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THE STRATEGY OF RISK APPROACH IN ANTENATAL CARE: EVALUATION OF THE REFERRAL COMPLIANCE

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Abstract—The main goal of antenatal care in developing countries is to identify women whose pregnancy or delivery is likely to raise problems and to refer them at the appropriate time to a hospital facility where the necessary medical equipment and expertise (vacuum extractors, cesarian sections, human skill, etc.) is available. This approach, which is known as the Risk Approach (RA) strategy, is expected to significantly reduce maternal morbidity and mortality. However, the RA will function properly only if the women identified at risk agree to give birth in a hospital on the one hand, and if they can indeed reach this hospital on the other hand. In this article the authors assess to what extent women with a risk of difficult labor (nulliparous or primiparous women under 150 cm, history of previous difficult delivery or stillbirth, women with transverse lie) agreed to give birth in a hospital. This descriptive survey, which covered 5060 pregnancies monitored in the Kasongo District, Maniema, in eastern Zaire, showed that the referral success rate in this socioeconomically very disadvantaged region was only 33%, despite some favorable conditions, such as a strong emphasis on community participation, a complementarity of health centers and hospital, and the absence of financial barriers within the health services system. Of the various hypotheses tested, the geographic accessibility of the hospital and the parturient's perception of the risk status were the two most important factors determining the compliance rate. A stratified analysis shows that the intensity of the parturient's perception has a different impact on compliance whether rural or urban situations are considered. In their conclusions, the authors stress the importance of the problem and the need for additional qualitative studies (open interviews, focus group discussions) to better understand the reasons of this low compliance. The phenomenon observed in Kasongo is definitely not a unique one, and unawareness of this problem is likely to be one of the reasons for the low success of pregnancy monitoring programs when they are assessed in terms of reduction of maternal morbidity and mortality.

Key words—antenatal care, risk approach strategy, referral compliance

INTRODUCTION

The Safe Motherhood Initiative advises to implement the Risk Approach (RA) strategy as an effective means to reduce maternal mortality [1]. In this approach, women with the highest probabilities of suffering from pathological conditions during pregnancy or delivery must be identified by a Risk Factor (RF) and referred to a hospital facility for special monitoring and delivery in a maternity ward. Many publications have been focusing on the RA, the identification of the RFs, the evaluation of their predictive value, etc. [1–4]. Nevertheless, the success of this method depends just as much on its compliance, i.e., to what extent the women it targets will accept *and* carry out the referral advised by the health service.

In this article, which concerns the case of women with a risk of difficult labor, we evaluate the degree of compliance with the referral decision and analyze some of the factors that may influence it.

METHODS

This descriptive survey was carried out in the Kasongo District (population 200,000) located in the Maniema Region in eastern Zaire. The analysis was done in 1988, and relies upon the antenatal clinic (ANC) records of 11 health centers (7 rural and 4 urban centers) out of the 20 existing ones. These centers were chosen because of the quality of their records. Three of these 11 centers also participated in a similar research in 1986, 1987 and 1990. No noticeable changes that might have caused variations in the compliance rate occurred in the Kasongo District between 1986 and 1990. The data pertaining to this period were therefore added to the 1988 data as they were of good quality (<10% noresponse rate). In total, 5478 ANC records were studied. However, for 418 of them information was lacking indeed, the place of delivery was not known. These records were therefore excluded from the analysis. This was deemed acceptable since the proportion of cases with presence of a RF in that particular population (7.9%

i.e. 33/418), was similar to the proportion of cases with a RF in the remaining population (6.4% i.e. 324/5060). This difference is not significant, $P = 0.24$.

ANCs in the Kasongo District are organized and carried out at the health center level. Women are advised to give birth at home if no risk factor is identified, or to deliver in the hospital if one is identified. The development of community participation is considered a priority in this district. The two levels of the health system, i.e. the Health Centers (HCs) and the referral hospital (the only one in the district), function in a way so as to complement each other. The cases referred by the HCs are given priority by the hospital team. Moreover, it is important to point out that the antenatal care attenders pay a onetime fee which covers the cost of the referral consultation and the cost of the admission when the latter is justified. These factors are favorable conditions expected to yield a high referral compliance rate. However, travel costs and other indirect costs (lost of working days . . .) have to be supported by the women and their families.

