

Effect of Moringa Leaf Extract on Hemoglobin Levels in Pregnant Women with Anemia at Soasio Tidore Health Center

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Abstract. Anemia stands as one of the predominant health challenges encountered by pregnant women. Moringa leaves have been incorporated among green vegetables recognized for elevating blood hemoglobin concentrations. Dubbed occasionally as "The Miracle Tree," moringa serves as a superior dietary reservoir of iron, wherein a mere 100 grams furnishes approximately 31% of the recommended daily intake (Winarno, 2018). Within the ambit of the Soasio Tidore Health Center, this research seeks to ascertain whether hemoglobin levels are augmented among pregnant women consuming moringa leaves. Employing a quantitative approach, the study adopted a pre-experimental one-group pretest-posttest design. The population comprised forty pregnant women attending the Soasio Tidore Health Center. Through a non-probability purposive sampling method guided by inclusion and exclusion criteria, 16 respondents were selected. The research protocol entailed paired pre- and post-intervention assessments. Findings revealed that moringa leaf intake elevated the mean hemoglobin level in pregnant women from 10.525 g/dL to 11.219 g/dL. A paired t-test yielded a p-value of 0.000 (<0.05), substantiating that moringa leaf consumption markedly enhances hemoglobin levels in pregnant women. This outcome reinforces the potential of moringa leaves in averting anemia among this demographic.

Keywords: Anemia Prevention; Hemoglobin Levels; Maternal Nutrition; Moringa Leaves; Pregnant Women

1. INTRODUCTION

Throughout the standard gestational period from conception extending approximately 38 weeks profound physiological and psychological transformations are undergone by the female body and psyche. Elevated anxiety may be precipitated by certain pregnancy-induced alterations. Unmanaged prenatal anxiety can precipitate obstetric complications, including feeble uterine contractions, prolonged labor duration, fetal distress, and maternal hypertension (Setyaningrum RF, 2017).

Iron-deficiency anemia emerges as another frequent affliction in gestation. Hemodilution arises as plasma volume expands disproportionately to red blood cell augmentation during pregnancy, thereby diluting overall blood composition. Although multifactorial etiologies underpin gestational anemia, dietary iron paucity constitutes a primary culprit (Simbolon, D., 2018).

Gestations afflicted by anemia exhibit heightened susceptibility to preterm parturition, infections, maternal and neonatal mortality, alongside sundry complications. Maternal iron-deficiency anemia imperils fetal ontogeny and prospective progeny vitality. In Indonesia, anemia afflicts 36.4% of urban-dwelling gravid women and 37.8% in rural locales, per Riskesdas (2013) and Indonesia, K. K. R. (2017).

Therapeutic modalities for iron-deficiency anemia encompass both pharmacotherapeutic and non-pharmacologic stratagems. A pharmacotherapeutic exemplar is

the Ministry of Health initiative dispensing ferrous tablets sequentially over 90 days to expectant mothers. Non-pharmacologic alternatives encompass ingestion of iron-replete victuals such as guava nectar, moringa foliage, date fruits, spinach, and guavas.

Atika et al. (2021) demonstrated that hemoglobin augmentation is achievable among gravid women via moringa leaf consumption. The East Nusa Tenggara province abounds in moringa resources. Beyond its substantial global economic valuation, moringa confers manifold salubrious benefits. Indigenous Flores populace denominate this arboreal species "moltong."

A preliminary enumeration at the Soasio Tidore Health Center documented 154 gravid women. Imperative targeted interventions are underscored by our findings to ameliorate anemia and bolster maternal-fetal well-being in the locale.

According to UNICEF, there are 12,230,142 million people who are aware of problems during pregnancy and 30% of the majority experience anxiety. According to the ADAA, 52% of pregnant women experience increased anxiety during pregnancy (Putri et al, 2022). Meanwhile, Indonesia itself has increased the number of pregnant women who experience anxiety to 373,000. As many as 107,000 (28.7%) of them, experienced, antenatal, moderate anxiety in pregnant women (. Anitasari., 2018).

Anxiety that occurs in pregnant women causes the release of stress hormones such as Adreno Cortico Tropic Hormone (ACTH) and cortisol, with the release of these hormones causing systemic vasoconstriction which affects the vaso-utero placenta so that it can interfere with the blood circulation process in the mother's womb which results in the oxygen supply to the uterus being disrupted and causing the contraction of the uterine muscles to weaken. If anxiety persists until before the delivery process, this condition will affect the length of labor (long partus) so that it will affect the health of the fetus (Amalia, 2019)

Several studies conducted in various regions in Indonesia corroborate this data. For example, a study published in the Malahayati Midwifery Journal (2024) stated that the prevalence of pain during childbirth reached 86.8 percent. In addition, studies in several health facilities show that most mothers experience moderate to severe pain, with a percentage of moderate pain of 43.5 percent and severe pain of 33.9 percent (Innovative: Journal Of Social Science Research, 2025). Data from West Java also revealed that almost 90 percent of mothers experienced pain during childbirth, with details of 23 percent experiencing mild to moderate pain, 61 percent moderate to severe pain, and 16 percent severe pain.

