ISSN No:-2456-2165

Analysis of the Determinants of Premarital Fertility in Benin using Cox's Survival Model

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Abstract :- This study focused on premarital fertility in Benin. It examined, in particular, the factors that influence this phenomenon based on data from five Demographic and Health Surveys (DHS) conducted in the country in 1996, 2001, 2006, 2011-2012, and 2017-2018. Using a Cox model or proportional hazards model, the study sought to explain the instantaneous risk of being a mother during a period of celibacy according to the socio-demographic, socio-cultural, and socio-economic characteristics of Beninese women. The results indicate that residing in the departments of Atacora, Donga, Borgou, or Alibori, having close family ties with the head of household or having no family ties at all, having a low level of education (primary or uneducated), or living in a poor household promotes premarital procreation. In addition, belonging to the Muslim religious group less predisposes single women to procreate (in this status) compared to other groups.

Keywords:- *Premarital fertility, unmarried, Cox model.*

I. INTRODUCTION

Fertility is a key component, if not the main one, in the study of demographic dynamics or the movement of populations. In Africa, in a context where a large descent was a determining factor of social status and a source of wealth, (traditional) societies were pro-natalist. Sub-Saharan Africa has thus emerged as the most fertile region in the world.(PRB, 2008). However, despite this prominent place it occupied, fertility in these societies was governed by norms and rules. It is not only necessary to have a large lineage, but above all to ensure a good status and integrate it socially. Thus, the only socially prescribed framework for procreation was the conjugal sphere.(Adjamagbo, Antoine, & Delaunay, 2004). Suddenly, extramarital births were perceived as scourges, sacrileges and treated as such. Penance is even more severe when the phenomenon affects never-married women.

However, the last decades have been marked by profound social and economic changes that have led to the weakening of social norms, traditional values and practices regarding nuptiality and reproduction in sub-Saharan African societies.(Garenne, Michel; Halifax, Juliette, 2000).These include, among others, rapid urbanization, the schooling of girls beyond the traditional marriage ages, the emergence of new female preferences for modern economic activities, the appearance of new models of similar to those in developed countries, the desire to delay entry into union, the possibility of a woman choosing a partner, controlling fertility thanks to modern methods of contraception and the practice of abortion(Soler-Hampejsek, Mensch, & Hewett, 2009; UNICEF, 2005). These different mutations have induced enormous changes in nuptiality, sexuality and procreation. As a result, we are witnessing the increase in the proportion of pregnancies among single people, their growing practice of abortion and the multiplication of births among them.(Gage-Brandon & Meekers, 1993; Laré & Amadou Sanni, 2017). In 2017,40% of women under 25 in Gabon, Namibia and Liberia and 30.4% in Nigeria have already given birth(Clark, Shelley; Koski, Alissa; Smith-Greenaway, Emily, 2017).Thus, celibate sexuality and the onset of childbearing are becoming common and seem to be socially accepted in many developing countries.

Moreover, although social penance is diminishing, the phenomenon of single mothers has serious consequences for both the young girl and her child. This is a status that ties in with precarious living conditions(Adjamagbo, Antoine, & Dial, 2004). Many women are forced to abandon their studies or the trades they were learning in order to face the enormous burdens imposed by the onset of pregnancy.(Garenne, Michel; Halifax, Juliette, 2000). Many are those who, in search of an income-generating activity, are forced to separate from their child (abandonment, daycare or refuge with grandparents) who constitutes an obstacle on the job market.(Camara & Gueye, 2013). Similarly, the risks of maternal and infant death are higher among single mothers, because they generally enjoy less attention and assistance from their parents and parents-in-law compared to married mothers; their children are more affected by growth problems and malnutrition(Clark, Shelley; Hamplová, Dana, 2013; Ntoimo & Odimegwu, 2014).The fear of these obstacles pushes many young girls to resort to clandestine abortion, a source of health and reproductive problems in the future, when death has been averted.(N'Bouké, Calvès, & Lardoux, 2016). Thus, this phenomenon constitutes a threat to the achievement of several Sustainable Development Goals, in particular the first four (SDGs 1-4) which aim to build the quality human capital necessary to achieve the demographic dividend so much sought after by all country of the world.The motherhood of single people is therefore a problem of a seriousness which must challengethe attention of political decision-makers, the various development actors as well as that of the world of research. Unfortunately, in Benin, as in many other countries in Francophone West Africa, research on the subject is still more or less thin. While the related works are enlightening on the qualitative aspects, they provide little information on the quantitative indicators. This is the basis of the need to conduct this study on the determinants of premarital fertility in Benin.