Two visits are scheduled: one during the first trimester with the purpose to detect pre-existing risk factors; the other at 9 months with the purpose to provide a final assessment before the delivery. If necessary, additional appointments are scheduled. The effectiveness of the various risk factors, especially the five risk factors of difficult labor mentioned above, i.e. nulliparity or primiparity and small stature (under 150 cm), difficult labor antecedents (cesarian section or use of vacuum extractor), stillbirth at previous delivery, and finally transverse lie of the foetus, was identified and evaluated during an epidemiological survey conducted in 1975 [5].

The compliance with the referral decision (i.e. the proportion of at risk women who accepted to go to the hospital and who indeed delivered in the hospital) was determined as follows: for each referral decided upon identification of a given risk factor, a follow-up was done so as to check where the woman had actually given birth (at home, which meant 'rejection' of the referral; or in the hospital, which meant 'acceptance' of the referral) and whether the delivery was difficult or not. A delivery was considered 'difficult' in the following cases: a ruptured uterus, a cesarian section for difficult labor, the use of the vacuum extractor, a stillbirth and a neonatal death (the deaths of children with birth weights under 2500 g were excluded because the probability of a difficult labor to be the cause of death is low in such cases). Given the scarcity of resources, the doctors tended to be very specific in their indications and obstetric surgery of vacuum extraction were performed only when absolutely necessary.

Epi info software (version 5.0, Centers for Disease Control, Atlanta) was used for the statistical analysis. For the two main compliance determinants, a stratified analysis (Mantel–Haenszel χ^2) was done in order to identify a possible interaction.

In the presentation of the results we will limit ourselves to the analysis of the compliance with the referral decision based on these different RFs and to the identification of determinants that may have influenced it.

RESULTS

Of the 5060 pregnancies studied, 324 (6.4%) women were identified at risk for difficult labor (one or more of the RFs present) and were referred to a hospital for delivery. Out of these 324 referred cases, 108 (33.3%) women gave birth in the hospital maternity, whereas it was the case for only 505 (10.7%) women out of the 4736 non-referred cases. This difference, which is statistically significant ($P < 0.001$), illustrates the effectiveness of the referral strategy.

Nevertheless, the overall success rate of referral (percentage of referred women who actually gave birth in the hospital) was poor, only 1 woman out of 3 at risk delivered in the hospital. We broke down the overall rate by difficult labor RF in order to better understand the reasons for this low figure. In Table 1, several explanatory hypotheses for this overall poor result are presented.

Table 2 presents the referral rates (referral rates refer to the proportion of women identified at risk during ANC, to whom it was advised to deliver in the hospital) and the compliance rates (compliance rates refer to the proportion of women at risk and thus referred, who indeed delivered in the hospital) for each RF. Table 3 presents the proportions of difficult deliveries, amongst women identified at risk during their pregnancy. Figure 1 enables us to check the validity of the three first hypotheses.

Our first hypothesis, i.e. "the overall rate may conceal large factor-specific variations", is partly founded according to these results. Compliance rates vary according to the risk factor considered. However, this overall significant variation ($P < 0.05$) is not very wide, ranging from 24.8% and 26.4% for 'primiparity and length under 150 cm' and 'previous

Table 1. Hypotheses to test in order to identify the various factors influencing the referral compliance

1. The overall rate may conceal large factor-specific variations

2. The RFs may be too frequent (i.e. too sensitive and not specific enough)

3. The positive predictive value (i.e. the probability of a difficult labor when the RF is present) is too low

4. The patient's behavior does affect the referral compliance

5. The geographical accessibility is a major constraint

6. Referral compliance will increase if antenatal care regularity increases

7. The quality of staff will increase the referral compliance

Table 2. Referral and compliance rates for each RF

Risk factor	Referral rates N (%)	Compliance rates N (%)
1. Nulliparous under 150 cm	89/815 (10.9%)	33/89 (37.1%)
2. Primiparous under 150 cm	53/592 (9.0%)	14/53 (26.4%)
3. Transverse lie	31/5060 (0.6%)	15/31 (48.4%)
4. Previous difficult delivery	35/4245 (0.8%)	15/35 (42.9%)
5. Previous still-born child	137/4245 (3.2%)	34/137 (24.8%)
Significance level	$P < 0.001$	$P < 0.05$

