JOURNAL OF INTERDISCIPLINARY PERSPECTIVES

ISSN Print: 2984-8288, ISSN Online: 2984-8385
Vol. 3 No. 5, pp. 263-273, May 2025

Knowledge, Attitude, and Nutritional Intervention on the Quality of Antenatal Care Among Pregnant Women

Conrado F. Odchigue Jr.*, Gloria M. Cunanan
College of Nursing, Liceo de Cagayan University - Carmen, Cagayan de Oro City, Philippines

*Corresponding Author Email: codchigue59780@liceo.edu.ph

Date received: March 3, 2025
Date revised: March 28, 2025
Date accepted: April 18, 2025

Originality: 99%
Grammarly Score: 99%
Similarity: 1%

Recommended citation:
Odchigue, C., & Cunanan, G. (2025). Knowledge, attitude, and nutritional intervention on the quality of antenatal care among pregnant women. *Journal of Interdisciplinary Perspectives*, 3(5), 263-273.
https://doi.org/10.69569/jip.2025.131

Abstract. This study explores how socioeconomic factors, healthcare system features, knowledge, attitudes, and nutritional interventions influence the quality of antenatal care (ANC) in Camiguin. A purposive sample of 300 pregnant adolescents aged 15 and below was analyzed statistically to assess these effects. Findings indicate weak and statistically negligible relationships between ANC awareness ($r = 0.044$, $p = 0.443$), visit frequency ($r = 0.028$, $p = 0.630$), and nutritional aid ($r = 0.041–0.069$, $p > 0.05$) with ANC quality. According to regression analysis, knowledge, attitudes, and eating habits only account for 1.7% of the variation ($R = 0.129$, $R^2 = 0.017$). This shows that more changes, such as better socioeconomic conditions, better healthcare infrastructure, and easier access to services, are needed. However, nutritional interventions significantly enhance ANC quality by fostering better health-seeking behaviors, with a second model showing a strong fit ($p = .015$). According to this model, attitudes about health behaviors make up 70% of the variation in ANC, while understanding prevention, awareness, and management make up 29%. The fact that attitude ($p = .333$) and information ($p = .497$) had no significant effects shows that they might have indirect effects, like support networks and developing habits. The results make it clear how important it is to deal with the social barriers, accessibility problems, and indirect pathways that affect maternal health care. Improving systemic factors could lead to better ANC quality and better health results for mothers in Camiguin.

Keywords: Antenatal care; Attitudes; Maternal healthcare; Knowledge; Nutritional interventions.

1.0 Introduction

Camiguin has consistently fallen short of national prenatal care targets, with only 43.59% of births receiving quality care and 26.49% of eligible women accessing services over the past five years. In 2021, 30.04% of 1,854 expectant mothers attended quality check-ups, leaving a 64.96% service gap against the national goal of 95%. Despite slight improvements in 2022 and 2023, attendance remains critically low, increasing maternal and infant health risks. Pregnancy-related complications are a leading global cause of death and disability, with 99% of maternal deaths occurring in low- and middle-income countries. Maternal, neonatal, and infant mortality rates have increased in Camiguin; infant mortality increased from 8 in 2022 to 28 in 2023 (PHO FHSIS, 2023). These concerning patterns demonstrate how urgently enhanced prenatal care is needed to guarantee early risk identification and improved health outcomes.

This study is significant in addressing critical gaps in prenatal care in Camiguin, where low service utilization increases maternal and infant health risks. Identifying barriers related to knowledge, attitudes, and nutritional

practices provides valuable insights for healthcare providers and policymakers. Findings will guide the Provincial Health Office, local government units, local hospitals, WHO, and the Department of Health in developing targeted interventions, improving maternal and child health, and reducing hospitalizations. Additionally, the study supports policy development, enhances community awareness, and helps lower healthcare costs by preventing complications, ultimately contributing to lower maternal and infant mortality rates.

2.0 Methodology

2.1 Research Design

This investigation utilizes a descriptive-correlational design to investigate the correlation between maternal knowledge, attitudes, nutritional interventions, and the quality of antenatal care (ANC). This method identifies trends and associations without establishing causation (Aggarwal & Ranganathan, 2019). The study offers a comprehensive understanding of the factors that influence the quality of ANC by examining both independent and dependent variables. A causal-comparative framework is also employed to investigate potential causal linkages, evaluating the potential impact of knowledge, attitudes, and nutritional support on variations in ANC quality (Brewer & Kubn, 2010). This method, in contrast to experimental studies, investigates pre-existing conditions to ascertain potential influences on the efficacy of ANC. The integration of descriptive-correlational and causal-comparative designs provides a more comprehensive comprehension of the quality of ANCs, reconciling statistical relationships with explanatory insights. This dual approach further enhances the study's relevance to improving maternal healthcare in Camiguin.

