

INTRODUCTION

The appearance of HIV/AIDS has attracted considerable attention to the analysis of sexual behaviour. The trends in the orientation of research appear to have favoured survey-based researches which examine elements of risk in the sexual orientations of either target groups or communities. Underlying the extant pattern of research focus is the desire to tackle the problem of HIV/AIDS pandemic through sexual behavioural re-orientation, given the stronger likelihood of winning the anti- HIV/AIDS war by sexual behavioural reorientation than by the medical curative option.

Two major factors have been identified in literature as encouraging vulnerable sexual orientation. The first is poverty, while the second is domiciliary instability that is connected with individuals' livelihood engagements (Orubuloye, Caldwell and Caldwell, 1992; Anarfi and Antwi 1997; Marck 1999; Adegbola, Babatola and Oni 1995). So far, a number of researchers have documented the various dimensions in which poverty promotes vulnerable sexual orientation in a population.

Likewise, significant research efforts have focused on the analysis of the role of domiciliary instability in the imbibitions risky sexual behaviour. (Anarfi 1993, Lakolande, Meda and Sangare(1998) Their findings have emphasized the fact that domiciliary instability, which characterizes migrants and or circulatory workers often lead to the imbibitions of risky sexual behaviour among the group.

By their nature, however, the methodological approaches of many of those studies in the latter category are generally less robust than required. First, the focus of many of these studies have a partial focus, as they are concerned mainly with migrant workers who are

basically income earners in their destinations among their host communities. Although the well-researched long-haul trucks drivers (Marck 1999), which falls partially into this category, still differ somehow from the normal migrants, as much of their risky sexual transactions is carried out along the major transportation arteries plied by them during their periodical travels. Besides, studies conducted on this set of drivers have consistently omitted the use of non-circulatory drivers as control groups. The exclusion invariably diminishes from the specificity power of their findings, especially in terms of their versatility to show whether the pattern of sexuality risk parameters and their cofactors vary significantly between itinerant and non-itinerant population groups.

The present paper endeavours to fill this gap, by examining aspects of risky sexual orientations between itinerant and non-itinerant commercial population groups in Lagos, Nigeria.

Theoretical Consideration

Migrants and those whose livelihoods entail certain degree of domiciliary instability have been associated with the tendency for risky sexual orientation. (Anarfi, Appiah and Awusabo-Asare 1997; Marck 1999). Explanation for their greater disposition to sexual risk is hinged on their physical separation from their regular sexual partner or spouses and the possibility of biological pressure for sex on the migrant at destination.

Most studies, which focus on the vulnerable sexual behaviour of migrants, often employ only one sexuality risk parameter, particularly the size of sexual partners. However, in the context of vulnerability to HIV/AIDS at least three sexuality-related variables are critical; namely the sizes of sexual partner, the use/non-use of appropriate contra-infection device,

(condom) as well as the patronage of commercial/casual sex partner. These are often neglected in many studies.

Although, each of the three variables exposes sexual partners to the risk of sexual infections, both commercial sex and multi-partner sex need not result in actual infection, if partners use appropriate contra-infection device. This suggests that the only critical variable that matters in sexuality risk analysis is the use of condoms. However, a chain of connected reasons reinforces the relevance of the three risk variables specified above, despite the apparent singular weight of the use of the appropriate contra-infection device.

The findings in research of possibility and the reality of uninfected discordant partners despite continued sexual relationships (Marie-Marcelle, Page, Hafner and Johnson 1996) tend to diminish the supposed inevitability of condom, as the latter also tends to de-emphasize the risk of infection through either multi-partner or commercial/casual sexual transactions, given that sex partners use appropriate contra-infection device.

To date, however, the state of knowledge of the degree to which discordant sexual partnership reduces the spread of HIV/AIDS is still imprecise. Such imprecision may be likened to the challenge confronting researchers with respect to the reliability of responses to the question on the use of condom during sexual intercourse, generally among respondents. In other word, research findings give an indication that most men, desiring to avoid being labelled non-conformists, claim to use condom in sexual intercourse without actually doing so. Parallel findings in literature that most male partners (Varga 1997), including clients of commercial sex partners often insist on 'no condom' sex to maximize sexual pleasure reinforces support such proposition. And given the economic context of commercial sex,

which weighs heavily on the economic survival inclination of female sex vendors, the chances are that many of the sexual intercourse reportedly had with condoms were indeed unprotected sex.

The implication is that a comparative analysis of sexuality risks, either of individuals or groups which employs a multi-variable approach, offers a more robust approach, as it captures wider dimensions of the possibility of exposure to infection or re-infection, thus minimizing the reliability problem that weighs heavily on employing only one sexuality risk variable.

In addition to the interest in sexuality risk characterization, the notion of selectivity in migration theories, which posits that circulatory populations differ in many aspects of socio-economic profiles from their non-circulatory counterparts (Bilsborrow, Oberai and Standing, 1992) adds yet another dimension to the research interest. The additional dimension touches on whether differences in the socio-economic characterization of related circulatory and non-circulatory groups could in any significant way influence their orientations to vulnerable sex.

Three major questions emanate from the foregoing and produce the direction to which the present study is oriented. They are:

- (i) What are the basic risk elements that characterize the sexual orientations of the selected circulatory and non-circulatory commercial population in Lagos?
- (ii) To what extent do these dimensions of sexuality risks significantly differentiate circulatory from their non-circulatory counterparts?

- (iii) How comparable are the descriptive models of risky sexuality for itinerant and non-itinerant groups, in the light of the theoretical specification of significant socio-economic differences between them.