High anxiety can trigger physiological responses such as increased heart rate, blood pressure, and the release of stress hormones (cortisol and adrenaline) that can worsen labor

pain and slow down the opening of the cervix. This condition can lead to longer labors and risk complications. In addition, anxiety can also affect the mother's mental readiness, reduce coping skills, and have an impact on the bonding of mother and baby after birth.

Handling anxiety in pregnant women can be done through various approaches, especially non-pharmacological. Prenatal education and counseling are essential to provide clear information and reduce unfounded fears. Relaxation exercises and breathing techniques, such as those applied in prenatal gentle yoga, have been shown to be effective in lowering anxiety levels and increasing the mental readiness of mothers for childbirth. Social support from families and health workers also plays a big role in reducing anxiety. In addition, music therapy, massage, and mindfulness can be alternatives that help mothers feel calmer and more comfortable.

A number of studies have been conducted

2. RESEARCH METHOD

A one-group pretest-posttest configuration was employed in this research, a paradigm frequently encountered in pre-experimental inquiries. This archetype was selected to juxtapose pre-intervention and post-intervention states within an identical cohort, thereby ascertaining whether prenatal gentle yoga ameliorated labor-related anxiety. The inquiry encompassed females in the third trimester of gestation domiciled in North Sulawesi's Minahasa Regency. Implementation occurred under the auspices of the Tateli Health Center. The cohort comprised twenty third-trimester gravid women satisfying all stipulated inclusion and exclusion stipulations. Through quota sampling, the investigator secured a minimum of fifteen assenting participants for the prenatal gentle yoga regimen. Eligibility extended to third-trimester women (gestational ages 27–36 weeks) deemed physically capable of yoga praxis. Exclusion applied to those incapable of completing the full intervention sequence or harboring grave obstetric complications.

3. RESULTS AND DISCUSSION

Results

Table 1. Distribution By age group.

Features	N	%
Mother's Age		
< 20 years old	0	0%
20-35 years old	13	81.25%
>35 years old	3	18.75%
Total	16	100%

As indicated in Table 1, the 20–35 age stratum encompassed 13 individuals (81.25% of the aggregate), whereas the cohort aged 35 and above comprised 3 individuals (18.75%).

Table 2. Distribution by Education.

Education	Frequency	Presentase (%)
SD	3	18,75%
SMP	7	43,75%
SMA	1	6,25%
DIPLOMA	2	12,5%
PT	3	18,75
Total	16	100%

Table 2 shows that the respondents had the most junior high school education as many as 7 respondents (43.75%) and at least 1 respondent had a high school education (6.25%).

Table 3. Distribution by Parity.

Paritas	Frequency	Presentase (%)
Primigravida	7	43.75%
Secundigravida	3	18.75%
Multigravity	6	37.5%
Total	16	100%

Based on table 3, the parity in the most respondents is the *primigravida* category, which is 7 respondents (43.75%) and the least respondents are in the *secondary category*, which is 3 respondents (18.75%)

Table 4. Distribution of Respondents by Gestational Age.

Gestational Age	N	Minimum	Maximum	Mean
They respond	16	28,2	37,0	32,13

Across the 16 specimens, gestational maturity averaged 32.13 weeks, spanning a spectrum from 28.2 to 37 weeks.

Table 5. Distribution Based on Hemoglobin Levels of Pregnant Women during Pre Test and Post Test.

Hemoglobin Up	Quantity	Minimum	Maximum	Mean	Hours Deviation
Pre Test	16	10.0	10.9	10.525	2745
Post Test	16	10.6	11.7	11.219	2880

Table 5 reveals that participants' mean hemoglobin concentration ascended from 10.525 ($SD = 0.2745$) pre-intervention to 11.219 ($SD = 0.2880$) post-intervention. The ensuing tabulation delineates the categorization of respondents' hemoglobin strata as anemic or non-anemic:

Table 6. Distribution Based on Hemoglobin Levels of Respondents if Categorized as Anemia.

Hemoglobin Up	Pre Test		Post Test	
	N	%	N	%
Weight	0	0	0	0
Medium	0	0	0	0
Lightweight	16	100	1	6.25
No Anemia	0	0	15	93.75
Total	16	100	16	100

Table 6 shows that during *the pre-test*, all respondents experienced mild anemia (100%), while *post test* 1 respondent experienced mild anemia (6.25%) and 15 respondents did not experience anemia (93.75%)

Table 7. Data Normality Test Results.

