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Correlates of Unintended Pregnancies in Ivory Coast: Results from a National Survey

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Abstract: As in most of Africa, unintended pregnancy remains a major reproductive health challenge in Ivory Coast. The 3 Demographic and Health Survey (DHS) conducted in the country in 1994, 1999, and 2012, revealed a decreasing trend in the percentage of unwanted pregnancies: 7.8%, 4.9%, 3.3% in 1994, 1999, and 2012 respectively. However, the percentage of births that were wanted later remained regularly high, around 20% with a pic on 23.8% in 1999. Understanding the extent of unintended pregnancy and the factors associated is crucial to conduct evidence-based interventions and avoiding women's resort to unsafe abortions. A secondary analysis of the DHS 2011-2012 of Ivory Coast allowed to include 1032 pregnant women at the time of data collection. A bivariate analysis and multivariate was conducted with Stata 14.0 for identifying associated factors with unintended pregnancy. In total, 26.4% of the pregnancies were unintended. Age was not found as a correlate of unintended pregnancy. Women in primary and secondary education categories were more likely to have unintended pregnancy as compared to the no education category (OR (95%CI): 2.0 (1.3-3.1) and 2.1 (1.1-4.0) respectively). Ever use of family planning, high parity (5 children and more), and one as well as two and more deliveries in the past five years were associated with unintended pregnancy (OR (95%CI): 2.1 (1.4-3.2), 3.5 (1.2-10.2) and 2.8 (1.5-5.5), respectively). Partner's desire for less children was also found to be associated with unintended pregnancy (OR (95%CI): 1.9 (1.1-3.1)). Women already burdened with higher fertility were suffering from unintended pregnancy. Efforts to increase the use of family planning services among these women should be strengthened.

Keywords: Unintended Pregnancies, Family Planning, Associated Factors, Ivory Coast

1. Introduction

Unintended pregnancies refer to pregnancies that are reported to have been either unwanted (not wanted at the time) or mistimed (wanted but at a later time) [1, 2]. Globally, it is estimated that there are 87 million cases of unintended pregnancies annually of which 46 million cases resort to induced abortion, including 18 million of unsafe abortions [2, 3]. In sub-Saharan Africa, unintended pregnancy accounts for more than a quarter of the 40 million pregnancies that occur annually [4, 5, 6].

There are a number of factors predicting the occurrence of unintended pregnancies. The socio-demographics factors that were reported to have been associated with increased level of unintended pregnancies included younger age, less level of education, unmarried, rural residence, and lower income [7, 8, and 9]. Besides these demographics factors, failure of the healthcare system to meet the demands for reproductive health services particularly that limit size is also recognized as another major cause [10]. In addition, partner desire for

child, domestic violence and less autonomy are also correlates of unintended pregnancies [8, 9].

Unintended pregnancies have been a major public health issue due to its adverse consequences to the maternal and child health [10, 11]. It is a major cause of unsafe abortion and related maternal deaths, low birth weight baby, preterm birth, and high infant mortality [3, 5, 12, 13, 14].

As in most of Africa, unintended pregnancy remains a major reproductive health challenge in Ivory Coast. The 3 Demographic and Health Survey (DHS) conducted in the country in 1994, 1999, and 2012, revealed a decreasing trend in the percentage of unwanted pregnancies: 7.8%, 4.9%, 3.3% in 1994, 1999, and 2012 respectively. However, the percentage of births that were wanted later remained regularly high, around 20% with a pic on 23.8% in 1999 [15]. Like other developing countries, the majority of these unintended pregnancies will end up with induced abortion, mostly unsafe abortion [16]. A national survey conducted in 2007 among 15-49 years old women, estimated a high prevalence of unsafe abortion, up to 42.7% putting these women at a high risk of dying from the complication of unsafe abortion [17].

