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Factors Associated with Low Coverage of Intermittent Preventive Treatment with Sulfadoxyne-Pyrimethamine in Pregnancy in Dassa-Glazoué

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Abstract: Introduction: Malaria during pregnancy is a major public health concern in most endemic areas, including Benin. To overcome this, the World Health Organization (WHO) recommends several prevention strategies, including the administration of sulfadoxine-pyrimethamine (SP) during pregnancy. Objective: To study the factors associated with low coverage of Intermittent Preventive Treatment with sulfadoxine-pyrimethamine (IPT-SP) against Malaria in pregnant women at Dassa-Glazoué area hospital in 2020. Study Method: This was a descriptive, analytical study with retrospective data collection that took place from May 25 to September 25, 2020. Results: During our study, three hundred and forty (340) pregnant women were investigated. The mean age was 27.67±6.12 years. The pregnant women included in the study were traders/dealers (35%) with a primary level of education (35%) and living in a common-law relationship (77.65%). The prevalence of IPT-SP coverage in antenatal care (ANC) was 35.00%. The number of ANC (less than 4) attended by the pregnant women (p=0.00), the age of more than 3 months from pregnancy to the first ANC (p=0.00) and non-compliance with ANC (p=0.00) were the factors associated with this low coverage. Conclusion: ANC is a special time for the administration of SP. New strategies must be put into place for the correct use of this service by pregnant women.

Keywords: Intermittent Preventive Treatment, Sulfadoxine-Pyrimetamine, Antenatal Consultation, Malaria

1. Introduction

Malaria during pregnancy is a major public health concern in most endemic areas [1]. Each year, nearly 25 million pregnant women, 20% of whom are first-time mothers, are confronted with the consequences of malaria in sub-Saharan Africa [2]. In Benin, malaria represents 39.7% of the reasons for seeking treatment in health facilities [3]. It is the leading cause of hospitalization (24.7%) and death [3]. In general, the maternal-fetal consequences linked to malaria are very important. In sub-Saharan Africa, WHO recommends the administration of Intermittent Preventive Treatment (IPT) and the use of insecticide-treated bednets [4] during pregnancy.

A schedule of at least 3 doses of IPT with SP is now recommended, starting from the second trimester of pregnancy, from the sixteenth week of amenorrhea, during each antenatal consultation (ANC) scheduled until delivery; each dose should be given at least one month apart [5, 6]. The administration of three doses of SP during pregnancy is difficult to implement, because, at the Dassa-Glazoué area hospital, a large number of women either come for their first antenatal consultation (ANC) in the 9th month or, sometimes, to deliver without having received the recommended 3 doses of SP. This study aims to investigate the factors associated with low coverage of IPT-SP in pregnant women at the

Dassa-Glazoué area hospital in 2020.

Objective: To study the factors associated with low coverage of Intermittent Preventive Treatment with Sulfadoxyne-Pyrimethamine against malaria in pregnant women at Dassa-Glazoué area hospital

2. Patients and Methods

Our study took place at the Dassa-Glazoué Area Hospital. This was a descriptive, analytical study with prospective data collection. The study ran from May 25 to September 25, 2020.

The study population consisted of women seen for an antenatal consultation (ANC) in 2020 at the Dassa-Glazoué area hospital. Pregnant women who performed at least one prenatal consultation in a health facility in the municipality of Dassa in 2020, and whose theoretical pregnancy term was greater than 36 Weeks of Amenorrhea (WA) were included in the study. Those who did not give their consent to participate were excluded from the study; likewise for pregnant women whose pregnancy follow-up booklet was unusable. The sample size was calculated according to Schwartz's formula on the basis of the coverage rate for the second dose of SP recorded in 2017-2018 in the sanitary zone, i.e. 32% [7], considering a 5 percent (5%) margin of error.

$$N=Z^2\frac{p\times q}{\alpha^2}=1{,}96^2\frac{0{,}32\times 0{,}68}{0{,}05^2}=335$$

α=0,05; Z=1,96; p=0,32; q=1-p=1- 0,32=0,68

Our study consisted of three hundred and thirty-five (335) pregnant women.

