Quantitative Analysis of a Retrospective Review of Fistula Cases in Nigeria: Study Report

Assessment of Communication Needs For Obstetric Fistula Programming In Nigeria

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Introduction

The Fistula Care *Plus* (FC+) project conducted an Assessment of Communication Needs for Obstetric Fistula Programming in Nigeria study in early 2016. The study involved in-depth interviews and focus group discussions with a variety of key informants at federal, state, local government authority (LGA), and community levels in each of the focus states. Additionally, the study reviewed existing patient records from FC+ supported fistula treatment sites. Results from this retrospective record review are reviewed in this report; the qualitative findings are summarized in a separate report. Findings from these studies will inform and guide future communications efforts in Nigeria related to fistula prevention, treatment and social reintegration services.

Objective

The overall goal of the assessment study was to identify key information gaps related to maternal health and childbirth injury prevention and treatment that need to be addressed through fistula prevention and treatment communications strategies; and the best communications channels to reach women of reproductive age and their partners, other influential household decision-makers, and women living with childbirth injuries. The objective of the retrospective record review and quantitative analysis of fistula patient data was to identify geographic areas where past treated cases originated and better understand the characteristics of past fistula clients, including the distances traveled by patients to seek fistula services. The findings from the record review analysis will guide future communications efforts related to fistula services by shedding light on the reach of past communications activities as well as by identifying unreached geographic areas that should be prioritized.

Methods

Records of fistula cases were reviewed at five treatment facilities in five different states. The facilities include Farida General Hospital Gusau in Zamfara, National Obstetric Fistula Centre Ningi in Bauchi, National Obstetric Fistula Centre, Abakaliki in Ebonyi, Ogoja General Hospital in Cross River, and Sobi Specialist Hospital Ilorin in Kwara. Patient chart review documented client age, age at first marriage, leakage duration (in days, months or years), and provenance (ward/community, LGA, and state); client names were not recorded. Distance traveled by patients was estimated based on the kilometers between client ward/community and the facility where patient was treated.

Fistula records were selected from facility registers through systematic sampling. At each facility, reviewers divided the total number of cases over the period of 2014-2015 by a desired sample of 100 to obtain a k^{th} number; each k^{th} case record was selected for inclusion in the review. However, due to limited number of available records at some facilities, the data collectors reviewed cases as far back as 2012 when data was available. The sample was cleaned to eliminate duplicate records of patients with repeated surgeries, resulting in a final analytic sample size of 430 cases. The analytic sample includes 55 cases from Bauchi, 88 cases from Cross River, 100 cases from Ebonyi, 93 cases from Kwara, and 94 cases from Zamfara.

Quantitative data analysis was conducted using Stata 11. Analysis included descriptive summaries and cross-tabulations of client characteristics as well as ANOVA and regression analysis examining associations between client characteristics and leakage duration as well as estimated distance traveled.

Missing Data

Percentages of missing data for each variable by treatment facility was observed to identify variables where 10 percent or more of the cases had missing data points. For state of residence and treatment

facility, none of the cases had missing data. Approximately, 6 percent of cases had missing data points for client age and LGA. Analyses including client age and LGA dropped cases with missing data points. Forty percent of the cases had missing data points for age at first marriage – 12 percent of the missing data points came from Cross River and 22 percent from Zamfara treatment facilities. Analyses including age at first marriage dropped all cases from Cross River and Zamfara, resulting in an analytic sample of 248 cases. Twenty-five percent of the cases had missing data points for leakage duration – 22 percent of the missing data points came from Zamfara treatment facility. Analyses including leakage duration dropped all cases from Zamfara, resulting in an analytic sample of 336 cases.

Findings

Descriptive Summaries

Client Age

Across the five states, client age ranged from 8 to 74 years with a mean of 33.7 years and median of 30 years (IQR: 25-40). Client age varied by treatment facility and was highest in Cross River with a mean of 37.4 years and median of 35 years; and lowest in Zamfara with a mean of 27 years and median of 25 years. Table 1 shows the descriptive statistics for client age for the total and disaggregated by state of treatment facility.

Table 1. Descriptive Statistics of Age of Client by Treatment State

State of Facility	Mean	Median	IQR	Range	n
Bauchi	30.5	28	20 - 40	13 - 62	55
Cross River	37.4	35	25 - 48	10 - 74	87
Ebonyi	34.3	32	27 - 39	8 - 72	100
Kwara	36.6	33	27 - 42	18 - 70	93
Zamfara	27.0	25	20 - 30	14 - 55	71
Total	33.7	30	25 - 40	8 - 74	406

Age at First Marriage

Across the five states, age at first marriage ranged from 16 to 25 years with a mean of 20.8 years and median of 20 years (IQR: 16-25). Age at first marriage varied by treatment facility. The highest mean age at first marriage was in Ebonyi (22.5 years) and highest median was in Kwara (22 years); the lowest age was in Bauchi with a mean of 15.7 years and median of 15 years. Table 2 shows the descriptive summary of age at first marriage for the total and disaggregated by state of treatment facility.

