

# Factors of Access to Care Within 72 hours after Sexual abuse

Guerschom Mugisho<sup>1</sup>, Raha Maroyi<sup>2</sup>

**Abstract.** The figures of the Panzi Hospital indicate that less than 17% of survivors arrived at the hospital within 72 hours after rape; and yet, survivors who arrive at the hospital before 72 hours receive a special medical support to prevent Sexually Transmitted Diseases, pregnancy, HIV transmission and tetanus. The objective of this study is to determine the factors causing most survivors come to care after 72 hours of the rape. This work is an explanatory study conducted at the Panzi Hospital, carried out on 543 survivors of sexual violence, in 2014.

A logistic regression model was helpful to us in determining the factors explaining overall access to care before 72 hours of rape. The confusion matrix and the ROC curve allowed us to appreciate the quality of the model. The odds ratios were derived from the final model coefficients and tested by chi-square Wald. For all the tests, a p-value less than the threshold of 5% was considered significant. The results of the logistic model showed that access to care before 72 hours was significantly influenced by the distance between the residence of the survivor and the Hospital, the presence of a link between the survivor and her aggressor, the trauma level of the survivor.

**Keywords:** Access to care, before 72 hours, Logistic regression, Panzi Hospital, Survivor of Sexual Violence.

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## 1 INTRODUCTION

Since the engagement of political and armed conflicts in the East of the DRC in 1996, the issue of sexual violence in the countries of sub-Saharan Africa continues to arouse the interest of researchers, policy, humanitarian aid and development. In this context of recurring wars and violations of human rights, the extent of sexual is a major concern, thus attracting the attention of the national and international community on the harmful consequences of the phenomenon (in the health, psychosocial, economic, and cultural plans) on the one hand and the means to address them on the other.

Sexual violence is a problem that has marked the history of human society over the centuries [2]. However, it became increasingly clear that the problem is much more common in situations of conflict and political instability.

Indeed, most of the wars, anywhere in the world, have been characterized by an increase in sexual assaults of women and young girls.

Yet despite the progression of international norms, sexual violence in intrastate conflicts continues. In many modern conflicts, sexual violence has become ever prevalent and destructive. Mass rape campaigns have been documented in Sierra Leone, Rwanda, Liberia, the Balkans, Uganda, Sudan, and DRC [5].

Sexual violence in the DRC has reached disturbing proportions to be one of the most serious problems that women and girls face today in the country.

Meanwhile, the high numbers of incidents of sexual violence that is recorded in the DRC is one of the major obstacles to the social and economic reconstruction of the country. Panzi Hospital has been providing medical and psychosocial supports to the survivors of sexual violence for more than a decade. A special care is assured to survivors who arrive at the hospital before 72 hours: in order to prevent Sexually Transmitted Diseases, pregnancy-HIV-and tetanus [8] However, it is important to point out that the percentage of patients who arrive before 72 hours and even 120 hours at Panzi Hospital in particular and in all healthcare facilities in general is very small. For example, from 2008 to 2013, respectively 4%, 5%, 4%, 8%, 12% and 17% of admitted survivors arrived before 72 hours; correlatively, 24%, 28%, 45%, 18%, 16% and 19 arrived between 6 and 12 months of rape. Most of the

survivors are received a year after rape as explained in the following statistics from 2008 to 2011(51%, 29%, 40%, 34%, 27% et 31%)<sup>3</sup>.

This study will focus on the main issue, namely the determinants of the delay of access to care.

As assumptions, we assume that the following factors would explain the delay of access to care for survivors of sexual violence:

### 1) **The distance between the residence of the survivor and the health structure in this case Panzi Hospital**

The fact that the victim of rape is far from the health facility can cause the delay of access to care. Thus, a survivor wanting to access care in 3 days following rape and living around the hospital maximizes her opportunity to access care unlike a survivor who lives 200 kilometers away, due to the long time she spends on her way to the health facility.

**Hypothesis 1:** Living far from the health facility, in this case Panzi Hospital, reduces the chance to access health care before 72 hours.

### 2) **The relationship between the therapist and the survivor**

In case there is a certain relationship between the survivor and her oppressor, they can agree on not reporting the rape. This is the case of a girl raped by her boyfriend and who only reported this after there was no menstruation the next month.

**Hypothesis 2:** The relationship between the rapist and the survivor is likely to reduce the chance to access care before 72 hours or 120 hours.

