetric-related conditions such as hypertension among pregnant teenagers.

Acknowledgement

We would like to acknowledge the KZN Department of Health and selected study district and public health institutional managers for their support and permission to conduct the study. Much appreciation also goes to the administrative personnel in the selected public health institutions who assisted with the retrieval of maternity files.

References

Abebe, A. M., G. W. Fitie, D. A. Jember, M. M. Reda, and G. E. Wake. 2020. "Teenage Pregnancy and Its Adverse Obstetric and Perinatal Outcomes at Lemlem Karl Hospital, Tigray, Ethiopia, 2018." *BioMed Research International* 2020: Article ID 3124847. https://doi.org/10.1155/2020/3124847

Battarbee, A. N., R. G. Sinkey, L. M. Harper, S. Oparil, and A. T. N. Tita. 2020. "Chronic Hypertension in Pregnancy." *American Journal of Obstetrics and Gynecology* 222 (6): 532–541. https://doi.org/10.1016/j.ajog.2019.11.1243

Bezuidenhout, F. J., ed. 2015. *A Reader on Social Issues.* 5th ed. Pretoria: Van Schaik.

Braunthal, S., and A. Brateanu. 2019. "Hypertension in Pregnancy: Pathophysiology and Treatment." *SAGE Open Medicine* 7: 1–15. https://doi.org/10.1177/2050312119843700

Brink, H., C. van der Walt, and G. van Rensburg. 2018. *Fundamentals of Research Methodology for Healthcare Professionals*. 4th ed. Cape Town: Juta.

Brown, M. A., L. A. Magee, L. C. Kenny, S. A. Karumanchi, F. P. McCarthy, S. Saito, D. R. Hall, C. E. Warren, G. Adoyi, and S. Ishaku. 2018. "Hypertensive Disorders in Pregnancy: International Society for the Study of Hypertension in Pregnancy (ISSHP) Classification, Diagnosis, and Management Recommendations for international Practice." *Hypertension* 72 (1): 24–43. https://doi.org/10.1161/HYPERTENSIONAHA.117.10803

Chandio, R., J. H. L. Boloch, N. F. Pathan, A. Ayoob, N. A. Samoon, A. A. Sheikh. 2021. "Assessment of the Pregnancy Induced Hypertension and Gravida in Teenage Girls at People Medical College Hospital Nawabshah Pakistan." *Journal of Pharmaceutical Research International* 33 (14): 51–56. https://doi.org/10.9734/jpri/2021/v33i1431275

Cífková, R., M. R. Johnson, T. Kahan, J. Brguljan, B. Williams, A. Coca, A. Manolis, C. Thomopoulos, C. Borghi, C. Tsioufis, et al. 2020. "Peripartum Management of Hypertension: A Position Paper of the ESC Council on Hypertension and the European Society of Hypertension." *European Heart Journal Cardiovascular Pharmacotherapy* 6 (6): 384–393. https://doi.org/10.1093/ehjcvp/pvz082

Cronje, H. S., J. B. F. Cilliers, and M. A. du Toit, eds. 2016. *Clinical Obstetrics: A South African Perspective*. 4th ed. Pretoria: Van Schaik.

Dewau, R., F. A. Mekonnen, and W. S. Seretew. 2021. "Time to First Birth and Its Predictors among Reproductive-age Women in Ethiopia: Inverse Weibull Amma Shared Frailty Model." *BMC Women's Health* 21: 113. https://doi.org/10.1186/s12905-021-01254-z

DoH (Department of Health). 2016. *Guidelines for Maternity Care in South Africa: A Manual for Clinics, Community Health Centres and District Hospitals*. 4th ed. Pretoria: Government Printer.

