# Plagiarism Checker X Originality Report

**Similarity Found: 22%**

Date: Thursday, April 14, 2022
Statistics: 830 words Plagiarized / 3753 Total words
Remarks: Medium Plagiarism Detected - Your Document needs Selective Improvement.

-------------------------------------------------------------------------------------------------

The effect of a maternal mentoring program on the timing of first antenatal care visit among pregnant women in Bantul, Indonesia: results of a cluster randomized trial Abstract Background: Early initiation of antenatal care (ANC) visits is essential to improving maternal health. The Indonesian Basic Health Survey (2018) indicated that 20% of pregnant women did not initiate ANC during the first trimester. The present study sought to determine the impact of maternal mentoring program on the timing of the first ANC visit.

Methods: The present study reports on a Cluster Randomized Controlled Trial (CRCT) design in three subdistricts of Bantul District, divided into 61 clusters in each group. A total of 322 preconception women were recruited at baseline, of which 205 were later confirmed to be pregnant. The program consists of (1) preconception health education, (2) monitoring of pregnancy status, and (3) reminded to immediately carry out the first ANC visit.

Mann Whitney and Chi Square tests were conducted to identify the effect of the program on the timing of the first ANC visit. Results: At the individual-level, the intervention group had a mean time of first ANC visit ± 2 days earlier than in the control group (p <0.05), but not statistically significant at the cluster-level. After controlling for basic demographic factors and secondary outcomes, the odds of starting the first antenatal care visit early (<39 days of gestation) was higher in the intervention group (AOR 2.14; 95% CI 1.06, 4.32).

Conclusions: Maternal mentoring from the time of preconception can improve the timing of the first ANC visit. It is crucial that ANC visits are initiated as early as possible for optimal maternal health outcomes. Keywords: antenatal care, preconception,

maternal health, Indonesia, pregnancy

Introduction The Maternal Mortality Rate (MMR) in Indonesia has decreased over the last three decades but still remains relatively high (305 per 100,000 live births).1 Serious efforts are required to reduce MMR in order to reach the Sustainable Development Goals target by 2030 of <70 per 100,000 live births. One strategy is to ensure every pregnant woman receives quality antenatal care (ANC) services.

Previous studies have shown that among women with no ANC, there is increasing risk of maternal mortality,2,3 and missed opportunities of institutional delivery.4 According to the Indonesian Basic Health Survey (2018), more than 90% of pregnant women have received ANC at least once, but only 80% had their first ANC visit during the first trimester and only 74.1% received ANC as recommended with a frequency of at least 1-1-2 (i.e., once during the first trimester, once during the second trimester, and twice during the third trimester).5

In other words, about one-fifth of pregnant women are late in receiving their first ANC visit, and one-quarter of pregnant women do not achieve the recommended frequency and timing of ANC visits during pregnancy. Previous studies have shown that having an earlier ANC visit during pregnancy is associated with improved pregnancy outcomes, such as reduced risk of (1) gestational hypertension and spontaneous abortion6; (2) low birth weight7, (3) preterm birth8, as well as a greater chance of consuming 90 tablets or more of iron supplements, in line with recommendations.9 Likewise, delaying the first ANC visit can impede the delivery of crucial information about recommended health behaviors.

One study in Uganda found that among 400 pregnant women who were late for their first ANC visits (first visit at >20 weeks of gestation), most women did not know (1) at what gestational age they should have their first ANC visit, and (2) the importance of receiving ANC early on. This study recommended that education be given to women, even before pregnancy.10 Delivering health education is one strategy for improving health-related behaviors. Our previous study showed that nutrition education followed by short messaging reminder improved knowledge and maternal behavior, improved compliance to iron pill supplementation and increased hemoglobin level of pregnant women.11 Other studies also found that preconception health counseling and education can increase maternal knowledge, self-efficacy, improved ANC attendance, and maternal lifestyle choices during pregnancy to prevent unwanted pregnancy outcomes.12,13 The present study integrated health education into a maternal mentoring program from preconception until pregnancy.

The educational materials highlighted (1) the importance of preconception health, (2) recommendations for receiving regular and timely ANC, and (3) education regarding

following a healthy diet. Messaging was used as a strategy for reminding women to schedule ANC visits as soon as they experience pregnancy signs and symptoms. The overall goal of the present study was to determine the effect of our adapted maternal mentoring program on the timing of the first ANC visit among pregnant Indonesian women.

