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Determinants of pregnant women intention to respect the optimal timeframe for intermittent preventive treatment to Sulfadoxine pyrimethamine against malaria

Oscar Kolnziam Nsutier, Gédéon Ngiala Bongo, Ruth Claudine Tshiama, Cassilda Kininde Kibongo, Jacques Murazini Kanika, Lekya Mukandu Basua Babintu

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Authors:
G. N. Bongo
Department of Biology, Faculty of Science,
Kinshasa Province,
Democratic Republic of Congo

O. K. Nsutier ✉, R. C. Tshiama, J. M. Kanika, L. M. B. Babintu
Teaching and Administration in Nursing Care, Nursing Sciences, Higher Institute of Medical Techniques, Kinshasa,
Democratic Republic of Congo

O.K. Nsutie, C. K. Kibongo
Teaching and Administration in Nursing Care, Nursing Sciences, Higher Institute of Medical Techniques, Bandundu Province,
Democratic Republic of Congo

✉ gedeonbongo@unikin.ac.cd

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Abstract

Malaria is the leading cause of morbidity and mortality in Democratic Republic of the Congo (DRC), precisely among children under five years and pregnant women who do not receive necessary preventive or curative care. The aim of this study was to identify the psychosocial factors explaining the intention of pregnant women to respect the optimal timeframe of Intermittent Preventive Treatment (IPT) for malaria. This was an analytical study, of correlational descriptive type. In this study, 108 pregnant women who initiated their antenatal care services in the structures of the Lemba Health Zone to benefit for the TPI to Sulfadoxine Pyrimethamine (SP) were surveyed. The structured interview and the seven-level Likert scale were used for data collection. The findings revealed that the mean age of our respondents was 27.33 ± 4.8 years, 84.3% were married, 50% had a high school education, 74% were unaware of the calendar of IPT for malaria and 70.4% know that a pregnant woman must start the antenatal in her first trimester. Behavioral beliefs ($\beta = 0.236$) and control beliefs ($\beta = 0.235$) correlate with the intention. On the other hand, the importance attributed to facilitating or detrimental factors ($\beta = 0.131$) and normative beliefs ($\beta = 0.038$) didn't correlate with the intention. Malaria constitutes a great danger for pregnant woman and the knowledge of the IPT to SP is very important for the well-being of these women as well as of their future baby.

Keywords antenatal care, intermittent preventive treatment, malaria, optimal timeframe, pregnant women, sulfadoxine pyrimethamine

Introduction

Malaria is the leading cause of death in the Democratic Republic of the Congo (DRC), especially among children under five years and pregnant women. Some pregnant women in Kinshasa city, located in a malaria-endemic area, do not receive adequate preventive or curative care against malaria. For these women, Malaria prevention should be provided as a part of a comprehensive set of care defined according to the Operational Intervention Standards for Antenatal Care (ANC) [1]. The World Health Organization (WHO) [2] recommends that pregnant women have to receive at least two doses of Sulfadoxine Pyrimethamine (SP) at the first and second ANC consultation after the onset of fetal movements. Furthermore, these doses of SP should be spaced at least a month apart, and for those who attend their ANC late, even a single dose for them may be beneficial [2]. During a survey, Sangba [3]

reported that the regular administration of effective preventive antimalarial treatment during the gestational period prevents malaria in African tropical countries is very low (42%) as compared to developed countries [4]. Ogobara [5] reported that in Africa only 47% of pregnant women have taken SP as an antimalarial drug for prevention during their last pregnancy. Nowadays, Malaria incidence is 40%, due to increased resistance of mosquitoes to pesticides and parasites to drugs [6]. Moreover, in areas of high transmission, 40% of pregnant women who don't take the preventive treatment can die from severe forms of malaria, and between 80% and 90% of deaths due to malaria occur in sub-Saharan Africa, including DRC where 90 % of infected persons live [7]. In addition, certain theories are applied to health-related behaviors, notably the theories of interpersonal behavior [8] based on the theories of reasoned actions [9] and planned behavior [10], which are distinguished by their description of the components that facilitate this behavior. According to this theory, behavior is influenced by three main components namely behavioral intention, habit and behavioral adoption. The habit is decisive when the behavior is repeated meanwhile if the behavior is new, the intention is behavioral. Behavioral intention includes four determinants that facilitate its appearance, notably: perceived consequences, affect, personal identity, and normative factors [11].

It seems that no study has analyzed the determinants associated with observing the optimal timeframe for IPT to SP against malaria in health facilities in Kinshasa city. In order to identify and better understand the determinants of adherence to the optimal timeframe of IPT to SP by pregnant women, we have asked the following questions: (1) What behavioral beliefs (attitude), control (perception and facilitating factors) beliefs and normative beliefs (subjective norms) determine the intention of pregnant women to respect the optimal timeframe of IPT to SP? (2) Out of which variables and beliefs could interventions be developed in order to promote the respect of the optimal timeframe of pregnant women for IPT to SP against malaria? The aim of this study was to identify the psychosocial factors that may explain the intention of pregnant women to respect the optimal timeframe of IPT to SP against malaria.

