ORIGINAL RESEARCH

The comparison of maternal stress level during pregnancy between two groups of pregnancy outcomes in the COVID-19 pandemic

Farisya Nurliana Fatin[1] [ID]**, Gatut Hardianto[2]** [ID]*****, Dwi Izzati[1]** [ID]
[1]Midwifery Study Program, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.
[2]Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Airlangga,
Dr. Soetomo General Academic Hospital, Surabaya, Indonesia.

Article Info	ABSTRACT
  *Corresponding author: Gatut Hardianto gatut.hardianto @fk.unair.ac.id 	**Objective**: This study analyzed the comparison of maternal stress levels during pregnancy between two groups of pregnancy outcomes in the COVID-19 pandemic at Koja Regional General Hospital, North Jakarta, Indonesia. **Materials and Methods**: A hospital-based analytic observational study conducted with a case-control approach, involving mothers giving birth in March-August 2022, aged 20–35, without disease histories such as hypertension, anemia, gestational diabetes mellitus, and tuberculosis. Two groups in this study had matched inclusion criteria, consisting of 24 respondents with adverse pregnancy outcomes in the case group and 34 respondents with good pregnancy outcomes in the control group. The sampling method used total population technique. Data were obtained from medical record and modification of Depression Anxiety Stress Scale (DASS42) questionnaire. Analysis of confounding variables used different tests and bivariate analysis using the Mann-Whitney test. **Results**: Respondent characteristics had no difference (p >0.05). Respondent distribution with normal levels in the control group (70.6%) was higher than in the case group (45.8%). The result of Mann-Whitney test was no different in maternal stress levels during pregnancy between the case and control groups with pregnancy outcomes in COVID-19 pandemic (p=0.102). **Conclusion**: Most maternal stress levels during pregnancy were in the normal category. There was no difference in maternal stress level during pregnancy between both groups in COVID-19 pandemic at Koja Regional General Hospital, North Jakarta, Indonesia.

Highlights:

1. Maternal stress level during pregnancy in the COVID-19 pandemic had normal category.
2. There was no difference of maternal stress level during pregnancy between good and adverse pregnancy outcomes in the COVID-19 pandemic.
3. Other factors can influence maternal stress level during pregnancy in the COVID-19 pandemic.

INTRODUCTION

Maternal stress during pregnancy refers to the unbalance condition that pregnant women feel when faced with demands and worries.[1] Pregnancy makes women have different stressors such as physical change, less empowerment, job condition, relation with her spouse, and mood change.[2] Stress could happen when pregnant women feel that demand has proven more than their ability to receive. Around 78% of women have moderate stress during pregnancy, while 6% have severe stress.[3] A previous study showed that 54% of the mothers who had stress during pregnancy finally had preterm birth, while the percentage of all mothers with preterm bith was 23%.[4] The term birth occurs between 37 and 42 weeks, while preterm birth is defined as delivery before 37 weeks gestation age.[5] A meta-analysis study by Lima et al.[6] to 1,382 women have shown that mothers with stress during pregnancy had 1.68 more risk of having a baby with low birth weight (LBW) than mothers without stress. The normal birth weight for a baby is between 2500–4000 grams. If the birth weight is less than 2500 grams, it is referred as LBW. This condition may result from preterm birth, intrauterine growth restriction (IUGR), or both.[7,8]

Stress during pregnancy may be affected by COVID-19 pandemic.[9] Pregnant women may have psychological problems during the pandemic due to limited health facility access, lack of social support, and feeling worried about their health if infected with COVID-19.[10] Other factors that affect maternal stress are economic crisis and media exposure (pers, radio, television). It increases anxiety and depression symptoms in pregnant women due to COVID-19 pandemic.[11]

A study by Gruebner et al.[12] has shown the risk of mental health problems in urban areas is higher than in rural areas. Jakarta occupies the ninth position as the most stressful city in the world.[13] The prevalence of mental and emotional problems in Jakarta was 10.1%, while depression was 5.9%, while the prevalence increase from 2013 was 5.7%. The result also showed that North Jakarta becomes one of the top three cities in Jakarta region with higher mental health problems of 12.95% for mental and emotional problems, and 7.14% for depression prevalence.[14–16]

Those data only showed the prevalence of mental health problems in general society. Data on stress for pregnant women were still difficult to find, especially during the COVID-19 pandemic. Those previous studies were conducted in other countries, while in Indonesia studies exploring the effect of stress on pregnancy outcome remains limited. Moreover, another research only analyzed the impact of stress on one of the outcomes.