2.2 Research Locale

Camiguin is the second-smallest province in the Philippines in terms of both population and land area, following Batanes, with Mambajao as its capital and largest municipality. The island is pearl-shaped, covering an area of approximately 238 km² (92 sq mi), measuring 23 kilometers (14 mi) at its longest and 14.5 kilometers (9.0 mi) at its widest, with a mountainous terrain and the highest elevation reaching over 5,000 feet (1,500 meters). A 64-kilometer (40 mi) national road encircles the island. As of the 2007 census, the province has a fifth-class income classification and a population of 81,293, projected to reach 94,450 by 2023. The economy primarily relies on fishing and farming, with copra and lanzones being key agricultural products, alongside abaca, rice, mangoes, and other fruits. The growing tourism industry has boosted the economy, and small cottage industries have increased to accommodate visitors. Camiguin comprises five municipalities: Catarman (17,784), Guinsiliban (6,849), Mahinog (14,834), Mambajao (41,820), and Sagay (13,163).

2.3 Research Participants

In order to recruit pregnant women who had received at least four prenatal visits, the study used purposive sampling. This was done to ensure that relevant insights backed up the research hypothesis. Rather than providing an equal selection probability, this approach set itself apart from universal sampling by guaranteeing that participants had a suitable degree of ANC exposure. Participants were pregnant women from several Camiguin towns, including teenagers under fifteen. The distribution of the sample was as follows: Guinsiliban: 25 out of 25 (100%), Mahinog: 50 out of 113 (44%), Mambajao: 110 out of 319 (34%), Sagay: 40 out of 48 (83%), and Catarman: 75 out of 100 (75%). A final sample size 300 (49.6%) was selected from 605 eligible women. The study's ability to assess the variables influencing the quality of ANC was improved by this purposive strategy, which ensured that the focus would be on those who had received enough ANC.

2.4 Research Instrument

A questionnaire created by the researcher was based on the WHO Recommendations on Antenatal Care, DOH Administrative Order No. 2016-0035, and study by Balogun et al. (2019), Patel et al. (2016), and Fagbamigbe et al. (2013). Prenatal care quality (the dependent variable), nutritional interventions, attitude toward high-quality prenatal care, and knowledge of high-quality prenatal care comprise the instrument's four parts. The Liceo de Cagayan University Research Office tested the instrument's reliability, and three experts assessed its content validity. The instrument's internal consistency was evaluated by a Cronbach's Alpha reliability test with 30 pregnant women who were not part of the main study. Important of Quality ANC (0.933), ANC Visits (0.867), Mother and fetus Screening (0.898), Adolescent Pregnancy (0.732), Health Practices (0.786), Facility Healthcare Practices (0.872), Iron & Folic Acid Supplementation (0.710), Calcium Supplementation (0.779), and Healthy Diet & Exercise (0.789) were the independent variables that showed acceptable to high reliability (≥0.7). On the advice

of the data processor, two unreliable variables were eliminated. Strong dependability was also demonstrated by the dependent variable, Quality of ANC: Safe Pregnancy (0.922), Safe Delivery (0.930), and Safe Childbirth (0.957). The validity and reliability of the questionnaire for evaluating ANC quality are established by these values, which verify that all subscales reach the required threshold (≥0.7).

2.5 Data Gathering Procedure

An investigator obtained a letter of endorsement from the Dean of the College of Nursing at Liceo de Cagayan University to conduct the study and filled out the Research Ethics Application form to meet ethical standards. After receiving approval from the University Ethical Board, the researcher prepared a letter requesting permission to conduct the study, which was addressed to the Municipal Mayors through the Municipal Health Officers (MHO) and signed by both the researcher and the adviser. The letter was mailed to the local chief executives (LCE), and a copy was sent to the MHO. The researcher then presented the study's objectives, purpose, and questionnaire content to the rural health unit (RHU) personnel. Upon approval by the LCE and MHO, the questionnaires were distributed to 300 pregnant women, including those with teenage pregnancies under 15 years old, using purposive sampling during prenatal appointments. The researcher reviewed the filled-out questionnaires for validation, tallying, and analysis using Windows SPSS. The data was entered into the SPSS database for quality control, and completeness, consistency, and missing values were assessed. The internal consistency of the study instrument was assessed using Cronbach's alpha, with a significance level established at alpha = 0.05.

2.6 Ethical Considerations

This study strictly adhered to ethical guidelines, particularly about informed consent, a vital component of ethical research. Informed consent ensures that participants voluntarily agree to participate and clearly understand the study's purpose, procedures, risks, and benefits. Participants were provided with comprehensive information about the study, including its aims, what it intended to explore, and the steps involved, all communicated in the local dialect. They were informed about the expected duration of the study, which would take approximately 15-20 minutes, and assured that participation was entirely voluntary, with the right to withdraw at any time without any negative consequences. The potential implications of declining participation or withdrawing were also discussed, along with any factors influencing their decision, such as possible risks or discomforts. The initial page of the survey questionnaire featured an informed consent form, providing participants ample opportunity to read and make an informed decision regarding their participation. Participants were guaranteed that all data gathered would be handled with strict confidentiality and utilized exclusively for the study's objectives.