Study area

The study was carried out in the Lemba Health Zone which is one of the 35 health zones of Kinshasa city. It is bordered with Limete health zone in the North, with Matété and Kinsenso health zones in the East, with Makala health zone in the West and with the Mont-Ngafula health zone in the South. In this area, the following diseases are most prevalent namely: malaria, acute respiratory failure, tuberculosis, HIV, diabetes, diarrhea and typhoid fever. All hospital-type facilities offer CAP (complementary activity package) while those of the Health Centers deal with the MAP (minimum activity package).

Methodology

The present study has a correlational design aimed at exploring the relationships that exist between the intentional variables and seeks to determine whether the variables involved are associated with these facts or not. The current study is descriptive-correlational because several concepts notably behavioral beliefs, normative beliefs and the perception of control are measured at the same time and we intended to study the relationships between them.

The population targeted at this study was pregnant women who consulted preventive care services to benefit from IPT to SP in health facilities of Lemba namely Lisanga and Bon Berger health centers. The sampling method was non-probabilistic for convenience. This method involves people whom come to the agreed location (antenatal consultation) until the desired number of participants was reached [12]. Our criteria of inclusion were a woman has to be pregnant and has consulted the ANC services to benefit from preventive care against malaria during our study period. Data collection was performed among pregnant women who initiated antenatal visits (ANC) in order to receive the first dose of SP in the frame of IPT to prevent malaria. In total, 108 pregnant women were surveyed during the period between October and November 2015.).

Organization of the ANC

Lemba health zone organizes the ANC in collaboration with other structures implanted within its jurisdiction which offers preventive services to the pregnant women. The purpose of ANC in this area is to ensure the well-being of pregnant women and their future baby. In addition, each structure offering the service of ANC organizes individualized service in order to provide a framework for pregnant women for preventive care against pandemics and advise them against these pandemics. The Health Zone through its Nurse Supervisor implements ANC planning by providing a schedule in all facilities providing preventive care to pregnant women. However, each pregnant woman had to use the ANC service three times (ANC1, ANC2 and ANC3) in order to comply with WHO recommendation regarding the prevention of complications, especially malaria regarding the pregnancy. Data were collected using a questionnaire while a seven-choice Likert-type was used in the design of these items.

Operational definitions of the study variables

The three variables belonging to the theory of planned behavior and the importance given to the facilitating or harming factors of interpersonal behavior theory are relevant to the use of ANC services by pregnant women to benefit from IPT at SP against malaria.

(a). ***Dependent variable***

Intention to use IPT at SP within the optimal timeframe

The Intention represents the subject's motivation or willingness to behave, and is the perception of the likelihood of adopting the perfect behavior of using preventative malaria care services to SP in the first trimester of pregnancy. However, as suggested by Fishbein and Ajzen [11], intentions were measured using a Likert scale of four questions having seven response levels. Each pair of adjectives was presented after the following statement: "I intend to use IPT to SP during pregnancy from the first trimester of pregnancy to my future pregnancies". The following adjectives were proposed for the measure of intent: Very unlikely, somewhat likely, slightly unlikely, Not likely, and Not improbable, slightly likely, somewhat likely, very likely.

(b). ***Independent variables***

Behavioral beliefs about the realization of behavior

Pregnant women reported their behavioral beliefs about the use of preventive malaria care at SP through IPT. Moreover, Fishbein and Ajzen [11] reported that behavioral beliefs were measured using a Likert scale consisting of 11 sets of different questions having seven levels of response. Each pair of adjectives was presented after the following statement: "For me to respect the optimal timeframe of IPT in the first trimester is a better way to preserve my health and the one of my unborn baby against the consequences of malaria:" The following adjectives were proposed for the measurement of behavioral beliefs notably: strongly disagree, agree, somewhat agree, Neither agree, and Neither disagree, somewhat agree, agree, and strongly agree.

Normative beliefs

Normative belief is the perception of the subject that individuals or groups of people of importance to him who would prove or disapprove the use of ANC to benefit from IPT to MS against malaria during pregnancy. However, a Likert scale with seven response levels and four sets of questions were measured. Each pair of adjectives was presented after the following statement: "My husband encourages me to respect the optimal timeframe of IPT at SP during pregnancy in the first trimester". The following adjectives were proposed for the measurement of normative beliefs: Very unlikely, somewhat likely, slightly improbable, Not likely and Unlikely, slightly likely, somewhat likely, very likely.

Behavioral control beliefs

Behavioral control beliefs are the perception of the degree of ease or difficulty with which a behavior can be adopted. For each of the control beliefs identified from the preliminary study, the

respondent had to identify the reasons or contexts for which it would be more difficult or easier for them to use IPT at SP during pregnancy. However, a seven-level Likert scale of responses was measured using a series of four questions. Each pair of adjectives was presented after the following statement: "My husband morbidity and mortality due to malaria in the pregnant woman and the fetus. Usage of Intermittent Preventive Treatment (IPT) to SP. encourages me to respect the optimal timeframe of IPT at SP during pregnancy in the first trimester". The following adjectives were proposed for measuring behavioral control beliefs: Very unlikely, somewhat likely, slightly unlikely, not likely and unlikely, slightly likely, somewhat likely, very likely.