### 3) **Knowing an organization providing the reference of the survivors to appropriate health structures**

: Knowing at least an organization providing reference of the survivors may cause the survivor to access care before 72 hours. Indeed, some NGOs and organizations have to their breasts of transportation formerly Rapids (vehicles are able to send survivors to health facilities as soon as possible :

**Hypothesis 3:** Knowing an organization providing appropriate health structures for the reference of the survivors or patients is likely to increase the opportunity to access care before 72 hours.

### 4) **The number of aggressors**

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<sup>3</sup>The Statistics department of the Panzi Hospital

The number of attackers would exert an influence on the probability of access to care for 72 hours. Thus, a survivor raped by several people is like seek care faster to avoid sexually transmitted diseases and pregnancy pI. As mentioned earlier , we make assume that:

**Hypothesis 4** : the number of aggressors would increase the chance of access to care before 72 hours.

**5) The age of the survivor**

The age of the survivor can also influence access to care before 72 hours. Thus, a survivor undergoing sexual violence during the period of menopause and knowing that she can no longer procreate will not ask preventive care from pregnancy, neither to pass the pregnancy test. This argument is supported by the Panzi Hospital statistics which show that 76% of the survivors arriving at the hospital within 3 days of rape are minors<sup>4</sup>.

**Hypothesis 5** : The advanced age of the survivor would decrease the chance of accessing to care before 72 hours.

**6) The trauma level of the survivor**

The high degree of trauma of can influence a survivor to seek care as soon as possible in order to be detraumatized. However, it is also true that, as a result of the disappointment after rape, a survivor of sexual violence heavily traumatized can refrain from accessing care,because of despair. The sense of influence of the trauma levelon the probability of access to care or the number of days between the date of the incident and the date of access to care is not predictable. This leads us to formulate the following hypothesis:

**Hypothesis 6** : The high degree of trauma of the survivor would influence, positively or negatively, the probability of access to care before 72 hours.

**7) Having been injured or tortured**

Having been injured or tortured or the fact that the survivor is in a bad state of health as a result of rape can lead her to go directly to the hospital to get treatment.

**Hypothesis 7** : Having injuries increase for the survivor the opportunity to access care before 72 hours.

The general objective of this research is to determine the factors causing that most survivors arrive to care after 72 hours of rape in order to increase the number of survivors admitted before 72 hours.From this general objective follow these specific objectives:-Make known to stakeholders who

deserve a high awareness, but also the themes of awareness –Make known the places where the organizations will install their field of action to facilitate the reference of the survivors to health facilities .

**2 PLACE OF STUDY AND METHODS**

**2.1 THE SUPPORT OF THE SURVIVORS OF SEXUAL VIOLENCE AT PANZI HOSPITAL**

**2.1.1 Presentation of the SSV Program**

The SSV Program of the Panzi Hospital is a program of medical and psychosocial assistance to Survivors of Sexual Violence (SSV).

**2.1.2 Objectives of the Program**

The overall objective of the project is to improve the quality of care provided to survivors of sexual violence and to some patients with specific gynecological conditions namely fistula and the prolapse.

The project aims to achieve the following results:-provide medical and psychosocial supports of higher quality to the survivors of sexual violence and patients with specific gynecological conditions - Offers socio-economic Assistance, business training, the home follow-up for all patients admitted within the project –Promote the reference of the sexual violence survivors through community awareness, training and meetings with local partners - Promote the quality of the data collection regarding sexual violence .