Understanding the extent of unintended pregnancy and the factors associated is crucial to conduct evidence-based interventions and avoiding women's resort to unsafe abortions. Even though researches from other countries presented a detailed report on the issue, in Ivory Coast, available literature do not provide sufficient evidence and national as well as subnational level information are lacking; as a result, statistics regarding this phenomenon is hardly available. In order to fill this gap in, this report based on analysis of existing data from the Ivorian Demographic and Health Survey (IDHS) 2011-2012, aimed at assessing the prevalence of and factors associated with unintended pregnancies to avail evidence for future decision-making.

2. Methodology

2.1. Source of Data and Sample Size

The data for this paper were drawn from the 2011-2012 IDHS. It is part of a worldwide MEASURE DHS project funded by the United States Agency for International Development (USAID) and implemented by the Ivorian National Statistical Agency. It is a community based analytical cross sectional study that is undertaken every 5 years and the 2011 survey is the third DHS in Ivory Coast. The first DHS was performed in 1994 and the second in 1999 [10].

Ivory Coast is divided into 11 study sites, the 10 former administrative regions and the city of Abidjan, and all of them were covered by this third IDHS. Information were collected from a nationally representative sample of 10,413 households, 10,848 women (15-49 years), 5,677 men (15-49 years) [DHS Ivory Coast]. A stratified, two stage cluster sampling procedure was used to identify the representative samples. The sampling frame consists of strata or Enumeration Areas (EAs). An EA is a geographic area consisting of a convenient number of dwelling units. On the first stage, 352 EAs were selected, 16 in urban areas and 191 in rural areas using probability to proportional size method. Then, on second stage, based on the place of residence, a fixed number of households per EA was 27 in urban area and 32 in rural area [10].

The 2011 IDHS used questionnaires that were adapted from model survey instruments developed for the MEASURE DHS project, to which were added some modules developed by UNICEF for the Multiple Indicators Clustered Survey (MICS). Various Stakeholders (Experts from the government and the partner institutions) were consulted to improve on the tools considering both users' need and key issues in the field of population and health [10].

Prior to start of fieldwork, the survey tools were pre-tested on 4 sites to make sure questions were clear and understandable to the respondents. The questionnaires were modified following the input of the pre-test, then a 2 weeks training was conducted for the interviewers, editors and supervisors, for collecting data related to: family planning; fertility levels and determinants; fertility preferences; infant, child, adult and maternal mortality; maternal and child health; nutrition; women's empowerment and knowledge of HIV/AIDS. It also collected information on unintended pregnancy and only women who were pregnant at the time of data collection were included in the analysis. In fact, retrospectively reported pregnancy intentions for past pregnancies generally become more positive as mothers tend to like the baby once born [18]. Hence the analysis was made only the sub-sample of 1032 women who were pregnant at the time of data collection.

2.2. Study Variables

2.2.1. Outcome Measure

Women were asked if the current pregnancy was wanted or not. If the pregnancy was wanted then, it is considered to be planned. It is considered to be mistimed if it was wanted but at a later time; and unwanted if it was not wanted at the time. Mistimed and unwanted pregnancies were merged as "unintended" to create a binary variable with the planned pregnancies (intended).

2.2.2. Exposure Measures

The potential predictors of unintended pregnancy identified in the dataset were grouped into socio-demographic, reproductive and autonomy related variables.

a) Socio-demographic characteristics of women: age, residence, (Urban/Rural), education, marital status, wealth Index.

b) Reproductive Health: ideal number of children, number of children ever born, number of living children, entry birth order, number of births in the past five years, ever terminated pregnancy, knowledge of ovulation timing, ever use of family planning, partner desire for children.

c) Autonomy is represented by selected direct measures of

women's autonomy [10]: decision-making power on woman's visit to families or relatives, decision-making power on making large household purchases, decision making on women's health care, and women's attitude toward wife beating. The response categories for decision-making variables are "respondent alone", "jointly with partner", and "partner/someone else".