Data were collected by means of a structured interview with the pregnant women and consultation of the pregnancy follow-up booklet. A questionnaire, previously tested for its applicability, was used to collect data. The dependent variable was SP coverage. The women who had received less than three doses of SP were considered to have had poor coverage and those who had received three or more doses to have had good coverage. The independent variables were socio-demographic characteristics of the patients; the obstetrical history; the prenatal follow-up; and the knowledge of the pregnant women on IPT-SP. At the end of data collection, the sheets were subjected to a manual analysis to check the completeness and consistency of the data. Double data entry was made in the Epi Data 3.1 software. Data analysis was performed using Epi info software version 7.1.3.3. For each variable, odds ratios (OR) were evaluated with a 95% confidence interval. The threshold of statistical significance considered was 5%.

3. Results

At the end of our study, three hundred and forty (340) pregnant women were investigated.

3.1. Sociodemographic Characteristics

The mean age was 27.60±6.29 years with extremes of 15 years and 49 years. The age group [15 to 26 years [was most represented at 47.94%.

The pregnant women included in the study were traders/dealers (35%) with a primary level of education (35%) and living in a common-law relationship (77.65%). The table below gives an account of the characteristics of the pregnant women surveyed.

Table 1. *Distribution of pregnant women surveyed on sulfadoxine-pyrimethamine at the Dassa-Glazoue district hospital in 2020 according to socio-demographic characteristics.*

	Number	Percentage
Age (Years)		
[15-26]	163	47.94
[26-36]	144	42.35
37 years and over	33	9.71
Work		
Tradeswoman	119	35.00
Craftswoman	93	27.35
Household	53	15.59
Civil servant	42	12.35
Student	29	8.53
Other	04	1.18
Educational level		
Illiterate	87	25.59
Alphabetized	25	7.35
Primary School	119	35.00
Secondary School	84	24.71
Graduate Studies	25	7.35
Marital status		
Married	72	21.18
Cohabitation	264	77.65
Divorced	03	0.88
Widow	01	0.29

3.2. Residence of Pregnant Women

More than half of pregnant women were living in urban areas (68.53%) and less than 5 km from the hospital (62.94%). The rest were living in rural areas (31.47%) and more than 5 km from the hospital (37.06%).

3.3. Obstetric History

22.35% of pregnant women in the study were primigests; 32.94% were paucigests; 33.53% were multigests and 11.18% were severe multigests. With regards to parity, more than a quarter (31.18%) of the pregnant women were multiparous; 29.41% were primiparous; and 25.59% were nulliparous. Large multiparous and pauciparous represented 1.47% and 12.35% respectively.

3.4. Pregnancy Follow-up

More than half of the pregnant women (56.80%) in the sample had less than 4 ANC during their pregnancy compared to 43.20% who had 4 or more ANC. In the study, more than 57.40% of the pregnant women started their ANC after 3 months of pregnancy. Those who started ANC before 3 months of pregnancy were 42.60%. The pregnancy was mainly monitored in a public center (91.18%). Private centers covered only 16.81% of pregnancies. In addition, pregnancies were monitored by midwives (70.59%), obstetrician-gynecologists 26.18%, general practitioners,

unlicensed assistive personnel (aide-soignants) and matrons in a proportion of 0.59%. The ANC appointments were respected in 54.41% to 45.72% of missed appointments.

3.5. Sulfadoxine Pyrimethamine During Pregnancy

Pregnant women who received three or more doses of SP during their pregnancy were 35%. The intake was unsupervised in 62.65%. More than two-thirds (71.18%) of the pregnant women experienced no side effects.

Table 2. *Distribution of pregnant women investigated on Sulfadoxine Pyrimethamine at the Dassa-Glazoue area hospital in 2020 regarding intake of Sulfadoxine Pyrimethamine.*

	Number	Percentage
Number of doses of SP administrated		
No administration	27	7.94
1 dose	107	31.47
2 doses	87	25.59
3 doses and over	119	35.00
Medication was supervised		
Yes	127	37.35
No	213	62.65
Side effects		
No side effect	242	71.18
Aches	28	8.24
Digestive disorders	27	7.94
Impression of feeling bad	23	6.76
Headache	09	2.65
Dizziness	10	2.94
Hives	01	0.29

3.6. Knowledge of Pregnant Women Investigated About IPT-SP

More than two-thirds of the pregnant women (77.94%) said they were aware of the existence of SP, and believed its administration was unnecessary during pregnancy (73.24%). By contrast, the remaining third (22.06%) said they were unaware of the existence of SP. For 22.94% of the patients, taking SP was not necessary during pregnancy. In addition, 64.41% of the pregnant women did not know the ideal time to start taking SP, nor did they know how often they should.