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II. MATERIALS AND METHODS

In this section, the general methodology of the study is presented, in particular, the data source, the sampling procedure and the analytical methods used. It is worth pointing out that this study is purely quantitative. It is therefore based on calculations of statistical indicators.

A. Source of data

The most appropriate and available data for this study are those from Demographic and Health Surveys (DHS). These surveys are part of the International Demographic and Health Survey (DHS) Programme. They were carried out by the National Institute of Statistics and Economic Analysis (INSAE) in collaboration with the National Program for the Fight against AIDS (PNLS), the National Program for the Fight against Malaria (PNLP), the Standing of the Food and Nutrition Council (SP/CAN), Ministry of Health. Benin has experienced five (05) phases of these DHS(in 1996, 2001, 2006, 2011-2012 and 2017-2018).Data collection operations took place in June-August 1996 (EDSB 1), from August 2 to November 13, 2001 (EDSB 2), from August 3 to November 18, 2006 (EDSB 3), from December 10, 2011 to March 31 2012 (EDSB 2011-2012), and from November 06, 2017 to February 18, 2018 (EDSB 2017-2018). At each phase of these surveys, three components are affected: household component, female component and male component. This study focuses on single women of childbearing age (15-49 years old). In total, respectively 5491, 6219, 17794, 16599 and 15928 women aged 15-49 years old were surveyed in 1996, 2001, 2006, 2011-2012 and 2017-2018.

B. Sampling

The five (05) DHS took place on samples formed through two-stage stratified cluster surveys. At the first (EDSB-I), 200 clusters were drawn (at the first level) from the list of enumeration areas (ZD) established by the RGPH-II of 1992; in the second, from the list of households counted in each cluster, 4777 households were selected. Every woman aged 15-49 should be administered an individual questionnaire. During the second DHS, 247 clusters and 5769 households were actually surveyed. For the EDS-III, these are 750 clusters and 17,511 households; for the fourth (EDS-V), 750 clusters and 17,422 households were interviewed. At the last DHS, there are 555 clusters and 14,156 households. In the study of the fertility of single people, we were interested in single women who had started their first fertility during the survey year, on the one hand, and those still single of childbearing age, on the other. The total numbers of these women are 935, 1257, 3253, 3467 and 3587 respectively in 1996, 2001, 2006, 2011-2012 and 2017-2018.

C. Analysis method

In the present study, it is a question of explaining the occurrence of a birth among women in a situation of celibacy. The dependent variable offers two response options for each woman. It takes the value 1 if the woman experienced the event (which is a birth) and 0 otherwise. It is therefore binary. Generally, the explanation of such a dependent variable is done using a logistic regression model. But, within the framework of this study, we are interested in the duration of exposure elapsed until the moment of the occurrence of the first birth in unmarried women. The literature indicates that the Cox model (established in 1972), which is a survival model, makes it possible to satisfy this need. It takes into account not only exposure time, but also right censoring. In effect, women who have not had their first births at the time of a study may have them later (after the survey). They are therefore not eternal survivors. As a result, their data is right censored. The Cox model takes this into account. Below, we present its theoretical form as well as the empirical one adapted to our context.

➢ *Presentation of the Cox model*

- Theoretical model
  The Cox model or continuous proportional hazards model is expressed as follows:

$$\boldsymbol{h(t,X) = \alpha_0(t) exp\left(\sum_k \beta_k X_k\right)}$$

With$t$, the waiting time before the occurrence of the event,$\alpha_0(t)$, the basis risk independent of the explanatory variables and the exponential of the product of the vector of explanatory variables and the vector of coefficients.$\boldsymbol{exp\left(\sum_k \beta_k X_k(t)\right)}$

Subsequently, we have$\boldsymbol{Logh(t,X) = \alpha_0(t) + \sum_k \beta_k X_k + \in}$

- Empirical model

$$\boldsymbol{h(t,X) = \alpha_0(t) exp(\beta_1 Reg + \beta_2 Educ + \beta_3 Parent + \beta_4 Relig + \beta_5 Mmc + \beta_6 NiV + \beta_7 Period)}$$

With Reg =Region of residence, Educ = Level of education, Parent = Relationship with the HH, Relig = Religion of belonging, Mmc = Knowledge or not of modern methods of contraception, NiV = Standard of living, Period = Period of study.