Importance given to facilitating or harmful factors

The importance given to facilitating or harmful factors is the magnitude to which a the person attributes a certain value to the health situation. For each of the importance given to facilitating or harmful factors selected from the preliminary study, the respondent had to identify the reasons or contexts for which it would be more difficult or easier to use IPT at SP during pregnancy. A seven-point Likert scale of response was measured using a series of six opposing questions. Each pair of adjectives was presented after the following statement: "I want to respect the optimal timeframe of IPT at SP in the first trimester only if I receive appropriate explanations for malaria education:" The following adjectives were proposed for the measurement of the importance given to facilitating or harmful factors: Strongly Disagree, Strongly Disagree, Slightly Disagree, Neither Agree, and Neither Disagree, Slightly Agree, Strongly Agree, Totally Agree.

Data collection, development and validation of the questionnaire

The study data were collected using a maintenance guide. A seven-choice Likert-type scale was used in the design of the items. For the development of the instrument, the approach proposed by Gordin et al. [25] was used. This step aimed to collect from a representative sample of the study population, in the form of open-ended questions, the perceived advantages and disadvantages of respecting the optimal timeframe of IPT at SP against malaria during pregnancy, people or groups of people who would approve of this behavior and the anticipated psychological or physical barriers to the use of ANC for prevention. A further preliminary survey was conducted with 20 pregnant women attending the ANC service to benefit from IPT in the aforementioned health facilities in the Lemba Health Zone. This was in order to highlight the salient beliefs of the respondents who helped to build the final instrument of the current study. This study used structured interview to gather information from the respondents. It is a concern whereby the researcher is in direct contact with the respondent in order to gather accurate information about a phenomenon. Pregnant women who participated in the current study were met on the days of ANC, the aim of the present research was presented to the respondents which was that of identifying the determinants related to the respect of the optimal timeframe by the pregnant women for ITP at SP but also explanations of the procedures to respond to our instrument and the meeting with respondents was performed before or after the medical consultation.

The collection of this information was necessary in order to identify the most crucial beliefs in the reference population. The items that were most often mentioned were selected, and these are in a way the basis for indirect measures of attitude, subjective norm and behavioral perception, referring to behavioral, normative and control beliefs. This collection tool highlighted the salient modal beliefs of study participants for indirect constructs and according to the recommendations of Triandis [8] which concern direct constructs in order to reconstruct the final instrument.

Identification of salient modal beliefs to be contextualized

To identify the salient beliefs, an analysis of the content of this questionnaire was carried out to highlight a list of respondents' personal salient beliefs as proposed by Gordin et al. [25]. However, Ajzen [9] reported that three criteria have to be taken into account, one of the possibilities consists in choosing the most 10 or 12 beliefs often expressed, another possibility is to maintain beliefs that the frequency gets at a given percentage (10% or 20%). Finally, the most popular method is to maintain the most often mentioned

beliefs until a given percentage (75%) so that the total number of beliefs is reached. Indeed, the most popular beliefs of which the sum of frequencies reached 75% of mentions were maintained. Concerning the

Table 1. Salient beliefs on the behavior of pregnant women to respect the optimal timeframe of IPT to SP against malaria

Variables	Frequency of items	Frequency (%)
Intention to respect the optimal timeframe of IPT to SP		
Deciding to respect the optimal timeframe of IPT in my future pregnancies	15	60
I decided to respect the optimal timeframe of IPT to SP in the first trimester of my pregnancy	5	20
I assess the respect of optimal timeframe of IPT to SP in the first month of my pregnanccy	5	20
Behavioral beliefs		
To respect the optimal timeframe is an acceptable moral behavior	5	25
To ensure a good growth of the fetus	10	50
Reduce the delivery of still born	1	5
To avoid a neonatal malaria	4	20
Normative beliefs		
My husband and my friends approve that I have to respect the optimal timeframe of IPT to SP in the first trimester	4	44.5
My family-in-law disapprove the ANC of IPT to SP in the first trimester of the pregnancy	5	55.5
Control beliefs		
Other people advices encouraged to respect the optimal timeframe of IPT to SP in the first trimester of pregnancy	5	41.5
Even though the health facility is farther, I would use the IPT to SP during the ANC in the first trimester of the pregnancy	3	25
I am ashamed to have to recourse of IPT to SP in the first trimester of the pregnancy	3	25
Professional activities don't allow me to follow the IPT to SP	1	8.4
Importance given to facilitating or detrimental factors		
I respect the optimal timeframe of IPT to SP, if I receive clear explanation	4	33.4
I decided to start the ANC using IPT to SP if I have financial means	5	41.6
I disapprove the respect of the optimal timeframe of IPT to SP due to my socio-economic situation	2	16.6
I decided to start the IPT to SP if the ANC is no longer paying	1	8.4

current study, all beliefs maintained reached 20 or 30%. However, the results of participants' health beliefs can be found in table 1.