3.0 Results and Discussion

3.1 Level of Knowledge of Quality Antenatal Care

Importance of Antenatal Care

An aggregate mean score of 4.58 indicated that the respondents were highly informed about prenatal care (see Table 1). This supports WHO's focus on the importance of ANC in disease prevention, complication screening, and health promotion. Matovelo et al. (2016) emphasize the relevance of ANC awareness in risk identification and prevention, while Bashir et al. (2023) and Gibore et al. (2019) highlight the association between ANC awareness and improved pregnancy outcomes. These findings are important because of what they mean for the health of mothers and children. Reduced maternal and newborn death rates, better pregnancy management, and early detection of problems are all facilitated by high ANC knowledge. Although respondents generally show a high level of ANC knowledge, specific initiatives could strengthen areas like birth planning further to improve the health of both mothers and fetuses.

Antenatal Care visits

The high average score of 4.52 suggests that respondents strongly comprehend the value of prenatal care visits (see Table 2). Gupta et al. (2019) state frequent visits are essential for ongoing care and safe institutional deliveries. Gonzales Jr. & Barcelo (2023) advise at least four prenatal visits to guarantee necessary maternal health treatments. These results are important because they point to an informed populace that may improve the health of expectant mothers and newborns. They also draw attention to the necessity of ongoing education to guarantee that suggested visitation plans are followed, which would ultimately lower perinatal mortality, enhance patient experiences, and fortify maternal healthcare systems as a whole.

Table 1. *Level of knowledge of quality antenatal care in terms of the importance of antenatal care | n=300*

	Indicators	Mean	SD	Interpretation
1.	Early antenatal care is important because it will help determine the expected date of delivery	4.62	.507	Very High Knowledge
2.	Antenatal care (ANC) is important for the mother's health and the fetus's development.	4.57	.535	Very High Knowledge
3.	Antenatal care is important because it will classify the pregnant woman as needing specialized care or basic ANC.	4.62	.486	Very High Knowledge
4.	Antenatal care offers an opportunity to develop a birth plan.	4.54	.531	Very High Knowledge
5.	Antenatal care is important because it will help recognize and manage pregnancy-related complications such as hypertension.	4.56	.517	Very High Knowledge
Overall Mean		**4.58**	**.461**	**Very High Knowledge**

Table 2. *Level of knowledge of quality antenatal care in terms of antenatal care visits | n=300*

	Indicators	Mean	SD	Interpretation
1.	The first prenatal visit is crucial for early identification of underlying conditions and should be done as early as possible, preferably during the first trimester (within the first 12 weeks).	4.53	.513	Very High Knowledge
2.	The antenatal period is when the doctor, midwife, or nurse empowers the mother through health education.	4.52	.533	Very High Knowledge
3.	Antenatal check-ups are the most beneficial comprehensive service for preventing pregnancy-related complications, which in turn improves pregnancy outcomes.	4.53	.500	Very High Knowledge
4.	Prenatal visits provide opportunities to promote lasting health, offering benefits that continue beyond the pregnancy period.	4.53	.526	Very High Knowledge
5.	Prenatal care with a minimum of 4 visits is recommended to reduce perinatal mortality and improve women's care experience.	4.49	.569	High Knowledge
Overall Mean		**4.52**	**.465**	**Very High Knowledge**

Screening of Mother and Fetus

With a mean score of 4.53, which falls under "Very High Knowledge," the respondents are somewhat conscious of the need for prenatal screening for the fetus and the mother (see Table 3). Although prenatal screening provides important information, it can also offer difficult decisions and moral conundrums for expecting women (Glynou et al., 2022). In line with this, Kutlu et al. (2020) underline that doctors must offer delicate recommendations for extra treatments and screening tests. This significant degree of knowledge emphasizes the need for diagnostic tests to safeguard the health of the fetus and the mother. There are still chances to improve understanding of the psychosocial aspects influencing pregnancy outcomes, although general awareness. Increasing awareness of these factors promotes all-encompassing maternal care.