**2.1.3 Evolution of the Number of Patients Treated by the SSV Program (from 2004 to 2013)**

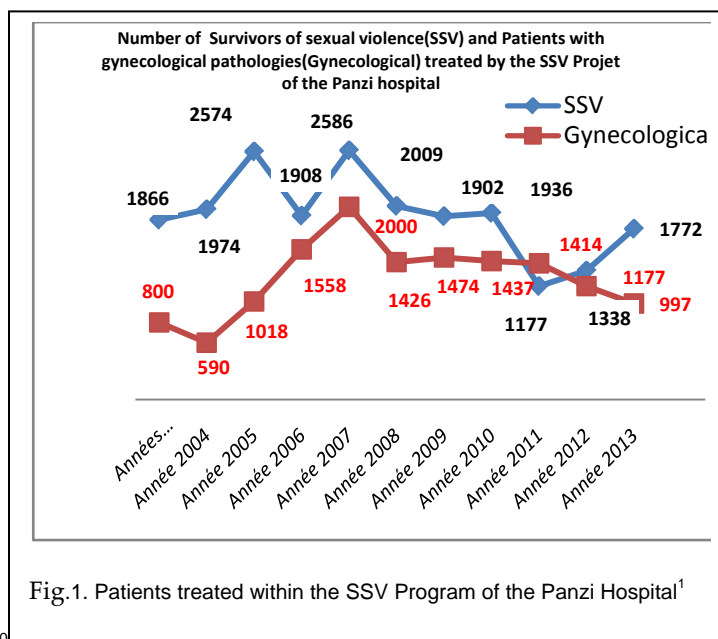


Fig.1. Patients treated within the SSV Program of the Panzi Hospital<sup>1</sup>

<sup>4</sup> The Statistics department of the Panzi Hospital

2007 followed by 2005 are years during which a large number of survivors of sexual violence were admitted.

## 2.2 METHODOLOGICAL APPROACH

### 2.2.1 Techniques of Data Collection

Individual interviews were conducted with various stakeholders in the field of support for survivors of sexual violence: it is the various GBV (Gender Based Violence) program managers, the data and mapping managers of UNFPA. During these interviews, we identified the different variables which may theoretically explain the delay of access to care, and we have taken them into account in this study.

### 2.2.2 Sampling

The study has been conducted at Panzi Hospital. Therefore, the target population consists of survivors of sexual violence admitted within the SSV program in 2015.

The sample size was calculated using the following formula:

$$n_0 = \frac{z_{\alpha}^2 pq}{d^2} [6], \text{ where}$$

$n$  : initial sample size

$z = 1.96$ : value of the centered normal distribution corresponding to a confidence level of 95%;

$p$  = proportion of individuals have studied character, namely the survivors having been admitted in less than 72 hours.

Calculated over a period of 7 months, the proportion of survivors admitted in less than 3 days is 9,8%<sup>5</sup>

$d$  = margin of error, here 5%.

All these elements led us to a minimum sample size of 543 survivors of sexual violence.

The survey database consists of all survivors of sexual abuse admitted within the program in 2015. The sample was selected systematically. The selected codes on the one hand included 180 survivors admitted before 72 hours and 17 survivors admitted between 72 and 120 hours, and on the other hand, 346 survivors admitted after 120 hours.

### 2.2.3 The Variables Under Study

**The dependent variable:** Access to care before or after 72 hours

This variable is dichotomous whose terms are 1 and 0, respectively when the survivor was admitted before and after 72 hours.

#### The explanatory variables

##### *The distance between the residence of the survivor and Panzi Hospital*

Due to lack of estimation technique of distance between the place of residence of the survivor and the Panzi Hospital, we have transformed the variable in 7 terms that are : less than 10 km (1), 11 to 25 km (2), 26 to 50 km (3), 51 to 100 km (4), 101 to 200 km (5) 201 to 500 km (6), over 500 (7 km).

This variable is, in principle, expected to negatively influence the probability of access to care for 72 hours, or to influence positively the number of days between rape and access to care.

##### *Presence of a relationship between the rapist and the survivor*

The variable is binary: it takes the value 1 when there is a relationship between the rapist and the survivor and 0 when there is no relationship between the survivor and perpetrator.

The expected effect of this variable on the probability of access to care before 3 days is negative (and correspondingly positive on the number of days between the dates of incident and access to care, in which case we would consider the number of days between the incident and admission as the dependent variable).

##### *knowing an organization providing the reference of the survivors to the appropriate sanitary structures:*

The variable is dichotomous: it takes the value 1 when the survivor (or her family) knows an organization providing the reference of the survivors to appropriate health facilities and mode 0 otherwise.

The theoretical impact of this variable on the probability of access to care for days is positive.

##### *The age of the survivor*

The variable is quantitative. In theory, the age is supposed to negatively influence the probability of access to care

<sup>5</sup> The statistics department of the Panzi hospital

before 72 hours or positively the number of days between the dates of incident and access to care.

**Having injuries or having been tortured**

The variable is also dichotomous, it takes the value 1 when the survivor suffered torture and 0 for other reasons. The contribution of this variable on the chance to access care within 3 days is in principle positive, and negative on the number of days between the date of incident and the date of admission to care.

**The number of perpetrators**

Theoretically, the number of aggressors would positively influence the probability of access to care within 72 hours.

