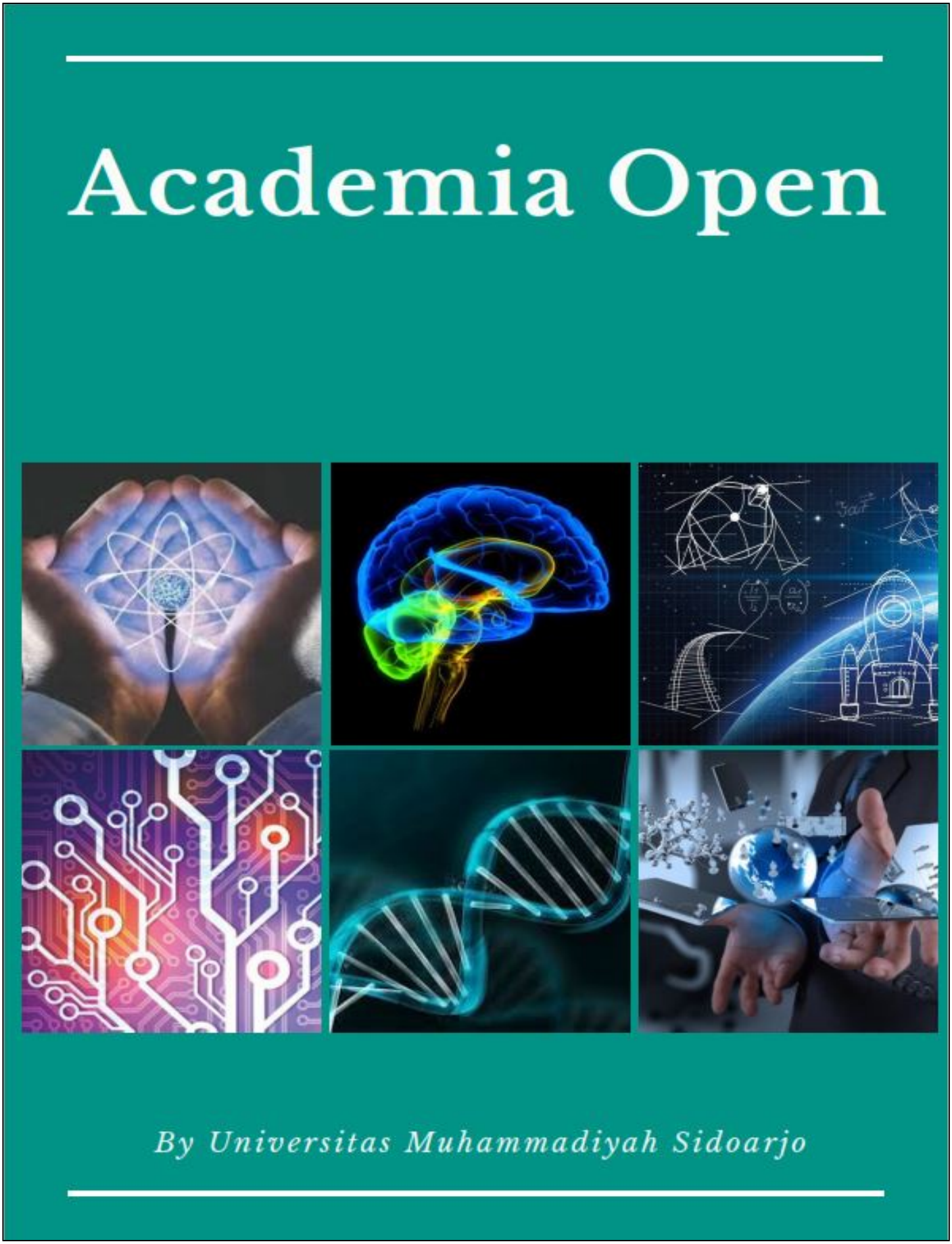
Academia Open
Vol 9 No 1 (2024): June
DOI: DOI 10.21070/acopen.9.2024.8933 . Article type: (Medicine)

Table Of Content

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: DOI 10.21070/acopen.9.2024.8933 . Article type: (Medicine)



ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: DOI 10.21070/acopen.9.2024.8933 . Article type: (Medicine)

Originality Statement

The author[s] declare that this article is their own work and to the best of their knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the published of any other published materials, except where due acknowledgement is made in the article. Any contribution made to the research by others, with whom author[s] have work, is explicitly acknowledged in the article.