Table 3. *Level of knowledge of quality antenatal care in terms of screening of mother and fetus | n=300*

	Indicators	Mean	SD	Interpretation
1.	Complete blood count (CBC) and other laboratories will be performed to determine if anemia is present, possible complications of pregnancy, and sexually transmitted diseases that put at risk the pregnant and the fetus.	4.54	.512	Very High Knowledge
2.	Diagnostic ultrasound examination may be employed in a variety of specific circumstances during pregnancy, such as after clinical complications or where there are concerns about fetal growth	4.52	.533	Very High Knowledge
3.	Prenatal screening tests and an early pregnancy blood test are vital to assessing the health of both mother and child during pregnancy.	4.57	.510	Very High Knowledge
4.	During pregnancy, the relationship with the partner during the development of the child and pregnant woman is important to improve clinical diagnosis and subsequent care if intimate partner violence (IPV) is identified.	4.50	.558	High Knowledge
5.	A mom's oral health is connected to the health of her unborn baby–and it can all be traced to the bacteria in her mouth	4.51	.527	Very High Knowledge
Overall Mean		**4.53**	**.465**	**Very High Knowledge**

3.2 Level of Attitude of Quality Antenatal Care

In terms of Teenage/Adolescent Pregnancy

A 4.08 mean score indicates a highly positive Attitude toward realizing the difficulties young mothers encounter in obtaining prenatal care (Table 4). Often delaying prenatal care are these barriers: societal stigma, fear of judgment, and lack of support (Hackett et al., 2019). According to the WHO (2016), teen prenatal care offers continual assistance and goes beyond simple visits. Likewise, DOH AO No. 2016-0035-A emphasizes the need for extra treatment for persons with medical disorders—inadequate prenatal care results from factors like

sociodemographics, risky behaviors, unintended pregnancies, and financial hardships. Improving mother and baby health depends on strengthening community education and support systems.

Table 4. *Level of attitude of quality antenatal care in terms of teenage/adolescent pregnancy | n=300*

	Indicators	Mean	SD	Interpretation
1.	Most teenage pregnant will visit the health center for antenatal care only when pregnancy is obvious	4.37	.713	High Positive Attitude
2.	Teenage pregnant will be ashamed to visit the health center because of what people might say and the reaction of the health worker.	4.06	1.008	High Positive Attitude
3.	Most adolescents who are pregnant do not have antenatal care during early pregnancy because they conceal their pregnancy from their classmates and parents.	4.07	.996	High Positive Attitude
4.	Teenage pregnant do not want to have the prenatal because their partner and family do not support the pregnancy.	3.83	1.139	High Positive Attitude
Overall Mean		**4.08**	**.804**	**High Positive Attitude**

In terms of Health Practices

Strong agreement on important pregnant health behaviors—including abstaining from dangerous substances, getting enough sleep, keeping a healthy diet, and physical activity—is indicated by a mean score of 4.39 (see Table 5). It is in line with studies by Krzepota and Sadowska (2015), who discovered a significant relationship between prenatal class attendance and health practices and the quality of life of pregnant women. The results underline the importance of focused education on less well-known hazards like coffee drinking. Healthcare professionals may build on the positive attitudes currently in place and improve the health of the mother and the unborn child by pushing complete lifestyle changes and ensuring expecting moms are aware of and avoid any possible hazards. Hadian et al. (2019) contend that mother health practices directly affect pregnancy outcomes. This study emphasizes the need for prenatal care and health literacy in advancing the condition of the mother and the fetus. These visits allow doctors to encourage good lifestyle choices, which will eventually help the pregnancy and childbirth outcomes to be better.

Table 5. *Level of attitude of quality antenatal care in terms of health practices | n=300*

	Indicators	Mean	SD	Interpretation
1.	Drinking coffee throughout pregnancy may give rise to complications such as miscarriage, fetal growth restrictions, and low birth weight.	4.22	.833	High Positive Attitude
2.	Smoking or being in contact with people who smoke cigarettes will bring harm to the pregnancy.	4.40	.830	High Positive Attitude
3.	It is advised to stop drinking alcohol throughout pregnancy and beyond because alcohol increases the risk of miscarriage, premature birth, and your baby having a low birth weight.	4.37	.850	High Positive Attitude
4.	Sleep at least 8 hours daily to prevent weariness during pregnancy and have enough energy during labor and birth.	4.45	.629	High Positive Attitude
5.	Healthy eating and staying physically active during pregnancy are recommended for pregnant women to stay healthy and prevent excessive weight gain.	4.52	.569	Very High Positive Attitude
Overall Mean		**4.53**	**.465**	**High Positive Attitude**

Table 6. *Level of attitude of quality antenatal care in terms of facility healthcare practices | n=300*

	Indicators	Mean	SD	Interpretation
1.	Antenatal care offers health workers an opportunity to provide pregnant women with a range of support and information, including on healthy lifestyles, preventing diseases, and family planning.	4.45	.574	High Positive Attitude
2.	Effective communication between health providers and patients can reduce unnecessary anxiety and make childbirth a positive experience for a woman, even if she experiences complications.	4.43	.605	High Positive Attitude
3.	Antenatal care provides an opportunity to immunize pregnant women with the recommended (at least) 2 doses of tetanus toxoid and provide advice and a schedule for completing the immunization at postpartum.	4.52	.551	Very High Positive Attitude
4.	Health facilities should have equipped transport services available that operate 24 hours a day, 7 days a week, to transport women and newborns as necessary.	4.47	.586	High Positive Attitude
5.	Health facilities need well-trained and motivated staff consistently available to provide care	4.48	.592	High Positive Attitude
Overall Mean		**4.47**	**.498**	**High Positive Attitude**

In terms of Facility Healthcare Practices

With a 4.47 mean score (High Positive Attitude), one shows excellent awareness of facility-based healthcare's need to offer effective prenatal treatment (Table 6). Respondents mostly agree on health facilities' importance regarding access to trained personnel, immunization, and education. Musni (2022) underlines how important it is to reduce mother mortality using competent healthcare support during prenatal visits. Although logistical and technical elements are well known, the results imply that patient-provider communication has to be improved to improve the treatment experience. Using better communication skills and healthcare professional training can help make prenatal care more patient-centered, enhancing the outcomes related to a mother's health.