Fakier, A., G. Petro, and S. Fawcus. 2017. “Mid-upper Arm Circumference: Surrogate for Body Mass Index in Pregnant Women.” *South African Medical Journal* 107 (7): 606–610. https://doi.org/10.7196/SAMJ.2017.v107i7.12255

Fu, Z. M., Z. Z. Ma, G. J. Liu, L. L. Wang, and Y. Guo. 2018. “Vitamins Supplementation Affects the Onset of Preeclampsia.” *Journal of the Formosan Medical Association* 117 (1): 6–13. https:///doi.org/10.1016/j.jfma.2017.08.005

KZN (KwaZulu-Natal) Department of Health. 2018. “King Cetshwayo District Health Plan 2018/19–2020/21.” Accessed April 10, 2019. https://www.health.gov.za/DHP/docs/DHP2018-21/kwazulu

Lai, C., S. A. Coulter, and A. Woodruff. 2017. “Hypertension and Pregnancy.” *Texas Heart Institute Journal* 44 (5): 350–351. https://doi.org/10.14503/THIJ-17-6359

MacDonald, S., and J. Magill-Cuerden, eds. 2015. *Mayes’ Midwifery*. 14th ed. London: Elsevier.

McGregor, S. L. T. 2018. *Understanding and Evaluating Research: A Critical Guide*. London: SAGE. https://doi.org/10.4135/9781071802656

Patten, M. L., and M. Newhart. 2018. *Understanding Research Methods: An Overview of the Essentials*. 10th ed. New York: Taylor and Francis Group. https://doi.org/10.4324/9781315213033

Reddy, P., R. Sewpaul, and K. Jonas. 2016. “Teenage Pregnancy in South Africa: Reducing Prevalence and Lowering Maternal Mortality Rates.” Accessed January 10, 2021. https://www.hsrc.ac.za/en/research-data/view/8117

Sanchez, A., and M. Favara. 2019. “Consequences of Teenage Childbearing in Peru: Is the Extended School-day Reform an Effective Policy Instrument to Prevent Teenage Pregnancy?” Accessed August 28, 2019. https://www.younglives.org.uk/files/YL-WP185.pdf

Selala, D. B. 2017. “Factors Contributing to Late Booking amongst Pregnant Women at Ekurhuleni Health District.” Master’s diss., University of South Africa, Pretoria.

Sellers, P. M. 2018. *Sellers’ Midwifery*. 3rd ed. Cape Town: Juta.

Shigemi, D., M. Ishimaru, H. Matsui, K. Fushimi, and H. Yasunaga. 2021. “Suicide Attempts during Pregnancy and Perinatal Outcomes.” *Journal of Psychiatric Research* 133: 101–105. https://doi.org/10.1016/j.jpsychires.2020.12.024

Shreya, G., L. Pranathi, and V. Kavitha. 2015. “Comparison of Spot Urine Protein–Creatinine Ratio with 24-hour Urine Protein Excretion in Women with Preeclampsia.” *International Journal of Integrative Medical Sciences* 2 (1): 55–59. https://doi.org/10.16965/ijims2015.102

South Africa. 1996. *Constitution of the Republic of South Africa, 1996*. Pretoria. Government Printer.

South Africa. 2017. *Saving Mothers: Annual Report on Confidential Inquiries into Maternal Death in South Africa*. Pretoria: Government Printer.

Statistics South Africa. 2015. *Millennium Development Goals: Improve Maternal Health*. Pretoria: Government Printer.

Statistics South Africa. 2020. "Maternal Health Care in South Africa Shows Signs of Improvement." Accessed January 10, 2021. https://www.statssa.gov.za/?s=Maternal+Health+Care+in+South+Africa+Shows+Signs+of+Improvement

WHO (World Health Organization). 2011. "WHO Recommendations for Prevention and Treatment of Pre-eclampsia and Eclampsia." Accessed August 26, 2019. http://apps.who.int/iris/bitstream/10665/44703/1/9789241548335-eng.pdf

WHO (World Health Organization). 2016. "ANC Guidelines for a Positive Pregnancy Experience." Accessed June 21, 2021. https://www.who.int/sites/default/files/2019-06/Draft%20ANC%20Guidelines%20201

WHO (World Health Organization). 2018. "Preterm Birth: Key Facts." Accessed December 3, 2020. https://www.who.int/news-room/fact-sheets/detail/preterm-birth

WHO (World Health Organization). 2019. "Adolescent Pregnancy: Evidence Brief." Accessed January 29, 2021. https://www.apps.who.int/iris/bitstream/handle/10665/329883/WHO-RHR-19.15.PDF?ua=1