➢ *Inter pretation tools*

After estimating the various regression coefficients, we proceed to calculate the marginal effects and the instantaneous relative risks (or in English).$hazardratio$

The hazard ratios are tools to help interpret the relationship between the dependent variable and the explanatory variables. They measure the relative propensities between the characteristics of women from the point of view of the occurrence of a birth during the period of celibacy.

For two groups of subjects (women) belonging to different categories A and B of the same variable, the instantaneous risk ratio or hazard ratio is defined by:

$$\boldsymbol{\frac{h(t,X_B)}{h(t,X_A)}}$$

ISSN No:-2456-2165

This ratio is independent of time and expresses the relative risk of women belonging to category B of being a single mother compared to those of category A. When it is equal to 1, the risk of being a single mother does not vary when moving from category A women to category B women. If it is greater than 1, the risk is greater in category B women than in category A women. on the other hand, less than 1, the risk of being a single mother is higher among women in category A compared to those in category B.

III. RESULTS

The results of the various estimates (coefficients, relative probabilities and marginal effects) are summarized in Table 1 below. But upstream, Wald's global significance test provides a p-value of almost zero (0.000), indicating that the model is globally significant at the 0.1% level. Thus at least one of the factors significantly explains the probability of being a single mother. Moreover, the specification test reveals a non-significance of the coefficients of the squares of the explanatory variables. Thus, the shape of the model is suitable; the model is therefore well specified. As with overall significance, significance tests were performed for each of the estimated coefficients. These tests reveal varying levels of significance depending on the factors.

Table 1: Coefficients, instantaneous relative probabilities and marginal effects by sociocultural, sociodemographic and socioeconomic characteristics of single women

Cox regression -- Breslow method for ties

No. of subjects = 12499 Number of observations = 12499
No. of failures = 241
Time at risk = 54805
LR chi2(13) = 184.28
Log-likelihood = -1835.9106 Prob > chi2 = 0.0000

Variable	Coefficient	Standard error	P>z	Hazard Ratio	Marginal effects
Region of residence					
Atacora/Donga and Borgou/Alibori		***Ref***			
Atlantic/Coastal	-1.279521	0.1953279	0.0000	0.2781704	0.3197713
Mono/Couffo	-1.99458	0.3145001	0.0000	0.1360708	0.1564205
Oueme/Plateau	-1.589245	0.2424232	0.0000	0.2040797	0.2346002
Zou/Hills	-0.933883	0.1956837	0.0000	0.3930248	0.4518025
Educationallevel					
Illiterate and Primary		***Ref***			
Secondary	-0.245627	0.1440326	0.0880	0.7822141	0.4294874
Superior	-0.792274	0.3891934	0.0420	0.4528141	0.2486249
Relationship with the HH					
Close and unrelated relatives					
head	-0.73102	0.2983685	0.0140	0.4814175	0.2551987
Other parent	-0.641386	0.2548248	0.0120	0.5265619	0.2791297
Religion of belonging					
Atheist and Christian		***Ref***			
Muslim	-0.316984	0.1710402	0.0640	0.7283423	0.3955999
Knowledge of Modern Methods of Contraception					
Do not know		***Ref***			
knows	0.6136062	0.2660808	0.0210	1.84708	0.5441457
Quality of life					
Poor and Average		***Ref***			
Rich	-0.285697	0.1659014	0.0850	0.7514903	0.4609875
Very rich	-0.768542	0.1918581	0.0000	0.4636888	0.2844411
Studyperiod					
1996, 2001, 2006, 2011-2012		***Ref***			
2017-2018	0.3539979	0.137367	0.0100	1.424752	0.6171994