2.3. Data Analysis

Percentage and mean/median were used to describe the socio-demographic and reproductive characteristics of study participants. Bivariate analysis in terms of Chi-square test has been used to assess the effect of each independent variable towards unintended pregnancy. Ideal number of children ever born, number of living children and entry birth order demonstrated correlation. To avoid multicollinearity, only "number of children ever born" was selected to be included in the logistic regression analysis. Independent variables with p-value less than 0.25 in the bivariate analysis were included in the multiple logistic regression analysis to control for possible confounding factors [19]. Multiple logistic regression analysis was used, and Odds Ration with 95% Confidence Interval (95% CI) computed to describe the association of risk factors with unintended pregnancy. Statistical significance was considered at p-value less than 0.05. Stata 14.0 software was used in the analysis of data.

2.4. Ethical Review

Ethical clearance for the survey was provided by the Ivorian National Research and Ethics Committee and Institutional Review Board of ICF International, and the Center for Disease Control [10]. Detailed information on the study area, study population, organization of the survey, sample design, questionnaires, data collection, data quality, data processing and ethical issue is published in the Ivorian Demographic and Health Survey 2011 report [10]. The primary author communicated with MEASURE DHS/ICF International and permission was granted to download and use the data for this project.

3. Results

3.1. Sociodemographic Characteristics of Respondents

Table 1 summarizes the socio-demographic characteristics of study participants. In order to ensure representativeness across the country, data was weighted according to survey sample A total of 1032 currently pregnant women in the 2011 IDHS were included in the analysis. More than 2-third of the respondents were between 20 and 34 years of age with overall mean age of 26.7 (+/-6.59). The majority of women were rural residents and married. About 2-third never had formal education while nearly half of them belonged to the poor wealth index categories.

Table 1. *Sociodemographic characteristics of pregnant study participants, Ivory Coast.*

Sociodemographic characteristics	Frequency	Percentage
Age (years)		
15 – 19	177	17.2
20 – 24	251	24.3
25 – 29	256	24.8
30 – 34	205	19.9
35 – 39	110	10.7
40 – 44	24	2.4
45 – 49	09	0.7
Mean (SD)	26.7 (6.59)	
Type of Place of Residence		
Urban	431	41.7
Rural	601	58.3
Current Marital Status		
Never in union	145	14.1
Married	503	48.8
Living with partner	358	34.7
Widowed	05	0.4
Divorced	05	0.4
No longer living together/separated	16	1.5
Highest Education level		
No education	612	59.3
Primary	257	24.9
Secondary	140	13.5
Higher	23	2.2
Wealth Index		
Poorest	219	21.2
Poorer	243	23.5
Middle	202	19.6
Richer	197	19.1
Richest	171	16.6

3.2. Reproductive Health Characteristics

Nearly three-fourth of the respondents reported that the current pregnancy is wanted at that point while those who wanted it at a later time and not at all accounted for 23.1% and 3.3% respectively. The unintended pregnancy rate ranged from 12.8% in the Northern region to more than 35% in the Central, the East Central regions and in Abidjan, the economic capital of the Country. The number of children ever born ranged from 0 (24.4%) to 5 children and more (16.5%). Slightly more than 40% of the respondents had no birth in the last five years preceding the survey. About one-third of the women reported their desired number of children to be 6 or more. Respondents who knew of modern contraceptives represented 93.4% of respondents while 27.9% recognized that ovulation time is at the middle of the cycle. Ever use of family planning method was reported by 66.9% of the respondents. Nearly one-third of the respondents reported that both partners desire the same number of children whereas one-fifth stated that the partner wants more number of children (Table 2 and Table 3).

Table 2. *The Prevalence of Unintended Pregnancy in the 11 Regions of Ivory Coast, 2011.*

Regions	Unintended (%)	Intended (%)
Centre	29 (35.6)	53 (64.6)
East Centre	26 (37.7)	43 (62.3)
North Centre	25 (24.7)	76 (75.3)
West Centre	18 (18.7)	78 (81.3)
North	10 (12.8)	68 (87.2)
North East	18 (22.8)	61 (77.2)
North West	27 (20.2)	107 (79.8)
West	29 (29.9)	68 (70.1)
South without Abidjan	22 (28.9)	54 (71.1)
South West	26 (24.5)	80 (75.5)
Abidjan	35 (35.7)	63 (64.3)
Total	265 (26.1)	751 (73.9)