Development of the Likert scale and data quality

Russo et al. [13] reported that most of studies using interpersonal behavior theory use Likert's method, which is widely used to measure beliefs and cognitive constructs as behavioral beliefs, normative beliefs, control beliefs, importance given to facilitating or harmful factors and the intention. However, Légaré et al. [14] proposed an approach for the elaboration of this instrument using a socio-cognitive theory and there are two strategies to develop a scale: one that immediately gives an identical weight to each item (additive scale) and the one that attributes different importance to the items according to whether they reflect a higher or lower level of possession of the measured characteristic (Likert scale).

The metrological qualities of the instrument (Likert scale) developed were evaluated using the test-retest method with an interval of two weeks. This method made it possible to check the temporal stability of their measurement as well as the internal consistency of the constructs. This pre-survey included 20 pregnant women selected from two health centers in Lemba health zone but who were not selected as the sampling frame for this study. It should be noted that this pre-experimentation also validated the understanding of the meaning of questions and response options as well as the level of language.The results of the fidelity tests (CIC and Cronbach's alpha) are presented in Table 2.

Table 2. Fidelity of the items used

Questionnaire used	Number of items	α	CIC	n
Intention	4	.711	.711	20
Behavioral beliefs	11	.783	.783	20
Normative beliefs	4	.745	.745	20
Control beliefs	4	.763	.763	20
Importance given to facilitating or harmful factors	6	.602	.602	20

According to Weir [15] interpretation scales, the theoretical constructs demonstrate a temporal stability (intra-class coefficient) ranging from mediocre to good (0.43 to 0.86). As shown in Table 2, the value obtained for the importance given to facilitating or harmful factors (0.602) was a limit to the study. As for other constructs, the values were considered satisfactory demonstrating certain fidelity of the questionnaire. With respect to Cronbach's alpha coefficients of intent, behavioral beliefs, normative beliefs, perceived control, and importance to facilitating or harmful factors reviews the literature which illustrate that the majority of researchers using TCP accepts a minimum value of 0.60 at Cronbach's alpha. However, the value of 0.70 was used to judge satisfactory Cronbach alpha coefficients as suggested by Nunnally and Bernstein [16]. The values obtained are almost all higher than 0.70, which was considered satisfactory and showing a certain consistency between the items and the measured construct.

Ethical considerations

For ethical reasons, the aim of the research was presented to the participants which was to identify the determinants of sociocultural behaviors related to the respect of the optimal timeframe by pregnant women of IPT to SP against malaria. It was crucial to request the informed consent of participants and inform them about the guarantee of confidentiality of the answers provided. In order to facilitate the participation, the interviews were held in appropriate facilities before or after antenatal care and the consent were read to the respondent prior to the interview.

Data analysis

On the one hand, the present study dealt with descriptive analyzes (frequency, mean, and standard deviation) in order to describe the sampling profile. Correlational analysis using Pearson correlation coefficients was performed between different variables used in the current study. On the other hand,

Table 3. Socio-demographic characteristics of respondents (n=108)

Characteristics		Mean	Standard deviation	Min	Max
Age		**27.33**	**4. 8**	**18**	**40**
	Modalities		**n**		**%**
Age categories of the pregnant woman	Less than 20 years More than 20 years		14 94		12.9 87.1
Marital status	Married Bachelor		91 17		84.3 15.7
Education level	None Primary Secondary University		2 26 54 26		1.9 24.1 50.0 24.1
Professional activity	At home Out of home		85 23		78.7 21.3
Husband's job	Jobless Occupational work Salaried employee		16 8 84		14.8 7.4 77.8
Number of times where the repesct of optimal timeframe of IPT to SP chez the pregnant woman is needed	I don't know Once Twice Thrice		75 10 9 14		69.4 9.3 8.3 13
Period which the pregnant woman needs to start the ANC	I don't know In the first trimester In the second trimester In the third trimester		5 76 26 1		4.6 70.4 24.1 0.9
Total			**108**		**100**

multiple linear regression was used to identify salient beliefs that predict the intention of pregnant women to use IPT. Data analysis was performed using SPSS version 20 software. Probability values less than 0.05 were considered statistically significant.

Results and Discussion

Sociodemographic characteristics of participants

The present study focused on 108 pregnant women who consulted health facilities in Lemba Health Zone during the period of our study, in particular at Lisanga and Bon Berger health centers (Table 3).

It is clearly showed that women in this study were between 18 and 40 years old with an average age of 27.3 ± 4.8 years. More than two-thirds of these pregnant women were married (84.3%). Half of women (50.0%) had a high school education, but it should be noted that 24.1% had only completed primary school while 1.9% of women were illiterate. More than half of these women (74%) do not know the IPT schedule for SP administration while 70.4% of these women know that a pregnant woman needs to start ANC in their first trimester.

Determinants of pregnant women intention to respect the optimal timeframe of IPT to SP

The determinants of the intention of pregnant women to respect the calendar of IPT to SP against malaria are provided (Table 4) as mean and standard deviation. The Table 4 shows that all the mean values are close to the maximum values i.e. these women have a positive and strong intention (20.7 ± 3.4) to respect the optimal timeframe of IPT to SP and they have positive or supportive beliefs about IPT to SP

(60.5 ± 10.0). They believe that there are influential people who would force them to respect this optimal timeframe during the ANC to benefit from IPT to SP (19.2 ± 4.0) despite of the available resources to use the ANC to benefit from IPT (20.0 ± 3.1). Finally, they gave more importance to the factors facilitating or hindering their compliance with the optimal timeframe for ANC in order to benefit from IPT (32.7 ± 4.2).

