Poor Pregnancy Outcomes among Adolescents in South Nyanza Region of Kenya

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ABSTRACT

In this paper, we examine factors associated with poor pregnancy outcomes among teenagers in South Nyanza region of Kenya. The analysis is based on a recent WHO funded study on Adolescent safe motherhood in the region, which involved a survey of 1247 adolescents aged 12-19 and in-depth interviews with 39 of the adolescents who had experienced very early pregnancies or a pregnancy wastage. The indicators of poor pregnancy outcomes analysed include pregnancy wastage and pre-term delivery. A striking finding is the unusually high rate of pre-term deliveries, especially in cases of unintended pregnancies. Analysis of the qualitative data based on in-depth interviews sheds some light on possible explanations for the poor pregnancy outcomes observed among these adolescents. In particular, unsafe abortion attempts and poor maternal health-care emerge as important issues of concern. (*Afr J Reprod Health* 2006; 10[1]:26-38)

RÉSUMÉ

Faibles résultats de grossesse chez les adolescentes dans la région de Nyanza du sud au Kenya. Dans cet article, nous étudions les facteurs liés aux faibles résultats de grossesse chez les adolescentes dans la région de Nyanza du sud au Kenya. L'analyse est basée sur une étude qui a été financiée par l'OMS sur la maternité sans danger par rapport aux adolescentes dans la région. Il s'agissait d'une enquête menée sur 1247 adolescentes âgées de 12–19 ans et des interviews en profondeur auprès de 39 de ces adolescentes qui ont fait l'expérience d'une grossesse précose ou d'un gaspillage de grossesse. Les indicateurs de faibles résultats de grossesse qui ont été analysés comprennent la grossesse gaspillée et l'accouchement avant terme. Nous avons trouvé assez frappant le taux d'accouchement avant-terme qui était exceptionnellement élevé, surtout en ce qui concerne la grossesse dont on ne s'occupe pas. Une analyse des données qualitatives basée sur les interviews en prondondeur jette la lumière sur les explications possibles pour les faibles résultats de grossesse qu'on a constaté chez les adolescentes. En particulier, les tentatives dangereuses vers l'avortement ainsi que le faible soin de santé maternelle figure comme des problèmes de grande importance. (*Rev Afr Santé Reprod* 2006; 10[1]:26-38)

KEY WORDS: *pregnancy outcomes, teenagers, pre-term delivery, pregnancy wastage, Kenya.*

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Introduction

Notwithstanding the unresolved debate on the role of biological immaturity as opposed to social disadvantage in explaining poor birth outcomes among adolescents, studies in various settings of the world have established a positive association between teenage pregnancy and poor pregnancy outcomes such as low birth weight, pre-term births, and pregnancy wastage[1-2]. A pre-term birth is a major complication of teenage pregnancies, especially if the interval between menarche and conception is short[3]. In particular, younger adolescents aged under 16 years have been observed to have the highest proportions of low birth weight, pre-term birth and infant mortality rate due to possible biological immaturity[4-5].

In the developing world, the problem of poor pregnancy outcomes among teenagers is further exacerbated by poor maternal health-care among teenage mothers[6]. This is especially so in cases of unintended premarital pregnancies[2,7]. The problem of unintended premarital pregnancies and associated adverse outcomes is particularly critical in sub-Saharan Africa, where the incidence of adolescent pregnancies is highest compared to other regions of the world, mainly due to lack of effective contraception for adolescents [3].