3.7. Factors Associated with Low Sulfadoxine-pyrimethamine Coverage

3.7.1 Socio-demographic Characteristics

From bivariate analysis, there was no statistically significant association between age (p=0.10), marital status (p=0.05), distance between health center and home (p=0.18) and the coverage in SP.

There was a statistically significant association between occupation (p=0.03), residence (0.001) and low SP coverage, though. In fact, housewives are 4 times more likely to take a lower dose of SP during ANC (OR 4.09 95% CI 1.49-11.24). For those living in rural areas, the risk is 1.74 (OR 174, 95% CI 1.09-2.77).

Table 3. *Distribution of pregnant women surveyed on Sulfadoxine-Pyrimethamine at the Dassa-Glazoue district hospital in 2020 regarding socio-demographic characteristics in bivariate analysis.*

	Total (N)	Low coverage of SP		OR	$IC_{95\%}$	P
		N	%			
Work						0.03
Tradeswoman	93	38	40.86	2.17	0.84-5.59	
Craftswoman	119	46	38.66	1.98	0.78-5.01	
Household	53	30	56.60	4.09	1.49-11.24	
Civil servant	42	12	28.57	1.25	0.42-3.71	
Student	29	7	24.14	1		
Other	4	1	25.00	1.05	0.09-11.75	
Residence						0.001
Urban	233	82	35.19	1		
Rural	107	52	48.60	1.74	1.09-2.77	

3.7.2. Pregnancy Follow-up

Pregnant women with less than 4 ANC were 8.82 times more likely to have less than 3 doses of SP during their pregnancy (p=0.00). The risk was lower (3.95) for those who started their first ANC after 3 months of pregnancy (p=0.00). When ANC appointments were missed, pregnant women had a 13.84-fold risk of having low SP coverage (p=0.00). On the other hand, no statically significant link was found between low SP coverage and attendance of at least one ANC in private (p=0.00).

Pregnant women who did not receive supervised use of SP during pregnancy were 3.28 more likely to have low SP coverage (p=0.001).

The table below shows the factors associated with low SP coverage.

Table 4. *Distribution of pregnant women surveyed on Sulfadoxine Pyrimethamine at the Dassa-Glazoue zone hospital in 2020 regarding pregnancy monitoring in bivariate analysis.*

	Total (N)	Low coverage of SP		OR	$IC_{95\%}$	P
		N	%			
Number of PNC						0.00
Less than 4	192	112	58.33	8.82	5.07-5.32	

	Total (N)	Low coverage of SP		OR	$IC_{95\%}$	P
		N	%			
4 and more	146	20	13.70	1		
Pregnancy age during PNC						0.00
Under 3 months	144	31	21.53	1		
Over 3 months	194	101	52.06	3.95	2.43-6.44	
Were Frequent at PNCs						0.00
Yes	155	17	10.97	1		
No	184	116	63.04	13.84	7.70-24.88	
In Private PNCs						0.38
No PNC	282	113	40.07	1.14	0.63-2.06	
At least one PNC	57	21	36.84	1		
Supervised medication of SP						0.001
Yes	127	29	22.83	1		
No	213	105	49.30	3.28	2.00-5.38	

3.7.3. Multivariate Analysis of Associated Factors

In the regression model, achievement of less than 4 ANC, age of pregnancy on 1st ANC, and non-adherence to ANC appointments were factors associated with low IPT-SP coverage in pregnant women at the Dassa-Glazoué AH in 2020.