Source: Our calculations based on data from EDSB I, II, III, IV and V

A. Region of residence and premarital fertility

The coefficients of all regions are significant at the 1% level (p-values < 0.01). Analysis of these coefficients reveals that the instantaneous probability of procreation in a situation of celibacy is higher among women in the regions of Atacora/Donga and Borgou/Alibori (the 4 departments constituting the northern part of the country). Indeed, all the coefficients are negative (these two regions being those chosen as reference). Moving from women in these regions to others, the probability of being a single mother decreases. The hazard ratios make it possible to quantify the relative propensities of the other regions compared to Atacora/Donga and Borgou/Alibori. From their analysis, it appears that the probability of being a single mother is multiplied by 0.28, 0.14, 0.20, and 0. 39 when we go from the women of these regions to those of Atlantique/Littoral, Mono/Couffo, Ouémé/Plateau and Zou/Collines respectively. The inversion of these risks gives respectively 5.3, 13.6, 7.9 and 3.7. This indicates that the propensity for a single woman residing in the Atacora/Donga and Borgou/Alibori regions to be a mother is 5.3, 13.6, 7.9 and 3.7 times greater than that of a woman living in the Atlantique/Littoral. , Mono/Couffo, Ouémé/Plateau or Zou/Collines respectively. It is important to note that the relative propensity is lower in the Zou/Collines region. The department of Collines is relatively closer to the northern part and constitutes the center of the country. The single mother phenomenon is therefore more due to women from the north and center than those from the south.

B. Education and premarital fertility

Like the region of residence, the level of education of the woman has an effect on her chance of procreation in a situation of celibacy. The coefficient for the higher level is significant at the 5% threshold, while that for the secondary level is only significant at the 10% threshold. The results therefore show that the risk of becoming a single mother declines when going from women with at most primary level to those with a relatively high level. Having a higher level of education than primary reduces the risk of experiencing motherhood in a situation of celibacy. Indeed, the relative probabilities of women with secondary and higher levels are respectively multiplied by 0.8 and 0.5 compared to that of illiterate women and those with primary level. In other words, the chance of becoming a single mother is 1.3 and 2.2 times higher for illiterate women at the primary level compared to those at the secondary and higher levels respectively. In addition, women who have never been educated have almost the same chances as those of primary level in terms of procreation in a situation of celibacy. There is no significant difference between these two groups of women: this is what, moreover, leads to their grouping as the reference modality. Education therefore only has a real effect on the reproductive behavior of these women from the secondary level and the more it improves, the lower the probability of becoming a single mother. Twice as high for illiterate women at primary level compared to those at secondary and higher levels respectively. In addition, women who have never been educated have almost the same chances as those of primary level in terms of procreation in a situation of celibacy. There is no significant difference between these two groups of women: this is what, moreover, leads to their grouping as the reference modality. Education therefore only has a real effect on the reproductive behavior of these women from the secondary level and the more it improves, the lower the probability of becoming a single mother. women who have never been educated have almost the same chances as those of primary level in terms of procreation in a situation of celibacy. There is no significant difference between these two groups of women: this is what, moreover, leads to their grouping as the reference modality. Education therefore only has a real effect on the reproductive behavior of these women from the secondary level and the more it improves, the lower the probability of becoming a single mother. women who have never been educated have almost the same chances as those of primary level in terms of procreation in a situation of celibacy. There is no significant difference between these two groups of women: this is what, moreover, leads to their grouping as the reference modality. Education therefore only has a real effect on the reproductive behavior of these women from the secondary level and the more it improves, the lower the probability of becoming a single mother.

C. Family relationship with the head of the household and premarital fertility

Kinship with the head of household (HH) is a variable which also influences the attitude of single women towards procreation. No significant difference was noted between the women having no family relationship with their HH and those having very close family relationships (daughter, sister, granddaughter) with the latter. Hence the need to put these two groups of women together to constitute the reference modality. It therefore emerges from the analysis that, compared to women living under the authority of a head of household with a very close family tie or those who are not familiar with him, those who are not under the guardianship of head of household are less likely to become single mothers. The same observation is made among women with relatively weaker kinship ties than close relatives (cousin, nieces, other kinship ties) and women without any kinship ties with them. Indeed, going from close relatives to HHs or from unrelated women to autonomous ones (HH), the relative propensity is 0.5. In other words, the chance of becoming a single mother is about twice as high among women living under the authority of a close relative or someone with no ties compared to those who are heads of their households. The same is true for women with a non-direct link to the HH: their probability is half that of women with a very close relationship and those without any relationship with the HH. other family ties) and unrelated women. Indeed, going from close relatives to HHs or from unrelated women to autonomous ones (HH), the relative

ISSN No:-2456-2165

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D. Religion and premarital fertility

With regard to the religion of belonging, we only note significance at the 10% threshold, and this is for the Muslim religion. Women of other religions (Christian, traditional) and atheists do not differ significantly; this is what imposed them as a modality of reference to be compared to those of the Muslim religion. Compared to others (Christian, traditional, atheist) the probability of being a single mother is lower among Muslim women. The relative propensity of the latter compared to the others is 0.7. In other words, moving from Muslim women to Christian, atheist or traditional religion women, the propensity to be a single mother is multiplied by 1.4.