3.3 Level of Nutritional Interventions

In terms of Supplementation with Iron and Folic Acid

Strong awareness and dedication to iron and folic acid supplementation during pregnancy is reflected in a 4.45 mean score—highly effective (Table 7). Respondents generally agree that these vitamins are crucial in preventing low birth weights, maternal anemia, preterm births, and neural tube problems. While da Silva Lopes et al. (2021) stress their part in lowering stillbirths and mother mortality, the WHO (2023) ties iron and folic acid intake to a decreased prevalence of anemia. Felipe Dimog et al. (2021) underline the need to follow advised dosages to reduce mother and newborn morbidity and mortality. Although the advantages are well known, logistical difficulties, including supply shortages, could prevent regular supplementing. Regular availability in health facilities and strengthening supply networks would help to increase adherence. Furthermore, teaching programs on appropriate dosages and advantages helps to underline the need for supplements, thus improving mother and fetal health results.

Table 7. *Level of nutritional interventions in terms of supplementation with iron and folic acid | n=300*

	Indicators	Mean	SD	Interpretation
1.	Give enough iron and folic acid supplements for a daily oral dose.	4.56	.510	Very Highly Effective
2.	Daily iron and folic acid supplements containing 60 mg of elemental iron with 0.4 mg of folic acid are the recommended dose for at least 180 days during pregnancy and up to three months after delivery of my baby.	4.50	.552	Very Highly Effective
3.	Daily iron and folic acid supplements prevent maternal anemia, low birth weight, preterm birth, and neural tube defects.	4.52	.527	Very High Effective
4.	A lack of supply in the health center is one reason people fail to take the daily recommended dose of iron and folic acid (at least 180 days).	4.	.856	Highly Effective
Overall Mean		**4.47**	**.498**	**High Positive Attitude**

In terms of Calcium Supplementation

Strong knowledge of the necessity of calcium supplements during pregnancy, with a mean score of 4.40, indicates good effectiveness (Table 8). Respondents understand how it helps to prevent pre-eclampsia, preserve mother bone health, and lower early birth risks. While Gomes et al. (2022) propose combining supplements with food-based techniques for safer mother outcomes, the WHO (2023) links calcium intake to a lower risk of hypertensive diseases. Higher rates of hypertension diseases in low-income nations are attributed, according to Hofmyer et al. (2019), to dietary calcium differences. Despite this understanding, supply chain issues and insufficient knowledge of other calcium sources could impede enough intake. Encouragement of calcium-rich foods and strengthening of supplement availability will help to enhance mother and fetus health results.

Table 8. *Level of nutritional interventions in terms of calcium supplementation | n=300*

	Indicators	Mean	SD	Interpretation
1.	Calcium supplement during antenatal care is recommended for the prevention of pre-eclampsia in pregnant women, particularly among those at higher risk of developing hypertension.	4.49	.558	Highly Effective
2.	Lack of calcium supplements can cause hypertensive disorders such as pre-eclampsia which can lead to maternal deaths and preterm births.	4.37	.648	Highly Effective
3.	Adequate calcium intake for pregnant women can also be accessed through locally available, calcium-rich foods such as milk and milk products and leafy green vegetables.	4.52	.563	Very Highly Effective
4.	An insufficient calcium intake could increase maternal bone loss during pregnancy and reduce bone recovery postpartum.	4.38	.677	Highly Effective
5.	The lack of a supply of calcium supplements in the health center is one reason pregnant women have low calcium intakes.	4.25	.854	Highly Effective
Overall Mean		**4.40**	**.535**	**Highly Effective**

In terms of Health Diet and Exercise

With an average score of 4.49, classified as "Highly Effective," participants' strong will to keep a healthy diet and physical exercise during pregnancy—crucial for both mother and baby health—show reflected (Table 9). Studies show that good nutrition and regular exercise can control weight increase, lower the risk of gestational diabetes, hypertension, and other problems, and enhance general health outcomes. Important for managing gestational diabetes, Rasmussen et al. (2020) stress how physical activity increases insulin sensitivity and glycemic control. Better health for the mother and the child can result from practical tactics such as controlling carbohydrate consumption, avoiding fatty meals, staying hydrated, exercising at least 30 minutes daily, and lowering sedentary behavior. A comprehensive approach to prenatal health depends on teaching expectant people about these behaviors and the value of appropriate hydration and exercise. It will help produce better delivery outcomes and better pregnancy outcomes.