Like most countries in sub-Saharan Africa, the problem of teenage pregnancies and associated adverse consequences is a critical one in Kenya. The problem is likely to be particularly critical in specific regions of the country which have reported among the worst maternal and child-health outcomes as well as adolescent reproductive health indicators. Existing population-based data in Kenya suggest wide regional disparities in maternal health and adolescent reproductive health indicators in the country. Low maternal mortality ratios of less than 100 deaths per 100,000 live births have been observed in parts of the low mortality areas in central Kenya while ratios higher than 1000 deaths per 100,000 live births have been observed in other regions such as Nyanza, Coast and Western provinces[8]. Nyanza Province has also consistently recorded the highest infant and child mortality levels in the country over last few decades, and recently available HIV/AIDS data also show that the province has the highest prevalence. Indicators of overall maternal health, and adolescent reproductive health do vary considerably even within Nyanza province. Among the 16 districts oversampled in the 1998 KDHS to provide district level estimates, contraceptive prevalence was lowest in South Nyanza (9.5 percent, compared to 40.9 percent for Kisii within the same province). The same district (South Nyanza) also reported the lowest mean age at first intercourse (14.3 years), first marriage (16.0 years), and first birth (16.9 years), compared to national averages of 16.1, 18.4 and 18.8 years respectively[9]. Early initiation of sexual activity, in the absence of contraceptive use, exposes adolescents in such settings to particularly high risk of unplanned teenage pregnancies and related adverse outcomes. Despite this grim picture of adolescent maternal health in the region, comprehensive studies that would inform relevant policy and program interventions in the area are lacking. This paper is part of a recent WHO funded study on adolescent safe motherhood in the South Nyanza region of Kenya and aims to: (i) examine socio-economic and demographic factors associated with adverse pregnancy outcomes among adolescents in South Nyanza; and (ii) explore possible explanations for poor pregnancy outcomes among teenagers in the region.

Data and Methods

This paper uses data from the adolescent safe motherhood survey (ASMS) of 2002. The ASMS had three components: a household-based survey of adolescent females aged 12-19; a qualitative study involving in-depth interviews with adolescents who have ever had a pregnancy wastage or a very early pregnancy (at age 15 years or younger); and a community assessment of avail-

ability and accessibility of reproductive health services. The household-based survey involved interviews with 1247 adolescents aged 12-19 years identified from a sample of 3133 households in 32 clusters or communities. The data analysed in this paper focus on 269 completed pregnancies among 245 adolescents, reported in the pregnancy histories section of the questionnaire. Information on various maternal and pregnancy characteristics was obtained for each index pregnancy.These data are complemented with information from 39 in-depth interviews with a selected sample of these adolescents who had experienced very early pregnancies (at age 15 years or below) or unintended pregnancies that did not result in a live birth.

Pregnancy outcome is classified into three distinct categories: pregnancy wastage (abortions or still births); pre-term live birth and full-term live births. The analysis of factors associated with pregnancy outcomes is based on both bivariate analysis and logistic regression, including a range of maternal and pregnancy characteristics, namely; urban/rural residence; school enrolment status; educational attainment; maternal age; marital status; pregnancy order; desirability of pregnancy; timing and frequency of antenatal care; and place of delivery or pregnancy termination. The logistic regression analyses examine the net effects of the background socio-economic, demographic, and maternal health-care factors, while simultaneously controlling for the effect of other important factors. Two sets of logistic regression analyses are carried out: the first on factors associated with pregnancy wastage among all completed pregnancies for which we have information on pregnancy outcome; and the second on factors associated with pre-term deliveries, among pregnancies that resulted in a live birth.

The qualitative data from in-depth interviews are analysed by conducting a thematic content analysis. The qualitative data processing and analysis involved: coding and classifying responses; identifying key responses for various themes; and summarising data to identify emerging patterns. Some excerpts from the in-depth interviews are presented verbatim to give a clearer picture of the circumstances and consequences of teenage pregnancies in the study population. However, most of the geographical information in the excerpts are anonymised to protect identity of the respondents.

Data Limitations

Some limitations of the data analysed in this paper are worth mentioning and should be kept in mind when interpreting specific findings. First and foremost, the sample size is too small to permit rigorous statistical analysis for a comprehensive understanding of the important associations. In particular, the number of completed pregnancies cannot allow a comprehensive statistical analysis of factors associated with poor pregnancy outcomes. The small sample size for specific sub-groups implies that we do not have sufficient statistical power to detect all of the important relationships.