E. Knowledge of modern methods of contraception and premarital fertility

From the analysis of the results relating to knowledge of modern contraception, it emerges from those with this knowledge to others that the probability of being a single mother decreases; the relative propensity is 1.8. This could be explained by the fact that women who know modern methods of contraception generally have a high level of education.(Baranon & Amadou Sanni, 2017). As a result, they have a certain autonomy as to their fruitful life. This can materialize by willingly choosing to have their first birth celibate.

F. Standard of living of the household and premarital fertility

The standard of living of the household is a variable that determines both the reproductive behavior of women in general and that of single people in particular. The results indicate the absence of significant difference between very poor, poor women and those in rather average conditions. These three categories are therefore put together to constitute the reference modality. The coefficients are all negative, indicating that the probability of becoming a single mother decreases when moving from poor and average women to those relatively well-off. The relative risks are 0.8 and 0.5 respectively for women living in rich and very rich households. In other words, the probability of becoming a single mother is 1.3 and 2. Twice as high among women living in poor and middle-income households compared to those living respectively in rich and very rich households. In addition, we note that the significance of the coefficients increases with the standard of living of the woman's household. Indeed, the significance is observed at the threshold of 10% and 0.1% respectively for the rich and very rich levels. This allows us to conclude that the difference in behavior with regard to premarital procreation is significant as the standard of living improves (with reference to women in precarious and average living conditions). In other words, affluence has an inhibiting effect on celibate procreation. we note that the significance of the coefficients increases with the standard of living of the woman's household. Indeed, the significance is observed at the threshold of 10% and 0.1% respectively for the rich and very rich levels. This allows us to conclude that the difference in behavior with regard to premarital procreation is significant as the standard of living improves (with reference to women in precarious and average living conditions). In other words, affluence has an inhibiting effect on celibate procreation. we note that the significance of the coefficients increases with the standard of living of the woman's household. Indeed, the significance is observed at the threshold of 10% and 0.1% respectively for the rich and very rich levels. This allows us to conclude that the difference in behavior with regard to premarital procreation is significant as the standard of living improves (with reference to women in precarious and average living conditions). In other words, affluence has an inhibiting effect on celibate procreation. This allows us to conclude that the difference in behavior with regard to premarital procreation is significant as the standard of living improves (with reference to women in precarious and average living conditions). In other words, affluence has an inhibiting effect on celibate procreation. This allows us to conclude that the difference in behavior with regard to premarital procreation is significant as the standard of living improves (with reference to women in precarious and average living conditions). In other words, affluence has an inhibiting effect on celibate procreation.

G. Period of study and premarital fertility

The analysis of the effect of the time when the surveys were carried out reveals a significant difference in behavior only in 2017-2018 (last survey). The difference in behavior therefore only began to be significant from 2017-2018. Going from single women in the first four surveys to those of the last (2017-2018), the probability of being a mother is more than doubled (2.8) without being tripled.

Ethnicity and place of residence have no significant effect on the risk of single women becoming a mother (at the 10% threshold). This led to their ejection from the final model (as explained above). These two variables therefore do not make it possible to make a difference between single women in terms of procreation in this status.

H. Analysis of the survival of the phenomenon and of the risk at the different times of exposure

In addition to the indicators presented in the table above (coefficients, hazard ratio and marginal effects), others help to assess the phenomenon. These include the probability of survival and that of occurrence at different times of the exposure period (which are represented by the graphs below).