Table 2. Descriptive Statistics of Age at First Marriage of Client by Treatment State

State of Facility	Mean	Median	IQR	Range	n
Bauchi	15.7	15	15 - 17	11 - 22	54
Cross River	22.0	20	18 - 27	10 - 41	38
Ebonyi	22.5	21	19 - 26	10 - 39	82
Kwara	21.9	22	20 - 25	13 - 32	82
Zamfara	n/a	n/a	n/a	n/a	0
Total	20.8	20	16 - 25	10 - 41	256

Leakage Duration

Across the five states, leakage duration ranged from 1 day to 45 years with a mean of 6.5 years and median of 4 years (IQR: 1-10). Leakage duration varied by treatment facility and was greatest in Cross River with a mean of 9.9 years and median of 8.5 years; and lowest in Ebonyi with a mean of 4.5 years and median of 1.2 years. It is interesting to note the marked difference between the neighboring states of Ebonyi and Cross River. Table 3 shows the descriptive summary of leakage duration for the total and disaggregated by state of treatment facility.

Table 3. Descriptive Statistics of Duration of Leakage in years by Treatment State

State of Facility	Mean	Median	IQR	Range	n
Bauchi	7.2	3.0	1.0 - 10.0	0.167 - 45	54
Cross River	9.9	8.5	4.0 - 12.0	0.083 - 42	80
Ebonyi	4.5	1.2	0.5 - 7.0	0.083 - 35	99
Kwara	5.2	3.0	1.0 - 6.0	0.003 - 35	88
Zamfara	n/a	n/a	n/a	n/a	0
Total	6.5	4	1.0 - 10.0	0.003 - 45	321

Estimated Distance Traveled and Client Provenance

Across the five states, estimated distance traveled by a patient ranged from 0 to 521 Km with a mean of 96.9 Km and median of 73 Km years (IQR: 22-147). Estimated distance traveled varied by treatment facility; the greatest mean estimated distance traveled was in Bauchi (149.7 Km) and greatest median was in Ebonyi (131 Km); the lowest mean estimated distance traveled was in Cross River (54.9 Km) and lowest median was in Kwara (24 Km). Table 4 shows the descriptive summary of estimated distance traveled in Km for the total and disaggregated by state of treatment facility.

Table 4. Descriptive Statistics of Estimated Distance Traveled in Km by Treatment State

State of Facility	Mean	Median	IQR	Range	n
Bauchi	149.7	106.0	105 - 191	70 - 492	49
Cross River	54.9	33.0	9 - 75	1 - 296	76
Ebonyi	145.1	131.0	64 - 211	0 - 521	99
Kwara	82.3	24.0	8 - 124	1 - 386	93
Zamfara	65.2	58.0	26 - 96	0 - 281	89
Total	96.9	73	22 - 147	0 - 521	406

Table 5 shows the cross tabulation of estimated distance traveled in Km and state of residence. The sample size from each state of residence varies greatly with only one case in many of the states; thus, means and median from states with few observations are not meaningful summaries. Among the states with more than 10 observations, patients from Imo traveled the longest distance with a mean of 183 Km and median of 212 Km; and patients from Kwara (where there is a facility) traveled the shortest distance with a mean of 31 Km and median of 12 Km. Among the patients from states with treatment facilities (Bauchi, Cross River, Ebonyi, Kwara and Zamfara), the range of estimated distance traveled was 0 to 386 Km, with patients from Kwara traveling the shortest and patients from Bauchi traveling the longest. It is also noteworthy that the one patient from Abuja traveled 521 Km and patients from Lagos traveled on average 265 Km. These are considerable distances for patients living in urban centers where there is improved infrastructure and presumably improved access to services.

Table 5. Cross tabulation of Estimated Distance Traveled in Km and State Residence

State of Residence	Mean	Median	Range	n
Abia	126	101	6 - 459	11
Abuja	521	521	521 - 521	1
Akwa Ibom	240	240	183 - 296	2
Anambra	168	162	125 - 249	6
Bauchi	126	106	70 - 211	43
Bayelsa	63	63	0 - 125	2
Cross River	55	33	1 - 185	79
Delta	234	254	0 - 347	7
Ebonyi	71	43	20 - 305	28
Edo	278	278	278 - 278	1
Enugu	129	119	31 - 210	15
Gombe	259	260	258 - 260	3
Imo	183	212	0 - 232	19
Jigawa	n/a	n/a	n/a	1
Kebbi	155	155	155 - 155	1
Kogi	312	328	234 - 368	7
Kwara	31	12	1 - 386	67
Lagos	265	293	164 - 297	9
Niger	387	387	281 - 492	2
Ondo	328	328	213 - 442	2
Osun	124	124	103 - 144	2
Oyo	114	130	10 - 164	8
Rivers	259	259	259 - 259	2
Yobe	326	326	326 - 326	2
Zamfara	62	58	0 - 219	87
Total	97	73	0 - 521	406

Table 6 shows the cross tabulation of state of residence and treatment state. Of the five treatment facilities, Ebonyi had the highest number (72) of out-of-state patients, followed by Kwara with 26 patients. Of the 430 patients analyzed, 108 patients traveled outside of their state of residence for treatment. Patients from states with treatment facilities went to treatment facilities within their own state, except for in Cross River, where 4 patients traveled to the neighboring state of Ebonyi for treatment.