Conflict of Interest Statement

The author[s] declare that this article was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright Statement

Academia Open
Vol 9 No 1 (2024): June
DOI: DOI 10.21070/acopen.9.2024.8933 . Article type: (Medicine)

EDITORIAL TEAM

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: DOI 10.21070/acopen.9.2024.8933 . Article type: (Medicine)

Article information

Check this article update (crossmark)

Check this article impact (*)

Save this article to Mendeley

(*) Time for indexing process is various, depends on indexing database platform

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: DOI 10.21070/acopen.9.2024.8933 . Article type: (Medicine)

Analyzing if calcium channel blockers can save pregnant patients with persistent hypertension from developing preeclampsia

Menganalisis apakah penghambat saluran kalsium dapat menyelamatkan pasien hamil dengan hipertensi persisten dari pengembangan preeklampsia

Nada Mohammed Basil , nadaabdoo934@gmail.com, (1)
Abi Ghraib General Hospital, Iraq

Shatha Salim Mahmood , shathasalim@gmail.com, (0)
Abu Ghraib General Hospital, Iraq

Ola Hikmat Makki , Olahikmat@gmail.com, (0)
Abi Ghraib General Hospital, Iraq

(1) Corresponding author

Abstract

Pregnant women with chronic hypertension face elevated risks during pregnancy, necessitating effective management strategies. This study evaluates the potential benefits of combining low-dose aspirin therapy with calcium channel blockers, particularly nifedipine, in this population. Thirty-seven participants were enrolled between July 2015 and September 2017, receiving combination therapy as part of their treatment regimen. Results indicate effective blood pressure control without significant adverse events, with 36.8% experiencing preeclampsia but no severe cases reported. Neonatal outcomes were generally favorable, although 15% of babies were classified as small-for-gestational-age, all achieving Apgar scores between nine and ten. These findings suggest promising outcomes with combination therapy, emphasizing the need for further research to optimize management approaches for pregnant individuals with chronic hypertension.

Highlight:

1. Controlled blood pressure: Combination therapy effectively manages blood pressure in chronic hypertension.
2. Lowered severe complications: Potential reduction in eclampsia and placental abruption risks.
3. Positive neonatal outcomes: Favorable Apgar scores and reduced small-for-gestational-age incidence.

Keyword: Chronic Hypertension, Pregnancy, Combination Therapy, Low-Dose Aspirin, Calcium Channel Blockers

Published date: 2024-05-13 00:00:00

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Academia Open
Vol 9 No 1 (2024): June
DOI: DOI 10.21070/acopen.9.2024.8933 . Article type: (Medicine)

INTRODUCTION

When the woman gets pregnant, she puts her unborn child at serious danger since she has a history of recurrent hypertension. According to the American College of Obstetricians and Gynecologists Preface Bulletin, this kind of hypertension is defined as having high blood pressure before conception or before the 20th week of gestation and lasting up to 12 weeks after delivery. Persistently high blood pressure during pregnancy raises the risk of complications; severe preeclampsia is the most common disease, affecting around one-third of these individuals. Preventive measures are critical because if left untreated, this sickness might deteriorate and progress to more dangerous illnesses such as eclampsia or convulsions (1).High blood pressure during pregnancy has also been associated to a variety of negative effects, including an increased chance of cesarean section, reduced fetal development, early delivery, and fetal death. As a result, adopting antihypertensive drugs remains a viable option that must be carefully reviewed and analyzed, despite the risks.

Calcium channel blockers are often used as a second-line treatment for pregnant women with persistent hypertension. Despite different viewpoints on their efficacy, long-acting calcium blockers have been found to be safe in this setting (2). The study described in this article employed two types of long-acting calcium blockers: amlodipine besylate tablets and controlled-release nifedipine (Adalat) pills. The goal of this research is to determine how effectively calcium channel blockers work to reduce the incidence of superimposed preeclampsia and prevent it from progressing to more severe illnesses such as eclampsia, placental abruption, and other adverse pregnancy outcomes. The study's parallel objective is to use these medical interventions to enhance newborn outcomes. This research significantly enhances the field of maternal-fetal medicine by evaluating the impact of calcium channel blockers on reducing the risks associated with persistent hypertension during pregnancy.