A second major limitation of the data relates to possible recall errors in retrospective reporting of pregnancy histories. The 12-19–year old adolescents provided pregnancy histories for all pregnancies they had ever experienced. Although most of these pregnancies were in the recent period, within the last three years preceding the survey, it is possible that the recall period could be a long as 5 years for a few pregnancies (e.g. if a 19 year old had her first pregnancy at age 14 years), making it difficult to accurately recall required information.

Finally, the data accuracy depends on the respondents' perceptions which may be biased for some variables. In particular, retrospective reporting of pregnancy desirability is subject to the well-recognised limitations ranging from reluctance of women to classify their offspring as unwanted, to post-facto rationalisation of fertility desires[10-13]. The accuracy of specific infor-

mation on pregnancy outcomes, such as pre-term delivery, is also very much limited by the fact that respondents' may not always have accurate knowledge on gestation period. Information on gestation period was sought in months, rather than weeks, since it was unlikely that respondents would be able to provide that level of detail with meaningful accuracy in the absence of any form of medical or personal records kept by the respondent. The information on gestation period should therefore be interpreted with great caution as it provides only an approximation. Despite these limitations, we expect the respondents' reporting on gestation period and pre-term delivery to be informed by other responsible adults they had discussed the pregnancy with, including the traditional birth attendants who have more experience on issues relating to pregnancy /childbirth. Specific information on pre-term delivery was, however, not derived from information on gestation period but rather based on the respondents' own reporting on whether the delivery was pre-term or full-term, consistent with the way this information had been obtained in an earlier Kenya Demographic and Health Survey (KDHS) (see, for example, [14] for comparative purposes.

Results

Pregnancy experience of survey respondents by background characteristics

Of the total 1,247 adolescents aged 12-19 interviewed, 245 (about 1 in 5) had ever been pregnant. The majority (181) of those who had ever been pregnant had experienced one pregnancy, while the remaining 64 had experienced two or more pregnancies. The distribution of pregnancy experiences by background characteristics is given in *Table 1*.

The data presented in *Table 1* show very strong associations between pregnancy experience and background characteristics of adolescents (except for district) all significant at one percent level based on Chi-square tests. About 30 percent of urban adolescents had experienced at least one pregnancy, compared to 16 percent of their counterparts residing in rural areas. The proportion of urban adolescents with 2 or more pregnancies is more than double that of rural adolescents (9 versus 4 percent).

As would be expected, pregnancy experience steadily increases with age of the adolescents. Only 3 percent of those aged 12-15 had ever been pregnant, while about 60 percent of the 18-19 year olds had ever been pregnant, with 22 percent in this age group reporting at least two pregnancies. Other sub-groups considerably more likely to have ever been pregnant include those living with spouses or not currently enrolled in school. Three-quarters of those living with a spouse, and about 55 percent of those out of school had ever been pregnant. It is important to recognise that these factors are interrelated. For instance, the older adolescents are more likely to be married and out of school. The distribution of pregnancy experience by household socio-economic status suggests that poverty is an important factor in teenage pregnancies.

Overall, the total number of reported pregnancies among the 245 ever pregnant adolescents ranges from 1 to 5, giving a total of 320 pregnancies, including current pregnancies. The analysis of pregnancy outcomes presented in the next section is based on 269 of these pregnancies that had ended by the time of the survey. Of the 245 ever pregnant adolescent, 86 met eligibility criteria for in-depth interviews (i.e. experienced their first completed pregnancy at age 15 years or younger, or had an unintended pregnancy that did not result in a live birth). About half of the eligible adolescents were targeted for in-depth interviews, based on a quota system, and successful interviews completed with 39 of them.

