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INVESTIGATING FACTORS INFLUENCING INTERMITTENT PREVENTIVE TREATMENT (IPT) ADHERENCE AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE VISITS AT SELECTED HEALTH FACILITIES IN SEKONDI-TAKORADI, GHANA

Mathias Moore[1], Christiana Nana Momo Lokko[2] & Francis Obodai Lokko[3]

[1]Department of Mathematics, Statistics and Actuarial Science, Takoradi Technical University, Takoradi, Ghana

[2]Department of Medical Laboratory Sciences, Takoradi Technical University, Ghana

[3]Department of Religious Affairs, Ghana Armed Forces, Ghana

ABSTRACT

The intermittent treatment of malaria with sulphadoxine-pyrimethamine (IPTp-SP) is the use of an anti-malarial druggiven in treatment doses at predefined intervals to clear a presumed burden of parasites, regardless of the absence of symptoms of malaria. To achieve immunity against malaria infection, pregnant women must adhere fully to IPTp-SP, taking all required doses until delivery. Despite the proven efficacy of IPTp-SP and its adoption as a national policy in over 35 sub-Saharan African countries including Ghana, its uptake remains low, falling short of the projected 80% coverage by WHO. The study aims to ascertain the demographic factors, healthcare system factors and side effect factors of SP administration associated with IPTp-SP adherence among pregnant women who attended selected health facilities in the Sekondi-Takoradi Municipality in the Western Region of Ghana.The analysis indicates that pregnant women above 30 years of age are more likely to take lower (below 3) doses of SP before delivery with a significant value. Again, unemployed pregnant women were less likely to take lower (below 3) doses of SP with a significant value. Therefore, demographic factors such as age and employment status are significant factors influencing adherence to IPTp-SP among pregnant women in Ghana. Similarly, side effect factors were found to significantly influence adherence to IPTp-SP among pregnant women in Ghana.

KEYWORDS: *Sulphadoxine-Pyrimethamine, Pregnant Women, Health Facilities, Doses, Sekondi-Takoradi*

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INTRODUCTION

Intermittent Preventive Treatment (IPT) of malaria is the use of anti-malarial drugs given in treatment doses at predefined intervals to clear a presumed to treat malaria in the presence or absence of malaria symptoms (Gosling et al. 2010). Malaria infection during pregnancy is a major public health problem, with substantial risks to the mother, her fetus, and the newborn, especially in sub-Saharan Africa regardless of the availability of different methods of preventing the disease(Bauserman et al. 2019). The main infection parasite plasmodium falciparum is responsible for 99% of all malaria cases during pregnancy. The unique burden of malaria in pregnancy was first described 75 years ago. Several chemoprophylaxis has been used to prevent malaria for decades(Zekar and Sharman 2023). The intermittent treatment of

malaria (IPTp) is the use of anti-malarial drugs given in treatment doses at predefined intervals to clear a presumed burden of parasites, regardless of the absence of symptoms of malaria(Belachew 2018; Zekar and Sharman 2023).Despite the use of several remedies and methods to prevent and treat malaria, the first effective treatment of malaria came from the bark of the cinchona tree which contains quinine. It was used by the Quechua Indians of Ecuador to reduce the shaking effects caused by severe chills (Musoke et al. 2023).IPTp was first tested in 1995 as a single dose, observed, therapeutic course of sulphadoxine and pyrimethamine (SP) (500mg sulphadoxine and 25mg pyrimethamine per tablet; three tablets in all) given as part of antenatal consultations (Balami et al. 2020).In 1981, Sulfadoxine/pyrimethamine, a combination medication was approved for medical use in the United States to treat malaria. Later in 1987 onwards, Artesunate and Artemether were derived from Artemisinin and used in clinics for malaria treatment (Tse, Korsik, and Todd 2019). The World Health Organization (WHO) now recommends that pregnant women in stable transmission receive up to six doses of SP-IPTp after the onset of fetal movement with each dose at least one month apart, until delivery (Roman et al. 2019).