Table 4. Determinants of pregnant women to respect the optimal timeframe of IPT to SP

Theoretical Variables	Mean ± Standard deviation	Min	Max
Intention	20.7 ±3 .4	11	27
Behavioral beliefs	60.5 ± 10.0	26	116
Normative beliefs	19.2 ± 4.0	8,0	26
Control beliefs	20.0 ± 3.1	13	26
Importance of factors facilitating or detrimental	32.7 ± 4.2	21	39

Internal coherence of the scales of the constructs

The internal consistency of the constructs was evaluated using Cronbach's alpha coefficient. According to the interpretation scales proposed by Nunnally and Bernstein [16], a theoretical construct is considered homogeneous when its Cronbach's alpha is between 0.50 and 0.60 moderate reliability, 0.50 to 0.70 value limit and 0.70 to 0.99 high or very high value. The internal consistency of the scales of constructs is presented in Table 5.

Table 5. Internal Coherence (Cronbach's Alphas)

Used questionnaire	Number of items	α	n (participants)
Intention	4	.777	108
Behavioral beliefs	9	.759	108
Normative beliefs	3	.661	108
Control beliefs	2	.745	108
Importance given to facilitating or detrimental factors	4	.721	108

Given the results in the Table 5, the value obtained of 0.66 for normative beliefs would be a limit value for this study. As to the others constructs, these values were considered satisfactory demonstrating a certain fidelity of the questionnaire used. Four values obtained are greater than 0.70 with maximum results for the intention (0.777), behavioral beliefs (0.759), control beliefs (0.745) and finally, for the importance of facilitating or detrimental factors (0.721).xx.

Different relationships between model variables related to health and sociodemographic variables

The correlation between different constructs of the current study was examined using Pearson coefficients giving the normality of independent variables distribution, thus proving the symmetry of the distribution (Table 6).

Table 6. Pearson's Correlation matrix between different theoretical variables

Variables	Intention	Behavioral beliefs	Normative beliefs	Control beliefs	Importance to facilitating or detrimental factors
Intention	1.00				
Behavioral beliefs	.309*	1.00			
Normative beliefs	.142*	.348	1.00		
Control beliefs	.289*	.207	.287	1.00	
Importance to factors facilitating/detrimental	.219*	.288	.231	.124	1.00
*p<0,05					

* : The correlation is significant at 5%.

This step identified potential determinants of intention. Correlation matrix analysis indicated that all psychosocial variables in this model are correlated with intention at 5% significance level ($p<0.05$).

Behavioral beliefs exhibited the highest association with the intention ($r = .309$), followed by control beliefs ($r = .289$), the importance of facilitating / detrimental factors ($r = .219$), and normative beliefs ($r = .142$). Since all these correlations are less than 0.70, the results indicate that there is no problem of multicollinearity. These results indicate that the variables "behavioral beliefs", "normative beliefs", "perception of control" and "importance given to facilitating/detrimental factors" are significantly associated with the intention.

Relations between different dimensions of observance and the belief model variables

In the table 7, different relationships are presented between different dimensions of compliance and belief health model variables as well as their critical modality. These analyses allowed us to answer the basic hypothesis of this study which postulated that: Behavioral, normative and control beliefs as well as facilitating factors significantly predict the intention of pregnant women to respect the optimal timeframe of IPT to SP (table 7). In light of Table 7, we found that these variables accounted for 13.2% of the variance in the intention of pregnant women to respect the optimal timeframe of IPT to SP with ($R^2 = 0.132$) followed by analysis of the variance (ANOVA) of ($F = (df: 4) = 5.0$; $*p<0.05$).

Table 7. Variables predicting the intention (regression analysis)

Variables	β	t	ρ
Variables of TCP		2.530	
Behavioral beliefs	.236	2.375	.019
Normative beliefs	-.038	-.382	.703
Control beliefs	.235	2.483	.015
Importance given to factors facilitating/detrimental	.131	1.372	.173
R2=,132 ; F= (df : 4)= 5,0 ; *p<0.05			

These findings indicate that the main determinants of pregnant women intention to attend ANC to get IPT against malaria within the timeframe required by WHO were as follow: behavioral beliefs (β=0.236), control beliefs (β=0.235) and the importance of facilitating/detrimental factors (β=0.131) and normative beliefs (β=0.038) are not significantly related to the intention. Therefore, the hypothesis underlying that behavioral, normative, and control beliefs as well as facilitating factors significantly predict the intention of pregnant women to respect the optimal timeframe of IPT to SP is only partially validated. The main beliefs or items of constructs that predict intentions are shown in Table 8.