**The level of trauma of the survivor**

The high degree of trauma of the survivor can influence her to go as soon as possible to care in order to be traumatized. The sense of influence of the level of trauma on the probability of access to care is not predictable. The variable is measured on an ordinal scale: without trauma (0), light trauma (1), medium trauma (2), (3) deep trauma.

**2.2.4 Statistics Methods**

The dependent variable is binary. It takes 2 values: 1 if the survivor has arrived at the hospital before 72 hours and 0 if the survivor was admitted after 72 hours of rape.

The dependence between each of the independent variables and the dependent variable was tested with the khi-2 test.

In order to estimate the probability of access to healthcare before 72 hours conditionally to the independent variables, we used a logistic regression model.

To measure the validity and relevance of our regression results, some tests have been used including the hypothesis on the parameters (Wald test), the test of prediction of the model which are the ROC curve and the prediction table. In order to interpret the marginal influence of each explanatory variable on the probability of access to care before 72 hours, we used the odds-ratios.

**2.2.5 Materials**

The database of the project SVS has been our main source of information. The data have been cleaned in Excel and analyzed with the SPSS 20 software.

**3. THE MAIN RESULTS OF THE STUDY.**

**3.1 Descriptive Analysis of the Variables**

TABLE 1. Descriptive Analysis

Variables	Terms or statistics	Before or after 72 hours			P-value
		After	Before	Total	
Link between author and survivor	No	321	185	506	0.037
	Yes	25	12	37	
The fact of having been tortured	No	337	190	527	0.205
	Yes	9	7	16	
Knowing an organization of support	No	65	75	140	0.000
	Yes	281	122	403	
Degree of trauma	Without	36	95	131	0.0205
	Light	203	68	271	
	Medium	100	31	131	
	Profound	7	3	10	
Distance	1	54	83	137	0.000
	2	14	7	21	
	3	87	94	181	
	4	44	4	48	
	5	121	9	130	
	6	24	0	24	
	7	2	0	2	
Number of main perpetrators	1	129	138	265	0,103
	2	106	35	141	
	3	71	16	87	
	> 3	40	10	50	
Age	Mean	35	28	33	0.032
	SD	15	18	17	
	Min.	5	2	2	
	Max.	79	69		

Source: our analyses

Within our sample (543 SSV), 64% arrived at the hospital after 72 hours and 136% were admitted before 72 hours of rape.

93% of survivors (506) have no relationship with their attackers. Among them, 63% (321) arrived after 72 hours of rape and 30% (or 185 survivors) before 72 hours. 7% (37) have relationships with their aggressors; among these 4.6% (25 survivors) and 2.4% (12 survivors) arrived respectively before and after 72 hours. Note the presence of a significant link between this variable and the fact of accessing care before 72 hours.

Only 3% of the survivors had injuries; 1.6% arrived before 72 hours and 1.4% after 72 hours. This variable is not significantly related to the dependent variable.

140 survivors in the sample did not know the organizations that provide support or reference to survivors of sexual violence; among them respectively 53,6% and 46,4% arrived



before and after 72 hours. 403 survivors (including 281 and 122 before and after 72 hours) are familiar with the referral organizations.

About the level of trauma, 131 survivors including 100 admitted after 72 hours have a medium trauma ; 131 including 95 admitted before 72 hours have no trauma; 10 including 3 received before 72 hours have a deep trauma.

184 survivors (93%) among the 197 admitted before 72 hours live within 50 km of the Panzi Hospital.

The distribution of survivors according to the number of perpetrators is as follows: 1 aggressor (49%), 2 aggressors (26%), 3 aggressors (16%), more than 3 aggressors (9%).

For survivors admitted before 72 hours, the average age is 28 years old; for those admitted after 3 days, it is 35 years. There is a significant difference between the average ages in both groups (those admitted before and those admitted after 72 hours). The eldest survivor (2 years old) was admitted before 72 hours, the eldest (79 years old) was admitted after 72 hours.

### 3.2 Model Validation Tools

The p-value of the Hosmer-Lemeshow test (0.79) above the level of significance of 0.05 leads us to not reject the null hypothesis of global significance of the model. The model is good.