Globally, there are 249 million malaria cases in 2022 compared to 244 million in 2021. The estimated number of malaria deaths stood at 608,000 in 2022 compared to 610,000 in 2021 (WHO 2023). In the Southeast Asia region, there were nine malaria-endemic countries in 2020, contributing to 2% of the global burden of malaria cases. In 2020, the region had 5 million estimated cases and 8900 estimated deaths (reductions of 80% and 77% respectively, 2 compared with 2010), representing the largest decline in any of the WHO regions (Liu et al. 2023). In India, there were 45 thousand reported cases of malaria in 2022 a sharp decrease compared to 2021 where India reported over 160,000 cases of malaria(Venkatesan 2024). In Africa, 233 million malaria cases were recorded in 2022, accounting for 94% of global malaria cases and 580000 deaths accounting for 95% of all malaria-caused deaths. Twenty-five (25) million pregnant women are infected with malaria both in high and low-malaria endemic areas, and 50,000 maternal deaths and 200,000 stillbirths occur because of malaria infection each year(WHO 2023).

A study conducted by Darteh et al. (2021) to investigate age as a factor influencing the uptake of SP among pregnant women in SSA, using data collected from current versions of the Malaria Indicator Survey of 12 countries in SSA showed a 30.69% average prevalence of uptake of SP among pregnant women in the selected countries, with the highest and lowest prevalence in Ghana (59.64%) and Madagascar (10.08%) respectively. The study indicated that women above 30 years compared to women below 20 years had higher odds of receiving 3 or more doses of SP. A cross-sectional study conducted among a population of 400 pregnant women randomly sampled from antenatal lines of five selected healthcare facilities to investigate factors that influence SP uptake in the Sunyani Municipality of Ghana established that women with a secondary or tertiary education took 3 or more doses of SP compared to women with only primary education or none (Ibrahim et al. 2017).A qualitative study conducted by Rassi et al. (2016) to assess the supply-side factors to SP uptake among pregnant women in Uganda indicated that incompetency among ANC providers resulted in a low level of SP uptake among pregnant women. Literature suggests a direct association between adherence to SP administration protocols and uptake of SP. Research done to explore practices of ANC providers at ANC clinics in the Bwari Area Council of Abuja, Nigeria showed that WHO protocols such as the direct observation of pregnant women by ANC providers as the pregnant women take SP at the clinics was nonexistent, leading to many pregnant women not taking the full course of SP even when administered to them (Mama et al. 2022).

Literature suggests that there is a lack of research on the factors influencing SP uptake globally. The identified studies mainly focused on healthcare system factors influencing IPTp-SP adherence among pregnant women such as availability of ANC providers, availability of medication (sulphadoxine-pyrimethamine), attitude, knowledge and technical

ability of ANC providers and demographic factors such as age, education level, marital status, employment status, ethnicity and decision-making power of pregnant women on adherence to IPTp-SP.

However, the identified studies have not been able to provide evidence that suggests that side effect factors of IPTp-SP such as feeling nauseous, vomiting, severe weakness, skin rash and seizure affect adherence to IPTp-SP among pregnant women. Furthermore, documented studies have not been able to explore IPTp-SP adherence among urban suburb populations like pregnant women who attend ANC visits at municipal hospitalsin the Regions of Ghana. The current study therefore seeks to fill the knowledge gap by examining side effects experienced by pregnant women on taking SP that may influence adherence to IPTp-SP.

METHODS

This research used a cross-sectional to gain an in-depth understanding of the problem and develop interventions to stop or significantly reduce the problem. A cross-sectional study is an observational study that analyses data from a population at a single point in time. The cross-sectional study design is the most relevant design when assessing the prevalence of disease and attitudes and knowledge among patients and health personnel (Kesmodel 2018). The study was conducted at Sekondi-Takoradi. Pregnant women who attend ANC visits at the selected facilities comprise the population for the study.