Therefore, this study aimed to analyze the comparison of maternal stress levels during pregnancy between two groups of pregnancy outcomes in the COVID-19 pandemic.

MATERIALS AND METHODS

A study using observational analytic design with case-control approach was conducted at Koja Regional General Hospital, North Jakarta, Indonesia. The population, consisted of the case group (adverse outcomes) were all mothers with preterm birth and or LBW baby, while the control group (good outcomes) was all mothers with term birth and normal birth weight baby. Both groups underwent matching process with inclusion criteria, ie. giving birth between March–August 2022, aged 20–35, without history or pregnancy complications such as hypertension, pre-eclampsia, anemia, gestational diabetes mellitus, and tuberculosis. Respondents who refused to join this study were excluded. The total respondents were 58 mothers, 24 respondents in the case group and 34 respondents in the control group.

The sampling method used a total population technique. Data were related to pregnancy outcomes and respondents phone number obtained from the medical record. The general data of the respondents were obtained from the questionnaire. Data for assessing maternal stress levels during pregnancy used a modified questionnaire from Depression Anxiety Stress Scale 42 (DASS42). The questionnaire was already used before in a study by Tambunan[17] at Deli Serdang District, North Sumatera, Indonesia. The original DASS42 questionnaire consists of 42 statements to rate depression, anxiety, and stress levels in the general population. The modification of this questionnaire has 14 statements for assessing maternal stress levels during pregnancy in the COVID-19 pandemic. The evaluation scoring is 0 for none or never, 1 for sometimes, 2 for often, and 3 for almost every time. Furthermore, the evaluation indicators of stress levels depend on the score of the sum result in each statement that is normal (0–14), mild (15–18), moderate (19–25), severe (26–33), and very severe ($\geq$34).

Data collection used an online form called Zoho Survey. The first page of the form displays information about the research procedure, purpose, and benefit. Respondents also signed an informed consent on their readiness to join this study. On the next page, respondents filled out the online form that consisted of biodata and DASS42 questionnaire. Data analysis used Statistical Program for Social Science (SPSS) application version 25. The comparative difference test

was used for the confounding variables between control and case groups, while the Mann-Whitney test was used for bivariate analysis. This study had received ethical approval through the Health Research Ethics Committee of the Faculty of Medicine Universitas Airlangga (No. 89/EC/KEPK/FKUA/2022).

RESULTS AND DISCUSSION

The general data distribution of respondents, percentage, and the comparative difference test are shown in Table 1. The results of the comparartive difference test showed no difference in the general data of the respondents between case and control groups. Table 2 shows that most maternal stress levels during pregnancy are in the normal category. Although the percentage of mild-level and moderate-level in the case group was higher than in the control group, the results of the Mann-Whitney test showed no difference between maternal stress during pregnancy with

pregnancy outcomes in both groups (p=0.102). The systematic review study of Lima et al.[6] revealed no significant difference between the case and control groups with preterm birth. It was different from the result of a case-control study by Nurahmawati[18] which found an influence of maternal stress levels on LBW. This study stated that chronic stress during pregnancy without good stress management increased the risk of LBW as it decreased blood flow and inhibited fetal growth. Release of corticotropin-releasing hormone (CRH) by the placenta can affect gestational duration which is a risk for preterm birth. It is not just hormones, Saleha et al.[19] and Primawati et al.[20] stated that maternal stress levels during pregnancy have influenced by other factors such as job, parity, social economic factors, social support, and environment. There is a significant association between maternal jobs and stress levels during pregnancy.[21] Stress can arise in working mothers with a job that requires complete thought.[22]