#### 3.2.1 Power of prediction of the model: confusion matrix and ROC curve

TABLE 2 Prediction Table

Observed		Expected			% correct
		Before or after 72 hours			
		After	Before	Total	
Before or after 72 hours	After	315	31	346	91
	Before	48	149	197	75.6
	<b>Total</b>	<b>363</b>	<b>180</b>	<b>543</b>	
<b>Overall percentage</b>					<b>85.5</b>

On the threshold of 5%, the model class 85.5% cases correctly. So, the model has a better predictive power. The error rate (of bad ranking) model is 14.5%<sup>6</sup>. The sensitivity, noted  $S_e$  is 75,6%<sup>7</sup> represents the percentage of well classified among survivors admitted before 72 hours. The Precision, here 82, 7%<sup>8</sup>, the percentage of well classified among the survivors listed by the model as having arrived before 72 hours. The numbers of classified survivors as

<sup>6</sup>(48 + 31) / 543

<sup>7</sup>149/197

<sup>8</sup>149/180

having arrived before 72 hours and that have actually happened after 72 hours is 31. The rate of false positives is 9%<sup>9</sup>, the percentage of misclassified among the survivors admitted after 72 hours. The specificity or true-positive rate is 91%<sup>10</sup>, the percentage of well classified among survivors admitted after 72 hours.

### The ROC curve and the test AUC

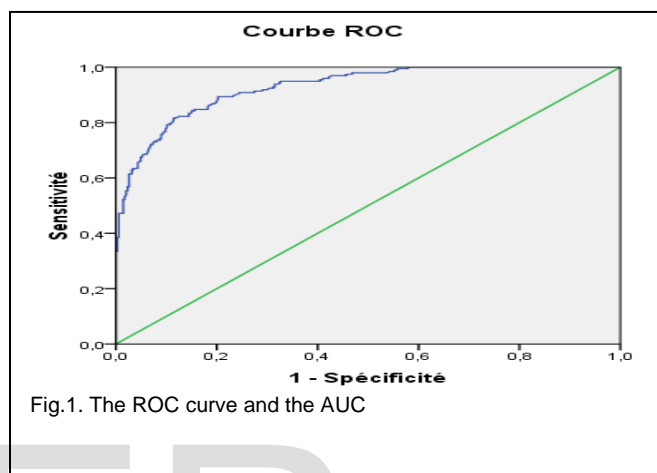


Fig.1. The ROC curve and the AUC

The AUC (area under the ROC curve) is 0,928. This result is quite encouraging. You could easily guess besides observing figure 1. The curve deviates significantly from the first bisecting line. It seems to indicate — with the reserves still setting as long as we evaluate our model on the training data — that our model is "exceptional"[10].

### 3.3 Factors of Access to Care Before 72 Hours after Sexual Abuse

TABLE 3 Coefficients of the model

Variables	Odds Ratio	Coeff. Statistic	Z	P value
AGE	0,9867	-0,0134	-18,712	0,0613
ORGANIZATION	14,643	0,3814	12,944	0,1955
TRAUMA	0,3606	-1,02	-65,272	<b>0.0000</b>
DISTANCE	0,4907	-0,712	-73,085	<b>0.0000</b>
LINK (Yes/No)	0,2495	-13,884	-31,816	<b>0.0015</b>
AUTHOR	0,5047	-0,5553	-13,555	0,1085
TORTURE (Yes/No)	28,448	10,455	1,775	0,0759
CONSTANT	*	31,844	85,952	0.0000

Source: Our analyses

Considering a 5% significance level, three variables have a significant effect on access to healthcare for 72 hours.

<sup>9</sup>31/346

<sup>10</sup>315/346

The distance home-Panzi Hospital, the presence of a link between the survivor and the perpetrator, the level of trauma of the survivor. The effect of the variables Age and Torture is not significant at the 5% threshold. However, it is significant on the threshold of 10%.

### **Interpretation<sup>11</sup> of the effect of the influential factors<sup>12</sup> on the chance of Access to care within 72 hours**

The Trauma level has a negative effect on the opportunity to access care before 72 hours. This means, when the level of trauma increases, the chance to access care before 72 hours decreases. This result is explained by the fact that as a result of the disappointment after rape, a survivor of sexual violence heavily traumatized can refrain from accessing care, because of despair. Thus, when the trauma level increases, the probability of access to care before 72 hours decreases of 63,9%<sup>13</sup>, all things being equal[2].

The distance between the place of residence of the survivor and the Panzi Hospital has a significant negative effect on the probability of access to care for 72 hours. Thus, when the home-Panzi Hospital distance increases by one, i.e. move from one interval to another<sup>14</sup>, the opportunity to access care decreases of 51%<sup>15</sup>, all things being equal.