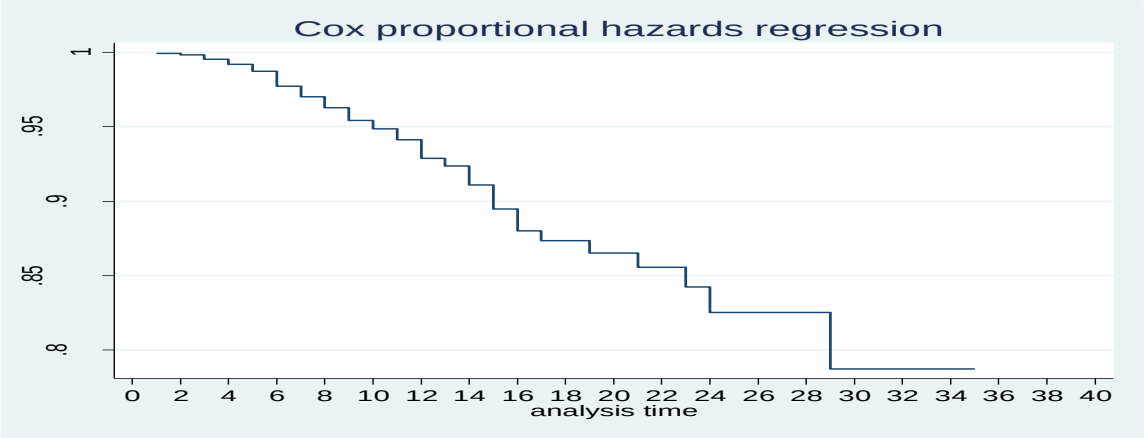

Fig. 1: Evolution of the probability of survival to procreation according to the duration of exposure to the risk of the phenomenon

From the analysis of the graph, it emerges that the probability of survival to procreation in a situation of celibacy decreases with the time of exposure of the woman to the risk of the phenomenon. However, this fall is not linear over time. It has a cascading look with slow motions, of variable durations depending on the sub-periods. Before 6 years of exposure (corresponding to 14-19 years of age), a relatively small drop in this probability of survival is observed. As a result, the decline is accentuated to slow down between 16 and 23 years of exposure (30-37 years completed). Finally, the rate of the fall is maximized at 29 years of exposure (43 years old), then stabilizes at the same value the rest of the time.

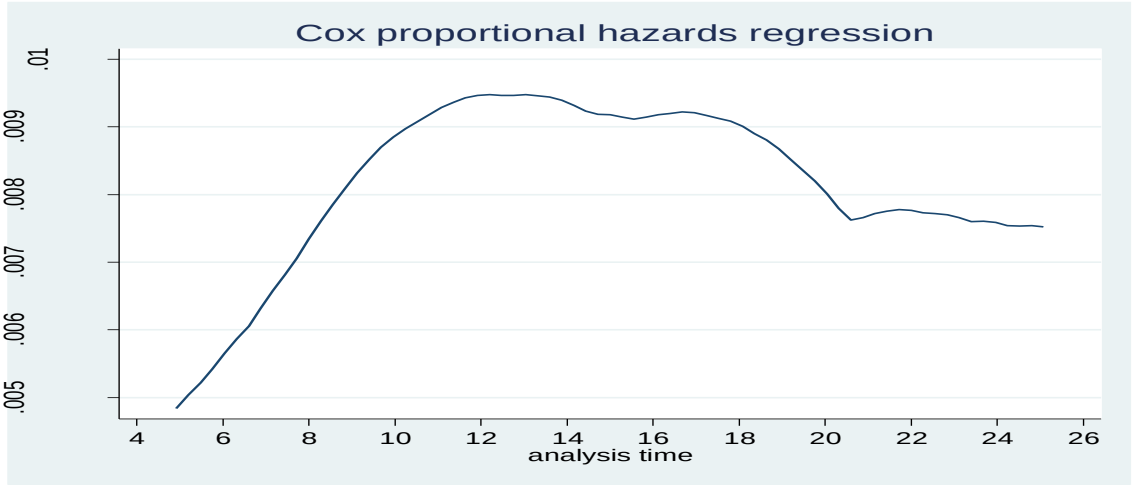

Fig. 2: Instantaneous probability of occurrence of a birth at different times of the exposure period

This figure represents the probability that a woman will experience procreation knowing that she has survived it until time t (t being the duration of exposure). This probability evolves according to a non-regular trend over time. It has an upward trend, with a quasi-linear pace up to 12 years of exposure to the risk of the phenomenon. Thus, during this period, the instantaneous probability of being a mother (knowing that the woman has not been until now) increases very quickly from one moment to another (relatively higher). It reaches its peak at 12 years, then declines globally for the rest of the exposure time. In this phase of decline, there are also slight rebounds at 17 years, then 21 years of exposure.