Table 9. *Level of nutritional interventions in terms of health diet and exercise | n=300*

	Indicators	Mean	SD	Interpretation
1.	Eating reasonable quantities of high-quality carbohydrates such as breads, cereals, pasta, and rice for my healthy diet for the good of pregnant and baby during pregnancy and birth.	4.45	.558	Highly Effective
2.	Limit quantities of high-fat or sugary foods such as fast food, cakes, and biscuits.	4.45	.561	Highly Effective
3.	Drink plenty of water to keep hydrated during pregnancy.	4.59	.545	Very Highly Effective
4.	Lying on the left side also keeps your expanding body weight from pushing down too hard on your liver during pregnancy. It also increases blood circulation	4.45	.655	Highly Effective
Overall Mean		4.49	.493	Highly Effective

3.4 Quality of Antenatal Care

In terms of Safe Pregnancy

Strong recognition of prenatal care (ANC) as essential for a safe pregnancy and mother-infant health is shown by a 4.59 mean score—very high quality (Table 10). Respondents believe ANC to be crucial for treating comorbid diseases, lowering difficulties, and guaranteeing first-rate pregnancy. Ahmed and Mansoor (2019) underscore the need for ANC in safe motherhood, while Gupta et al. (2019) underline its relevance in lowering anemia, hypertension, diabetes, and miscarriage risks. Notwithstanding this knowledge, prenatal education on HIV screening and prevention could have to be strengthened. Enhancing diagnostic and treatment programs guarantees that no element of mother health care is undervalued. Emphasizing its importance in lowering mother morbidity and death, Aziz Ali et al. (2018) said ANC is vital for expecting women.

Table 10. *Quality antenatal care in terms of safe pregnancy | n=300*

	Indicators	Mean	SD	Interpretation
1.	Antenatal care can provide HIV testing and medications to prevent mother-to-child transmission of HIV.	4.55	.613	Very High- Quality Antenatal Care
2.	Antenatal care has an important role in the prevention of comorbid conditions like anemia, hypertension, diabetes, and risk of abortion	4.58	.539	Very High Quality
3.	Antenatal care is key to improving maternal and infant health.	4.59	.569	Very High Quality
4.	Antenatal care is potentially one of the most effective health interventions for preventing maternal morbidity and mortality, particularly in places where the general health status of women is poor.	4.63	.524	Very High Effective
Overall Mean		**4.49**	**.493**	**Very High Effective**

In terms of Safe Delivery

A mean score of 4.58 (Very High Quality) clearly shows the value of prenatal care in encouraging safe deliveries and lowering mother's health concerns (Table 11). Participants agree that minimizing birth-related issues and enhancing a mother's health depends on prenatal care. While Geltore and Anore (2021) emphasize its importance in promoting healthy births without endangering maternal health, Danadji et al. (2022) demonstrate a good link between prenatal visits and safe deliveries. However, more has to be done to highlight the link between prenatal care and lower maternal mortality, particularly in areas where facility-based deliveries are scarce. A strong link between safe delivery and prenatal care in medical facilities was found by Phommachanh et al. (2019). Improving access to quality care during labor and raising knowledge could further enhance the health of the mother and the newborn, reducing the risk of maternal, stillbirth, and neonatal deaths.

Table 11. *Quality antenatal care in terms of safe delivery | n=300*

	Indicators	Mean	SD	Interpretation
1.	Antenatal care encourages women to seek skilled care at birth.	4.59	.544	Very High Quality
2.	Antenatal care is to assure that every wanted pregnancy results in the delivery of a healthy baby without impairing the mother's health.	4.63	.511	Very High Quality
3.	Antenatal care with health facility delivery was positively correlated with safe delivery.	4.60	.511	Very High Quality
4.	Having antenatal care and health facility delivery seems to have an additive effect on maternal mortality reduction.	4.50	615	Very High Effective
Overall Mean		**4.58**	**.409**	**Very High Effective**

In terms of Safe Childbirth

A 4.68 mean score (Very High Quality) reflects a strong understanding of safe childbirth and the critical role of antenatal care in improving maternal and fetal outcomes (Table 12). Alabi et al. (2023) confirm that antenatal care prepares women for safe delivery. According to Gultom (2024), antenatal education gives expectant women knowledge, educated decision-making, and mental and physical preparation for childbirth; emphasizing the effect of prenatal care on lowering avoidable complications will help raise public knowledge even more. Women who deliver their babies in medical facilities under qualified doctors feel more comfortable about the results of their pregnancies. The results confirm that guaranteeing safe deliveries and better mother health depends on prenatal care visits and related interventions.