METHODS

The research enrolled thirty-seven From July 2015 to September 2017, Abi Ghraib General Hospital diagnosed pregnant mothers with chronic hypertension. According to the American College of Obstetricians and Gynecologists (ACOG) Preface Bulletin recommendations, gestational hypertension was defined as a systolic blood pressure of 140 mmHg or higher or a diastolic blood pressure of 90 mmHg or higher, based on several measurements taken six hours apart (3). A rapid onset or worsening of urine protein, a sudden increase in blood pressure, a low platelet count, or high liver enzymes after the 20th week of pregnancy were further indicators of preeclampsia in addition to persistent hypertension. If a baby's birth weight fell below the 10th percentile, it was classed as small-for-gestational-age (SGA) according to a national standard curve for singleton births. Evaluations were performed on thirty-seven pregnant women with chronic hypertension who attended their initial prenatal clinical sessions to ensure that their condition was thoroughly monitored and risk factors identified.

Every participant had standard kidney and liver function assessments, echocardiograms, blood coagulation and clotting assays, and a full medical history review. Every participant in the research had their body mass index (BMI) calculated. When it was determined that the patients had chronic hypertension, they were immediately administered a variety of antihypertensive medications, including calcium channel blockers and low-dose aspirin. For example, twenty-five patients were told to take 50 milligrams of aspirin orally every night, along with five milligrams of oral amlodipine besylate tablets every day. Similarly, 12 more patients were instructed to take 30 milligrams of controlled-release nifedipine pills daily, in addition to 50 milligrams of aspirin administered orally every night. The low-dose aspirin medication was discontinued in the 36th week of pregnancy, although calcium channel blockers were provided throughout the pregnancy. Throughout their pregnancies, all participants attended regular monitoring and follow-up sessions at the current obstetric clinic. In addition to non-stress tests performed close to delivery, prenatal care included monthly blood and urine tests, ultrasound examinations to determine fetal status and amniotic fluid levels, and color-Doppler assessments to determine blood flow in the uterine arteries and fetal blood vessels. There were eight incidences of complications from gestational diabetes mellitus (GDM), three cases of retinopathy, and two cases of adrenal tumors in the group of 13 persons with known underlying medical problems.

RESULT

During the first visit sessions ,patients data are recorded in details which regarded the foundational dataset for analysis Table 1. In contrast, Table 2 encapsulates the information gathered post the administration of antihypertensive medication. Upon meticulous examination of these two tables, a prominent observation emerges regarding the efficacious control of patients' blood pressures due to the medication regimen. Notably, there was a marginal increment in systolic pressure from 142.3 mmHg to 147.7 mmHg, while

Table (1) Demographic patient data (n=37).	
Items	mean
Age (years)	31.3

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Prior to weight (kg)	68.6
Prior to BMI	26.6
Week of gestation at the first consultation	16.0
Systolic blood(first reading)	146.3
Diastolic blood (first reading)	93.8
Parity Primipara	19 (51.5%)
Multipara	18(48.5%)

Table 1.

Table 2.Demographic patient after drug administration (n=37).	
Blood pressure during birth, measured in systolic form	148.7
Blood pressure at diastolic level at delivery	96.9
Gestational weeks at delivery	36.9
≥ 37	24(65 %)
< 37	13(35%)
Alampsia	0 (0.0%)
sudden stoppage of the placenta	0 (0.0%)
Urine protein -ve +ve	22 (60%) 15 (40%)
Delivery mode: Natural delivery Cesarean delivery	7 (19%) 30 (81%)
In terms of gestational age (SGA), minimum n (%) Less than tenth of the total birth weight in grams ≥ 2,500 g	5 (15.1%) 3,008 26 (78.8%
Apgar (9–10 points) at 1–5 minutes	37(100%)

Table 2.

the diastolic pressure exhibited a slight rise from 91.8 mmHg to 96.9 mmHg. Subsequent to the medication administration, it was discerned that 40% of the patients manifested super-imposed preeclampsia, characterized by the presence of positive urine protein. Nevertheless, it is noteworthy that none of these cases progressed towards more severe complications such as eclampsia or placental abruption. Moreover, the continuity of pregnancy was observed in 71.2% of the patients until the 37th

week of gestation, culminating in successful deliveries. However, it is interesting to note that the rate of natural deliveries stood at a mere 19%, contrasting sharply with the significantly higher rate of cesarean deliveries, which peaked at 81%. Delving into the realm of neonatal outcomes, it is apparent that a substantial proportion, specifically 78.8%, of neonates exhibited a birth weight exceeding 2,500 g. Furthermore, a mere 15% of the Patients gave birth to babies who were classed as Small for Gestational Age (SGA), meaning that their birth weight was less than the benchmark 10th percentile. Remarkably, all newborns' Apgar values at the one- to five-minute mark were consistently high, ranging from 9 to 10, with no scores falling below the 9.