Table 6. Cross tabulation of State Residence and Treatment State

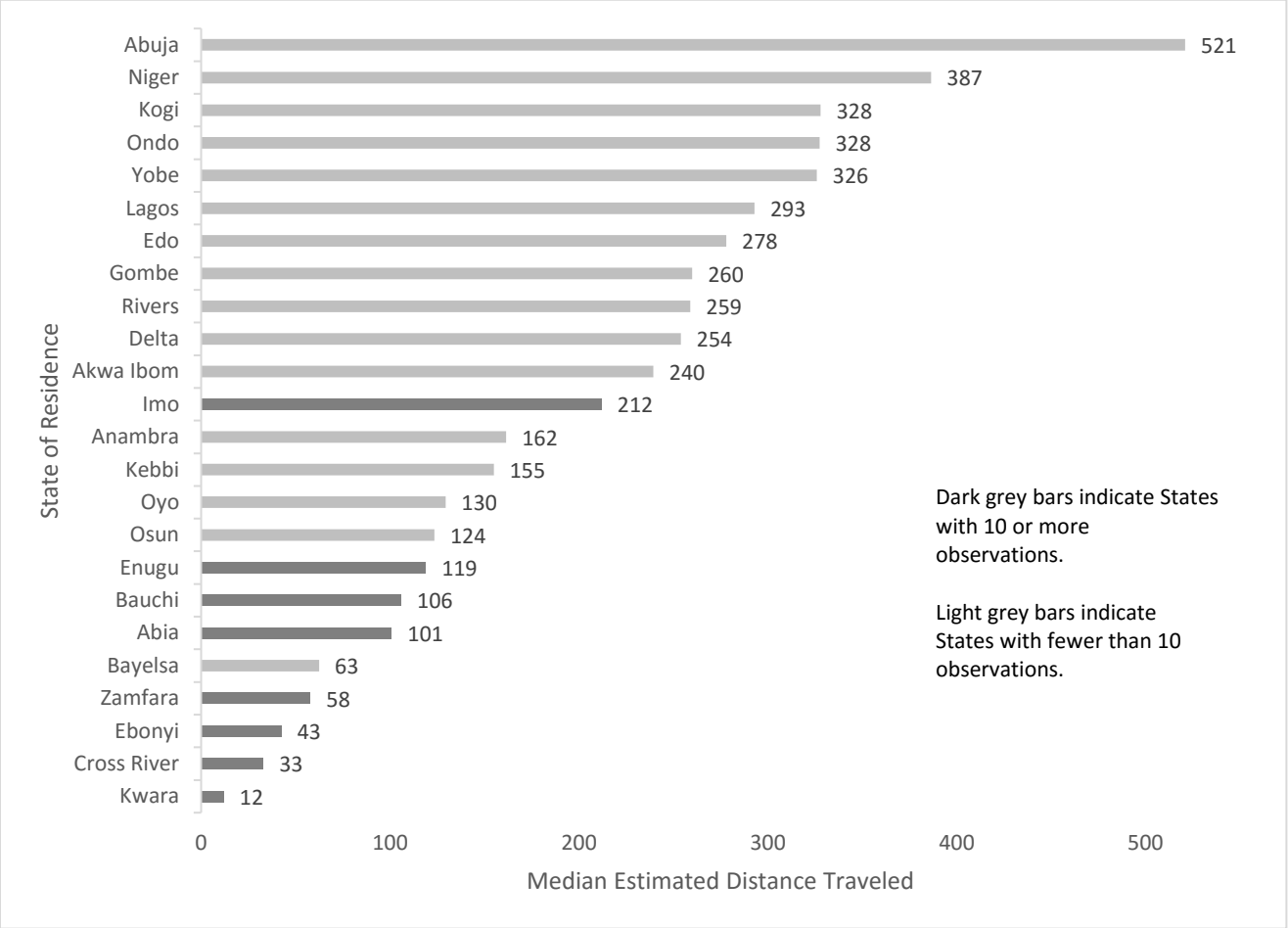
	Treatment State					
State of Residence	Bauchi	Cross River	Ebonyi	Kwara	Zamfara	Total
Abia	0	0	11	0	0	11
Abuja	0	0	1	0	0	1
Akwa Ibom	0	1	1	0	0	2
Anambra	0	0	6	0	0	6