Table 3. Difficult deliveries amongst women presenting a RF

Risk factor	Difficult delivery (%)	Outcome unknown (%)
Nulliparous under 150 cm	15/81 (18.5%)	8/89 (9.0%)
Primiparous under 150 cm	3/50 (6.0%)	3/53 (5.7%)
Transverse lie	2/30 (6.6%)	1/31 (3.2%)
Previous difficult delivery	3/33 (9.1%)	2/35 (5.7%)
Previous still-born child	14/133 (10.5%)	4/137 (2.9%)
Significance level	$P = 0.17$	
Total number of women	35/303* (11.6%)	21/324 (6.5%)

*Women may present more than one risk factor.

stillborn child' to 42.9% and 48.4% for 'previous difficult delivery' and 'transverse lie', respectively. This hypothesis proves valid and in some situations, it might be interesting to put more emphasis on these RFs that are best accepted.

Our second hypothesis, i.e. "the risk factors may be too frequent, i.e. too sensitive and not specific enough", implying that too many women are referred, thereby decreasing the acceptability of the referral by the women, seems to be confirmed. Indeed, the rarer factors ('transverse lie' and 'previous difficult delivery') implying lower referral rates, yield the highest compliance rates. When the RFs are aggregated according to their frequency, i.e. corresponding referral rates above or below 1%, then the compliance rate is 45.5% (30/66) when the referral rate is less than 1%, and 29.0% (81/279) when it is >1%. This difference is statistically significant ($P < 0.01$).

Our third hypothesis, i.e. "the positive predictive value (i.e. the probability of a difficult delivery when the RF is present) is too low, and these factors are thus poorly accepted by the pregnant women" does not seem to be confirmed. In other words, even if the positive predictive values (PPV) which are a measure of the efficacy of the RF, range from 6.0 to 18.5% (see Table 3), they do not vary significantly from one RF to another ($P = 0.17$). Nor does, as shown in Fig. 1, the PPV seem to be linked to the compliance rates. For instance, the RF 'transverse lie' has a predictive value (6.6%) grossly similar to the one of RF 'previous stillborn child' (10.5%), although the latter has the lowest compliance rate (24.8%). Other biases may nevertheless interfere. For example, only cases of difficult labor requiring technical intervention (vacuum extraction, cesarian) were retained. This explains in part the low PPV. The exact ages of the pregnancies were also difficult to assess. This may be the cause of large errors in the estimation of foetal position at the last contact. Indeed, the health workers may then diagnose an eventual normal
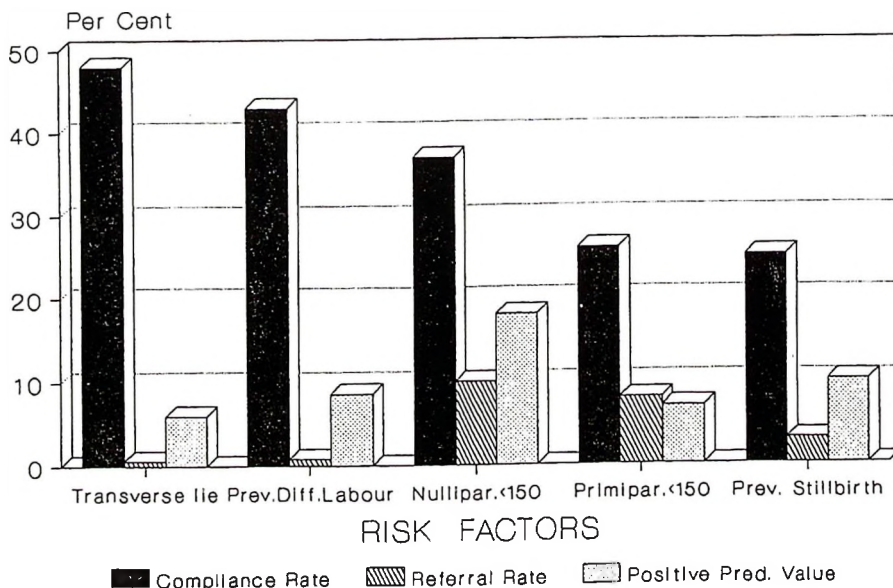

Fig. 1. Decreasing compliance rates with the corresponding referral rate and positive predictive values for each RF.