Table 3. *Reproductive characteristics of pregnant study participants, Ivory Coast, 2011.*

Characteristics	Frequency	Percentage
Current pregnancy wanted		
Then	754	73.7
Later	236	23.1
Not at all	34	3.3
Number of children ever born		
0	252	24.4
1-2	385	37.3
3-4	225	21.8
5+	170	16.5
Median (IQR)	2 (3)	
Births in the last 5 years		
No births	414	40.1
1	453	43.9
2	156	15.1
3	09	0.8
Median (IQR)	1(1)	
Ideal number of children		
0	06	0.6
1	03	0.3
2	24	2.4
3	79	7.6
4	230	22.3
5	245	23.8
6+	350	34.0
Non numeric answers	94	9.1
Knowledge of any methods		
Knows no methods	65	6.3
Knows only traditional method	03	0.2
Knows modern method	964	93.4
Ever used Family Planning Method		
Yes	690	66.9
No	342	33.1
Knows the timing of ovulation		
Yes	288	27.9
No	744	72.1
Partner's desire for children		
Bothwant the same	228	26.6
Husbandwants more	180	20.9
Husband wants fewer	49	5.7
Don't know	402	46.8
Person who usually decides on respondent's health care		
Respondent alone	60	7.1
Respondent and husband/partner	209	24.4
Husband/partner alone	576	67.2
Someone else	06	0.7
Other	05	0.6
Person who usually decides on large household purchases		
Respondent alone	60	7.0
Respondent and husband/partner	245	28.6
Husband/partner alone	543	63.4

Characteristics	Frequency	Percentage
Someone else	06	0.7
Other	03	0.3
Person who usually decides on visits to family or relatives		
Respondent alone	122	14.2
Respondent and husband/partner	242	28.2
Husband/partner alone	480	55.9
Someone else	09	1.1
Other	05	0.6
Wife beating justifiable		
Yes	533	51.7
No	499	48.3

3.3. Bivariate Analysis of Exposure Measures

Table 4 and 5 describe the bi-variate analysis result between the exposure measures and the outcome measures (unintended pregnancy). Age, current marital status and level of education were among the socio-demographic variables that showed significant association with unintended pregnancy ($p<0.05$). Among the reproductive characteristics, the variables that demonstrated significant relationship with unintended pregnancy included number of children ever born, ideal number of children and ever use of family planning ($p<0.05$). With regards to decision-making power, both decision-making on respondent's visit to family and decision making on respondent's healthcare showed statistically significant association in the bi-variate analysis ($p<0.05$).

Table 4. *Bivariate analysis of socio-demographic and reproductive characteristics versus unintended pregnancy, Ivory Coast, 2011.*

	Unintended Pregnancy		Chi-Square p-value
	Number (Row%)		
	Yes	No	
Characteristics			
Age (Years)			
15-19	61 (34.4)	116 (65.6)	15.9 (0.05)
20-24	74 (29.4)	117 (70.6)	
25-29	65 (25.3)	191 (74.7)	
30-34	36 (17.4)	169 (82.6)	
35-49	34 (24.0)	108 (76.0)	
Type of place of residence			
Urban	116 (26.9)	315 (73.1)	0.24 (0.72)
Rural	157 (25.6)	444 (74.4)	
Current marital status			
Not in Union	96 (56.3)	75 (43.7)	95.1 (<0.0000)
Married	105 (20.8)	398 (79.2)	
Living with partner	69 (19.3)	289 (80.7)	
Highest Educational Level			
No education	121 (19.7)	491 (80.3)	33.0 (<0.0004)
Primary	86 (33.4)	171 (66.6)	
Secondary	63 (38.8)	100 (61.2)	
Wealth index			
Poorest	44 (20.2)	175 (79.8)	9.9 (0.16)
Poorer	67 (27.5)	176 (72.5)	
Middle	61 (30.4)	141 (69.6)	
Richer	44 (22.1)	153 (77.9)	
Richest	54 (31.3)	117 (68.7)	
Number of children ever born			
0	92 (36.6)	160 (63.4)	22.4 (< 0.005)
1-2	83 (21.6)	302 (78.4)	
3-4	46 (20.4)	179 (79.6)	
5+	48 (28.4)	122 (71.6)	
Births in the last 5 years			
No births	109 (26.2)	306 (73.8)	9.8 (0.07)
1	103 (22.7)	350 (77.3)	
2+	59 (35.4)	106 (64.5)	
Ideal number of children			
3 or less	50 (45.5)	44 (54.5)	48.2 (< 0.000)
4	83 (36.0)	147 (64.0)	
5	51 (20.9)	194 (79.1)	
6+	67 (22.6)	284 (77.4)	
Non-numeric answers	17 (18.7)	76 (81.3)	
Knowledge of any methods			
Knows no method	11 (21.6)	58 (78.4)	4.4 (0.27)
Knows modern method	259 (35.4)	704 (64.6)	