Table 1. The general data distribution of the respondents

Data	Case		Control		P value
	f	%	f	%	
Job					
Housewife	20	83.3	29	85.3	
Employee	2	8.3	3	8.8	0.235[a]
Seller	0	0	2	5.9	
Other	2	8.3	0	0	
Education					
No/not yet graduated	1	4.2	0	0	
Elementary school	2	8.3	4	11.8	
Junior high school	3	12.5	7	20.6	0.534[b]
Senior high school	13	54.2	18	52.9	
University	5	20.8	5	14.7	
Household income					
Low	2	8.3	6	17.6	
Middle	15	62.5	17	50.0	0.958[b]
High	6	25.0	6	17.6	
Very high	1	4.2	5	14.7	
Smoking/alcohol					
Yes	0	0	2	5.9	0.632[a]
No	24	100	32	94.1	
BMI					
< 18.5	2	8.3	6	17.6	
18.5 – 24.9	16	66.7	20	58.8	0.072[c]
25 – 29.9	4	16.7	7	20.6	
≥ 30	2	8.3	1	2.9	
Gestational interval					
Risky	6	25	13	38.2	
Not risky	8	33.3	13	38.2	0.607[c]
-	10	41.7	8	23.5	
Parity					
Primipara	10	41.7	8	23.5	
Multipara	14	58.3	26	76.5	0.145[b]
Grand multipara	0	0	0	0	
Total respondents	24	100	34	100	

Chi-square[a], Mann Whitney[b], Independent sample t-test[c]

Table 2. Analysis of the comparison of maternal stress levels during pregnancy between two groups of pregnancy outcomes in during COVID-19 pandemic at Koja Regional General Hospital, North Jakarta, Indonesia.

| Stress Level | Pregnancy Outcomes | | | | Total | | P value |
| | Good[a] | | Adverse[b] | | | | |
	F	%	f	%	f	%	
Normal	24	70.6	11	45.8	35	60.3	
Mild	3	8.8	6	25	9	15.5	
Moderate	7	20.6	7	29.2	14	24.1	0.102
Severe	0	0	0	0	0	0	
Very severe	0	0	0	0	0	0	
Total	34	100	24	100	58	100	

The control group (all mothers with term birth and normal birth weight baby)[a], The case group (all mothers with preterm birth and or LBW baby)[b]

Most respondents in each group were housewives with the risk of having severe stress levels less than other job types. A study by Nasution[23] revealed an association between parity and stress level in pregnant women, where a mother with first pregnancy tends to have higher stress levels than multipara. The result is in line with respondent characteristics that are dominated by multipara. Stable social economics condition can decrease maternal stress levels because of higher affordability of health facilities where mothers are able to ensure their physical and psychological health.[24]

Most of the women in this study had middle household incomes which have not become a trigger for severe stress than women with low household incomes. Other factors like social and environment support also have a role in providing calm and comfort feelings that affect stress levels for pregnant women. Form of support like information or emotional support can be provided by family and friends.[25,26]

Most respondents in both groups had normal stress levels. Declining stress levels during pregnancy could happen through a positive coping strategy.[27,28] Coping strategy refers to an effort made by the pregnant women in response to stressors, so it can minimize negative affect.[29] A simple coping strategy such as a healthy diet and doing a hobby can decrease stress levels.[30] Moreover, coping strategies such as active and problem-focused coping aim to resolve stressors and prevent adverse pregnancy outcomes instead of maladaptive coping like avoidance as passive action and ineffective.[31]

Normal stress levels dominated in the case group refer to the possibility of other factors that influence preterm birth and LBW. Table 1 shows that almost all respondents in the case group (94.1%) are not smokers and alcohol consumers. Even though the mother is not a smoker, another study found an association between a passive-smoker mother with preterm birth and LBW.[32,33] Furthermore, although most respondents'

BMI before pregnancy was in normal category, incidents of preterm birth and LBW also depend on nutrition status and weight gain during pregnancy.[34,35] The COVID-19 pandemic also had impact on the decline of antenatal care visits that raised adverse events for the mother and the fetus.[36] This is because mothers were afraid of being caught as having contacted with COVID-19, there were recommendations to postpone pregnancy checks, and the lack of personal protective equipment.[37]

However, this study approach could have had recall bias. Recall bias is a form of information bias that occurs when the respondents forget about data related to exposure.[38] Respondents cannot remember their experience accurately and there is possibility of changing or removing the detail. The accuracy in remembering some experiences also depends on the effect of the incident.[39] In this case, respondents could have forgotten or did not have capability to accurately remember stress exposure during the COVID-19 pandemic. This possibility can happen especially in the case group with adverse pregnancy outcomes. Those experiences could have made the mothers prefer to remove sad memories about their pregnancy and the baby's condition at birth.