Methods Design and Setting The present study was a cluster randomized trial using the hamlet, or small village, as the unit of randomization. The study began in January 2019 and ended in February 2020, and was conducted in three sub-districts of Bantul District, Yogyakarta, Indonesia, which were chosen based on having a high prevalence of anemia during pregnancy based on data from Bantul District Health Office. Together, these three sub-districts comprise of 12 villages including 156 hamlets.

To reduce contamination, hamlets whose residential areas were directly adjacent to other hamlets were categorized as one cluster, so that the total number of clusters included in the study was 122. These 122 clusters were divided randomly into the intervention group (n=61) and the control group (n=61). Respondents Due to the cluster design of the study, eligibility criteria were applied at both the individual- and cluster-level. At the cluster-level, all hamlets located in Sedayu, Pajangan, and Pleret Sub-districts were included.

At the individual-level, those included were (1) women of reproductive age planning a pregnancy, with (2) plans to stay in the research area for at least the next 2 years, and (3) who were willing to take part in the research by signing the informed consent. Women who were already pregnant before the mentoring program began, or who were lost to follow up, were excluded from the final analysis. At the individual-level, the present study included 322 preconception women at baseline, of which 205 were later confirmed to be pregnant and were included in the outcome measure of timing of the first ANC visit (Figure 1).

Confirmation of pregnancy status was carried out in several stages: (1) asking the respondent once a month via WA/SMS whether there were signs of pregnancy or not; (2) if not then it will be asked again in the following month, but if so then the next question was whether it had been confirmed to check with the midwife/doctor or not; and (3) if not then asked to immediately see a midwife/doctor, but if so, it means that she was confirmed to be pregnant. Intervention The intervention group received maternal mentoring from preconception until 12 weeks pregnant, whereas the control group received usual routine health services.

The maternal mentoring program was integrated into a Public Health Surveillance

activity under CAPTURE (Community-Alma Ata Partnership Through Updated Research and Education), a collaboration between Alma Ata University, the Bantul District Health Office, and the Bantul Regency Government. In the present study, the maternal mentoring program included (1) preconception health education which was done once during the first home visit, delivered by face to face counseling with a booklet as the education media, (2) monitoring of pregnancy status by asking this question via WhatsApp(WA)/SMS once a month: "have you experienced signs and symptoms of pregnancy such as late menstruation, nausea, vomiting, or others?", and (3) after respondents experienced signs and symptoms of pregnancy, they were sent a reminding message to book their first ANC visit immediately. The example of the message sent is as follows: "Hi, good morning ma'am. Don't forget to check your pregnancy at the nearest health center. The earlier the better".

The mentors were trained faculty and students of Alma Ata University. The mentors provided the intervention and acted as data collectors. Outcomes and Measurements We evaluated the effect of a maternal mentoring program begun during the preconception period on the timing of the first ANC visit among pregnant Indonesian women. The primary outcome was the mean time it took to have the first ANC visit after becoming pregnant, and the secondary outcomes included change in level of preconception health knowledge, and anthropometric changes (weight, height, MUAC), pre- and post-intervention.

The baseline data, which consists of anthropometric data (weight, height, MUAC) and level of preconception health knowledge were measured during the preconception period in the first home visit, before being given the counseling. The time at which a pregnant woman had her first ANC visit was expressed in terms of the mother's gestational age in 'days'. The gestational age was obtained from the difference between the date of the first ANC visit and the mother's first day of last menstruation. The date of the first ANC was obtained from the records in the mother's Maternal and Child Health Handbook.

At the end of study, mentors make the second home visit to measure weight, mid-upper arm circumference (MUAC), and level of knowledge about preconception health. Sample Size Calculation We calculated sample size using a method that takes into account the design effect (DE) of clustering. We assumed an intra-cluster correlation (ICC) of 0.05 and the average cluster size was 2.64, resulting in a DE of 1,082. We use a power of 80% to detect a 10% difference in the proportion of first time ANC visits between the two groups, resulting in a minimum sample size of 112 respondents per group.