ISSN No:-2456-2165

IV. DISCUSSION

This study focused on premarital fertility in Benin. In this section, the obtained results are discussed. It is a question of highlighting the assets, the nuances and the limits of these results.

A. Socio demographic characteristics and premarital fertility

The results showed that premarital fertility is more due to women with very close family ties to the head of household. This group of women behaves similarly to women who are not related to their HH. These results are in line with those of Touré (2015) who stipulate that women close to HHs develop early behaviors in terms of sexuality, and therefore fertility. It is therefore appropriate to question the form and content of education according to kinship with heads of household.

One of the commonly discussed avenues of birth control is the promotion of modern methods of contraception. A better knowledge of these methods should go hand in hand with a low risk of single childbearing. But, far from this expectation, the results revealed a greater manifestation of the phenomenon in women knowing these methods. As a result, if births are registered among single people, it is therefore not a problem of ignorance of these methods among the latter. It is one thing to know, another to use. In addition, this result agrees to some extent with previous work which states that the women who are most knowledgeable about modern methods of contraception are generally those who are well-educated.(Baranon & Amadou Sanni, 2017); education being such as to empower the woman to decide when to become a mother(Kourouma, 2011; N'Bouké A., 2011). The latter would therefore tend to deliberately choose to procreate outside marriage. Moreover, for an advance in knowledge, it would be interesting to study the strategies adopted by women who do not know any method. Do they abstain or what do they do? Similarly, would the effectiveness of modern methods of contraception be better than those of traditional methods? Such questions merit future investigation..

B. Sociocultural characteristics and premarital fertility

There is no difference between women in rural areas and those in urban areas. This result is consistent with many other previous studies. The absence of difference reflects the proximity of behavior between the two environments, characterized by a tendency of rural people to copy urban people, perceived as a model(Foaleng Tela, 2018). This state of affairs is favored by the extension of conditions from urban areas to rural areas, particularly with regard to electricity, access to the Internet (social networks), mobile telephony, etc.(INSAE, 2016). Furthermore, it highlights the weakening of social and cultural norms blaming the procreation of celibates, insofar as the rural environment was renowned for the maintenance of these norms.(Clark, Shelley; Hamplová, Dana, 2013; Amadou Sanni & Attemba, 2010).

Women in the Atacora/Donga and Borgou/Alibori regions were more affected by the single motherhood phenomenon. These results align well with reality to some extent given that the Yoa, Lokpa and related and Betamaribès and related ethnic groups who experience the highest rates are in the majority in the Atacora/Donga region.(INSAE, 2016). According to the work of Kiansi (1993), Betamaribès and related societies are among those in which premarital procreation is not perceived as a problem even in traditional societies; on the contrary, it was necessary for the acceptance of the woman in her future in-laws.

Although being weakly significant (at the 10% threshold), the results relating to religion underline the particular behavior of women of Muslim religious persuasion compared to others (other religions and no religion). Indeed, it is the only religion for which the probability of being a single mother is significantly different from that of women who practice no religion. This religion has thus proven to be less favorable to procreation among single people. This assertion abounds in the same direction as several previously dissimilar works. They reveal, in fact, that religions have a multiplier effect on the risk of giving birth before marriage.(Garenne, Michel; Halifax, Juliette, 2000; Adjamagbo, Antoine, & Delaunay, 2004), with the exception of the Muslim religion, which is characterized by a low openness of women to sexuality before marriage and their tendency to enter a union at a very young age.(Soura, Lankoande, Sanogo, & Compaore, 2018; Kuate-Defo, 2000).

C. Socioeconomic characteristics and premarital fertility

The analysis of the results relating to the standard of living indicates that the phenomenon of single mothers is more vital among women from non-rich households. In other words, compared to women from poor and average households, those living in better conditions of well-being are less inclined to procreate in a situation of celibacy. This result is consistent with many results of previous empirical and theoretical work on the relationship between fertility and poverty. In a context of poverty, the young girl constitutes a major burden for her parents.(Zabin & Kiragu, 1998); as a result, a lover is perceived as a source of income both for the girl and for her family; in these conditions, the only thing she can offer in return to keep her partner's affection is her intimacy(Faiz Rashid, 2008).