DISCUSSION

One of the key aims of treating chronic hypertension during pregnancy is to reduce morbidity among moms with high blood pressure. The most common unfavorable pregnancy outcome associated with persistent hypertension is preeclampsia with superimposition (4). A rigorous meta-analysis of data from 24 randomized studies revealed that antihypertensive medications significantly reduced the incidence of severe hypertension. However, there was no evidence that this treatment method decreased the incidence of superimposed preeclampsia, placental abruption, or fetal growth restriction (5). Furthermore, the newborn data indicated no improvement. According to the most recent research, calcium channel blockers are efficient antihypertensive medications since they maintain blood pressure levels without dramatically boosting them after taking the prescription. Despite the fact that almost 40% of the trial participants had superimposed preeclampsia after taking the medicine, none experienced more serious side effects such as placental abruption or eclampsia. Notably, Ellan and Heffrey (6) report that women with chronic hypertension had a 1.56% versus 0.58% ratio, making them twice as likely to have placental abruption as women with normal blood pressure. As a result, using calcium channel blockers or initiating early therapies may be able to prevent issues from deteriorating. The study's principal weakness is its relatively small sample size of 37 patients, emphasizing the need for a bigger cohort in future research to give a more comprehensive statistical analysis. Nonetheless, 15% of participants had small-for-gestational-age (SGA) babies after starting the study's antihypertensive drug. This incidence range is close to the 10-20% identified by Ellen and Heffrey in a study of women with chronic hypertension in the United States and Canada (6). It is critical to underline that obtaining Apgar scores greater than 9 for each kid during the first five minutes of life is a consistent predictor of improved outcomes for babies.

Calcium channel blockers may marginally increase the incidence of superimposed preeclampsia, according to

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

research released by the American College of Obstetricians and Gynecologists (ACOG) [7]. The present study's results showed a higher incidence rate of superimposed preeclampsia than the 30% suggested by ACOG, with 40% of research participants experiencing it. It is also important to remember that, in addition to blood pressure measurements, other aberrant test findings were evaluated when determining whether preeclampsia was moderate or severe. Notably, several patients in the present study group were identified to be in critical condition at the baseline assessment, which might possibly bias the findings in favor of a higher incidence rate. Thirteen of the 37 patients had underlying medical concerns discovered at their first clinical assessment; the other patients developed complications such as gestational diabetes mellitus (GDM), retinopathy, and adrenal tumors.

If the thirteen patients in this subset were placed in the highest risk category according on ACOG criteria, the incidence of superimposed preeclampsia would be 40%. This ratio seems to be lower than ACOG's reported 75% for this category [7]. Calcium channel blockers may minimize the incidence of superimposed preeclampsia in this high-risk group, according to one study. Furthermore, 35% of patients who went into labor before the 37th week of gestation had preterm labor, despite ACOG statistics indicating a 67% premature labor rate. Because randomized trials have not shown conclusive results, there is no agreement among proponents of antihypertensive medication for prenatal hypertension on the optimal blood pressure readings during pregnancy or the best timing to begin antihypertensive drug use. There are several professional standards that provide different recommendations on when to begin therapy [8]. However, the majority of experts recommend delaying to start treatment for mild cases of hypertension in pregnant women and avoiding treating small cases entirely. According to the 2001 ACOG guidelines for antihypertensive medication [9], pregnant women with hypertension should be administered antihypertensive medicines if their blood pressure readings were 110 mmHg or higher diastolic or 180 mmHg or higher systolic. In February 2012, ACOG changed the initial medication threshold to 150-160 mmHg systolic / 100-110 mmHg diastolic [10].

In contrast, the present research used a different approach, starting antihypertensive medication even for individuals with mild hypertension, with a diastolic blood pressure threshold of 90-95 mmHg. Because the duration and severity of elevated hypertension are associated with poor pregnancy outcomes, the authors reasoned that starting the medication at such a low dose would reduce the likelihood of more unfavorable pregnancy outcomes and slow the development of more severe hypertension. This view is backed by the present experiment's data, which revealed no substantial rise in blood pressure, eclampsia, or placental abruption. The blood pressure was well controlled.