Data Collection We collected demographic data and place of residence from premarital

women who were registered at the Village Office located in Sedayu, Pleret and Pajangan Subdistricts. Premarital women who met the eligibility criteria and who were willing to participate in the research study were recruited as respondents. We selected premarital women as targets in this study because they are in a preconception period and generally plan to become pregnant soon, so that it fits into this research line where the mentoring program was started at the preconception period and the outcome was measured after they become pregnant. From a total of 122 clusters, there were 16 clusters (8 clusters in the intervention group and 8 clusters in the control group) that did not participate because no premarital women met the criteria.

Demographic data and information regarding timing of the first ANC visit were collected using a structured questionnaire. Data on level of preconception health knowledge were obtained from a questionnaire that we have validated, containing 25 questions related to preconception nutrition, and summed to get a total scores, ranging from 0-100 (internal consistency Cronbach's alpha= 0.7). Anthropometric data (weight, height, MUAC) were collected using standardized instruments. Statistical Analysis Data were analyzed with statistical significance accepted at $P<0.05$ for all tests.

The Mann Whitney test was used to assess the mean difference of the timing of the first ANC visit, level of knowledge score, and anthropometric measures, between the intervention and control groups. We measured these data across two levels, i.e. individual-level analysis and cluster-level analysis. The Chi Square test was used for categorized data analysis. Results The baseline characteristics of the sample are shown in Table 1. There was no significant difference found between intervention and control groups for all baseline characteristics. The majority of the respondents were between 20 to 35 years of age, and about 61.5% of the respondents had a middle-school education.

Seventy-three point seven (73.7) percent of the respondents were currently working, and the majority (60.3%) earned less than the district minimum monthly wage. The mean monthly income in the intervention group was slightly lower than in the control group, but this difference was not statistically significant. Regarding nutritional status, the percent overweight in the intervention group was higher than the percent underweight, but in the control group the percent overweight was slightly lower than the percent underweight. Thirty-six point five (36.5) percent of the respondents in the intervention group and 34.9% in the control group were deemed to be at risk of chronic energy deficiency with a MUAC of less than 23.5cm.

Table 2 demonstrates that at the individual-level, the mean time for the first ANC visit in the intervention group was significantly different from the control group ($p<0.05$), while at the cluster-level, the difference was not statistically significant ($p>0.05$), though did

trend towards significance. Pregnant women in the intervention group made their first ANC visit ± 2 days earlier than pregnant women in the control group. In the intervention group, the average of their first ANC visit was at 39.75 (±7.71) days of gestation. Meanwhile, in the control group, the average first ANC visit was at 41.96 (±9.72) days.

The gestational age range of the first ANC visit timing was 24-92 days of pregnancy. Regarding to the level of knowledge about preconception health, both intervention and control groups significantly improved their knowledge scores from pre to post (Table 3), with the intervention group seeing a significantly greater improvement than the comparison group. Anthropometric changes measured included changes in body weight and MUAC. Change was determined by analyzing the difference between pre-pregnancy (preconception) and 13-16 weeks' gestation.

Based on our analysis, there was a significant increase in mean body weight in the two treatment groups, while a significant increase in MUAC only occurred in the intervention group. The mean MUAC in the control group also increased, but it was not statistically significant. The increase in body weight and MUAC in the intervention group was significantly greater than the control group (Table 3). Further analysis was carried out to determine other factors that may affect the timing of the first time ANC visit (Table 4).

For this analysis, the timing of the first ANC visit was categorized into two groups based on the median time in days (=39 days and <39 days of pregnancy). Factors that were analyzed for a relationship with timing of the first ANC visit were age, education level, income level, preconception nutritional status, and level of knowledge about preconception health. The results of this analysis found that the only factor significantly related to timing of the first ANC visit was receiving the mentoring treatment beginning in the preconception period.

All other factors were not found to be significantly related to the outcome. Respondents who received the mentoring program were more likely to make ANC visits earlier, at gestational age <39 days, than those in the control group (OR, 2.14; 95% CI, 1.06-4.32). Having a duration of education less than 9 years, an income level below the district minimum monthly wage, and abnormal nutritional status (underweight or overweight), served as protective factors for timing of the first ANC visit at <39 days of gestation, although none of these associations were statistically significant. Discussion This is one of the first intervention trials in Indonesian women to aim to improve prenatal care.