This study design had also tried to minimize those effects by using just the last six months' birth period. The time range from the end of pregnancy to the filling the questionnaire was not too long and the stress exposure experienced during the COVID-19 pandemic could still have been well remembered. The process of collecting primary data was also preceded by explaining that there were no right or wrong answers in filling out the questionnaire and the answers could affect the research result so that respondents can be more honest in filling out the questionnaire. The strength of our study was that it included two types of pregnancy outcomes and also analyzed a comparison of maternal stress levels during the COVID-19 pandemic.

CONCLUSION

Most maternal stress levels during pregnancy in the COVID-19 pandemic were still in normal category in both case and control groups. There was no difference in stress levels during pregnancy between mothers with good and adverse pregnancy outcomes within the period of the COVID-19 pandemic at Koja Regional General Hospital, North Jakarta, Indonesia. Further studies need to explore other factors that influence pregnancy outcomes in both the mothers and the babies during the COVID-19 pandemic.

DISCLOSURES

Acknowledgment

Conflict of interest

All authors do not have a conflict of interest.

Funding

Author contribution

All authors have contributed to all processes in this research, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.

REFERENCES

1. Engidaw NA, Mekonnen AG, Amogne FK. Perceived stress and its associated factors among pregnant women in Bale zone Hospitals, Southeast Ethiopia: a cross-sectional study. BMC Res Notes. 2019;12(1):356. doi: 10.1186/s13104-019-4383-0. PMID: 31234892; PMCID: PMC6591949.
2. Horsch A, Gilbert L, Lanzi S, et al. Prospective associations between maternal stress during pregnancy and fasting glucose with obstetric and neonatal outcomes. J Psychosom Res. 2019;125: 109795. doi: 10.1016/j.jpsychores.2019.109795. Epub 2019 Aug 6. PMID: 31421320.
3. Matas-Blanco C, Caparros-Gonzalez RA. Influence of Maternal Stress during Pregnancy on Child's Neurodevelopment. Psych. 2020 Oct;2(4):186–97. doi: 10.3390/psych2040016.
4. Lilliecreutz C, Larén J, Sydsjö G, et al. Effect of maternal stress during pregnancy on the risk for preterm birth. BMC Pregnancy Childbirth. 2016;16:5. doi: 10.1186/s12884-015-0775-x. PMID: 26772181; PMCID: PMC4714539.
5. Quinn JA, Munoz FM, Gonik B, et al. Preterm birth: Case definition & guidelines for data collection, analysis, and presentation of immunisation safety data. Vaccine. 2016;34(49): 6047-6056. doi: 10.1016/j.vaccine.2016.03.045. Epub 2016 Oct 13. PMID: 27743648; PMCID: PMC5139808.
6. Lima SAM, El Dib RP, Rodrigues MRK, et al. Is the risk of low birth weight or preterm labor greater when maternal stress is experienced during pregnancy? A systematic review and meta-analysis of cohort studies. PLoS One. 2018;13(7):e0200594. doi: 10.1371/journal.pone.0200594. PMID: 3004 8456; PMCID: PMC6061976.
7. Cutland CL, Lackritz EM, Mallett-Moore T, et al. Low birth weight: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data. Vaccine. 2017;35(48 Pt A):6492-6500. doi: 10.1016/j. vaccine.2017.01.049. PMID: 29150054; PMCID: PMC5710991.
8. Nurbaiti, Gofar SH, Samsun, Winarno G, et al. The accuracy of the weight of the fetal agency using ultrasound based on the formula hadlock compared to the birth of new body weight. KnE Life Sci. 2019;2019(7):82–6. doi: 10.18502/kls.v4i15.5741.
9. Matvienko-Sikar K, Redsell S, Flannery C. Effects of maternal stress and/or anxiety interventions in the first 1000 days:Systematic review of reviews. J Reprod Infant Psychol. 2023;41(2):114-151. doi: 10.1080/02646838.2021.1976400. Epub 2021 Sep 23. PMID: 34555958.
10. Arinda YD, Herdayati M. Masalah kesehatan mental pada wanita hamil selama pandemi COVID-19 [Mental healt in pregnancy during COVID-19 pandemics]. J Kesehat Vokasional. 2021;6(1):32. doi: 10.22146/JKESVO.62784.
11. Puertas-Gonzalez JA, Mariño-Narvaez C, Romero-Gonzalez B, et al. Stress and psychopathology reduction in pregnant women through online cognitive behavioural therapy during COVID-19: A feasibility study. Behav Sci (Basel). 2021; 11(7):100. doi: 10.3390/bs11070100. PMID: 3435 6717; PMCID: PMC8301144.
12. Gruebner O, Rapp MA, Adli M, et al. Cities and Mental Health. Dtsch Arztebl Int. 2017;114(8):121-127. doi: 10.3238/arztebl.2017.0121. PMID: 28302261; PMCID: PMC5374256.