Table 8. Items of constructs predicitng intentions

Variables	Adjusted R2	β	t	p
Behavioral beliefs	.135			
to respect the optimal timeframe of IPT to SP in the first trimester of the pregnancy would help me to avoid neonatal malaria		.288	2.638	.010
to respect the optimal timeframe of IPT to SP in the first trimester of pregnancy, would allow me to avoid a growth retardation of my fetus		.216	1.713	.090
to respect the optimal timeframe of IPT to SP in the first trimester of pregnancy would prevent the delivery of the still-born		.141	1.263	.210
Control beliefs	.109			
Even if the health facility is remotely installed, could you respect the optimal timeframe of IPT to SP in the first trimester of pregnancy		.222	2.045	.044
For me starting the IPT to SP in the first trimester for my next pregnancies would be beneficial for my future babies		.294	2.768	.007
***p<0.05**				

Regarding the table 8, only behavioral and control beliefs correlate. The items used to measure behavioral beliefs are "to respect the optimal timeframe of IPT to SP in the first trimester of pregnancy would help me to avoid neonatal malaria" (β=0.28), "to respect the optimal timeframe of IPT to SP in the first trimester of pregnancy, would allow me to avoid a growth retardation of my fetus" (β=0.21), "to respect the optimal timeframe of IPT to SP in the first trimester of pregnancy would prevent the delivery of the still-born"(β=0.14) and "respecting the optimal timeframe of IPT to SP in the first trimester of pregnancy would allow me to avoid severe malaria" (β=0.13). Concerning items used to measure control beliefs: "Even if the health facility is remotely installed, could you meet the optimal timeframe of IPT to SP in the first trimester of pregnancy" (β=0.22) and "For me starting the IPT to SP in the first trimester for my next pregnancies would be beneficial for my future babies" (β=0.29).

Discussion

The aim of the current study was to identify the psychosocial determinants that may explain the intention of pregnant women to respect the optimal timeframe of IPT to SP against malaria. In this regard, the findings of this study indicated that, behavioral beliefs (attitude), control beliefs (perception of control), normative beliefs (subjective norms), and facilitating or detrimental factors help to predict the intention.

Regarding the socio-demographical factors, the current study found that pregnant women who participated in this survey were ranged between 18 and 40 years old with an average age of 27.33 ± 4.8 years. These results corroborate those found by Mafuta and Kayembe [17], who reported that two-thirds of their study population was between 20 and 34 years old (68.6%) in the health zones of Equator and Katanga. However, more than two thirds, either 84.3% of these women were married, but the level of basic education was observed in 1.9% of pregnant women. In Mali, Dicko et al. [18] found that the majority of its target population had never been to school, including 73.3% of stepdaughters, 86.2% of stepmothers and 65.8% of spouses. In Benin, Ndiaye [19] reported that illiteracy in pregnant women was 67% of the studied population. In Argentina, Roy [20] reported that 23% of pregnant women had no education or didn't complete the primary education and only 9.9% of these women completed the secondary education. Among the pregnant women surveyed, the majority of them had their activities at home (78.7%) versus 21.3% who have their activities out of home. xxxx Regarding the frequency of participants who had appropriate knowledge on the IPT schedule for the administration of SP, we found that 74% of women did not respect the optimal timeframe to use IPT to SP and 70.4% of women only met this timeframe to use this preventive treatment. These results are similar with WHO [21] in a study conducted in 12 African countries where it was found that only 12 pregnant women (60%) attended antenatal care in a consistent way with ITP dosages. Khan et al. [22] reported that only 22% of pregnant women in Kinshasa complied with the WHO recommendation on beliefs, knowledge and barriers to the correct planning of prenatal care. Behavioral beliefs, control beliefs, normative beliefs and the importance given to facilitating or detrimental factors have a strong correlation with the intention. Our results revealed that behavioral beliefs (β = 0.236), control beliefs (β = 0.235), normative beliefs (β = 0.038) and the importance given to facilitating or detrimental (β = 0.131) are important determinants of the intention of pregnant women to respect the optimal timeframe of IPT to SP during pregnancy. Our results are similar with Beaudin et al. [23] and Godin and Kok [24] who reported that the average percentage of standard deviation explained by these variables among health professionals in Quebec is 58% and 41% for behaviors related to health. Moreover, we have observed that pregnant women have a strong intention to respect the optimal timeframe of IPT to SP (mean score of intention 20.7 ± 3.4 on a maximum score of 27).

The theory of reasoned action postulates that the realization of a given behavior is predicted by the individual's intention to perform this behavior, although there is always a state of discrepancy between intention and behavior [11] [25]. Thus, the intention of pregnant women to respect the optimal timeframe of IPT to SP is one of many determinants of the adoption of this behavior. On the other hand, Rwenge and Nguemeleu [26] reported that limiting factors such as being without education, single, divorced or widowed and the distance between the house and the nearest health facility influence the intention of the medical care

of the pregnancy among these respondents. Facilitating factors which influence the intention of late attendance to ANC are ethnicity group, urban residence, high level of education, and high level of exposure to television. However, the predicted variables of intention revealed that these variables explain 13.2% of the variance in the intention of pregnant women to respect the optimal timeframe of IPT to SP with R^2 = 0.132 and one (F = (df : 4) = 5.0 * p <0.05). These results indicated that the main determinants of the intention of pregnant women to use the ANC service to benefit from IPT to SP against malaria within the timeframe required by WHO were, in order of importance, behavioral beliefs (β = 0.236), control beliefs (β = 0.235) and the importance of facilitating or detrimental factors (β = 0.131) and normative beliefs (β = 0.038) are not significantly related to the intention. Dickson et al. [27] reported that the subjective norm is less important than the attitude and perception of control in predicting pro-environmental behavioral intention.