Table 1: **Distribution of survey respondents by background characteristics and pregnancy experience**

Background characteristic	Pregnancy experience			Cases
	Never pregnant	One pregnant	Two or more	
District				
– Homabay	79.5	14.8	5.7	473
– Migori	82.0	13.9	4.1	462
– Rachuonyo	79.2	15.1	5.8	312
Current residence**				
– urban	69.7	21.7	8.7	300
– rural	83.7	12.2	4.0	947
Respondents age**				
– 12-15	97.2	2.7	0.1	675
– 16-17	75.7	21.2	3.1	325
– 18-19	40.5	38.1	21.5	247
Whom respondent lives with**				
– both parents	94.8	5.2	0.0	381
– father only	94.1	5.9	0.0	34
– mother only	96.5	3.2	0.4	283
– spouse	24.9	51.5	23.6	233
– other	88.0	9.5	2.5	316
Socio-economic status**				
– low	76.6	16.0	7.4	376
– medium	77.8	16.7	5.5	472
– high	86.8	10.7	2.5	393
Currently in school **				
– yes	98.4	1.6	0.0	818
– no	45.5	39.3	15.2	422
Educational attainment**				
– none or primary	82.3	12.6	5.1	975
– incomplete	68.3	23.2	8.5	142
– primary complete	79.2	19.2	1.5	
– secondary +				
All	80.4	14.5	5.1	1247

** - significant at 1% level (i.e. Chi-square $p<0.01$

Background characteristics of in-depth interviewees

An examination of the socio-economic and demographic profile of the in-depth interviewees shows that the majority (27 out of 39) were living in rural areas. Almost all had attained only primary level education and were no longer enrolled in school. The majority were aged between 16 and 18 years, and married at the time of the survey. The typical age at first sex was between 12 and 15 years and first pregnancy experience was at age 14 or 15 years for all except four of the interviewees. The first pregnancy for six of the interviewees had ended in abortion or still

birth (i.e. two cases of reported induced abortion, two cases of miscarriage, and two still births). Twelve of the 39 adolescents had been pregnant more than once and all, except four, had at least one living child.

Factors associated with poor pregnancy outcomes

The bivariate associations between background, maternal and pregnancy characteristics with pregnancy outcomes are presented in *Table 2.*

Table 2: **Distribution of pregnancy outcomes by maternal and pregnancy characteristics**

Maternal/ pregnancy characteristics	Pregnancy outcome			Cases
	Wastage	pre-term	Full term	
Residence				
– urban	6.8	41.7	51.5	103
– rural	7.9	49.4	42.1	164
School enrolment				
– in school	6.0	53.0	41.0	83
– out of school	8.2	43.5	48.4	184
Maternal educational attainment				
– none or primary incomplete	8.9	45.5	45.5	191
– primary complete and above	3.9	48.7	47.4	76
Maternal age				
– 12-15	10.8	45.8	43.4	83
– 16-17	6.5	48.0	45.5	123
– 18-19	4.9	44.3	50.8	61
Pregnancy order				
– first pregnancy	9.1	45.5	45.5	55
– second or higher	7.1	46.7	46.2	212
Marital status				
– married	6.1	42.2	51.7	147
– unmarried	9.2	51.7	39.2	120
Desirability of pregnancy**				
– desired	11.1	27.8	61.1	72
– unintended	6.2	53.3	40.5	195
Timing of first antenatal care$				
– first trimester	[9.1]	[38.6]	[52.3]	44
– late (2nd or 3rd trimester) or never	4.2	47.9	47.9	190
Frequency of antenatal visits$				
– less than 4	8.5	45.4	46.2	130
– 4 or more	2.0	46.1	52.0	102
Place of delivery / termination*				
– health facility	7.8	37.1	55.2	116
– home /other	7.3	53.6	39.1	151
All 7.5	46.4	46.1	267	

*- significant at 5 % level (i.e. $p<0.05$), ** - significant at 1% level (i.e. $p<0.01$)

$ - some cases are missing information on timing of antenatal care (33 cases) and frequency of antenatal visits (35 cases).

Note: - outcome of pregnancy missing for 2 cases, hence, total cases=267 rather than 269.

- percentages based on less than 50 cases are enclosed in square brackets and should be interpreted with caution.

Overall, 8 percent of all reported pregnancies ended up in abortion or still birth, while the remaining 92 percent ended in live births, either prematurely or full term. An examination of the bivariate associations between socio-economic factors (urban/rural residence, school enrolment and educational attainment) and pregnancy outcomes (wastage, pre-term birth, full-term live birth) based on all the pregnancy histories shows that adolescents living in rural areas, not enrolled in school or with low educational attainment had a higher proportion experiencing pregnancy wastage compared to their counterparts who were living in urban areas, had higher educational attainment, or enrolled in school at the time of index pregnancy. Those in rural areas also had a higher proportion of pre-term births, compared to their urban counterparts.