Sample Technique and Sample Size

Simple random sampling without a replacement would be used to select the required respondents. Simple random sampling is a probability sampling technique that gives an equal chance to every pregnant woman in the target population to be selected. The study targets pregnant women in their third trimester attending antenatal care (ANC) visits at the municipal hospital. Selected hospitals in Sekondi-Takoradi were considered based on accessibility and convenience. It ensures relatively higher supervision and stricter enforcement of Intermittent Preventive Treatment in pregnancy using Sulfadoxine-Pyrimethamine (IPTp-SP) protocols. Additionally, its central location in Sekondi-Takoradi makes it a convenient healthcare facility for many pregnant women from nearby towns and villages, leading to a larger patient population for the study including CHPS compounds, the study aims to gain valuable insights into IPTp-SP adherence in less supervised ANC settings, offering a comprehensive understanding of the variations in adherence across different healthcare levels.Using epi info software version 7.2.4.0, the sample size of 312 pregnant women from a population of 2100 with 50% expected frequency, 5% confidence limit, 95% confidence level and a cluster of 1 was estimated. The sample size was 312 pregnant women who attended selected health in Sekondi-Takoradi for their ANC visits.

Data Collection and Analysis

The data collected through questionnaires was explored using tables, percentages and graphs using SPSS. Descriptive statistics was used to describe the basic features of data in the study as reported by the respondents.Binary logisticsregression is the statistical method used for further analysis in the research.

RESULTS

Preliminary Analysis

From Table 1, the analysis of the study reveals several findings regarding pregnant women attending ANC visits. A majority (52.5%) had taken three or more doses of SP, while 47.4% had taken fewer than three doses. The largest age group (35.9%) was 20–30 years, followed by 33.7% below 20 years and 30.4% above 30 years. Educational attainment was low, with 42.3% having

no formal education, 27.2% having only primary education, and 30.4% attaining secondary or tertiary education. Most respondents (55.1%) were single and 56.1% were employed. Regarding decision-making, 57.7% reported being autonomous. Access to ANC clinics was available to 85.9% of respondents. Additionally, 94% agreed that consulting midwives adhered to SP administration protocolsand 94.2% viewed them as competent. SP availability was consistent for 83.3% of respondents.

Concerning side effects, 55.1% of the respondents experienced no headaches whilst 44.9% of the respondents reported headaches. Again, the analysis suggests that 63.8% of the women experienced nausea and 36.2% of the respondents did not.Moreover, 59% of the respondents did not experience itchinessand 41% of the respondents did experience some form of itchiness. Again, 51.3% of the respondents reported fatigue after taking SP, whereas 48.7% did not. These findings provide a comprehensive understanding of SP administration, side effects and related factors among pregnant women in the study.

Table 1: Descriptive of the Characteristics

Characteristics	Percent (%)
Number of SP Doses Taken	
3 doses and above	47.4
Below 3 doses	52.5
Age of Pregnant Women	
Below 20 years	33.7
20 to 30 years	35.9
Above 30 years	30.4
Educational Level	
No education	42.3
Primary education	27.2
Secondary/Tertiary education	30.4
Marital status	
Married	44.9
Single	55.1
Employment status	
Employed	56.1
Unemployed	44.9
Decision-making powder	
Autonomous	58.0
Non-autonomous	42.0
Accessibility to ANC visits	
Unavailable in the town of residence	14.1
Available in the town of residence	85.9
Adherence to SP Administration Protocols	
Negligent	6.0
Adherent	94.0
Competency of midwife	
Yes	94.2
No	5.8
Availability of SP at the ANC to Pregnant women	
Always available	83.3
Sometimes or never available	16.7
Nausea as a side effect of SP administration	
Yes	63.8
No	36.2
Itchiness as a side effect of SP administration	
Yes	41.0
No	59.0
Fatigue as a side effect of SP administration	
Yes	51.3
No	48.7

Table 2: Estimated Odds Ratios (QR) and 95% Confidence Intervals (CI) From Binary Logistic Regression of Factors Influencing IPTp-SP Adherence Among Pregnant Women and SP Uptake During Pregnancy