At last, the findings of the current study pointed out salient beliefs which have a greater impact upon the intention of pregnant women to appeal to IPT to SP against malaria. These are the items used to measure behavioral beliefs such as "using IPT to SP in the first trimester of pregnancy would help me to avoid neonatal malaria" (β = 0.28), "appealing to IPT to SP from the first trimester of pregnancy, it would help me to avoid growth retardation of my fetus "(β = 0.21)," appealing to IPT to SP in the first trimester of pregnancy, would allow me to avoid severe malaria "(β = 0.14) and "appealing to IPT to SP in the first trimester of pregnancy, would allow me to avoid severe malaria" (β = 0.13). Yet, the item used to measure control beliefs: "even if the health center is installed remotely, could you use IPT to SP in the first trimester of pregnancy" (β = 0.22) and "for me to start IPT to SP in the first trimester for my next pregnancies would be advantageous for my future babies "(β = 0.29). Similar findings were found in Rosario (Argentina) the husband's support was not mentioned in factors influencing the intention to look for antenatal care. The most important factor encouraging the use of prenatal services is undoubtedly the unshakeable belief of pregnant women about the importance of medical monitoring during the pregnancy for the well-being of their future baby [20].

Furthermore, Greco [28] pointed out the same observation: the woman consults the doctor during her pregnancy because: "the life of her child or hers depends on it". Of course, the concern of knowing if one's child will be born in good health is peculiar to any pregnant woman. Kanter [29] reported that it seems rather difficult for nurses to increase their perception of control i.e. having some control over factors facilitating or detrimental to the use of the record of care. This perception of control would be possible if means are gathered by managers in order to facilitate the use of these beliefs and then reduce barriers to its utilization. One of these ways would certainly be to involve nurses in the process of implementing the development of this file in health facilities.

Conclusion

Malaria constitutes a great danger having a high mortality for the pregnant woman and the knowledge versus the use of IPT to SP is very important for the well-being of the mother latter as well as her future baby. Henceforth, the need to awake pregnant women mind by an awareness program in order to help them follow different ANC each trimester of pregnancy according to WHO recommendation.

References

[1] Ministère de Santé Publique (Ministry of Public Health) **(2012)**. Normes et directives de santé relatives aux interventions intégrées de santé de la mère, du nouveau-né et de l'enfant en République Démocratique du Congo. Soins Obs. Ess. 1, pp 110.

[2] Organisation Mondiale de la Santé **(2017)**. Recommandation de politique générale de l'OMS : Chimio-prévention du paludisme saisonnier pour lutter contre le paludisme à Plasmodium falciparum en zone de forte transmission saisonnière dans la sous-région du Sahel en Afrique. Rapport sur le paludisme dans le monde, Genève 2012, 4 p - [Mise à jour le 18 Mars 2017], disponible à : http://www.who.int/malaria/publications/atoz/who_smc_policy_recommendation/fr/