Table 12. *Quality antenatal care in terms of safe childbirth | n=300*

	Indicators	Mean	SD	Interpretation
1.	Pregnant women who participate in antenatal education programs tend to have better knowledge about health during pregnancy, preparation for childbirth, and postpartum care.	4.67	.497	Very High Quality
2.	Antenatal care promotes reductions in stillbirths, childbirth complications, and newborn deaths.	4.61	.528	Very High Quality
3.	Antenatal care is an evidence-based intervention that decreases the probability of bad health outcomes for mothers and their newborns.	4.69	.511	Very High Quality
4.	Having antenatal care and health facility delivery seems to have an additive effect on maternal mortality reduction.	4.74	.456	Very High Effective
Overall Mean		**4.68**	**.399**	**Very High Effective**

3.5 Relationship between Quality of Antenatal Care and Knowledge, Attitude, and Nutritional Intervention

The correlation analysis indicates that knowledge, dietary modifications, or attitudes scarcely influence the quality of prenatal care (see Table 13). These results imply that elements of the healthcare system define more how ANC quality is improved than personal knowledge or action. Regular ANC visits alone cannot reduce mother and child mortality, Nihal et al. (2024) stress; hence, quality of care is crucial. Stronger elements influencing ANC efficiency also include Langer et al. (2014), stressing infrastructure, provider knowledge, and drug supply. Prasodjo (2016) highlights how the relevance of ANC use is defined by the mother's education, socioeconomic position, and access to healthcare. Efforts should center on enhancing healthcare services, reassuring qualified practitioners, and extending access to improve mother and child outcomes rather than only on knowledge and behavioral therapy. Future research should examine systemic factors influencing antenatal care (ANC) quality, including healthcare infrastructure (availability of well-equipped health facilities, essential medical supplies, and efficient referral systems), provider competence (training, knowledge, and attitudes of healthcare professionals delivering ANC services), policy implementation (the effectiveness of maternal health policies, government funding, and adherence to international ANC guidelines), and socioeconomic conditions (factors such as maternal education, financial stability, geographic accessibility, and cultural influences affecting ANC utilization). Important aspects cover worker training, mother health policies, facility resources, and accessibility challenges. Meaningful changes in ANC can be brought about by improved coordination inside the healthcare system and guarantees of patient-centered treatment, improving mother and newborn health outcomes.

Table 13. *Correlations between the quality of antenatal care and their knowledge, attitude, and nutritional intervention | n=300*

Factors	Quality of Antenatal Care		Interpretation
	Pearson r	p-value	
Knowledge			
Importance of Antenatal Care	.044	.443	Not Significant
Antenatal Care Visits	.028	.630	Not Significant
Screening of Mother and Fetus	.054	.353	Not Significant
Attitudes			
Teenage/Adolescent Pregnancy	.013	.819	Not Significant
Health Practices	.017	.771	Not Significant
Facility Healthcare Practices	.012	.837	Not Significant
Nutritional Interventions			
Supplementation with Iron and Folic Acid	.041	.480	Not Significant
Calcium supplementation	.069	.230	Not Significant
Healthy Diet and Exercises	.067	.249	Not Significant

**.Correlation is significant at the 0.01 level (2-tailed).

Also, the findings reveal that the predictors and the outcome variable have a minimal relationship (see Table 14). With an R-value of 0.129, a minor relationship is proposed. Moreover, the R-squared value of 0.017 indicates that the independent elements explain 1.7% of the variance in the prenatal care quality. This implies that with respect to the benchmark of prenatal care, knowledge, attitude, and dietary interventions have minimal predictive value. The revised R-squared value of -0.014 supports the assertion that these features by themselves do not sufficiently characterize the quality of prenatal care since it implies that adding more elements does not improve the explanatory capacity of the model. These results emphasize the need to look at other elements that, by applying more exact prediction and improvement strategies, might raise the standard of prenatal care. Previous studies have shown that depending just on the number of visits or medical treatments does not always produce a superior treatment (Akin & Hutchinson, 1999; Langer et al., 2014). Consequently, other crucial variables could be elements like socioeconomic level, cultural competency, social support, provider effectiveness, accessibility, and the quality of the healthcare system. The low R2 value of the study emphasizes the complexity of prenatal care quality and suggests that attempts to improve it should follow a more all-encompassing and integrated approach. Future studies should focus on a broader spectrum of traits to build a more complete prediction model and assist legislative initiatives to address structural and systematic hurdles to provide high-quality prenatal care.