Table 6. Cross tabulation of State Residence and Treatment State

	Treatment State					
State of Residence	Bauchi	Cross River	Ebonyi	Kwara	Zamfara	Total
Bauchi	48	0	0	0	0	48
Bayelsa	0	0	2	0	0	2
Cross River	0	87	4	0	0	91
Delta	0	0	7	0	0	7
Ebonyi	0	0	28	0	0	28
Edo	0	0	1	0	0	1
Enugu	0	0	15	0	0	15
Gombe	3	0	0	0	0	3
Imo	0	0	20	0	0	20
Jigawa	1	0	0	0	0	1
Kebbi	0	0	0	0	1	1
Kogi	0	0	1	6	0	7
Kwara	0	0	0	67	0	67
Lagos	0	0	0	9	0	9
Niger	1	0	0	0	1	2
Ondo	0	0	1	1	0	2
Osun	0	0	0	2	0	2
Oyo	0	0	0	8	0	8
Rivers	0	0	2	0	0	2
Yobe	2	0	0	0	0	2
Zamfara	0	0	0	0	92	92
Total	55	88	100	93	94	430
Out-of-state patients	7	1	72	26	2	108

Figure 1 shows a bar chart with the data from Table 6. The state of residences in the chart are ordered by median distance traveled. Dark grey bars indicate states where there were 10 or more observations and light grey bars are for states with fewer than 10 observations. Of the states with 10 or more observations, Imo (212 Km), Enugu (119 Km), Bauchi (106 Km), and Abia (101 Km) had median distances traveled over 100 Km.

Figure 1. Bar Chart Showing Median Distance Traveled in Km by State of Residence



Leakage Duration

Table 7 shows results from bivariate linear regressions of client age on leakage duration in years for total and for each treatment facility state. A positive association between age and leakage duration ($p<.05$) was found, which is likely explained by the temporal nature of the variables. This association between age and leakage duration was found to be statistically significant in all four states included in the analysis – Bauchi, Cross River, Ebonyi, and Kwara ($p<.05$).

Table 7. Bivariate Linear Regression of Client Age on Leakage Duration in years

	B	95% CI			SE	P Value
Client Age, n=320	0.29	0.23	-	0.35	0.03	0.000
Bauchi, n=54	0.47	0.33	-	0.62	0.07	0.000
Cross River, n=79	0.36	0.24	-	0.48	0.06	0.000
Ebonyi, n=99	0.20	0.10	-	0.31	0.05	0.000
Kwara, n=88	0.17	0.06	-	0.28	0.05	0.003

Note: Analysis to Bauchi, Cross River, Ebonyi and Kwara due to a high number of missing cases in Zamfara.

To further illustrate the association between client age and leakage duration, figures 2-6 in Annex A show scatter plots for total cases (excluding Zamfara) and for each treatment facility state (excluding Zamfara).

Table 8 shows results from a bivariate linear regression of age at first marriage on leakage for the total cases and for each treatment facility. Overall, there was an inverse association between age at first marriage and leakage duration ($p<.05$). Thus, women married early had longer leakage duration periods. However, when looking at this association within treatment facility states, the association between age at first marriage and leakage duration was statistically significant in Eboyni and Kwara ($p<.05$) and not in Bauchi ($p>.05$).

Table 8. Bivariate Linear Regression of Age at First Marriage on Leakage Duration in years

	B	95% CI			SE	P Value
Age at First Marriage, n=215	-0.37	-0.56	-	-0.19	0.09	0.000
Bauchi, n=53	0.23	-1.03	-	1.49	0.63	0.715
Ebonyi, n=82	-0.34	-0.60	-	-0.07	0.13	0.014
Kwara, n=80	-0.57	-0.94	-	-0.21	0.18	0.003

Note: Analysis restricted to Bauchi, Ebonyi and Kwara due to a high number of missing cases in Cross River and Zamfara.

Table 9 shows results from a multivariate linear regression of age at first marriage on leakage, controlling for client age. The inverse relationship between age at first marriage and leakage duration continues to be statistically significant ($p<.05$), when controlling for client age.

Table 9. Multivariate Linear Regression of Patient Demographics on Leakage Duration in years, n=215

Demographic Variable	*B*	95% CI			SE	P Value
Age at First Marriage	-0.43	-0.60	-	-0.27	0.08	0.000
Client Age	0.29	0.22	-	0.36	0.04	0.000
Constant	3.91	-0.17	-	8.00	2.07	0.060

Note: Analysis of age at first marriage restricted to Bauchi, Ebonyi and Kwara due to a high number of missing cases in Cross River and Zamfara.

To further illustrate the association between age at first marriage and leakage duration, figures 7-10 in Annex A show scatter plots for total cases (excluding Cross River and Zamfara) and for each treatment facility state.

Estimated Distance Traveled

Figure 10 shows results from bivariate linear regressions of patient characteristics – client age, age at first marriage and leakage duration – on estimated distance traveled by patient in Km. None of these patient characteristics were found to be significantly associated with estimated distance traveled; however, an inverse association between leakage duration and estimated distance traveled approached statistical significance ($p= 0.067$).