[3] D. D. Sangba **(2010)**. Lutte contre le paludisme : connaissances, attitudes et pratiques dans les ménages. Mémoire de Master, Santé Publique, Epidémiologie et Médecine Préventive, Faculté de Médecine, Université de Lubumbashi, pp 50.
[4] P. Aubry and G. Bernard-Alex **(2015)**. Passeport Santé pour l'Afrique. Editions Universitaires Européennes, 444 pp.
[5] D. Ogobara **(1992)**. Epidémiologie du paludisme au Mali : étude de la chloroquino-résistance, essai de stratégie de contrôle basée sur l'utilisation de rideaux imprégnés de permethrine associée au traitement systématique des accès fébriles. Thèse de Doctorat, Sc Bio. Montpellier II, France, pp 245.
[6] M. T. Diouf **(2004)**. Représentation populaire de la maladie et option thérapeutique chez les femmes enceintes et les enfants de moins de dix ans : les cas des fièvres et/ou de l'accès palustre en milieux rural, Niakhar, Sénégal. Mémoire de maitrise en Population, développement et Santé de la reproduction. Université Cheikh Anta Diop, Dakar, 109 pp.
[7] S. Incardona **(2007)**. Le paludisme au Cambodge : épidémiologie, diagnostic moléculaire à haut débit, et variabilité du gène ARNr 18S des quatre espèces infectant l'homme. Thèse de doctorat, Université Paris 7- Dénis Diederot. Ecole doctorale de biochimie et biologie Moléculaire, pp 236.
[8] H. C. Triandis **(1980)**. Values, attitudes, and inter-personal behavior. In: Howe H, Page M, editors. Nebraska Symposium on Motivation. Lincoln, NE: University of Nebraska Press, 1980:195-259
[9] I. Ajzen **(1991)**. The theory of planned behavior. Organ Behav. Hum. Perform., **50:** 179-211.
[10] I. Ajzen and M. Fishbein **(1980)**. Understanding attitudes and predicting social behaviour.
[11] M. Fishbein and I. Ajzen (1975). Attitude, Intention and Behavior. In: An Introduction to Theory and Research 1975. Addison-Western, Boston.
[12] R. C. Bonono and P. Ongolo-Zogo **(2012)**. Optimiser l'utilisation de la consultation prénatale au Cameroun. Centre pour le Développement des Bonnes Pratiques en Santé–Hôpital Central. Yaoundé, Cameroun SURE–Supporting the Use of Research Evidence (SURE) for Policy in African Health Systems–is a collaborative project that builds on and supports the Evidence-Informed Policy Network (EVIPNet) in Africa and the Regional East African Community Health (REACH) Policy Initiative. SURE is funded by the European Commission's 7th Framework Programme. http://www.portal.pmnch.org/evidence/sure/ESPBCPN.pdf
[13] D. A. Russo, J. Stochl, M. Painter, G. F. Shelley, P. B. Jones and J. Perez **(2015)**. Use of the Theory of Planned Behaviour to assess factors influencing the identification of students at clinical high-risk for psychosis in 16+ Education. BMC health Serv. Res., **15:** 411. doi: 10.1186/s12913-015-1074-y.
[14] F. Légaré, F. Borduas, A. Freitas, A. Jacques, G. Godin, F. Luconi and J. Grimshaw **(2014)**. Development of a simple 12-item theory-based instrument to assess the impact of continuing professional development on clinical behavioral intentions. PLoS ONE **9:** e91013. doi:10.1371/journal.pone.0091013.
[15] J. P. Weir **(2005)**. Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. J. Strength Cond. Res., **19:** 231-240.
[16] J. Nunnally and I. Bernstein **(1994)**. Psychometric Theory (3rd ed.). New York: McGraw-Hill.
[17] D. R. Congo **(2011)**. Déterminants de la fréquentation tardive des services de soins prénatals dans les zones de santé de l'Equateur et du Katanga en République Démocratique du Congo. Annual Afr Med , **4:** 845.
[18] A. Dicko, I. Sagara, A. A. Djimdé, S. O. Touré, M. Traore and S. Dama et al. **(2010)**. Molecular markers of resistance to sulphadoxine-pyrimethamine one year after implementation of intermittent preventive treatment of malaria in infants in Mali. Malar. J., **9:** 9. doi: 10.1186/1475-2875-9-9.
[19] P. Ndiaye, A. T. Dia, A. Diediou, E. H. L. Dieyeand and D. A. Dione **(2005)**. Déterminants socioculturels du retard de la 1ere consultation prénatals dans un district sanitaire au Sénégal. Santé Publ., **17:** 531-538. DOI : 10.3917/spub.054.0531.
[20] S. Roy **(2008)**. Déterminants de l'utilisation des services publics de santé prénatale dans la ville de Rosario en Argentine (Doctoral dissertation, Université Laval).

[21] WHO (World Health Organization) **(2017)**. Traitement préventif intermittent du paludisme (TPI) pour les femmes enceintes. [Mise à jour le 6 Mai 2017], disponible dans : http://www.who.int/malaria/areas/preventive_therapies/pregnancy/fr/.
[22] M. Khan, M.R. Mwaku, N.D. Kinkela and V.A. Rie **(2005)**. Soins prénatals à Kinshasa (République démocratique du Congo): croyances, connaissances et obstacles à la programmation appropriée. Cahiers d'études et de recherches francophones/Santé, **15:** 93-97.
[23] N. Beaudin, E.B. Boulianne, M. Fortier, L. Poirier, M. Leclerc, G. Beaudet-Hillman et al. **(2015)**. Soins de proximité en périnatalité : Standards de Pratique de l'infirmière. Ordre des infirmiers et infirmières du Quebec.
[24] G. Gordin and G. Kok **(1996)**. The theory of planned behaviors: a review of its applications to health-related behaviors. Am. J. Health Prom., **1:** 87-98.
[25] G. Godin, C. Gagné and P. Sheeran **(2004)**. Does perceived behavioural control mediate the relationship between power beliefs and intention? Br. J. Health Psychol., **9:** 557-568.
[26] W. Rwenge and T. Nguemaleu **(2011)**. Facteurs sociaux de l'utilisation des services de soins obstétricaux parmi les adolescentes Camerounaises. Afr. J. Repro. Health, **15:** 81-92.
[27] A. Dickson, C. Knussen and P. Flowers **(2008)**. 'That was my old life; it's almost like a past-life now': Identity crisis, loss and adjustment amongst people living with Chronic Fatigue Syndrome. Psychol. Health, **23:** 459-476.
[28] A. A. Greco **(2005)**. Las voces acalladas en la maternidad: Los controles prenatales ausentes o inadecuados en la perspectiva de las mujeres de sectores populares.
[29] R. M. Kanter **(1977)**. Men and Women of the Corporation. New York.