	Unintended Pregnancy		Chi-Square p-value
	Number (Row%)		
	Yes	No	
Ever used family planning methods			
Yes	244 (35.4)	446 (64.6)	22.2 (0.002)
No	74 (21.6)	268 (78.4)	
Knows the timing of ovulation			
Yes	83 (29.9)	204 (70.1)	1.7 (0.29)
No	186 (25.8)	558 (74.2)	

Table 5. *Bivariate analysis of partner's fertility desire and decision-making variables versus unintended pregnancy, Ivory Coast, 2011.*

	Unintended Pregnancy		Chi-Square p-value
	Number (Row%)		
	Yes	No	
Characteristics			
Partner's desire for children			
Both want same	40 (17.7)	188 (82.3)	8.2
Husband wants more	42 (23.4)	138 (76.6)	
Husband wants fewer	17 (33.7)	33 (66.3)	(0.2)
Don't know	75 (18.6)	327 (81.4)	
Person who usually decides on the large household purchases			
Respondent alone	8 (19.6)	52 (80.4)	4.8
Respondent and husband/partner	31 (15.3)	178 (84.7)	(0.22)
Husband/partner alone	126 (22.0)	450 (78.0)	
Person who usually decides on respondent's health care			
Respondent alone	12 (26.0)	48 (74.0)	6.2
Respondent and husband/partner	37 (13.8)	208 (86.2)	(0.12)
Husband/partner alone	119 (20.3)	423 (79.7)	
Person who usually decides on visits to family or relatives			
Respondent alone	32 (26.0)	91 (74.0)	8.4
Respondent and husband/partner	33 (13.8)	209 (86.2)	(0.05)
Husband/partner alone	98 (20.3)	383 (79.7)	
Wife beating justifiable			
Yes	138 (25.9)	395 (74.1)	0.01
No	131 (26.3)	367 (73.7)	(0.92)

3.4. Multiple Logistic Regression Analysis of Exposure Measures

Table 6 presents the results of the multiple logistic regression analysis for the socio-demographic and fertility variables with p-value less than 0.25 in the bivariate analysis. Age was not found as a correlate of unintended pregnancy. Women in primary and secondary education categories were more likely to have unintended pregnancy as compared to the no education category (OR (95%CI): 2.0 (1.3-3.1) and 2.1 (1.1-4.0) respectively). High parity (5 children and more), and one delivery as well as two or more deliveries in the past five years were associated with unintended pregnancy (OR (95%CI): 3.5 (1.2-10.2), 2.8 (1.5-5.5), 4.1 (1.9-8.9)) respectively). In addition, Ever use of family planning were also showing an increased risk of unintended pregnancies (OR (95%CI): 2.1 (1.4-3.2)).

Finally, women without any healthcare decision-making power were also more likely to experience some unintended pregnancy as compared to women who were making such decision with their husband (OR (95% CI): 1.9 (1.1-3.1)).