13. VAAY. The most stressful cities index 2021. 2021. [cited 2022 Apr 10]. Available from: https://vaay.com/en/pages/stressful-cities-index.

14. Kementerian Kesehatan Republik Indonesia. Laporan Provinsi DKI Jakarta [Report from the Province DKI Jakarta]. Riskesdas 2018; 2018.

15. Kementerian Kesehatan Republik Indonesia. Riset Kesehatan Dasar 2018 [Basic Health Research 2018]. 2018; 227.

16. Kementerian Kesehatan Republik Indonesia. Riset Kesehatan Dasar 2013 [Basic Health Research 2013]. 2013; 166.

17. Tambunan RNZ. Gambaran faktor-faktor stres pada ibu hamil saat pandemi di wilayah kerja Puskesmas Biru-biru [Stress factors among pregnant women in Biru-Biru Health Center] [undergraduate thesis on the internet]. Univeristas Sumatera Utara; 2021. Available from: https://repositori.usu.ac.id/bitstream/handle/123456789/44274/171101090.pdf?sequence=1

18. Nurahmawati D. Pengaruh umur, jenis pekerjaan, paritas, umur gestasi dan stres psikososial pada ibu hamil terhadap berat badan lahir bayi di Desa Ngetos Kecamatan Ngetos Kabupaten Nganjuk [Effect of age, occupation, parity, gestational age, and psychosocial stress on birthweight in Nganjuk]. Judika (Jurnal Nusantara Medika). 2019:2(1); 34–42. doi: 10.33369/jvk.v2i1.10652

19. Saleha N, Delfina R, Maiyulis M. Derajat stres ibu hamil dan preeklamsia mempengaruhi kejadian persalinan prematur [Stress and preeclampsia in pregnancy affect prematurity]. J Vokasi Keperawatan. 2019;2(1):34–42. doi: 10.33369/jvk.v2i1.10652.

20. Primawati AS, Widyawati MN, Admini A. Penurunan tingkat stres ibu hamil dengan terapi musik dan aromatherapy pada kelas ibu hamil [Stress reduction with music and aromatherapy in prenatal class]. J Kebidanan. 2018;8(1):37. doi: 10.31983/jkb.v8i1.3733.

21. Khayati YN, Veftisia V. Hubungan stress dan pekerjaan dengan preeklampsia di wilayah Kabupaten Semarang. Indones J Midwifery. 2018;1(1). doi: 10.35473/ijm.v1i1.38.

22. Rudiyanti N, Rosmadewi R. Hubungan usia, paritas, pekerjaan dan stres dengan emesis gravidarum di Kota Bandar Lampung. J Ilm Keperawatan Sai Betik. 2019;15(1):7. doi: 10.26630/jkep.v15i1.1253.

23. Nasution SM. Pengaruh usia kehamilan, jarak kehamilan, komplikasi kehamilan, antenatal care terhadap kejadian bayi berat lahir rendah (BBLR) di RSUD Dr. Pirngadi Kota Medan Tahun 2017 [Effect of gestational age, distance, complications, and antenatal care on LBW in Medan] [undergraduate thesis on the internet]. Universitas Sumatera Utara; 2018. Available from: https://repositori.usu.ac.id/handle/123456789/6477.

24. Aniroh U, Fatimah RF. Tingkat kecemasan ibu primigravida dalam menghadapi persalinan ditinjau dari usia ibu dan sosial ekonomi [Primigravida's anxiety to face delivery in relations to age and socieconomic level]. J Ilmu Keperawatan Matern. 2019;2(2):1. doi: 10.32584/jikm.v2i2.374.