The presence of a link between the aggressor and the survivor, we assumed it and now it is verified, has a considerable influence on the chance to access care before 72 hours. Thus, a survivor with ties to its author of rape is 75%<sup>16</sup> less likely to access health care for 72 hours than a survivor not related, in a way or another, to her aggressor.

## **4 LIMITATIONS OF THE RESEARCH AND NEW AVENUES OF RESEARCH**

Several factors can influence the fact to access care before 72 hours for preventive and curative care. Some of these factors have unfortunately not taken into account due to

lack of data. This is the case of variables such as the level of education of the survivor, the customs and habits the lack of confidence in the nursing staff, the isolation of certain areas, the state of the road... To integrate all these variables, a survey questionnaire was to be submitted to survivors, which would require not only an additional budget but also a lot of time.

To consolidate these results, further research may be conducted using a different methodology or including some of the variables not taken into account in this paper. For example, someone would use the multiple linear regression model by specifying the number of days between the incident and the access to care as the dependent variable; we actually already proposed the way in which the related assumptions could be formulated.

## **6 CONCLUSION AND SUGGESTIONS**

The objective of this paper was to provide reliable and empirically verified information causing that most survivors of sexual violence arrive to health facilities after 72 hours of rape; this delay does not allow that preventive care for the survivors. When those factors are known, stakeholders in the fight against sexual violence especially Panzi Hospital, will better orient e their actions to act on some of the factors causing the delay to have access to care and therefore prevent some adverse consequences of rape. The problem which guided our research was the smallness of the number of survivors of sexual violence admitted at Panzi Hospital before 72 hours, which is, according to statistics of the SSV Project, less than 17 % of admitted survivors. The following factors were supposed to influence the chance of accessing care before 72 hours: the distance between the survivor's home and Panzi Hospital, the age of the survivor, the trauma level of the survivor, the presence of a relationship between the survivor and her perpetrator, knowing an organization providing the reference of the survivors to the structures of support, the fact of having been tortured, the number of aggressors.

A logistic regression model helped us to test the influence of each of these explanatory variables on the probability of access to care for 72 hours. The estimated model allowed to classify 85% of cases correctly on the cutoff 0.5 assignment; and has an exceptional discriminative power (an AUC greater than 0.9).

<sup>11</sup>For more information on the interpretation of the odds-ratios, to check the course of Jean-François Bickel (2008)

<sup>12</sup>Only the variables with significant influence on the at 5% on the probability of access to care before 72 hours will be taken into account

<sup>13</sup> $(0, 3606-1) * 100 = -63,9 \%$ ,

<sup>14</sup>Remember that the DISTANCE variable was measured with an ordinal scale (less than 10 km, 11 to 25 km, 26 to 50 km, km 51-100, 101 to 200 km, 201 to 300 km, 301 to 500 km, more than 500 km)

<sup>15</sup> $(0, 4907-1) * 100 = 51\%$ ,

<sup>16</sup> $(0,2495-1) * 100 = -75\%$

The empirical results showed that the variables Distance between the residence of the survivor and Panzi Hospital, Link between the survivor and the aggressor, Trauma of the survivor have a significant effect on the chance of access to care before 72 hours.

In the light of these results, we make the following suggestions: To Panzi Hospital and stakeholders in decision-making support survivors of sexual violence :

The results of this study show that among the factors causing the no access to care before 72 hours, there are factors depending on the survivor and factors not dependent on her. Increasing awareness on sexual violence sessions is useful. The out-of-court settlement between the survivor and her aggressor should not overshadow the victim to get treatment as soon as possible. As noted, the relationship between the aggressor and the survivor has major effect on the opportunity to access care before 72 hours – To the Congolese State : Maintenance of road infrastructure is essential for the effective transport of patients in general and of survivors of sexual violence, in particular to appropriate. Healthcare facilities .

## ACKNOWLEDGMENT

We thank all the staff of the Panzi Hospital for their activity of taking care of survivors of sexual violence. Special thanks are due to Dr. Denis Mukwege, Professor Gunilla Berglund of Stockholm University and Professor Shaven Siobhan of the Michigan University for their guidance. We will be thankful not to thank the International Center for Advanced Research and Training (ICART) for its many trainings that we have benefited.

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