Our findings indicate that women in the group that received the mentoring program, on average, made their first ANC visit two days earlier than those in the control group, at both the individual- and cluster-levels. Likewise, women in the treatment group were

2.14 times more likely to make their first ANC visit earlier (<39 days of gestation) compared to the control group. Previous studies have found similar results, with one study in particular conducted in the United States that found that women who received preconception counselling were 2.05 times more likely to have an ANC visit in the first trimester compared to the group who received no counselling.14 Another study in Zanzibar also found that women who received a mobile phone preconception counselling intervention had more than double the odds for attending four or more ANC visits.

12 The present study found that the mean time of the first ANC visit in both treatment groups was within the first trimester (<13 weeks), which is in accordance with the recommendation of the Indonesian Ministry of Health. We can conclude that the level of awareness of the importance of attending ANC visits early on during pregnancy is quite good in the chosen study area. Other studies have found different results, one of which was conducted in Nepal and found that almost half (45%) of the respondents did not have their first ANC visit until >3 months of gestation and 28% did not receive ANC at all.15 Similarly, in Zanzibar, one study found that the average time for pregnant women to receive ANC for the first time was at 20 weeks of gestation.12 Pregnancy checks are recommended as early as possible, especially because pregnant women who receive ANC since the first trimester have been shown to have a greater chance of having a higher number of ANC visits during their pregnancy.

In turn, having a higher number of ANC visits (> 4 times) can reduce the risk of experiencing negative birth outcomes such as low birth weight and preterm birth.16 An observational study using the secondary data of the 5th wave Indonesian Family Life Survey (IFLS) on 2014 showed that the ANC frequency of short stature mother had a significant relationship with stunting.17 First trimester is a crucial period of pregnancy because not only all of the major body organs and systems of the fetus are forming, but also the risk of having a miscarriage is highest during this period.

In the intervention group, on average, respondents made their first ANC visit two days earlier than in the control group (p<0.05). This difference in time may seem small, but in practice it can also be meaningful when the ANC visit is early, high-risk pregnant women can be detected earlier too. Early detection of symptoms and danger signs during pregnancy is the best effort to prevent serious pregnancy disorder and ensure a safe and healthy pregnancy.

In conditions where the mother experiences bleeding, hyperemesis gravidarum, or stomach cramps, it must be immediately checked. If there is a delay in checking for 2 days of course it can endanger the health of the mother and the fetus. Analyses of

secondary outcomes found that the respondents' knowledge scores increased significantly, both in the intervention and control groups. Although the control group did not receive the educational intervention component, it is possible they increased their preconception health knowledge due to easy access to information using modern day technology.

In addition, women entering pregnancy, especially a first pregnancy, tend to improve their health behaviors, such as information seeking.[18] Not surprisingly, the knowledge score in the intervention group increased significantly more than in the control group. This demonstrates that the educational component of our mentorship intervention had a positive impact on respondents' preconception health and nutrition knowledge.

Similar results were found in a study involving pre-marital women in Bandung, where providing education on preconception health significantly increased respondent's knowledge.[19] Regarding changes in body weight and MUAC, increases were significantly greater in the intervention group than in the control group. Weight gain during pregnancy is an important indicator for predicting pregnancy outcomes. Inadequate weight gain during pregnancy can increase the risk of giving birth to children with low birth weight[20,21], while excessive weight gain during pregnancy can increase the risk of macrosomia.[22] In the present study, the mean of first trimester weight gain was 1.3kg in the intervention group and 0.8kg in the control group. Based on the Institute of Medicine Guidelines[23], weight gain of 0.5-2kg in the first trimester is in the normal range.

MUAC is also an important predictor of pregnancy outcomes. Several studies have found that not having an adequate maternal MUAC is associated with low birth weight, preterm birth, and small for gestational age.[24–26] Energy intake and food availability are some of the factors that can affect maternal MUAC.[27] The present study has some limitation. The final sample size obtained in the present study did not meet the minimum sample size requirement due to limited time and the fact that less women became pregnant than we anticipated from our initial sample.

This limitation resulted in a power decrease to about 77%. This may have led to the absence of a significant difference in the mean time to first ANC visits between the intervention and control groups at the cluster level. Another limitation of this study is related to the intensity of the mentoring program, which may be low. Preconception education maybe should not only be done once at the beginning, but can be strengthened by providing educational messages via WA/SMS on a regular basis.