Nifedipine has a high potential to lower blood pressure since it is a strong arteriolar vasodilator; nonetheless, there is a significant risk that it may cause hypotension [11]. Due to this inherent danger, a more thorough assessment of its effects on pregnancy is required. Amlodipine, on the other hand, works directly with vascular smooth muscle to act as a peripheral artery vasodilator, decreasing peripheral vascular resistance and blood pressure [12]. Some patients' principal complaints throughout the ongoing investigation indicated discrepancies in the adverse effects of the two medications: Adalat users complained of headaches, whereas Norvasc users reported no headaches at all. This trend seems to be consistent with the results of the ACOG study on the harmful effects of nifedipine. The authors of the present study, however, lacked statistically significant data to determine with confidence how these two medications differed in terms of adverse effects. Therefore, further research is required to look at any possible variances in the effectiveness and side effects of these treatments before making any final findings.

CONCLUSION

The combination therapy of low-dose aspirin and calcium channel blockers, particularly nifedipine, presents promising results in managing chronic hypertension during pregnancy, as evidenced by this study's findings. The administration of these medications effectively controlled blood pressure levels without significant adverse events such as eclampsia or placental abruption. Notably, the incidence of superimposed preeclampsia, though higher than the rate suggested by ACOG, could potentially be mitigated by the use of calcium channel blockers, particularly in high-risk subsets. While the small sample size underscores the need for larger cohorts in future investigations to enhance statistical robustness, this study underscores the potential of early intervention in mild hypertension cases to improve pregnancy outcomes and mitigate the risk of severe complications. Further research is warranted to explore the comparative effectiveness and adverse effects of different calcium channel blockers, such as nifedipine and amlodipine, to inform clinical practice better and optimize therapeutic approaches for pregnant individuals with chronic hypertension.

References

1. A.V. Mattioli, S. Pennell, F. Demaria, A. Farinetti, "Atrial remodeling in pregnant hypertensive women: comparison between chronic and gestational hypertension," Open Cardiovasc. Med. J., vol. 6, p. 9, 2012.
2. A.E. Czeizel, F. Banhidy, "Chronic hypertension in pregnancy," Curr. Opin. Obstet. Gynecol., vol. 23, no. 76, 2011.
3. P.V. Garcia, C. Montufar-Rueda, A. Smith, "Pregnancy and severe chronic hypertension: maternal outcome," Hypertens. Pregnancy, vol. 23, p. 285, 2004.

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

4. C. Lydakis, D.G. Beavers, M. Beavers, G.Y. Lip, "Obstetric and neonatal outcome following chronic hypertension in pregnancy among different ethnic groups," QJM, vol. 91, p. 837, 1998.
5. L.A. Magee, C. Cham, E.J. Waterman, A. Ohlsson, P. von Dadelszen, "Hydralazine for treatment of severe hypertension in pregnancy: meta-analysis," BMJ, vol. 327, p. 955, 2003.
6. E.W. Seely, J. Ecker, "Clinical practice. Chronic hypertension in pregnancy," N. Engl. J. Med., vol. 365, p. 439, 2011.
7. American College of Obstetricians and Gynecologists, "ACOG Practice Bulletin No. 125: Chronic hypertension in pregnancy," Obstet. Gynecol., vol. 119, p. 396, 2012.
8. U. Perni, C. Sison, V. Sharma, G. Helseth, A. Hawfield, M. Suthanthiran, P. August, "Angiogenic factors in superimposed preeclampsia: a longitudinal study of women with chronic hypertension during pregnancy," Hypertension, vol. 59, p. 740, 2012.
9. European Society of Gynecology (ESG), Association for European Paediatric Cardiology (AEPC), German Society for Gender Medicine (DGesGM), V. Regitz-Zagrosek, C. Blomstrom Lundqvist, C. Borghi, et al., "ESC Guidelines on the management of cardiovascular diseases during pregnancy: the task force on the management of cardiovascular diseases during pregnancy of the European Society of Cardiology (ESC)," Eur. Heart J., vol. 32, p. 3147, 2011.
10. G. Mancia, R. Fagard, K. Narkiewicz, J. Redon, A. Zanchetti, M. Böhm, et al., "2013 ESH/ESC Guidelines for the management of arterial hypertension: the task force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC)," Eur. Heart J., vol. 34, p. 2159, 2013. doi: 10.1093/eurheartj/eht151. Epub 2013 Jun 14.
11. M. Jayashree, S. Singhi, "Changing trends and predictors of outcome in patients with acute poisoning admitted to the intensive care," J. Trop. Pediatr., vol. 57, p. 340, 2011.
12. S.R. Helms, "Treatment of feline hypertension with transdermal amlodipine: a pilot study," J. Am. Anim. Hosp. Assoc., vol. 47, no. 3, p. 205, 2011.

ISSN 2714-7444 (online), https://acopen.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo