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The Effectiveness of Leaflet Education Media on Knowledge of Pregnancy Danger Signs and Compliance with Antenatal Care Visits among Pregnant Women at Pagat Community Health Center, Hulu Sungai Tengah Regency

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Abstract. Maternal literacy regarding pregnancy danger signs and fidelity to Antenatal Care (ANC) protocols constitute pivotal determinants in mitigating obstetric anomalies and optimizing maternal-fetal clinical outcomes. Nonetheless, profound deficits in hazard recognition and non-adherence to standardized prenatal surveillance schedules remain highly prevalent among expectant mothers. This study evaluated the operational efficacy of leaflet-mediated health education in upgrading cognitive awareness of pregnancy danger signs and driving compliance with scheduled ANC visits at the Pagat Community Health Center. Employing a quantitative pre-experimental approach via a One-Group Pretest-Posttest Design, the investigation assessed a cohort of 30 pregnant individuals recruited through a total sampling framework. Primary data were captured using structured questionnaires and clinical observation sheets across pre- and post-intervention cycles, with subsequent computational modeling utilizing descriptive statistics and the Wilcoxon Signed-Rank Test. The analytical outputs revealed that post-intervention, the collective knowledge index advanced from 64.90 to 69.33, while the mean frequency of prenatal consultations increased from 5.60 to 6.90. Inferential modeling validated these longitudinal shifts as highly significant, confirming substantial improvements in both cognitive literacy ($p = 0.008$) and behavioral compliance ($p = 0.014$). These findings provide empirical proof that targeted typographic media serve as an effective, low-cost intervention for modifying health-seeking trajectories and reinforcing preventive care utilization in maternal health.

Keywords: Antenatal Care; Compliance; Health Education; Knowledge; Leaflet.

1. BACKGROUND

Maternal and neonatal mortality remain critical frontiers in global public health, particularly within developing nations. A significant proportion of maternal fatalities stem from gestational complications that evade early detection or fail to receive timely, adequate medical intervention. Within this framework, Antenatal Care (ANC) serves as a strategic cornerstone to mitigate maternal and infant morbidity and mortality by providing a dedicated space for physical monitoring, pathological risk screening, preventive interventions, and the transfer of health education. Through routinely scheduled ANC visits, healthcare practitioners can identify gestational risk indicators early on, ensuring that pregnant women receive comprehensive care throughout the course of gestation (Kementerian Kesehatan Republik Indonesia, 2023).

Accurate comprehension of pregnancy danger signs plays a pivotal role in the architecture of maternal safety. Clinical symptoms such as vaginal bleeding, severe cephalgia, visual disturbances, edema of the face and upper extremities, reduced fetal movement, and acute abdominal pain serve as warning signals that demand immediate response (Chendany & Kristiana, 2023). When a pregnant woman is equipped to identify these red flags, her determination to seek emergency medical assistance increases substantially, thereby

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minimizing the likelihood of fatal complications (Baity & Rahayuningsih, 2023). However, empirical observations frequently reveal a deficit in maternal cognitive capacity regarding these danger signs, which ultimately triggers delays in seeking care and escalates fatal risks for both mother and fetus.

The degree of compliance in compl eting scheduled ANC visits correlates strongly with maternal knowledge and awareness of reproductive health. Expectant mothers who internalize the urgency of routine antenatal examinations tend to exhibit a high commitment to attending scheduled appointments and adopting medical recommendations (Aprilna et al., 2025). Conversely, a deficit in knowledge remains a determining factor behind the underutilization of maternal healthcare services. Aligning with this phenomenon, a study orchestrated by Budhi & Nurhayati, (2020) concluded that maternal insight exerts a significant influence on compliance levels with ANC visits. This finding highlights that expanding comprehension of pregnancy management can foster positive health-seeking behaviors.

Fluctuations in maternal knowledge and ANC utilization are conditioned by a multifaceted matrix of factors, including educational attainment, access to information, family psychosocial support, socioeconomic status, and the intensity of health promotion initiatives. Among these variables, exposure to health information occupies a highly strategic position, as it mediates a mother's understanding of potential pregnancy risks. A research report by Lingga et al., (2025) reinforces this assumption by presenting evidence that information penetration and ease of access to health education contribute tangibly to shaping a pregnant woman's compliance in undergoing standardized pregnancy examinations.

Although health education is recognized as one of the most effective instruments for escalating maternal knowledge, delivering messages solely through verbal methods often clashes with the limitations of maternal memory retention, especially when conveying complex information regarding pregnancy complications (Galaresa et al., 2024). Consequently, the adoption of supportive instructional media is urgently required to reinforce understanding and facilitate long-term memory storage. The use of educational media enhances the efficiency of knowledge transformation by repackaging scientific data into a simpler, visual, engaging, and easily accessible format (Gesese & others, 2023).

Leaflets represent a widely relied-upon option for health promotion media due to their concise nature and inclusion of visual illustrations that clarify abstract concepts. Unlike verbal counseling, which is inherently temporary, leaflets offer the advantage of portability, allowing them to be taken home, studied repeatedly, and discussed with family members. The track record of prior research confirms that leaflet-based educational interventions effectively trigger

an increase in knowledge and guide mothers toward adopting better health behaviors. Oktaviance et al., (2026) also highlighted in their report that the reinforcement of a mother's foundational knowledge aligns linearly with the optimization of ANC service utilization a fact that underscores the urgency of designing effective educational strategies during pregnancy.

The objective conditions in the field were recorded through a preliminary study conducted on April 11, 2026, involving 10 pregnant women within the working area of the Pagat Community Health Center. The assessment revealed that 7 out of 10 respondents (70%) failed to perform regular ANC visits and could not fully identify pregnancy danger signs. The majority within this group reported that they had only received verbal counseling without any supporting printed media. Conversely, 3 respondents (30%) who complied with the ANC schedule stated that the presence of illustrated educational materials greatly assisted them in understanding and retaining the health information provided. If left unaddressed, this disparity in understanding poses a substantial risk of obstructing the early detection of pregnancy complications, ultimately leading to poor maternal and neonatal outcomes. Driven by this urgency, this study is oriented toward evaluating the effectiveness of leaflet-based educational media in escalating knowledge of pregnancy danger signs and compliance with antenatal care visits among pregnant women at the Pagat Community Health Center, Hulu Sungai Tengah Regency.

2. LITERATURE REVIEW

Antenatal Care (ANC)

Antenatal Care (ANC) constitutes a structured, preventative clinical framework designed to oversee both maternal well-being and fetal development across the gestational continuum. The programmatic architecture of ANC is geared toward the pre-emptive screening of obstetric anomalies, the deployment of prophylactic and therapeutic measures, and the dissemination of reproductive health literacy, all of which culminate in preparing the expectant mother for a safe parturition and postpartum transition. Maintaining an uninterrupted trajectory of scheduled antenatal consultations remains imperative in curbing systemic maternal and infant morbidity and mortality rates, as it establishes an empirical baseline for the early diagnosis and tactical containment of gestational pathologies (Nurrahmah et al., 2024).

Knowledge of Pregnancy Danger Signs

Maternal literacy regarding pregnancy danger signs denotes an expectant mother’s cognitive capacity to identify acute clinical symptoms that signal underlying obstetric emergencies requiring immediate, specialized medical mobilization. The clinical spectrum of

these warning indicators encompasses manifestations such as atypical vaginal bleeding, persistent cephalalgia, visual field distortions, localized edema in the facial and upper extremities, severe abdominal distress, hyperpyrexia, and a quantifiable deceleration in fetal motility. Possessing a robust interpretive understanding of these physiological red flags empowers pregnant individuals to execute swift health-seeking decisions, thereby neutralizing the systemic risks associated with delayed management of critical maternal-fetal complications (Duwila et al., 2025).

Compliance with Antenatal Care Visits

Compliance with ANC protocols is operationalized as the steadfast adherence and behavioral consistency demonstrated by pregnant women in fulfilling their prenatal clinical appointments in alignment with established health mandates. This behavioral variable is contingent upon an intersectional matrix of determinants, most notably baseline health literacy, formal educational attainment, geographical and financial accessibility to health infrastructure, familial support systems, and systemic exposure to institutional health messaging. Expectant mothers who exhibit high fidelity to ANC schedules maximize their exposure to continuous clinical surveillance and preventive education, rendering compliance a high-value diagnostic metric for maternal healthcare resource utilization (Liesmayani et al., 2025).

Leaflet Education Media

A leaflet functions as a portable, high-density typographical medium that synthesizes complex clinical configurations into a simplified architecture of concise textual explanations and strategic pictorial illustrations. Within the theater of public health promotion, leaflets are extensively leveraged due to their cost-efficiency, ease of dissemination, and permanent physical nature, which permits repeated intellectual engagement by the target audience. By offering a tactile, visual anchor, these media instruments reinforce the volatile nature of verbal consultations, enhancing cognitive retention and rendering technical epidemiological data highly digestible for the lay reader (Renta Sihombing et al., 2025).

Effect of Leaflet Education Media on Knowledge and ANC Compliance

The deployment of leaflet-mediated health education acts as an entry point for upgrading maternal cognitive assets, offering an intelligible, meticulously organized, and autonomous source of truth regarding gestational monitoring and hazard identification. This cognitive upgrade serves as a behavioral catalyst; as awareness regarding obstetric anomalies and the prophylactic value of clinical surveillance deepens, it reconfigures individual health attitudes, translating directly into heightened fidelity to scheduled clinic appointments. Pregnant individuals who have internalized both the preventive merits of systematic check-ups and the

clinical gravity of unmonitored anomalies exhibit a stronger intrinsic motivation to comply with ANC guidelines, positioning leaflets as a highly viable, low-cost intervention for optimizing maternal care trajectories (Duwila et al., 2025; Liesmayani et al., 2025).

3. METHOD

To test the operational efficacy of leaflet-based educational media, this investigation adopted a quantitative pre-experimental approach utilizing a *One-Group Pretest-Posttest Design*. This specific framework was selected to establish an internal baseline; by evaluating the participants' cognitive comprehension of pregnancy danger signs and their historical adherence to Antenatal Care (ANC) protocols prior to the intervention, the researcher could systematically measure the magnitude of cognitive and behavioral shifts occurring post-exposure.

Empirical data collection took place throughout 2026 within the catchment area of the Pagat Community Health Center, situated in Batu Benawa District, Hulu Sungai Tengah Regency, South Kalimantan. The accessible population comprised all registered pregnant women undergoing antenatal supervision at the facility. Participant recruitment relied on a total sampling technique (census approach), filtered through strict eligibility criteria. The inclusion parameters necessitated that participants be literate, capable of interpreting typographic health materials, formally willing to participate, and committed to completing both evaluation cycles. Primary data capture was facilitated by two distinct instruments: a structured questionnaire designed to quantify maternal knowledge regarding obstetric warning signs, and standardized observation sheets to verify physical attendance at scheduled ANC consultations.

Upon the conclusion of the fieldwork, the raw dataset underwent standard data hygiene protocols encompassing visual screening, numerical coding, and digital entry into a statistical computing environment. The preliminary phase of analysis utilized descriptive statistics to map the central tendencies, frequency distributions, and demographic profiles of the cohort. For the inferential phase aimed at verifying the significance of the observed variance between the two timepoints the data were subjected to the *Wilcoxon Signed-Rank Test*, adopted as the non-parametric procedure suited for paired, repeated-measure observations. Statistical decision-making was fixed at an alpha level of 0,05 consequently, any derived probability yielding $p<0,05$ was interpreted as an empirical validation of the leaflet medium as an effective agent for improving maternal health literacy and clinical compliance.

4. RESULT AND DISCUSSION

Respondent Characteristics

The socio-demographic matrix of the cohort encompasses group allocation, age, formal educational attainment, and occupational profile. The empirical breakdown of these baseline parameters is systematized in Table 1.

Table 1. Baseline Socio-Demographic Profile of the Cohort (n = 30).

Variable	Category	Frequency (n)	Percentage (%)
Group	Intervention	15	50.0
	Control	15	50.0
Age	Less than 20 years	10	33.3
	20–35 years	20	66.7
	Mean ± SD	28.30 ± 6.758	-
Education	Elementary School (SD)	10	33.3
	Junior High School (SMP)	13	43.3
	Senior High School (SMA)	7	23.3
Occupation	Housewife	20	66.7
	Private Employee	6	20.0
	Entrepreneur	3	10.0
	Civil Servant	1	3.3

As illustrated in Table 1, the sample maintained a balanced distribution between the experimental and observational arms, allocating exactly 15 participants (50.0%) to each. The mathematical average for age stood at 28.30 ± 6.758 years, with the 20-35 age bracket emerging as the dominant demographic node (66.7%). Regarding academic backgrounds, a plurality of the subjects had halted their formal schooling upon completing junior high school (43.3%), while the occupational distribution was heavily skewed toward non-salaried domestic labor, with housewives constituting 66.7% of the total sample pool.

Univariate Analysis

The granular stratification of cognitive scores regarding obstetric hazard signals across the pre- and post-intervention cycles is outlined in Table 2.

Table 2. Stratification of Maternal Knowledge Scores Across Evaluation Intervals (n = 30).

Category	Before n (%)	After n (%)
Poor (Score less than 50)	9 (30.0%)	6 (20.0%)
Fair (Score 51–75)	15 (50.0%)	14 (46.7%)
Good (Score 76–100)	6 (20.0%)	10 (33.3%)
Total	30 (100.0%)	30 (100.0%)
Variable		**Mean ± SD**
Knowledge Baseline (Pre-test)		64.90 ± 17.58
Knowledge Post-intervention (Post-test)		69.33 ± 16.93

The descriptive metrics in Table 2 reveal a positive upward movement in the collective knowledge index, where the mean score advanced from a baseline of 64.90 to 69.33 post-exposure. On a structural level, the high-tier competence band ("Good") expanded by 13.3 percentage points climbing from 20.0% to 33.3%. Concurrently, the lowest cognitive bracket

("Poor") shrank from 30.0% down to 20.0%. This descriptive variance signals a uniform consolidation of maternal understanding regarding critical obstetric risk signals following the introduction of the typographical medium.

The longitudinal behavioral patterns concerning adherence to scheduled prenatal examinations before and after media deployment are mapped in Table 3.

Table 3. Longitudinal Distribution of Prenatal Attendance Adherence (n = 30).

Category	**Before n (%)**	**After n (%)**
Non-compliant (Less than 6 visits)	14 (46.7%)	8 (26.7%)
Compliant (6 visits or more)	16 (53.3%)	22 (73.3%)
Total	30 (100.0%)	30 (100.0%)
Variable		**Mean ± SD**
ANC Frequency Baseline		5.60 ± 2.884
ANC Frequency Post-intervention		6.90 ± 2.759

The data compiled in Table 3 indicate a noticeable behavioral shift, with the average number of physical prenatal consultations rising from 5.60 to 6.90 entries per patient. The adherence rate experienced an upward surge, shifting from a borderline baseline of 53.3% to a robust 73.3% post-intervention. Mirroring this progress, the non-adherent segment contracted from 46.7% to 26.7%. These shifts indicate that exposure to the informational medium correlates with an increased commitment to clinical surveillance routines.

Bivariate Analysis

To statistically isolate the impact of the typographical media intervention on maternal cognitive assets, the paired datasets were subjected to the Wilcoxon Signed-Rank mathematical framework, as detailed in Table 4.

Table 4. Wilcoxon Signed-Rank Output for Cognitive Variances.

Operational Variable	**Z-Statistic**	**p-value**
Knowledge After – Knowledge Before	-2.646	0.008

The mathematical modeling displayed in Table 4 yields an asymptotic significance value of $p = 0.008$. Given that this derived probability falls comfortably below the critical alpha ceiling of 0.05, the null hypothesis is rejected. This outcome provides empirical proof of a highly significant structural difference between the pre- and post-test literacy profiles. The mathematical trajectory confirms that the deployment of leaflet-based health education served as an effective active agent in elevating maternal literacy levels.

The non-parametric evaluation of behavioral changes regarding clinic appointment fidelity post-intervention is documented in Table 5.

Table 5. Wilcoxon Signed-Rank Output for Behavioral Adherence Deltas.

Operational Variable	**Z-Statistic**	**p-value**
ANC Compliance After – ANC Compliance Before	-2.449	0.014

According to the computational outputs in Table 5, the non-parametric evaluation generated a critical value of p = 0.014. Because this threshold is lower than the standard significance parameter (alpha = 0.05), it confirms a statistically significant longitudinal shift in clinic attendance behavior. These findings provide solid evidence that leaflet-mediated instruction effectively improved behavioral fidelity toward antenatal medical appointments within the Pagat Community Health Center catchment pool. The notable growth in the strictly adherent cluster which rose from 53.3% to 73.3% further validates the practical utility of target visual-textual media in driving systemic health-seeking actions among expectant mothers.

Discussion

Knowledge of Pregnancy Danger Signs Before and After Leaflet Education

The descriptive outputs of this investigation reveal a upward shift in maternal cognitive baselines regarding obstetric hazard signals following the typographical intervention. The collective knowledge index advanced from a pre-test baseline of 64.90 to a post-test average of 69.33. On a structural level, this cognitive consolidation is highlighted by a 13.3 percentage point expansion in the high-tier competence band ("Good"), which rose from 20.0% to 33.3%, coupled with a noticeable contraction in the lowest tier ("Poor") from 30.0% down to 20.0%. These shifts demonstrate that the contextualized educational media served as an effective catalyst for clarifying complex clinical warning indicators.

Prior to the intervention, exactly half of the cohort was confined to a "Fair" baseline, and nearly one-third exhibited an inadequate understanding of acute complications. This systemic deficit in health literacy poses a critical risk in obstetric care; a limited cognitive grasp of early warning symptoms often directly impedes an expectant mother's capacity to recognize underlying physiological threats. This inability to identify severe symptoms compromises her health-seeking determination, creating a direct pathway to delays in accessing emergency medical care (*delay in seeking care*).

Knowledge acts as an essential pre-condition for behavioral modification, as individuals who are fully aware of specific clinical risks are better equipped to navigate crucial healthcare choices. This is supported by Metasari et al., (2022), who note that expanding maternal literacy regarding gestational monitoring reconfigures risk perception, leading to improved utilization of institutional maternal healthcare services and a stronger commitment to clinical surveillance.

The cognitive gains recorded post-intervention point directly to the practical design advantages of leaflets as an instructional medium. Leaflets condense intricate medical data into a clear layout where concise text works alongside strategic illustrations to ease cognitive load and aid memory retention. Unlike verbal counseling, which is often hindered by rapid memory

decay, leaflets provide permanent access to health information. Expectant mothers can take them home, review the content during self-directed study, and use them to spark health conversations with family members.

This finding aligns with Maryuni et al., (2023), who observed that structured health literacy tools are highly effective at neutralizing information volatility, helping to establish long-term memory storage and promoting proactive health behaviors. Consequently, targeted print media proves to be an accessible and high-utility asset for addressing gaps in maternal danger-sign recognition.

ANC Visit Compliance Before and After Leaflet Education

The behavioral indicators monitored across the pre- and post-test intervals point to an encouraging upward trend in clinic attendance patterns. The average frequency of prenatal check-ups increased from a baseline of 5.60 to a post-intervention rate of 6.90 visits per participant. Crucially, the strictly adherent group expanded from a baseline of 53.3% to a robust 73.3%, while the non-compliant segment contracted by 20.0 percentage points, falling to 26.7%. These numbers indicate that using targeted educational media can significantly improve a patient's commitment to recommended clinic visit schedules.

Adherence to standard antenatal protocols is a key factor in protecting maternal and infant health. Regular clinic visits provide healthcare practitioners with necessary opportunities to track fetal development, run essential diagnostic tests, and manage emerging gestational complications before they become life-threatening. Conversely, missing these appointments isolates an expectant mother from continuous clinical observation, leaving her vulnerable to unmonitored obstetric risks. As Mayasari & Rochmaedah, (2024) state, maintaining a steady routine of antenatal visits is a highly effective preventive measure, critical for avoiding preventable birth complications and ensuring positive clinical outcomes.

This positive behavioral change is closely linked to the improvements in maternal knowledge observed after the intervention. When pregnant women understand the preventive value of routine check-ups and the serious risks of ignored warning signs, they develop a stronger internal motivation to prioritize their appointments.

(Yakob & Rahmat, 2025) support this view, showing that regular exposure to health information and a clear understanding of prenatal care are major factors in keeping expectant mothers compliant with medical schedules. Thus, educational strategies that build maternal knowledge act as an effective behavioral tool, translating improved risk awareness into a reliable commitment to prenatal care.

Effectiveness of Leaflet Education Media on Knowledge of Pregnancy Danger Signs and ANC Visit Compliance

The inferential data generated by the Wilcoxon Signed-Rank Test confirms a statistically significant improvement in maternal knowledge regarding obstetric risk factors ($p = 0.008$). This statistical validation proves that the leaflet intervention was an effective educational tool for this cohort. By pairing concise text with clear visual illustrations, the medium bridges communication gaps, helping participants process technical health concepts more effectively. The accessibility of the leaflet allowed expectant mothers to independently absorb and retain crucial details about gestational care and hazard identification.

Similarly, the inferential analysis shows a statistically significant longitudinal shift in clinic attendance behavior ($p = 0.014$). This confirms that the leaflet intervention did more than just transfer information; it successfully influenced actual health behaviors. In line with established health behavior theories, expanding an individual's knowledge base can drive lifestyle and behavioral changes by reshaping their understanding of health risks and the clear benefits of preventive action. Once pregnant women grasp the critical role of regular check-ups, they are far more likely to stick to their medical schedules and participate actively in prenatal services.

These results align closely with previous public health literature. Haryanti & Amelia, (2025) demonstrated that maternal insight serves as a key driver for clinical appointment compliance, while Ganchimeg et al., (2021) observed that improving a mother's understanding of prenatal care leads to more proactive health-seeking behaviors. This study adds to that evidence, demonstrating that leaflet-based education is a practical, scalable, and highly effective tool for simultaneously raising danger-sign awareness and improving clinic attendance.

However, several limitations in this study warrant cautious interpretation. The research was conducted within a single healthcare facility with a small sample size ($n = 30$), which restricts the broader generalizability of the findings. Furthermore, the analysis did not look deeply into other influential factors, such as family support systems, socioeconomic status, geographical barriers, or deeply rooted cultural beliefs. Future research should use larger, multi-center sample pools and examine a broader range of socio-environmental factors to build a more comprehensive model of maternal knowledge and antenatal care compliance.

5. CONCLUSION AND RECOMENDATION

The empirical evidence generated by this study confirms that the deployment of leaflet-based educational media is highly effective in elevating maternal health literacy and driving positive shifts in clinic attendance patterns at the Pagat Community Health Center. Following the intervention, the collective knowledge index regarding obstetric hazard signals shifted upward, with the mean score rising from 64.90 to 69.33, and the high-tier competence band ("Good") expanding from 20.0% to 33.3% ($p = 0.008$). On a behavioral level, a corresponding upward trend was recorded in clinical attendance; the average frequency of prenatal check-ups increased from 5.60 to 6.90 visits per participant, while the strictly adherent cohort grew from 53.3% to 73.3% ($p = 0.014$). Taken together, these insights demonstrate that integrating targeted visual-textual print materials into routine prenatal counseling serves as a practical, validated strategy for reinforcing risk awareness and ensuring consistent clinical surveillance throughout the gestational continuum.

Based on these findings, healthcare providers are encouraged to systematically integrate illustrated leaflet media into their standard workflows as a permanent, accessible tool to reinforce verbal counseling and combat memory decay. Expectant mothers must also be supported in actively seeking health information and maintaining strict independent adherence to standard clinical examination schedules. However, because this study's scope was limited by its small sample size ($n = 30$) and execution within a single facility, future investigations should adopt more rigorous experimental frameworks, such as quasi-experimental designs that incorporate dedicated control groups across larger, multi-center sample pools. Furthermore, subsequent research should look beyond media interventions to examine influential socio-environmental determinants, including family support networks, geographical accessibility, and socioeconomic conditions, to construct a truly comprehensive model of maternal compliance and health literacy.

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