With respect to demographic factors, relatively higher incidence of pregnancy wastage

Table 3: **Results of logistic regression analysis of pregnancy wastage and pre-term delivery**

Parameter	Pregnancy wastage		Pre-term delivery	
	Estimate (standard error)	Odds ratio	Estimate (standard error)	Odds ratio
Residence				
– urban	-0.22(0.549)	0.81	-0.22(0.293)	0.80
– rural[R]	–	1.00	–	1.00
School enrolment				
– in school	-0.95(0.653)	0.39	-0.06(0.400)	0.94
– out of school[R]	–	1.00	–	1.00
Educational attainment				
– none/pri incomplete	0.85(0.677)	2.33	-0.24(0.310)	0.79
– primary complete +[R]	–	1.00	–	1.00
Age group				
– 12-15	0.99(0.849)	2.70	-0.13(0.455)	0.88
– 16-17	0.41(0.782)	1.51	0.08(0.383)	1.09
– 18-19[R]	–	1.00	–	1.00
Pregnancy order				
– first pregnancy	-0.83(0.648)	0.44	-0.08(0.392)	0.92
– 2nd or higher[R]	–	1.00	–	1.00
Marital status				
– married	-1.75(0.785)*	0.17	-0.15(0.406)	0.86
– unmarried[R]	–	1.00	–	1.00
Desirability of pregnancy				
– desired then	1.68(0.729)*	5.34	-1.12(0.359)**	0.33
– unintended[R]	–	1.00	–	1.00
Antenatal care				
– inadequate	0.86(1.104)	2.36	-0.05(0.448)	0.95
– adequate(1st trim, 4+visits)[R]	–	1.00	–	1.00
Place of delivery/termination				
– health facility	0.39(0.531)	1.47	-0.74(0.292)*	0.48
– home /other[R]	–	1.00	–	1.00

[R]- Reference category; *- $p<0.05$, **- $p<0.01$

is observed among first pregnancies, pregnancies outside marriage and very young maternal age (15 years or younger). However, it is important to note that the associations between the socio-economic and demographic characteristics with pregnancy outcomes are not statistically significant, possibly due to the relatively small number of pregnancies included in the analysis, and hence, insufficient power to detect some of the important associations.

Particularly striking is the strong association between desirability of a pregnancy and pre-term delivery ($p=0.001$). Unintended pregnancies are highly likely to result in a pre-term birth, compared to desired pregnancies. On the other hand, it is interesting to note that desired pregnancies are more likely to result in pregnancy wastage than unintended pregnancies.

On the association between maternal health-care and birth outcomes, the data show little evidence that poor maternal health-care is associated with pregnancy wastage, except for the significant link between pregnancy wastage and fewer antenatal visits, presumably because some of these pregnancies only lasted a few months. However, the proportion of pre-term births is higher in cases where antenatal care was initiated late in pregnancy or where childbirth took place outside a health facility.

Logistic regression analysis of the factors associated with pregnancy wastage and pre-term delivery is presented in *Table 3*. The model on pregnancy wastage relates to 267 completed pregnancies with known outcomes, while the model on pre-term delivery relates to 247 pregnancies that ended in a live birth.

The results suggest that marital status is a significant factor in pregnancy wastage. Pregnancies outside marriage are significantly more likely to result in an abortion or stillbirth than those within marriage, irrespective of whether the pregnancy is unintended or not. The results suggest that pregnancies outside marriage are almost six times more likely to end up in pregnancy wastage than those within marriage. Even though desirability of pregnancy also shows significance, the association is in the reverse direction, with unintended pregnancies being less likely to result in wastage. This is possibly due to reporting bias. Similar observations had been made in an earlier study based on a different data set which noted that mothers were less likely to report a pregnancy as unintended if the index child was dead [12]. The results also show an elevated risk of pregnancy wastage among younger adolescents (12-15 years old), those with low educational attainment (no formal education or incomplete primary level education), second or higher order pregnancies, and those who received inadequate antenatal care (no visit in first trimester and less than 4 visits throughout pregnancy). However, these associations are not statistically significant, possibly due to the small number of cases, and hence insufficient power to detect important relationships.