Table 4. Variations in referral acceptability according to the parturient's risk perception

Intensity of perceived risk	Hospital delivery
Woman feels herself to be in danger	30/66 15.5%)
Woman identified as being at risk	47/142 (33.1%)
Woman has lost a neonate	34/137 (24.8%)
Level of significance	$P < 0.05$

position to be a transverse lie and convince the parturient to give birth in a hospital: "Your delivery will be very difficult and you have to go to the hospital . . .", thereby explaining a higher than average compliance rate but a low predictive value.

Our fourth hypothesis is linked to the patient's behavior. Although we did not specifically analyze the women's individual health behavior, the following comments can be made. A woman who has experienced a difficult delivery before or who is told a few weeks before term that the delivery is very likely to be complicated and that she may die because of a transverse lie, would *a priori* accept the referral more easily than a woman whose previous child was stillborn or a woman who is a small primipara. The compliance rate for the RF 'previous stillbirth' will depend on the cultural perception of this event, which may vary from one population to another. It also depends on the woman's perception of the link between the delivery and the cause of the child's death. It seems that women in Kasongo consider perinatal mortality to be a 'chance mishap' during her reproductive years; a 'mishap' that is not as emotionally loaded as a neonatal death in industrialized

countries. Consequently, Kasongo women will perceive it to be a RF to a lesser extent. The compliance of 'nulliparous or primiparous under 150 cm' as a RF will depend above all on the persuasiveness of the health personnel in charge of the ANCs. If one accepts this hypothesis, the five risk factors of difficult labor may be assigned to three categories, depending on the intensity of the risk as it is perceived by the parturient herself. In the first category, the woman herself feels to be in danger (previous difficult delivery and transverse lie). In the second category, the woman is identified as being at risk by the health personnel (nulliparous or primiparous woman under 150 cm). And in the third category, the woman's previous delivery did not go smoothly, although her own life was never endangered (in fact, her last child was born dead). The results are summarized in Table 4.

The results show that the compliance rate ranges from 24.8% to 45.5%, depending on the patient's perception of the risk. This difference is significant ($P < 0.05$). Nevertheless, it should be pointed out that the two criteria of risk perception 'woman who identifies herself as being at risk' and 'woman who has lost a neonate' may vary greatly depending from the prevailing sociocultural context.

Geographical accessibility is the fifth hypothesis we considered, i.e. "geographical accessibility is a major constraint". When we compare the compliance rates for the urban HCs located in Kasongo township with those of the rural HCs (see Table 5), they are 55.7% (54/97) and 21.1% (45/213), respectively. For 14 women (4.3%), the facility where they attended ANC is unknown.

As could be expected, the difference is highly significant ($P < 0.001$). However, when 'rural' and

Table 5. Referral compliance: urban vs rural HCs

	Referral compliance		
Risk factor	Urban health centers (%)	Rural health centers (%)	Significance level urban/rural
Nulliparous under 150 cm	23/35 (65.7%)	10/54 (18.5%)	$P < 0.001$
Primiparous under 150 cm	10/19 (52.6%)	4/34 (11.8%)	$P < 0.01$
Transverse lie	9/15 (60.0%)	6/16 (37.5%)	NS
Previous difficult delivery	10/21 (47.6%)	5/14 (35.7%)	NS
Previous stillbirth	13/30 (43.3%)	21/107 (19.6%)	$P < 0.01$
Significance level (between risk factors)	NS	NS	
All criteria together:	65/120 (54.2%)	46/225 (20.4%)	$P < 0.001$
Total number of women*:	54/97 (55.7%)	45/213 (21.1%)	$P < 0.001$

*Women may present more than one risk factor: for 14 women, place of ANC is unknown.