Table 14. *Regression results of the variables that best predict quality antenatal care*

	Coefficients			t	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta		
1 (Constant)	4.40	.209		21.0	.000
Importance of Antenatal Care	.054	.075	.077	.718	.473
ANC Visits	-.094	.101	-.136	-.935	.351
Screening of Mother & Fetus	.091	.098	.128	.925	.356
Teenage Pregnancy	-.009	.028	-.023	-.321	.748
Health Practices	-.017	.053	-.032	-.318	.751
Facility Healthcare Practices	-.091	.080	-.140	-1.138	.256
Supplementation with Iron & Folic Acid	-.005	.070	-.008	-.076	.939
Calcium Supplementation	.068	.068	.112	.998	.319
Healthy Diet & Exercise	.050	.066	.076	.758	.449

R=0.129 R2= 0.017

a. Dependent Variable: Quality Antenatal Care

b. b. Predictors: (Constant), Healthy Diet and exercise, Teenage Pregnancy, Importance of Antenatal Care, Supplementation with Iron & Folic Acid, Health Practices, Calcium Supplementation, Screening of Mother and fetus, Facility Healthcare Practices, ANC Visits

The chi-square value ($X^2 = 50.989$, $p = 0.320$) and key fit indices above the advised criteria (NFI = .981, GFI = .973, CFI = .998, TLI = .998) clearly show that the second hypothesized model significantly enhances the fit indices by better aligning with the observed data. The RMSEA value of 0.017, far lower than the 0.05 cutoff, shows that the model fits the real data with little error. Furthermore, there is a slight difference between the expected and actual findings, as indicated by the RMR of 0.008. Unlike the prior model, which demonstrated poor fit (RMSEA = 0.223), this new model adequately describes the relationships among knowledge, attitude, and nutritional intervention in determining the quality of prenatal care. Numerous statistical indicators support the second hypothesized model, which is selected since it shows a much closer match with the observed data. A excellent match is

confirmed by the non-significant chi-square value (X2 = 50.989, p = 0.320), which indicates that there is no significant difference between the model and the observed data. Its robustness is further supported by the high values of NFI (.981), GFI (.973), CFI (.998), and TLI (.998), all of which are above the suggested thresholds. While the RMR of 0.008 shows a significant correlation between predicted and actual data, the RMSEA of 0.017, as opposed to the previous model's 0.223, indicates a minimal inaccuracy. This model is recommended because it has a higher predictive capacity, less inaccuracy, and better alignment with the data. It is a valuable tool for directing policies and activities to enhance maternal health because it provides a more trustworthy framework for comprehending how knowledge, attitude, and nutritional intervention affect the quality of prenatal care.

Table 15. *Fit Indices Result for the Hypothesized Model for Quality Antenatal Care*

Model	X^2		Prob.	NFI	GFI	CFI	TLI	RMR	RMSEA
	value	df							
Best Fit Model 2	50.989	47	.320	.981	.973	.998	.998	.008	.017
Standard Fit Criterion	not significant; ratio of X^2 to df ≤ 2 1.085			≥ .95	≥ .95	≥ .95	≥ .95	nearing zero	≤ .05 - .08

4.0 Conclusion

Particularly in disease prevention, screening, and supplementing, the results show pregnant women have great awareness of antenatal care (ANC). Birth preparation, psychosocial support, patient-provider communication, prenatal HIV screening, and facility-based delivery education were lacking, nevertheless. Furthermore, ANC quality is the least affected by information, attitudes, and dietary changes, which are mainly shaped by healthcare infrastructure, provider competency, policy execution, and socioeconomic circumstances. Efforts to increase ANC efficacy should center on strengthening healthcare systems using better infrastructure, guaranteeing necessary medical supplies, and enhancement of provider training. Maintaining mother care using expanding prenatal education on birth preparedness, neglected hazards, and safe deliveries helps to maximize it. Policymakers have to remove cost and geographic obstacles, including HIV testing in ANC, and encourage patient-centered communication. Future studies should investigate systematic elements affecting ANC quality, including healthcare infrastructure (availability of well-equipped facilities, medical supplies, and referral systems), provider competence (training and attitudes of healthcare professionals), policy implementation (effectiveness of mother health policies and funding), and socioeconomic conditions (maternal education, financial stability, and cultural influences). Dealing with these elements will enhance ANC delivery, guaranteeing fair access to high-quality mother healthcare and better pregnancy results.

5.0 Contributions of Authors

The author is accountable for the manuscript's creation, planning, evaluation, writing, or editing.

6.0 Funding

This project did not obtain any funding from any financial organization.

7.0 Conflict of Interests

The author states that there are no conflicts of interest related to the publication of this paper.

8.0 Acknowledgment

I truly thank God for His direction and wisdom over this study. For her great assistance and mentoring, my research adviser, Dean of the College of Nursing at Liceo de Cagayan University, Dr. Gloria M. Cunanan, deserves my utmost thanks. I thank Dr. Mariano M. Lerin, CPA, Research Panel Chair, and panel members Dr. Nenita I. Prado, Dr. Christy G. Dablo, and Dr. Bernarda C. Lleno for their insightful feedback. I am also grateful to the Mayors and Municipal Health Officers of the five municipalities of Camiguin Province for their cooperation and assistance. Lastly, I wholeheartedly thank my beloved wife and children for their unwavering love, patience, and support, which have been my greatest motivation throughout this journey.

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