The results of the logistic regression confirm the strong link between desirability of a pregnancy and pre-term delivery. Undesired pregnancies are significantly more likely to result in a pre-term birth than desired pregnancies. The strong association persists after controlling for important socio-economic and demographic characteristics, as well as maternal health-care variables. Another factor significantly associated with pre-term deliveries is place of delivery, with pre-term births being more likely to take place at home, compared to full-term births.

Possible explanations for poor pregnancy outcomes

Analysis of the qualitative data from in-depth interviews begins to shed some light on possible explanations for the undesirable pregnancy outcomes, such as the unusually high rates of pre-term deliveries among teenagers in South Nyanza region, especially in cases of unintended pregnancies. Two important themes emerge from the in-depth interviews: poor maternal health-care; and unsafe abortion attempts.

Poor maternal health-care

One of the major problems facing adolescent mothers in South Nyanza region is poor accessibility of maternal health-care services. In addition to the problem of physical accessibility, the appalling poverty situation aggregates the problem, making it impossible for the young mothers to seek appropriate maternal health-care, even in the most critical circumstances when complications, requiring urgent medical interven-tion develop, as illustrated by the excerpts below:

Case 1

"The next health centre was so far, one had to walk for 5 to 6 hours to reach there. I also did not know the particular day when they provided the check ups. The alternative was to hire a bicycle or taxi to take me to the health centre, but I did not have the money... When the child was about to come out it suddenly moved back to the upper part of my stomach and refused to move back to the lower part of the stomach for a while. The TBA added me more medicine to drink and after a short while the baby came out and died immediately."

(R23 - Married at 15 years, pregnancy reported to have lasted 11 months, still birth.)

Case 2

. . . When I was almost to give birth, I was told at the clinic that the baby was sleeping in a wrong position(across the stomach). I was advised to go to XXX District Hospital for delivery but I did not have any money, so I did not go.

Q: For how long did the pregnancy last?

A: 12 months.

Q: Why. Did you have any idea why it was not the usual nine months?

A: Because it was a bleeding stomach. I told you that I used to bleed during the pregnancy. The TBA said that it was normal for a bleeding stomach to last for more than nine months.

Q: So the bleeding was treated?

A: A TBA used to give me herbs to drink but it did not stop.

Q: Where did the delivery take place?

A: Just here at home.

Q: How was the delivery process. How long did the labour pains last?

A: Four days.

Q: Where were you all this period?

A: I was at home with the TBA though I had problems up to the fifth day, the baby had not come out and they were very worried. I was also in great pain and the TBA gave me more medicine to drink but there was nothing happening. While they were making a stretcher to carry me to the roadside to take a vehicle to the hospital, God did to me a miracle. I suddenly delivered the baby *(R09).*

One astonishing feature of the two cases cited above is the unusually long gestation period. Although it is possible that this could have been compounded with reporting errors, since the teenagers may have been unable to determine the precise gestation period, most traditional birth attendants (TBAs) usually have reasonably accurate idea of the gestation period. In the first case, the pregnancy ended in a stillbirth possibly due to foetal distress. Although the second case resulted in a live birth, further interviews suggested that the pregnancy was most probably post-term since it was cited that "the baby looked miserable with wrinkled skin" at birth, a condition that is typical of post-term babies. This is an issue that no doubt warrants further investigation. One important question is: For how long can a complicated pregnancy requiring medical intervention in the form of a Caesarean section or induced labour possibly last in the absence of such medical intervention?

Unsafe induced abortions

A substantial proportion of pregnancies among teenagers are unintended. These have considerable devastating effects on the girls, especially with respect to their educational opportunities and acceptance by the parents and families.