'urban' rates are broken down for each of the five RFs for difficult labor, the difference of compliance between the different RFs is no longer significant. On the other hand, it is interesting to note that the compliance rates in the rural population for two of the RFs ('antecedent of a difficult delivery' and 'transverse lie', respectively), are not significantly lower than the same rates in the urban population. On the contrary, there is a significant difference for the three other RFs considered. These findings suggest that the patient's proper perception of the risk is indeed an important determinant. However, accessibility may be a confounding factor for the association between parturient's perception and compliance. A stratified analysis (Mantel–Haenszel χ^2) was done in order to identify a possible interaction. The three categories of Table 4 have been plotted in two groups: the category of 'woman feels herself to be in danger' on the one hand, and the two other categories together on the other hand. For the rural ⬤s the compliance rate is 39.3% (11/28) when the woman herself feels to be endangered, and 18.5% (34/184) for the other cases. The relative risk is: 2.1 (1.2–3.7). For the urban HCs, the compliance rate is 52.8% (19/36) for the first group and 57.9% (44/76) for the second one. The relative risk is 0.9 (0.6–1.3). This stratified analysis shows that the parturient's perception is influencing the compliance in the rural areas but not so in the urban areas. This result is consistent with the fact that hospital utilization is a much more difficult process for patients living in remote rural areas.

Two hypotheses remain still to be tested. The sixth hypothesis states that the regularity of pregnancy monitoring influences the compliance rate, and the seventh that the performance of the staff delivering the antenatal care plays a significant role in the compliance with the referral decision.

⬤s mentioned above, two visits are scheduled for a normal pregnancy. The referrals were divided into two groups: women who attended both visits and those who only attended the first one. As the diagnosis of 'transverse lie' is made only at the end of the pregnancy, the 31 parturients presenting this RF were excluded from this analysis. Among the 297 remaining cases (4 women with transverse lie had also another RF), the compliance rates were 37.0% (67/181) and 22.4% (26/116) for 'regular' and 'irregular' women respectively. This sixth hypothesis proves valid, for the difference is significant ($P < 0.01$). This suggests that a more regular contact with the health service increases the compliance of a decision that has already been made at the first visit. Obviously, a selection bias cannot be ruled out. Indeed, it may very well be that women who are 'regular' attenders of the ANC are also women more concerned with their health status, so that they would anyhow comply to a larger extent with the decision taken by the nurse.

In order to verify the seventh and last hypothesis, we compared the following qualitative criteria for the best and the worst performing rural HCs (no difference was identified in terms of quality of care for the urban centers): quality of the relationship between the staff responsible for the ANC and the population, time spent on the job, quality of preventive and curative care, quality of interaction with the patients, knowledge of the vernacular, cleanliness of the premises, community involvement in educational meetings and finally the HCs management performance. The results show that referral rate is significantly lower for the 'best rural HC: 5.6% instead of 11.2% for the 'poorly' performing center ($P < 0.01$). On the other hand the compliance rate is higher for the best rural HC (21.7% instead of 9.1), but the difference is not significative ($P = 0.11$). The data therefore do not allow us to confirm this last hypothesis.

DISCUSSION

A number of features in the Kasongo district health system are expected to enhance the compliance with the referral decision of patients at risk of difficult labor. These are:

—a strong emphasis on community involvement in the management of the health services,
—a complementarity between the two levels of care within the district health system, fostered by regular supervision, by a functioning referral and counter-referral system,
—an identification and quantification of RFs of difficult labor based on local epidemiological data [5],
—a fee schedule favoring continuity of care: each pregnant woman registered for antenatal care pays a lump sum covering all medical costs of hospital admission and obstetric surgery (cesarian section, etc.) when these are necessary.

Despite these favorable conditions, the compliance rate is poor: 33.3% for all pregnancies (urban and rural communities together) and not more than 66.6% in the best of cases in urban settings. It should be pointed out that the real compliance rate is probably higher. Indeed, as it is difficult for the HC nurse to assess exactly the current age of the pregnancy, some women at risk who would have complied with the decision taken and who would have given birth in the hospital delivered at home a few weeks before the 'expected' delivery rate. As a matter of fact, 15% of all deliveries occurred more than two weeks before the expected due date. If we assume that 15% of the referred women were unable to reach the hospital for that particular reason, the new compliance rate would be 39.3% (108/275).