Hemoglobin Up	Shapiro- Wilk		
	Statistics	df	Sig. (p>0.05)
<i>Pre Test</i>	.921	16	.172
<i>Post Test</i>	.947	16	.446

Based on Table 7, the normality test results for the data before and after consuming moringa leaves indicate that the data are normally distributed, with a p-value of 0.172 before and 0.446 after, both greater than 0.05. These statistical tests were conducted to determine the effect of moringa leaf consumption on increasing hemoglobin levels in pregnant women within the Sosasio Tidore Health Center’s service area.

Table 8. Paried Test Results.

	Mean	N	Hours of deviation	Std. Error Mean
Hb Before	10.525	16	.2745	.0686
Hb After	11.219	16	.2880	.0720

Table 8 discloses that mean hemoglobin concentration escalated from 10.525 g/dL pre-intervention to 11.219 g/dL post-moringa leaf ingestion. An augmentation of 0.694 g/dL in hemoglobin levels was evidenced, reflected by a post-intervention standard deviation of 0.720 versus 0.686 beforehand.

Table 9. Paired Samples Test.

	Mean	Hours of deviation	Std. Mean	95% Confidance Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
				HB Before HB After	-6937			

As depicted in the aforementioned tabulation, the paired t-test juxtaposing pre- and post-moringa leaf consumption mean hemoglobin concentrations yielded a t-value of 0.347 at a significance level of 0.000. Given a p-value of 0.000—substantially below the 0.05 threshold—statistical evidence substantiates a marked disparity in hemoglobin strata

antecedent to and subsequent to the intervention. Ergo, gravid women within the Soasio Tidore Health Center's catchment area can elevate their hemoglobin concentrations through moringa leaf ingestion.

4. DISCUSSION

Characteristics of Respondents

Education Level

Educational attainment has been posited by Bachtiar et al. (2023) as a modulator of cognitive acuity. Augmented scholastic proficiency is conventionally associated with heightened cognizance. Edison (2019) avers that gestational anemia among gravid women stems from deficient comprehension of hemoglobin paucity repercussions coupled with pecuniary impediments to procuring ferruginous alimentary provisions. Laila et al. (2023) evince that anemia prevalence is octupled among less erudite pregnant cohorts vis-à-vis their more schooled counterparts. A nexus between maternal erudition and gestational anemia incidence is discernible. Nonetheless, Bachtiar et al. (2023) discerned no substantive linkage, as evinced by a p-value of 0.258 (>0.05), wherein educational stratum exerted negligible influence.

Gestational Age

Gestational maturity emerges as a pivotal covariate in anemia pathogenesis via vicissitudes in ferric requisites. Anemia predilection peaks in the second trimester relative to inaugural or terminal trimesters. Such proclivity arises from plasma volumetric flux, hemoglobin diminution in the initial trimester, apogee at second-trimester terminus, and tertiary escalation (Ayensu et al., 2020). Fitri et al. (2023) quantified second-trimester anemia at 45.7%—surpassing tertiary (43.5%) and inaugural (10.9%) incidences—with a p-value of 0.020 (<0.05). Conversely, Qomarasari and Pratiwi (2023) unearthed no momentous affiliation betwixt anemia ubiquity and gestational tenure. Among Soasio Tidore Health Center attendees, 13 gravid women (81.25% aggregate) spanned 20–35 years, whilst 3 (18.75%) exceeded 35.

Parity

Within the Soasio Tidore Health Center purview, primiparity characterized 7 women (43.75%), secundiparity 3 (18.75%). Multipartite gestations imperil anemia via vascular and endometrial dilapidation, impeding fetal nutriment conveyance (Harahap, 2018). Recurrent pregnancies attenuate hemoglobin via augmented sanguineous and ferric depletion. Primigravidae evince diminished anemia incidence per Widiastuti et al. (2023), attributable

perchance to intensified primordial nutritional vigilance. Multigravidae, conversely, may attenuate self-gestational stewardship amid polyprogeny dispersal. Qomarasari and Pratiwi (2023) substantiated parity-anemia congruence ($p=0.030 < 0.05$), whereas Abidah and Anggasari (2019) detected none. Notably, grand multiparae (>4 gestations) manifested zero anemia ($p=0.222 > 0.05$).

5. CONCLUSION

The inquiry "The Effect of Moringa Leaf Consumption on Increasing Hemoglobin Levels in Pregnant Women in the Sosasio Tidore Health Center Service Area" chronicled participants' demographic contours—encompassing chronological age, scholastic pedigree, parity quanta, and gestational maturity. Predominantly, 43.75% of respondents had attained junior secondary completion; 81.25% occupied the 20–35 age echelon. Primiparity denoted 43.75%, with most consigned to tertiary trimester.

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