Characteristics	Exp. (β)	[95% CI]		P-value
		Lower	Upper	
Age of respondents				
Below 20 years (RC)	1.000	1.000	1.000	1.000
20-30 years	0.796	0.228	2.777	0.721
30 and above	12.575	3.310	47.775	0.001
Educational level				
No formal education (RC)	1.000	1.000	1.000	1.000
Primary education	0.297	0.800	1.097	0.680
Secondary education	1.448	0.397	15.285	0.576
Marital status				
Married (RC)	1.000	1.000	1.000	1.000
Single	1.335	0.567	3.238	0.494
Employment status				
Employed (RC)	1.000	1.000	1.000	1.000
Unemployed	0.228	0.900	0.581	0.002
Headache				
Yes (RC)	1.000	1.000	1.000	1.000
No	0.728	0.232	2.281	0.586
Nausea				
Yes (RC)	1.000	1.000	1.000	1.000
No	2.266	0.600	11.488	0.200
Itchiness				
Yes (RC)	1.000	1.000	1.000	1.000
No	0.118	0.290	0.487	0.003
Fatigue				
Yes (RC)	1.000	1.000	1.000	1.000
No	2.225	0.479	10.333	0.307
Access to ANC clinic				
Available in the town of residence (RC)	1.000	1.000	1.000	1.000
Unavailable in the town of residence	1.756	0.496	6.210	0.383
Competency of ANC provider				
Competent (RC)	1.000	1.000	1.000	1.000
Incompetent	1.956	0.171	22.308	0.589
Adherence to SP administration protocols				
Adherent (RC)	1.000	1.000	1.000	1.000
Negligent	0.346	0.037	3.251	0.353
Availability of SP at ANC clinic attended				
Always available (RC)	1.000	1.000	1.000	1.000
Sometimes or never	1.261	0.352	4.516	6.721

DISCUSSION

The age of the pregnant women was found to have a significant relationship with SP uptake among pregnant women (p= <0.001). The analysis suggests that pregnant women 30 years and above are more likely to have taken below 3 doses of SP during pregnancy while those from 20 to 30 years are less likely to take SP compared to pregnant women below 20 years. This current finding is congruent with a study which indicated that older pregnant women were at a higher relative risk ofreceiving the recommended dose of IPTp-SP compared to younger pregnant women(Azizi et al. 2018). This current study however contradicts a study conducted by Darteh et al. (2021)which investigated age as a factor influencing the uptake of SP among pregnant women in sub-Saharan Africa and suggested that women above 30 years of age were less likely to take below 3 doses of SP before delivery compared to other age groups.

The education level of pregnant women was found not to have a significant association with SP uptake among pregnant women (p=0.44). However, the analysis suggests that pregnant women with secondary and tertiary education were more likely to have taken below 3 doses of SP than those with no formal education. Similarly, in studies by Darteh et al. (2021); Nyarko and Cobblah (2014), compared to women with no formal education, those with higher education had higher odds of reporting receiving 3 or more doses of IPTp-SP. Pregnant women with only primary education are less likely to take below 3 doses of SP before delivery. These findings contradict a study by Ibrahim et al. (2017) conducted to investigate SP uptake in Sunyani Municipality in Ghana and found that women with secondary or tertiary education were less likely to take below 3 doses of SP before delivery compared to pregnant women with only a primary or no formal education.

Similarly, marital status was found not to have a significant relationship with SP uptake among pregnant women (p=0.494). However, the analysis suggests that pregnant women who are single are more likely to take below 3 doses of SP compared to married pregnant women. This study is supported by the findings from Kibusi, Kimunai, and Hines (2015); Klu and Owusu (2023)who found no significant relationship between marital status and uptake of IPTp. According to these studies, single pregnant women are less likely to seek maternal health services compared to married pregnant women respectively.

Again, the employment status of pregnant women was found to have a significant relationship with the uptake of IPTp-SP. The analysis indicates that unemployed pregnant women were less likely to take below 3 doses compared to pregnant women with employment. This finding agrees with that of Kibusi, Kimunai and Hines (2015) which indicated a significant relationship between uptake of IPTp and participants' occupation.

The decision-making power of pregnant women was found to have no significant relationship with the uptake of SP during pregnancy. However, the analysis suggests that non-autonomous pregnant women are less likely to take below 3 doses of SP compared to pregnant women who are autonomous.

Similarly, nausea as a side effect of SP administration was found to have no significant relationship with the uptake of SP during pregnancy. Moreover, the analysis suggests that pregnant women who do not experience nausea as a side effect of SP administration are more likely to take below 3 doses of SP compared to those who experience nausea as a side effect of SP administration.