Among the seven hypotheses that were tested, geographic accessibility (urban vs rural HCs) appears to have the greatest impact on the compliance rates. The intensity of the patient's perception of the risk also seems an important determinant. The compli-

ance rate is higher in case of antecedents of difficult delivery and transverse lie (i.e. when women may fear for their own life), than when other risk factors (i.e. antecedents of stillbirths or women of short stature) not picturing any direct threat to the parturients' lives are present. A regular attendance of antenatal clinics enhances the probability of compliance, as does a low referral rate. Nevertheless, these two hypotheses do not explain the RF related variations in compliance rates.

We have not found any comparable studies of the compliance of RFs identified at ANCs in the literature. A study conducted in Kenya in 1975–1979, however allows for some interesting comparisons [6]. In this study, 4716 pregnant women were asked whether they intended to deliver at the hospital or at the local village maternity, and were asked as well what the determinants of their choice would be. After the delivery, the same women were seen again and asked where they actually delivered and what the outcome of the delivery was. Amongst the 87% (4103/4716) women who did express a choice at the time of the first interview, 54% (2216/4103) wished to deliver in a hospital environment. In fact, only 36% (1477/4103) of them did so.

The findings of this survey allow for a comparison between the 'subjective' degree of compliance (i.e. what the woman planned to do) and the 'objective' degree (i.e. what she actually did). The following results are of interest to the present discussion. The factors significantly related to the desire to deliver in a hospital setting were antecedents of a cesarian section, previous use of vacuum extraction or forceps, previous delivery in a hospital, age under 30 and primigravidity. The factors related to the desire to deliver at home were distance to the hospital, multiparity (> 5 deliveries) and women of short stature (< 150 cm). All these factors relate to the subjective compliance. For each risk factor, the 'objective' compliance is much lower than the 'subjective' one (a decrease rate of 35–50%), with two exceptions: a decrease rate of only 15% for women with antecedents of a cesarian section, and even an increase rate of 20% for women with small stature. For all the factors considered, there is an association between the presence of a RF and the intention to deliver in a hospital ('subjective' compliance). This association is even stronger for the 'objective' compliance, except for the RF 'antecedents of a perinatal death'. The findings of this study corroborate our own findings. Indeed, like in Kasongo, antecedents of perinatal death do not seem to be perceived sufficiently strong to overrule the cost of a referral to the hospital. On the other hand, it is interesting to note that the risk factor 'short stature', which did not appear to motivate women to deliver in the hospital (i.e. the 'subjective' compliance), is in fact a very real RF since many women who initially intended to deliver at home were 'forced' to deliver in the hospital (i.e. the 'objective' compliance).

The overall results of this descriptive study show the importance of assessing compliance with the referral decision, when promoting a risk approach strategy. Some hypotheses were tested to explain the poor compliance results. However, such a broad assessment is too general to identify the real explanations for a lack of compliance at the individual level. A more qualitative approach (open interviews, focus group discussions) are needed [6, 7] and should be the next step in the process analysis of the problems related to compliance with referral decision.

CONCLUSIONS

The main result of this research on the compliance with referral decisions is that it shows that, despite favorable conditions, the overall compliance rate of pregnant women at risk for difficult labor is poor: 33.3%, or only one out of three women complies with the decision taken. Both accessibility and parturient's risk perception influence this compliance. It is also important to underline the fact that the medical staff was unaware of this low compliance rate until this research was carried out. This unawareness is doubtlessly due to the fact that, as the overall referral rate (i.e. the proportion of women attending antenatal clinics identified at risk) is rather low (6.5%), the number of referred pregnancies remains quite small. Such a phenomenon does not become apparent until the data from different HC are pooled.

Maternal health problems in developing countries were recently recognized as a priority by the World Health Organization, the United Nations Fund for Population Activities and UNICEF. Improving the coverage of antenatal care (both qualitatively and quantitatively), as well as appropriate hospital care for high-risk pregnancies (obstetric surgery, etc.) are two of the main activities that, if carried out together, are expected to reduce maternal morbidity and mortality. Unfortunately, such activities will have little impact if the majority of the women in whom risk factors of difficult labor are detected do not deliver in the hospital.

This article was an attempt to highlight the importance of this problem and to identify some of its determinants. The interpretation and discussion of the data were done with a specific context in mind. We suggest that similar research be conducted in other contexts in order to assess the validity of our findings and to identify ways to improve the individual's compliance with referral decision.

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