Therefore, further research is needed with an adequate sample size and more intensive

interventions. Conclusion In summary, our maternal mentoring program had a significant impact on the time of the first scheduled ANC visit. In addition, respondents who received the program increased their preconception health knowledge. Finally, the increases seen in body weight and MUAC were significantly greater in the intervention group compared to the control group. This mentorship model can be further developed as a means for (1) monitoring the health of reproductive age women and (2) preparing for a healthy pregnancy.

Future work should be done to (1) explore the impact of extending the length of mentorship, and (2) follow women through delivery in order to better understand the relationship between mentorship and early ANC on pregnancy outcomes in this population. Intervention programs like the one implemented in the present study are crucial for reaching the Sustainable Development Goals MMR target for 2030. Ethical approval Ethical clearance was approved by the Medical and Health Research Ethics Committee (MHREC), Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia, No. KE/FK/1289/EC/2018 and No. KE/FK/1456/EC/2019.

Prior to enrollment, we explain the method of the study to the respondents, and written informed consent was obtained from them. Competing interests None Funding Indonesia Endowment Fund for Education, Indonesia Ministry of Finance and the University of Alma Ata. Authors' contributions YP, SH, DSN, and HH conceptualized the study. Data collection was carried out by YP. YP, SH, DSN, and HH analyzed the data. The first draft was prepared by YP with subsequent reviews and revisions completed by all authors. All authors reviewed the final draft and gave approval to publish.

All authors agreed to be responsible for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Acknowledgments The authors would like to thank all of the women who agreed to participate voluntarily in this study, as well as the research team who collected the data. Furthermore, the support of CAPTURE (Community – Alma Ata Partnership Through Updated Research and Education) of Alma Ata University, Yogyakarta, Indonesia, is greatly acknowledged.

INTERNET SOURCES:
--------------------------------------------------------------------------------------
2% - www.researchgate.net › publication › 276264150_Socio
<1% - www.econbiz.de › Record › analysing-data-from-a

<1% - www.researchgate.net › publication › 315064523
2% - www.researchgate.net › publication › 282866308
<1% - www.mjdrdypu.org › article
<1% - www.coursehero.com › file › 70537396
<1% - jepha.springeropen.com › s42506/020/00041-2
10% - www.academia.edu › 74839828 › The_effect_of_a
1% - www.researchgate.net › publication › 230848802_The
<1% - www.sciencedirect.com › science › article
<1% - www.coursehero.com › file › 70002141
1% - www.researchgate.net › publication › 259846315
<1% - www.differencebetween.com › difference-between
<1% - academic.oup.com › ndt › article
<1% - influentialpoints.com › Training › statistical_power
<1% - nces.ed.gov › FCSM › pdf
<1% - link.springer.com › article › 10
<1% - www.exam4training.com › the-mann-whitney-test-is
<1% - libguides.library.kent.edu › SPSS › ChiSquare
<1% - bmcpublichealth.biomedcentral.com › articles › 10
<1% - onlinelibrary.wiley.com › doi › 10
<1% - www.ics.uci.edu › ~jutts › 8
<1% - www.researchgate.net › publication › 334024822
<1% - bmcpregnancychildbirth.biomedcentral.com
<1% - journals.plos.org › plosone › article
<1% - www.researchgate.net › publication › 331053894
<1% - bmjopen.bmj.com › content › 3
<1% - reproductive-health-journal.biomedcentral.com
<1% - www.bangthetable.com › why-is-community-engagement
1% - etd.repository.ugm.ac.id › penelitian › detail
<1% - www.hopkinsmedicine.org › the-first-trimester
<1% - www.researchgate.net › publication › 336226318
<1% - www.frontiersin.org › articles › 10
<1% - www.cdc.gov › pregnancy-weight-gain
<1% - quizlet.com › 27724882 › chapter-12-maternal
1% - www.researchgate.net › publication › 230789126
<1% - www.wemakescholars.com › other › the-indonesia
1% - rapm.bmj.com › content › early
<1% - www.researchgate.net › publication › 346354323_Binge
<1% - www.researchgate.net › publication › 348942585