25. Utomo YD, Sudjiwanati. Pengaruh dukungan sosial terhadap tingkat kecemasan ibu [Social support affects mother's anxiety]. Psikovidya. 2018;22(2):185–211. doi: 10.37303/psikovidya.v22i2.117.

26. Pusparini DA, Kurniawati D, Kurniyawan EH. Hubungan tingkat stres dengan kualitas tidur pada ibu preeklamsi di wilayah kerja Puskesmas Tempurejo-Jember [Stress and sleep quality among preeclampsia mothers in Jember]. Pustaka Kesehat. 2021;9(1):16. doi: 10.19184/pk.v9i1.16139.

27. Goletzke J, Kocalevent RD, Hansen G, et al. Prenatal stress perception and coping strategies: Insights from a longitudinal prospective pregnancy cohort. J Psychosom Res. 2017;102:8-14. doi: 10.1016/j.jpsychores.2017.09.002. Epub 2017 Sep 4. PMID: 28992901.

28. Rofiqoch I, Dewi S, Yuliani DA. Strategi coping stres pada ibu hamil di masa pandemi Covid-19 [Stress coping strategy in pregnancy during Covid-19 pandemics]. J Kebidanan Harapan Ibu Pekalongan. 2021;8(2):100–6. doi: 10.37402/jurbidhip.vol8.iss2.141.

29. Chapuis-de-Andrade S, Moret-Tatay C, de Paula TA, et al. Psychological factors and coping strategies in pregnancies complicated by hypertension: A cluster-analytic approach. J Affect Disord. 2022;296:89-94. doi: 10.1016/j.jad.2021.09.049. Epub 2021 Sep 22. PMID: 34597892.

30. Penengo C, Colli C, Cesco M, et al. Stress, coping, and psychiatric symptoms in pregnant women in outpatient care during the 2021 second-wave COVID-19 pandemic. Front Psychiatry. 2022;12:775585. doi: 10.3389/fpsyt.2021.775585. PMID: 35069284; PMCID: PMC8775005.

31. Faramarzi M, Amiri FN, Rezaee R. Relationship of coping ways and anxiety with pregnancy specific-stress. Pak J Med Sci. 2016;32(6):1364-1369. doi: 10.12669/pjms.326.10892. PMID: 28083027; PMCID: PMC5216283.

32. Duhita F, Rahmawati NI. Dampak kesehatan anak pada periode embrio, janin, bayi dan usia sekolah dengan ayah perokok [Impact on health during embryonic, fetal, infancy and school-aged periods among children with smoking father]. J Kesehat Vokasional. 2019;4(1). doi: 10.22146/jkesvo.41777.

33. Iryadi R. Hubungan ibu hamil perokok pasif dengan kejadian bayi berat badan lahir rendah

[Passive pregnant smoker and LBW incidence]. J Kesehat Pertiwi. 2020;2(2).

34. Mustika E, Minata F. Analisis faktor maternal dan penyakit kronik pada kejadian persalinan prematur [Maternal factors and chronic diseases in premature delivery incidence]. J Kesehat Saelmakers Perdana. 2021;4(1). doi: 10.32524/jksp.v4i1.38.

35. Puspitaningrum EM. Hubungan status gizi ibu hamil dengan kejadian berat badan lahir rendah (BBLR) di RSIA Annisa Kota Jambi tahun 2018 [Pregnancy nutritional status and LBW in Jambi, 2018]. Scientia Journal. 2018;7(2):1-7. doi :10. 5281/scj.v7i2.67.

36. Angraini EC, Ratnaningsih S, Utami FS. Kepatuhan ibu hamil dalam melakukan ANC pada masa pandemi COVID-19 [Pregnant women's compliance of ANC during COVID-19 pandemics]. J Kesehat. 2022;13(1):130–8. doi: 10.35730/jk. v13i1.591.

37. Dewanggayastuti KI, Surinati IDAK, Hartati NN. Kepatuhan ibu hamil melakukan kunjungan ANC pada masa pandemi COVID-19 [Pregnant women's compliance of ANC visit during COVID-19 pandemics]. J Gema Keperawatan. 2022;15(1). doi: 10.33992/jgk.v15i1.1910.