Itchiness as a side effect of taking SP was found to have a statistically significant association among pregnant women. The analysis suggests that pregnant women who had no itchiness as a side effect aftertaking SP are less likely to take below 3 doses of SP before delivery compared to pregnant women who experience itchiness as a side effect of taking SP. The plausible reason is that pregnant women may find it uncomfortable to suffer itching as a side effect of administering SP, which may cause them to discontinue subsequent dosages. They may avoid taking more dosages out of fear for their health if itchy skin is seen as an allergic reaction or an indication of intolerance.

Fatigue as a side effect of SP administration was found to have no statistically significant relationship during pregnancy. However, pregnant women who do not experience fatigue as a side effect after taking SP are more likely to have taken below 3 doses of SP before delivery compared to pregnant women who experience fatigue as a side effect after taking SP. This is possible because pregnant women who report fatigue as a side effect may be monitored more closely by healthcare providers. These women might receive additional counselling, encouragement or follow-ups, ensuring they adhere to the full course of SP despite experiencing fatigue.

The respondent's accessibility to ANC clinics in their towns of residence was found to have no significant association with the uptake of SP during pregnancy (p=0.383). However, the study suggests that pregnant women with no access to ANC clinics in their towns of residence were more likely to take below 3 doses of SP compared to pregnant women with access to ANC clinics in their town of residence.

Again, the competency of ANC providers was found not to have a statistically significant relationship with the uptake of SP during pregnancy. The analysis shows that pregnant women who viewed the consulting midwife as incompetent in their work were more likely to take below 3 doses of SP before delivery compared to pregnant women who viewed the consulting midwife as competent.

Considering adherence to SP administration protocols by ANC providers, a statistically significant relation was not found. However, the analysis suggests that pregnant women who felt that ANC providers were negligent to SP administration protocols were less likely to take below 3 doses of SP compared to pregnant women who felt the consulting midwife adhered to SP administration protocols.

Similarly, the availability of SP at the ANC clinic was found to have no statistically significant relationship with SP uptake among pregnant women. Moreover, pregnant women who sometimes or never had SP available at the ANC clinic were more likely to take below 3 doses of SP compared to pregnant women who always had SP available to them at the ANC clinic they visited.

STRENGTHS AND LIMITATIONS

This study's strengths lie in its comprehensive analysis of the factors influencing adherence to IPTp-SP among pregnant women in Ghana. By examining demographics, side effects and health-system factors, it provides valuable insights into the role of age, employment status and side effects, especially itchiness, in adherence behaviour. The findings contribute to the literature by highlighting key determinants that can inform targeted interventions and policy recommendations, such as age, employment and educational campaigns. However, the study has limitations. The reliance on self-reported data may introduce recall and social desirability biases, affecting the accuracy of responses. The cross-sectional design limits causal inferences, and while health-system factors were considered, they were not fully explored, leaving potential barriers unaddressed. Additionally, the sample may not be fully representative of all regions or socioeconomic groups in Ghana. Future studies could address these limitations through longitudinal designs and broader exploration of health-system barriers.

CONCLUSION

Malaria during pregnancy remains a critical health concern, and adherence to intermittent preventive treatment using Sulphadoxine-Pyrimethamine (IPTp-SP) is vital for effective prevention. This study found that 47% of pregnant women in Ghana do not take the recommended minimum of three doses of SP before delivery. While health-system factors were not found to significantly influence adherence, demographic factors such as age and employment status, as well as side-effect factors like itchiness, played a significant role. Women above 30 years of age were more likely to take fewer doses, even if they had prior experience with SP during earlier pregnancies, while unemployed women exhibited better adherence compared to their employed counterparts. Additionally, women who did not experience itchiness as a side effect of SP were more likely to complete the recommended dosage. The findings emphasize the need for targeted education and interventions, especially for older, educated and employed pregnant women to promote the benefits of IPTp-SP. The

study's major contribution lies in identifying age, employment status and side effects as significant determinants of adherence to IPTp-SP, filling an important gap in the literature.

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