Table 5. *Summary of associated factors in multivariate analysis.*

	OR	$IC_{95\%}$	*P*
Number of PNC (less than 4 PNC)	10.79	[6.08-19.16]	0.00
Pregnancy age at first PNC (over 3 months)	6.22	[4.28-16.27]	0.00
Were Frequent at PNCs (No)	4.36	[2.54-7.47]	0.00

4. Discussion

In our study, the proportion of the pregnant women who received at least three doses of SP was 35% at the Dassa-Glazoué area hospital. This result is comparable to that found by Biaou et al. [8], in southern Benin in 2017, which was 35.42%. Other studies carried out in the south of Benin also found similar proportions of IPT (48%), but results vary between the municipalities: 56% for the municipality of Pobè; 27% for the municipality of AdjaOuèrè and 49% for the municipality of Kétou [3]. However, significantly higher proportions than ours were noted in the subregion: 96.2% in Burkina-Faso [9], 77% in Ghana [10] and 99.1% in Mali [11]. This difference could be explained by the number of doses of SP received by the pregnant women. In fact, in those studies, the authors took into account two doses of SP to define the coverage of IPT with SP, which led to increased SP coverage during pregnancy in their studies. In our study, if we stick to two doses of SP, the coverage would be greater (60.59%) but still below the expected 80%. Increased awareness among women in the municipality of Dassa through information, education and communication campaigns could have a positive impact on SP coverage during pregnancy.

In our study there was no association between IPT-SP coverage and the pregnant women's age. Tiendrébeogo et al. [3] found the same results as ours, but Bamba et al. [12] reported that IPT-SP coverage increased with age of the pregnant woman.

In fact, in their study, it was noted that the rate of good coverage was 21.3% (19/89) in women under 18 and 61.9% (219/354) in those over 18 years (p 0 <0.05). With increasing age, women gained more experience in monitoring pregnancies, and thus had a better knowledge about malaria including prevention during pregnancy.

The WHO recommends administration of SP by direct observation preferably [13]. In this study, the administration of SP was not supervised in more than half of pregnant women (62.64%). However, those who had not benefited from supervised use of SP during their pregnancy were 3.28 more likely to have low SP coverage (p=0.001). At the Dassa-Glazoué area hospital, there is a stock of SP available in the consultation room. The intake was not just free but also, above all, supervised. The occasional shortage of stock could explain the poor supervised intake of SP. In fact, in the event of rupture, SP is prescribed on prescription and pregnant women would obtain it in pharmacies, which considerably reduces the supervised use of SP.

The prenatal consultation is the best time to take SP. In this study, pregnant women with less than 4 ANC, or those who missed ANC appointments were more likely to have low SP coverage. The same observation was made by Bouyou-Akotet et al. [13] who stated that the high number of ANC was associated with intake of optimal dose of IPT-SP. Achieving the required number of ANC during pregnancy necessarily requires adherence to ANC schedule [3]. Rather, Pell et al. [14] believe that the quality of ANC should be emphasized. Indeed, during ANC, it happens that some agents, for unknown reasons, fail to give SP to pregnant women, as evidenced by the study by Ndyomugyeni et al. [15] - an aspect that we have not included in our study. For Tiendrébeogo et al [3], one should not limit oneself only to the moment of ANC to give SP to pregnant women. They suggest that community workers search for those lost to follow-up (those who have received a dose of SP); and any field that could be explored for expanding coverage of SP during pregnancy.

Another factor associated with the low SP coverage in our study was the age of pregnancy on 1st ANC. Pregnant women who achieved their first ANC after 3 months were more likely to have low SP coverage during their pregnancy. Kisuule et al. [16] had made the same observation in 2013. The late consultation of women in ANC is said to be of a cultural nature. The onset of pregnancy is kept secret for fear

of the evil eye. For other women, ignorance of the age of pregnancy and the ideal time to start ANC may be the cause of this delay to the first ANC. Community education sessions for women on the signs of early pregnancy and the timing of first ANC could reduce this delay, and thus help optimize the number of ANC during pregnancy.

5. Conclusion

At the Dassa-Glazoué area hospital, IPT-SP coverage is low. Factors associated with this low coverage were: less than 4 ANC performed by pregnant women, pregnancy age of over three months from onset of pregnancy to first ANC, and non-compliance with ANC appointments. Antenatal Consultation (ANC), therefore, appears to be an essential tool in reducing low coverage of IPT-Sp. New strategies will have to be put into place to encourage women to attend ANC early and to comply with appointments.

Women of childbearing age in the area of Dassa-Glazoué should benefit from multiple awareness-raising campaigns on the need to start consultations before three months of pregnancy, in order to comply with the prenatal consultation appointments, and to attend at least 4 ANC during their pregnancy. This being the case, it is important that other studies be carried out in order, to assess the level of responsibility of health workers in the low coverage of IPT-SP in the area of Dassa-Glazoué.

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