How did you feel when you realised you were pregnant?

R37: "I panicked. I was very afraid of what my parents would do to me. I ran away from school and came here to tell my boyfriend." *(Pregnant at age 16 years, miscarried.)*
R39: "I was shocked and depressed".
R07: "I was very afraid and very unhappy because I feared what my parents would do to me. I was also wondering what I would do about school." *(Got pregnant at age 14 years induced abortion.)*
R10: "I felt bad because I was pregnant and my age mates were going to school". *(Second pregnancy at age 15 years, attempted abortion failed, stillbirth.)*

In a number of cases, the teenagers are desperate to get out of the situation and often consider terminating the pregnancy. The excerpts below highlight typical cases of abortion considered but decided against, unsuccessful and successful attempts, highlighting the commonly used procedures which are often unsafe and self-administered without any professional advice.

Case 1

. . . I had even thought of aborting so that I could go back to school. I was really worried. After second thoughts, I realised that the abortion could be harmful to my health and therefore decided otherwise.

Q: How did you plan to abort?
A: Take medicine.
A: Which one?
A: Some girls had told me earlier that one could take tea leaves.
Q: What kind of tea leaves?
A: Strong very concentrated tea.
Q: How was this prepared?
A: Boil water with tea leaves until it turns red and then drink it.
Q: After taking it what happens?
A: Abortion takes place.
Q: Did you ever tell anybody about this?
A: No. I just thought about it silently
Q: What changed your mind about the abortion?
A: From past experience there were some ladies who had had unsuccessful abortions and got hurt in the process. They were injured to death *(R38).*

Case 2

Q: Had you wanted to abort?
A: Yes, I tried several times but I failed.
Q: What did you do?
A: A girlfriend of mine advised me to buy a half-litre of juice and drink it at once without diluting it.
Q: Is that what you did?
A: Yes. But it did not abort the foetus.
Q: What did you do next?
A: She also advised me to buy a packet of tea leaves and drink. I tried this but failed again. Now my sister told me of another drug for injection.
Q: What is its name?
A: I don't know what it's called.
Q: Where did your sister get it?
A: She works as a subordinate in a certain health clinic. I pleaded with her. She agreed to buy the drug, and then she injected me
Q: How did this drug look like?
A: It is in a small bottle and looks white in colour and she bought it at 65 shillings.
Q: What happened after the injection?
A: The abortion refused to take place.

(R08 - 16-year old, married after conceiving, looks thin/sickly, had child less than 1 year old, currently pregnant with second child.)

Case 3

A: I used to hear people saying that tea leaves helped in abortion, so I decided to try that.
Q: How did you go about it?
A: I just boiled some water one day while making breakfast, and then I put tealeaves on a sieve and passed a little hot water through it. Then I drank the resulting solution.
Q: And then what happened?
A: After drinking the solution, I felt nothing the whole day up to the evening is when there was a reaction. I even went to school normally, which was a Friday.
Q: What happened that evening?
A: My stomach started aching and this just intensified with every passing minute. Eventually even my mother became suspicious, but then it was too late and the foetus came out.
Q: You were still in the house when this happened?
A: Yes.
Q: Then what happened after that?
A: I was bleeding seriously so my mother went and bought me some medicine.

(R07 – first pregnant age 14, had induced abortion, and continued with schooling.)

In most cases the abortion procedures involve unsafe practices such as taking self-prescribed drugs including overdose of malaria drugs, or highly concentrated drinks in the form of strong tea or undiluted squash that greatly endanger the lives of these teenagers and the unborn babies. Unsuccessful abortion attempts are likely to interfere with the normal gestation and health of the newborn. Being aware and sometimes having witnessed the harmful effects of unsafe abortions, some decide to carry pregnancy to term and face the consequences of childbirth, rather than risk unsafe abortion which they knew could be fatal.