Table 6. *Factors predicting unintended pregnancy among pregnant women (Logistic regression analysis), Ivory Coast, 2011.*

Characteristics	Adjusted Odds ratio (95% CI)	p-value
Age (years)		
15 – 19	Reference	
20 – 24	0.7 (0.3-1.4)	0.3
25 – 29	0.6 (0.3-1.3)	0.2
30 – 34	0.4 (0.2-1.5)	0.08
35 – 49	0.6 (0.2-1.5)	0.3
Highest Education level		
No education	Reference	
Primary	2.0 (1.3-3.1)	0.003
Secondary and above	2.1 (1.1-4.0)	0.04
Number of children ever born		
0	Reference	
1-2	0.6 (0.3-1.6)	0.4
3-4	0.7 (0.2-2.1)	0.5
5+	3.5 (1.2-10.2)	0.03

Characteristics	Adjusted Odds ratio (95% CI)	p-value
Births in the last 5 years		
No births	Reference	
1	2.8 (1.5-5.5)	0.003
2+	4.1 (1.9-8.9)	0.000
Ever used Family planning methods		
No	Reference	
Yes	2.1 (1.4-3.2)	0.000
Partner's desire for more children		
Both want same	Reference	
Husband wants more	1.6 (0.9-2.8)	0.1
Husband wants fewer	1.9 (1.1-3.1)	0.04
Persons who ususally decide on respondent's healthcare		
Respondent and husband/partner	Reference	
Respondent alone	1.8 (0.7-2.3)	0.1
Partner alone	2.1 (0.3-3.1)	0.08

4. Discussion

This study addressed the prevalence, socio-economics and demographic correlates of unintended pregnancy in Ivory Coast. Results showed that 26.4% of the pregnancies were unintended. The analysis was focused on the current pregnancy with the intention of minimizing both recall bias and underestimation of unintended pregnancy if one uses previous pregnancies [18].

The current rate is far more than the report of another national study conducted 10 years ago and which found a rate of 12% of unintended pregnancies among women aged 15-49 years who practiced abortion [17]. Although the study was concerned with abortion experiences, these results may reflect the underlying increase in the phenomenon of unintended pregnancy. In fact, abortion rates in Ivory Coast increased between 2002 and 2007 from 34% to 42%; rates of unintended pregnancies may have similarly increased [17, 20, 21].

The analysis revealed that some regional states have extremely low level of unintended pregnancy that resulted in the lowering of national average. The significant difference in the extent of unintended pregnancy between regions calls for the need of targeted interventions based on the enormity of the problem.

An unintended pregnancy rate of 26.4% at the national level indicates that, despite the progress observed, the nation is still struggling in terms of fulfilling one of the reproductive health rights, namely access to safe, effective, affordable, and acceptable methods of family planning. Contraceptive prevalence is still low, only 13.6% at the national level according to the last DHS survey [15].

It is one way of addressing the reproductive right of individuals and couples to access family planning services and hence minimize unintended pregnancies. If the women had had access to fertility control services, such huge number of unintended pregnancies wouldn't have occurred [2, 4, 22].

Both primary level and secondary and above level of education were shown to be associated with increased level of unintended pregnancy as compared to those women with no formal education. Better education was thought to reduce the chance of having unintended pregnancy which was not the case in the current analysis. Educational background has also been shown to have either insignificant or inconsistent relationship with unintended pregnancy in diverse settings [2, 25, 26].

Despite high level of awareness (93.4%), only 33.1% of women had tried contraception at some point, showing a great gap between awareness and usage. The overall conclusion would be that knowledge does not seem to guarantee the practice of family planning [2, 25, 26]. Therefore, further research is necessary to study the possible factors that could affect this change. Possible factors that need to be investigated include fear of side effects, misinformation on contraception, spousal disapproval, adolescent discrimination in the use of contraception and fear of being wayward for using contraception among others [26, 27].

In addition, women who ever used any family planning were significantly more likely to report unintended pregnancy in conformity with study findings in Ethiopia, Bangladesh and Nigeria [8, 22, 25]. Women who ever used family planning might have utilized it long time ago and hence couldn't predict recent pregnancy outcome. It appears advisable to ask for a detailed information on ever use of family planning in terms of the timing. If the "ever use" is at a recent time, one can also think of contraception failure or discontinuation. The current dataset does not specify about the timing of past family planning use that would have helped to differentiate between recent and older exposure to family planning.