Table 10. Bivariate Linear Regression of Patient Demographics on Estimated Distance Traveled in Km

Demographic Variable	*B*	95% CI			SE	P Value
Client Age, n=385	0.08	-0.67	-	0.83	0.38	0.836
Age at First Marriage, n=211	1.52	-1.22	-	4.26	1.39	0.274
Leakage Duration (yrs), n=303	-1.43	-2.96	-	0.10	0.78	0.067

A one-way ANOVA was conducted and found a significant association between treatment facility state and estimated distance traveled ($F_{4,401}$=20.64, p=.0000). Figure 11 shows results from a regression of treatment facility state on estimated distance traveled. Cross River was treated as the reference group as it has the lowest mean estimated distance traveled of the five treatment states. Patients being treated in Bauchi traveled on average 94.77 Km longer than patients being treated in Cross River (p<.05); in Ebonyi, patients traveled on average 90.12 Km longer than patients being treated in Cross River (p<.05); and in Kwara, patients traveled on average 27.35 Km longer than patients being treated in Cross River (p<.05). However, the difference in means of distance traveled between Zamfara and Cross River were not statistically significant (p>.05).

Table 11. Linear Regression of Treatment Facility State on Estimated Distance Patient Traveled in Km

Treatment Facility State	*B*	95% CI			SE	P Value
Bauchi, n=49	94.77	63.82	-	125.71	15.74	0.000
Cross River, n=76			reference			
Ebonyi, n=99	90.12	64.36	-	115.89	13.10	0.000
Kwara, n=93	27.35	1.23	-	53.47	13.29	0.040
Zamfara, n=89	10.23	-16.15	-	36.62	13.42	0.446

Discussion of Findings and Implications for SBCC Strategy, Activities, and Messages

Communications and advocacy efforts should be refined to respond to the characteristics of fistula clients and be sensitive to any geographical differences in these characteristics.

- The study showed that client age and age at first marriage of fistula patients varied by treatment facility state. The lowest median ages were from facilities in the northern states of Bauchi (28 years) and Zamfara (25 years) and the lowest median age at first marriage was from Bauchi (15 years). *SBCC strategy and activities in the North should seek to empower and engage more actively with young women and with women who marry early. Additionally, SBCC activities should seek to engage the broader community to address inequitable gender norms and focus messaging on the importance of prevention of early marriage and keeping girls in school as well as engaging husbands as maternal health partners.*
- Leakage duration of fistula patients also varied by treatment facility state and was particularly long in the southern state of Cross River with a median of 8.5 years. In the other states where data was available, the median leakage duration was considerably lower (1.2 years in Ebonyi; and 3 years in Bauchi and Kwara). *SBCC strategy should seek to address the needs of women who experience longer leakage duration periods by focusing on stigma reduction activities. These efforts should focus in the southern state of Cross River, where there is a higher concentration of patients with longer leakage duration periods.*

- The regression analysis showed that older women are more likely to have longer leakage duration periods and that the earlier women marry, the longer their periods of leakage, regardless of current age. *SBCC strategies should include the development of targeted messages for women who marry early and older women who have been suffering with fistula for a longer period of time and who may have experienced years of stigma within their households and communities and/or previous unsuccessful treatment(s).*

Communications and advocacy efforts should be refined to identify ways to support patients who must travel great distances to access care.

- Estimated distance traveled by patients varied by client provenance and by treatment facility state. Median distances were considerably longer for patients being treated in the northern states of Bauchi (106 Km) and Zamfara (58 Km) and the eastern state of Ebonyi (131 Km) than for patients being treated in Kwara (24 Km) and Cross River (33 Km). Of the five treatment sites, Ebonyi has the longest median distance traveled as well the greatest number of out-of-state patients. These findings are likely attributable to the positive reputation and strong capacity of the National Obstetric Fistula Centre, Abakaliki in Ebonyi, as well as effective community outreach and messages regarding Abakaliki in the surrounding area. Analysis of patient state residence showed that the southeastern states of Imo, Enugu and Abia, which are nearby to Ebonyi, all had median distance traveled over 100 Km. While it is interesting to note areas from where patients are traveling longer distances, it might not necessarily indicate a need for scaled-up SBCC activities. Patients traveling longer distances to Ebonyi may be explained by greater saturation of messages related to specific fistula facilities; whereas patients traveling longer distances in the north – Bauchi and Zamfara – may be explained by the rural nature of the geography and limited services available. *SBCC activities should continue in regions where patients have demonstrated to travel long distances, especially where transportation infrastructure is weak. Efforts in these areas should include messages on available and free transportation to services. Additionally, SBCC activities and messages should be enhanced in regions where patients travel shorter distances, as this may be an indication that women in harder to reach areas are not accessing services and/or receiving messages about how to access services.*