Moreover, the manifestation of the phenomenon decreases when moving from one level of education to another higher. Similar results have been obtained following various studies relating to premarital fertility. In 2018, studying the effects of socio-cultural and socio-economic contexts on premarital motherhood in Cameroon, Tela came to the conclusion that the prevalence of the phenomenon is greater among uneducated women. Prior to this study, another study on the phenomenon in six countries (Nigeria, Rwanda, Malawi, DRC[1], Senegal and Namibia) revealed that the risk of giving birth before marriage is negatively correlated with the level of education, in other words, this

[1]DRC: Democratic Republic of Congo

risk decreases as the level increases (Palamuleni& Adebowale, 2013). Other studies still indicate that educated women are more inclined to use modern methods of contraception, which facilitates birth control.(Baranon & Amadou Sanni, 2017; Gupta & Mahy, 2003). In addition, the results are in line with the logic of the countries that did not adopt the draconian measures on the occasion of the 1st International Conference on Population in Bucharest in 1974. According to them, development (education) is the best contraceptive . Furthermore, the results indicate that the drop in the level of the phenomenon is only significant from secondary school onwards. This result confirms that social changes linked to education are expected only after complete primary schooling.(Vimard & Fassassi, 2010; Amadou Sanni M., 2011).

D. Limitations or shortcomings of the study

This study is affected by a few limitations and shortcomings that should be noted. We present the main ones below. These limitations relate mainly to the survey data used.

The changing characteristics over time (standard of living, level of education, knowledge of modern methods of contraception, place of residence, religion of affiliation, relationship with the head of household) were taken at the time of the surveys. Taken in this way, a bias could be introduced since between the occurrence of birth and the time of study, any of these characteristics could have changed. It is this and deeply this that motivated the choice to consider in this study the women who experienced the event during the year of study. However, the margin of error is not zero, although it is very insignificant. It is therefore important for future editions of DHS to focus on the characteristics of women at the time of the occurrence of the first birth, Another limit of the study is not being able to specifically study the variations of the single mother phenomenon according to the departments. Indeed, for the first three (03) DHS, the departments were formed in pairs (Borgou/Alibori, Atacora/Donga, Mono/Couffo, Ouémé/Plateau, Atlantique/Littoral and Zou/Collines). It is only in the last two editions that the departments have been separated. This imposed grouping for these last two DHS in order to be able to make comparisons.

The third limit is similar to the second. It is relative to the ethnic group of belonging. It would be interesting to have the details of the ethnic groups to better explore the ethnic groups most inclined or least inclined to experience the event.

V. CONCLUSION

This research focused on premarital fertility in Benin. It is particularly interested in the determinants of the phenomenon based on data from the five Demographic and Health Surveys (DHS) carried out in the country (1996, 2001, 2006, 2011-2012 and 2017-2018). Using a Cox model or proportional hazards model, the instantaneous risk of being a single mother was explained according to the socio-demographic, socio-cultural and socio-economic characteristics of Beninese women. . It shows that the fact of residing in the departments of Atacora, Donga, Borgou or Alibori, of having a very close family relationship with the head of household or of not having any family relationship with the latter, having a low level of education (primary or uneducated) or living in a poor household favors premarital procreation. However, it should be emphasized that education only has a significant effect from the secondary level: reproductive behavior is not significantly different between women with a primary level and those without any level. In addition, belonging to the Muslim religious group predisposes single women less to procreate (in this status) compared to others, in particular, practitioners of no religion and those of Christian religions. Curiously, knowledge of modern contraception proves to be more favorable to procreation in a celibate situation compared to that of traditional methods. From the limits which were imposed in the exploration of the subject, some points are released and proposed in terms of perspectives of research in the direction of an improvement. This is, firstly, the complement in the DHS collection tools of questions relating to socioeconomic, sociodemographic, and sociocultural characteristics at the time of the occurrence of events, in particular, premarital births. Secondly, the form and content of education according to the status of the child within the household would better explain the differences in behavior, in particular, procreative behavior according to the parentage. Third, digging into the question of the effectiveness of modern methods of contraception compared to traditional ones would better inform actors and researchers in the field of public health.

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