High parity (five or more children ever born) was significantly associated with unintended pregnancy. The expectation was that level of unintended pregnancy would be lower with increasing parity. The result indicating higher odds of unintended pregnancies with increasing parity among women is an observation which would need further investigation despite similar findings from other studies [23, 24].

Women with any history of pregnancies (one or two and more) in the five years preceding the survey were also more likely to have unintended pregnancies. It is an indication that there are women who continued living at risk of pregnancy despite attaining high level of fertility at one point in time. Different factors might have contributed for the failure of such

women in avoiding unintended pregnancy. Such women with higher fertility are more likely to have unmet need for family planning. The factors predisposing the women to the risk of pregnancy might be related to the woman, partner, family, society, and health worker or health program performance [7, 8, 9]. In-depth investigation on such women in advised to assess the root cause of their failure that can help in developing evidence based intervention. Health programs have to devise a mechanism of reaching women with increased level of fertility who desire to space or limit birth.

Partner's desire for children was found to be associated with unintended pregnancy. Different studies revealed that partner's influence had a significant association with unintended pregnancy [3, 9, 11].

The limitation of this study is that relevant variables such as cultural influence, accessibility to health service, communication between spouses, and reasons for the failure to avoid unintended pregnancy were not available in the dataset for analysis. Nevertheless, the strength of the DHS data lies on the representation of diverse population groups, wide geographic coverage, use of standard questionnaire and data processing.

5. Conclusion

A significant proportion of the current pregnancies were found to be unintended. Women already burdened with higher fertility were suffering from unintended pregnancy. Regional differences of unintended pregnancies were noted. Family planning programs need to target women with higher fertility to minimize the risk of unintended pregnancy. Reproductive Health managers are advised to investigate the effectiveness of the existing family planning program in reaching such groups of women. Targeted interventions need to be implemented in the regions with higher level of unintended pregnancy. Further in-depth investigation in recommended to identify the major gaps to be addressed in the prevention of unintended pregnancy.

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References

[1] Santelli J, Rochat R, Hatfield-Timajchy K, Gilbert B, Curtis K, Cabral R: The measurement and meaning of unintended pregnancy. Perspectives on Sexual and Reproductive Health 2003, 32 (2): 94-101.

[2] Singh S, Sedgh G, Hussain R (2010). Unintended pregnancy: worldwide levels, trends, and outcomes. Stud Fam Plann 41: 241-250. Doi: 10.1111/j.17284465.2010.00250.x.Pubmed: 21465725.

[3] Kubicka L, Matejcek Z, David HP, Dytrych Z, Miller WB et al. (1995) Children from unwanted pregnancies in Prague, Czech Republic revisited at age thirty. ActapsychiatrScand 91: 361-369. Doi: 10.1111/j.

[4] Adetundji J: Levels, trends and determinants of unintended childbearing in developing countries. DHS Analytical Report No. 8. Calverton, Maryland: Macro International Inc.; 1998.

[5] Bitto A, Gray RH, Simpson JI, Queenan JT, Kambic RT, Perez A, Mena P, Barbato M, Li C, Jennings V: Adverse outcomes of planned and mistimed pregnancies among users of natural family planning: a prospective study. Am J Public Health 1997, 97 (3): 338-343.

[6] Forrest JD: Epidemiology of unintended pregnancy and contraceptive use. Am J Obstetrics Gynaecology 1994, 170 (5): 1485-1489.

[7] Bongaarts J: Trends in unwanted childbearing in the Developing world. Stud Fam Plan 1997, 28 (4): 267-277.

[8] Kamal M, Islam A (2011). Prevalence and socio-economic correlates of unintended pregnancy among women in rural Bangladesh. Salud Publica Mexico 53: 108-115. Doi: 10.1590/S0036-3642011000200003.