Annex A: Scatterplots of Patient Demographics on Leakage Duration

Figure 2. Client Age and Leakage Duration in Years, n=320

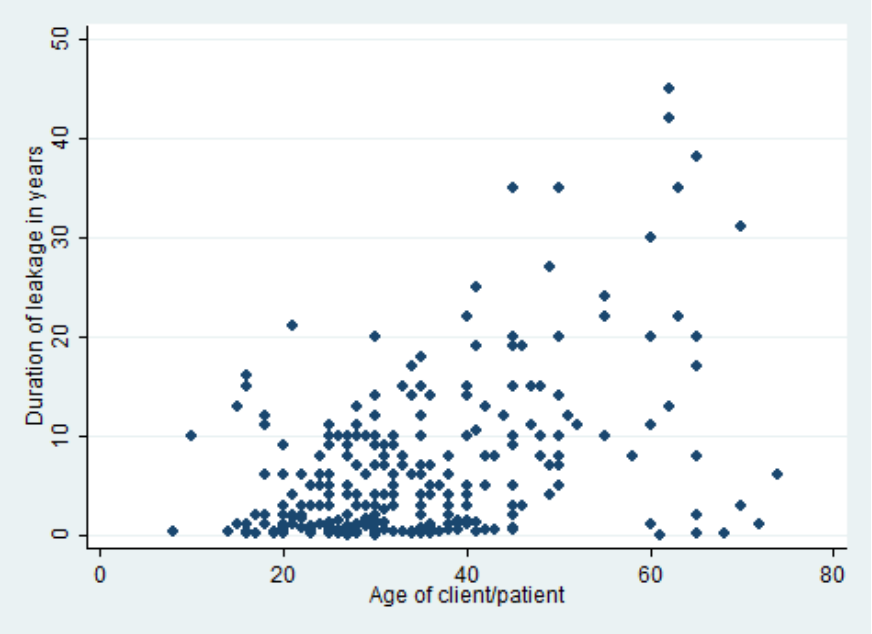


Figure 3. Client Age and Duration of Leakage in Years at Bauchi, n=54

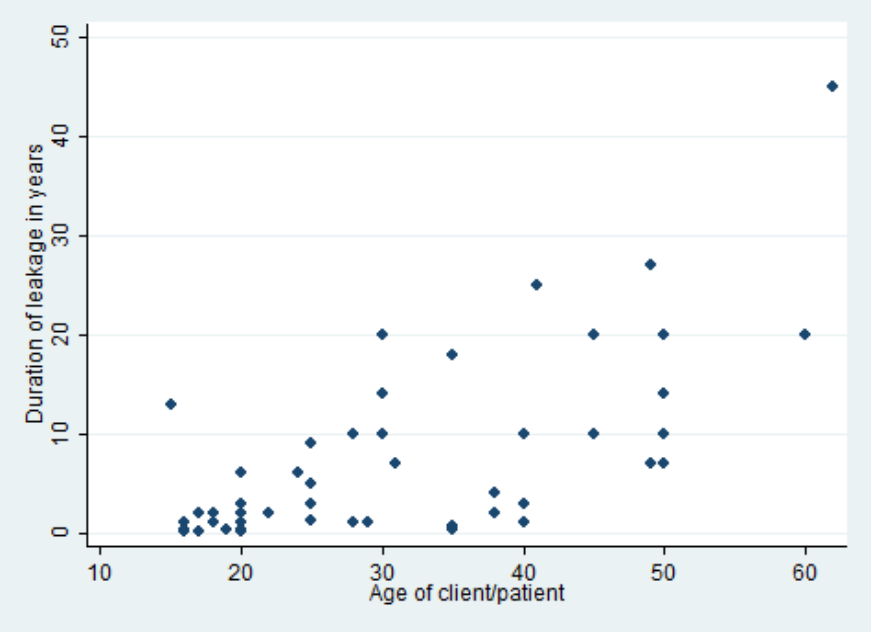


Figure 4. Client Age and Duration of Leakage in Years at Cross River, n=79