Discussions and Conclusions

The overall patterns in the associations between socio-economic and demographic characteristics with pregnancy outcomes observed in the bivariate and multivariate analyses conform to what is expected. The results show higher incidence of poor pregnancy outcomes among rural residents, those with low educational attainment, very young mothers, unmarried teenagers and first order pregnancies. However, these associations are not statistically significant, possibly due to the relatively small number of cases analysed in this paper, and hence, insufficient power to detect statistical significance.

One striking finding in this study is the unusually high incidence of pre-term deliveries, with about half of all live births reportedly pre-term. It is possible that the precise pre-term delivery rate is masked by reporting errors, since the information was based on mother's own report of gestation period which could have been inaccurate. Although other studies in sub-Saharan Africa have observed rather high pre-term delivery rates of up to 20 percent [15-16], the rates suggested in this study are appalling, warranting further investigation. A number of factors may explain an unusually high rate of pre-term deliveries among adolescents in South Nyanza. The study area is predominantly inhabited by the Luo ethnic community, who had been observed in a separate study using the KDHS dataset to have the highest incidence of pre-term deliveries in Kenya[14]. The same study observed that the odds of pre-term deliveries among Luo women was seven times higher compared to the Kikuyu, and about 10 times higher compared to the other ethnic communities in Kenya combined (excluding Luhya, Kisii and Kikuyu). This suggests possible existence of some health-care factors or cultural practices that may be associated with various risk factors of pre-term births among Luo women. The problem may be confounded with environmental and other health related factors

including malaria, poor nutrition/ anaemia, and sexually transmitted infections, including HIV/ AIDS, all known to be critical problems in the study region and important risk factors for pre-term deliveries. These factors, together with the fact that very young maternal age is in itself a risk factor for pre-term delivery [4-5,17], may partly explain the reported high incidence of pre-term deliveries among our study population.

The fact that the incidence of pre-term deliveries is particularly high among unintended pregnancies may be explained by a number of factors. First and foremost, unintended pregnancy has been identified as a risk factor for poor antenatal care which is in turn associated with pre-term deliveries[2,14,18]. However, this relationship persists even after controlling for antenatal care suggesting possible presence of other important factors. The qualitative information from the in-depth interviews reveal that some of the unintended pregnancies are subjected to repeated unsuccessful abortion attempts, which may possibly interfere with the normal gestation period. Nevertheless, it is important to recognise that the high rates of pre-term deliveries among unintended pregnancies may also be confounded with reporting errors, since data on timing of pregnancies may be less accurately reported in cases of unintended, than intended pregnancies. However, the fact that no significant pattern is observed by educational attainment or age may suggest that this is unlikely to be the key explanation.

A related issue that may also be compounded with possible misreporting of the gestation period is the issue of post-term pregnancies. There are strong indications from the qualitative data that complicated pregnancies requiring critical medical intervention for safe delivery are unable to receive such care, with adverse consequences for maternal and newborn health due to postmaturity. Although the incidence of post-term pregnancy is believed to be low (less than 10%) in most populations, it has been identified as a major cause of perinatal mortality [19], and hence warrants further investigation. It is important to better understand the extent of the problem of post-maturity and its possible consequences for maternal and newborn health, especially in such settings as the study population where complicated pregnancies requiring medical interventions in the form of Caesarean section or induced labour are unable to receive such care.

The results from both the quantitative and the qualitative data illustrate urgent need for intervention in specific areas to improve pregnancy outcomes among teenagers in South Nyanza region. Of considerable concern is the problem of unintended pregnancies and associated problem of abortion and preterm deliveries. Another area of concern relates to accessibility of appropriate maternal health-care, especially essential obstetric care and delivery care where both physical and cost barriers need to be addressed. Improving accessibility of reproductive health services for teenagers, including family planning and maternal health-care, will undoubtedly go a long way in enhancing adolescent safe motherhood in the region. However, there is need for more in-depth understanding of the magnitude of the problem of pre-term and post-term deliveries in the region, possibly through medical research. Furthermore, there is need for better understanding of factors, including cultural practices, contributing to the unusually high incidence of pre-term deliveries in the study community, to enable formulation of effective interventions to improve pregnancy outcomes, especially among adolescents in the region.

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