[9] Kaye DK, Mirembe FM, Bantebya G, Johansson A, Ekstrom AM (2006). Domestic violence as risk factor for unwanted pregnancy and induced abortion in Mulago Hospital, Kampala, Uganda. Trop Med Int Health 11 (1): 90-101. Pubmed 16398760.

[10] Rosenfield A: Prevention of maternal mortality Network. International Journal Gynecology Obstetrics 1997, 59:S1-S27.

[11] Tiwari A: The impact of psychological abuse by an intimate partner on mental health of pregnant women. BJOG, Blackwell Publishing 2008, 115: 377-384.

[12] Afable-Munsuz A, Braveman P: Pregnancy intention and preterm birth: differential associations among a diverse population of women. Perspect Sex Reprod Health 2008, 40 (2): 66-73.

[13] Exavery A, Kanté AM, Hingora A, Mbaraku G, Pemba S et al. (2013) How mistimed and unwanted pregnancies affect timing of antenatal care initiation in three districts in Tanzania. BMC Pregnancy Childbirth 13 (1): 35. doi: 10.1186/1471-2393-13-35. PubMed: 23388110.

[14] Marston C, Cleland J (2003): Do unintended pregnancies carried to term lead to adverse outcomes for mother and child? An assessment in five developing countries. Popul Stud (Camb) 57 (1): 77-93. Doi: 10.1080/0032472032000061749. PubMed: 12745811.

[15] National Institute of Statistics (INS) and ICF International 2012. Demographic and Health Survey and Multiple Indicators Clustered Survey in Ivory Coast 2011-2012. Calverton, Maryland, USA: INS and ICF International.

[16] Grimes DA, Benson J, Singh S, Romero M, Ganatra B, et al. (2006) Unsafe abortion: The preventable pandemic. Lancet 368 (9,550): 1,908-1,919.

[17] Benié BVJ, Tiembre I, Attoh H, Kouadio ED, Kouakou L, Coulibaly L, Kouakou A H, Saracino TJ: Epidemiology of induced abortion in Ivory Coast, Santé publique du 02/01/2012, volume 24, Avril-Mai, p. 67-76.

[18] African Population and Health Research Centre: Population and health dynamics in Nairobi informal settlements. Nairobi: African Population and Health Research Centre; 2002.

[19] Bowers D (2008) Medical statistics from scratch: an introduction for health professionals. John Wiley & Sons.

[20] Desgrees DLA, Msellati P, Viho, Ekra WC: Resort to induced abortion in Abidjan: a cause of decreasing fecundity? Population 1999, vol 54 N°3 Pp 427-446.

[21] Guillaume A, Desgrees DLA: Birth limitation among women in Abidjan, Ivory Coast, contraception, abortion or both? Family Planning Persp 2002; 28 (3): 159-66.

[22] Petersen R, Gazmararian JA, Anderson Clak K, Green DC: How contraceptive use patterns differ by pregnancy intention: implications for counseling. Women's Health Issues 2001, 11 (5): 427-435.

[23] Eliason S, Baiden F, Yankey BA, Awusabo-Asare K: Determinants of unintended pregnancies in rural Ghana. BMC Pregnancy and Childbirth 2014, 14: 261.

[24] Omane-Adjepong M, Oduro FT, Annin K: A multinomial regression analysis of unplanned pregnancies in AhafoAno South District, Ghana. Am Int J Contemp Res 2012, 2: 12.

[25] Adewole IF, Oye-Adeniran BA, Iwere N, Oladokun O, Gbadegesin A, Babarinsa AI. Contraceptive usage among abortion seekers in Nigeria. W Afr Med 2002; 21 (2): 112-4.

[26] Onuzurike BK, Usochukwu BSC. Knowledge, attitude and practice of family planning amongst women in high density low income urban of Enugu, Nigeria. Afr J Reprod Health 2001; 5 (2): 83-89.

[27] Aitken ME, Oconto PI, Andes BAA. Knowledge and perception of emergency contraception among female Nigerian undergraduates. Int Fam Plann Persp 2003; 29 (2): 84-87.