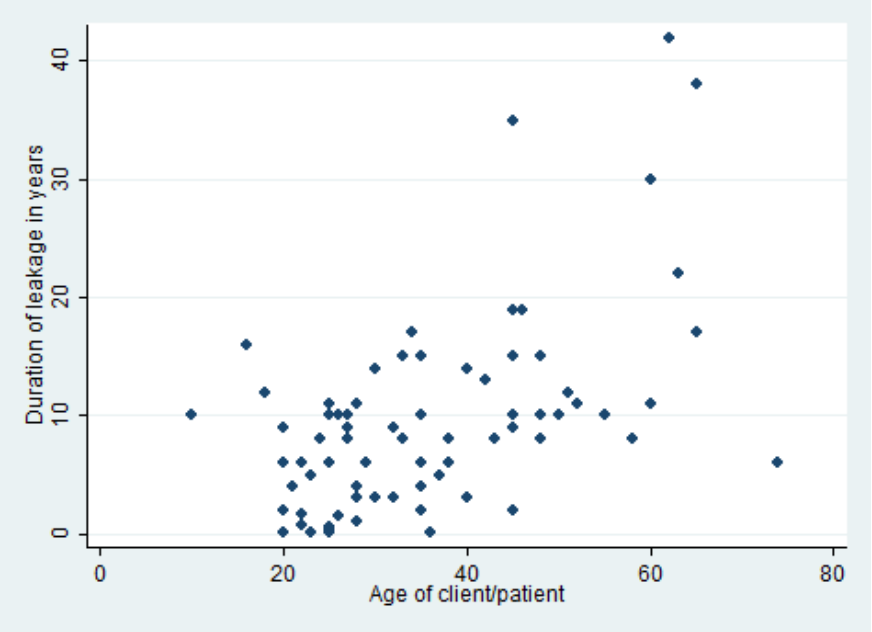


Figure 5. Client Age and Duration of Leakage in Years at Ebonyi, n=99

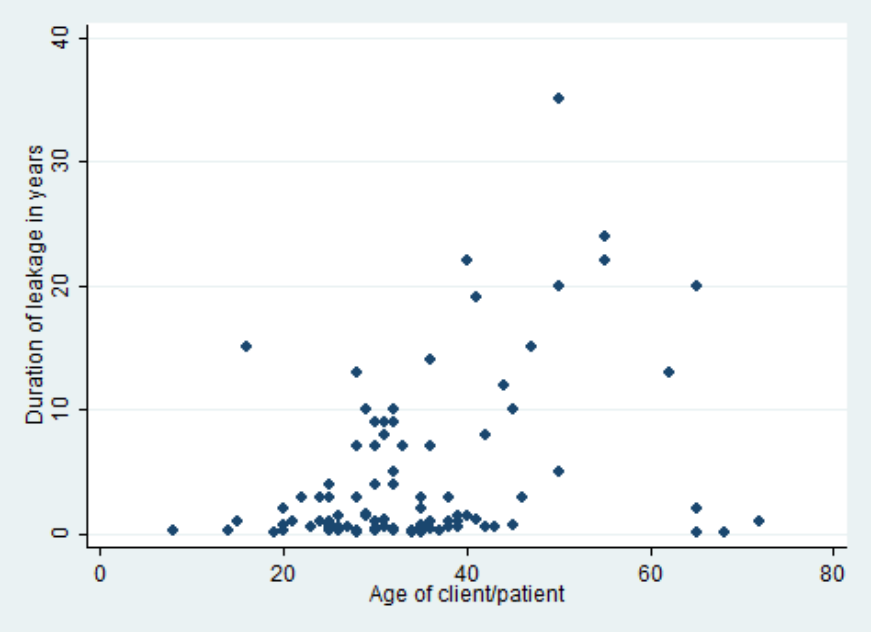


Figure 6. Client Age and Duration of Leakage in Years at Kwara, n=88

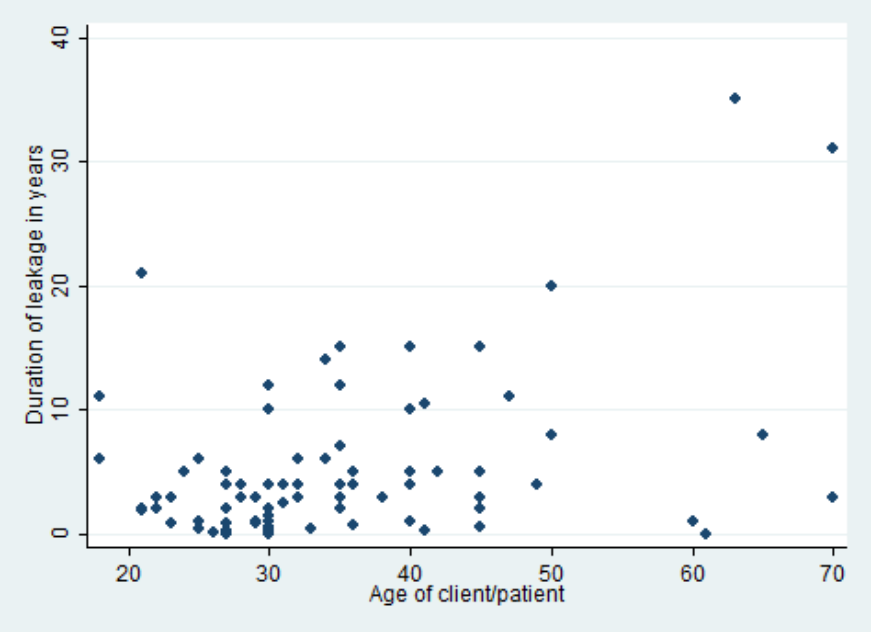


Figure 7. Age at First Marriage of Patient and Duration of Leakage in Years, n=253

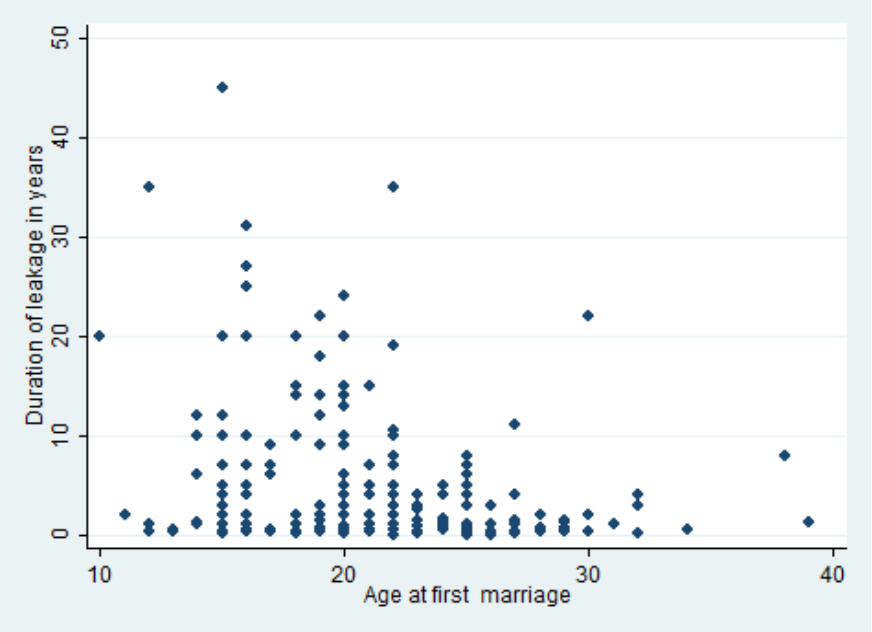


Figure 8. Age at First Marriage of Patient and Duration of Leakage in Years at Bauchi, n=53

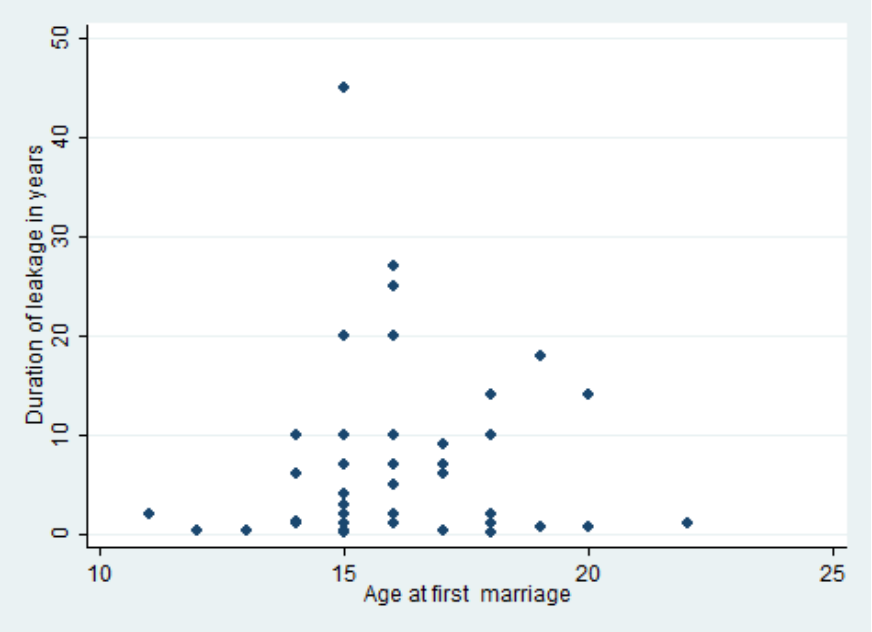


Figure 9. Age at First Marriage of Patient and Duration of Leakage in Years at Ebonyi, n=82

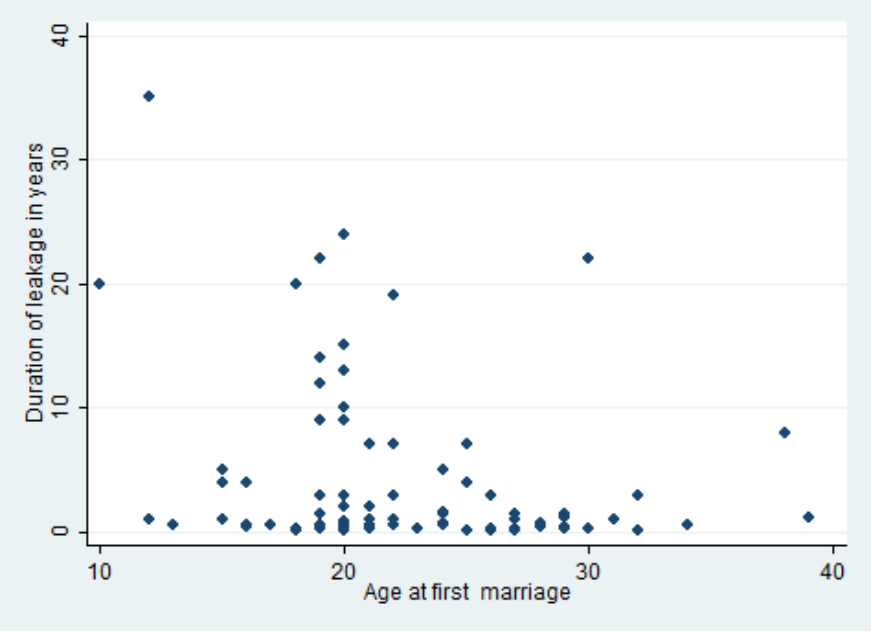


Figure 10. Age at First Marriage of Patient and Duration of Leakage in Years at Kwara, n=80