Such an analysis should enhance the position of theory on vulnerable sex. In the minimum, it will enhance the capability of research to better specify if the observed or the supposed greater likelihood of circulators for vulnerable sex, is contingent on the similarities or differences in the socio-economic profile of circulators and that of their non-circulatory counterparts.

Operational Definitions

Sexuality Risk and Circulators

Assessment of sexuality risks employed seven variables in varying degrees. The first set of four variables was analyzed at a general level, and was meant to serve as a prelude to the detailed analysis of three other primary sexuality risk variables that followed it. The first four variables include the Total Sexual Partners Ever Had (TSEXP); Age at First sexual Intercourse (AGESEX); Duration of Exposure to Sexuality (DES) and the Mean sexual Partners per Sexually-active Year.

Arising from the lower degree of reliability attached to the four variables above, which are derivatives of TSEXP, with the exception of AGESEX, the study followed with a comparative analysis of multi-partnership sex, patronage of commercial sexual partners as well as default in appropriate contra-infection over a maximum of three sexual partners had in the last one year. Information on the level of commercial sexuality was obtained from the question whether or not monetary gift was given to any of the specified number of sexual partners. (Caldwell, Orubuloye and Caldwell 1994). A question on default/inappropriate

contra-infection was asked for each of the three levels of sexual partnership on which questions were posed. An individual in essence would manifest either no risk or a combination of the three risks outlined above.

Circulators in this study are traders who do not only engage in international commerce but travel at varying intervals to buy their wares. Some even buy and sell on both sides of the divide. Their physical involvement in international travels differentiates them from other non-circulatory traders that are locally-based and with whom they trading arena. Other peculiarities of the group that are relevant to the study are examined under methodology.

Methodology

This study employed primary data obtained from two sets of questionnaire designed to study a larger problem of population circulation and the risk to sexual health in Lagos Nigeria.

The paper adopted the market-based approach to obtaining samples of its respondents as it facilitated access to the target population.

The Study Population (The Micro-area)

A number of criteria informed the selection of the markets from which samples were drawn. One, the trading populations of such a market must comprise both international circulatory traders as well as non-circulatory traders; hence, markets whose traders deal in imports without they themselves being involved in international travels do not fit into the fold. Likewise, markets that subsist essentially as appendage of another were also dropped, to prevent double counting of circulatory traders who have more than one branch in different commercial areas. In addition, markets in which the physical layout posed a major constraint to the possibility of efficient numbering of traders, and or stalls, for a reliable random sampling exercise were also excluded. Ultimately, four major markets namely,

ASPADAM (Auto Spare Parts Dealers Association Market), Alaba International market, Balogun International Centre for Commerce and Oyingbo White Sand Market met the requirements in varying degrees

Identification of the Population Groups: The Domiciliary Factor

The domiciliary characteristics of the study populations influenced many decisions about the fieldwork. First, the non-circulatory respondents are primarily domiciled in Lagos and operate trading outfits in one of Lagos large commercial centres. The circulatory group consists of those who own retail outlets in one of the selected markets, and have once engaged, or still engage in international commercial travel as at the time of the fieldwork. Generally their international trips last for between few days and 6 to 8 weeks. Their apprentices manage their operations while they are away on trips. When not on trips, they are physically present in their stalls to conduct business; hence, their circulatory characteristics do not render them significantly unreachable as is the case with many other categories of mobile population. The fieldwork lasted for 3 months to take care of circulators that were randomly selected, but had travelled at the commencement of the study.

The Sampling Procedure

The field-work entailed numbering of the commercial stall(s)/store(s), relying as much as possible on the locality arrangement of goods.. Each group has a separate sampling frame to ensure that either of them could be analysed as independent samples. To ensure anonymity, individual traders were identified by the serial numbers assigned them in different localities within individual markets. The serial numbers assigned to individual traders/stalls were written out respectively in paper slips, to produce two independent sampling frames; from which random sampling without replacement was carried out to obtain the samples for the groups.

Sample Size Appropriation

Although the total population of non-circulators exceeded that of the circulators, the same sample sizes were selected for both groups for two reasons. First either of them is an independent sample and not a sub-sample to the other. What matters most in essence is to obtain random samples of individual group, and which is well addressed by the study's sampling strategy. Second, the circulators questionnaire covered more issues, particularly on their circulatory history and sexual transactions outside Nigeria. Ultimately, the number of independent variables elicited in the circulators' questionnaire was about twice of those in the non-circulators' questionnaire. And following Hopskin (2001), when analysis involves the use of the logistic regression, it is required that the sample size should vary positively with the number of independent variables to be examined. Thus while the non-circulators should have a larger sample on the ground of larger population size, the non-circulators also qualify for a larger population on the basis of larger size of independent variables. The final decision was to have equal sample sizes of 450 respondents each for both groups; especially as the two groups are independent population samples..

Table 1 illustrates the selected markets, the commercial populations and the expected samples.

Table 1: The Selected Markets / Sample Size

Name Of Market	Total Population Size		Expected Sample Size	
	Non-Circ	Circ.	Non-Circ	Circ. ^A
ASPADAM	2,756	208	71	24
Alaba International Market.	3,300	500	85	58
Balogun Market (ICC)	11,400	3,172	293	367
Oyingbo	800	250	20	29
TOTAL	17,456	3,880	450	450
Cumulative Total		21,336		900

The Survey Instrument and Administration

Two sets of largely structured and open-ended questionnaires were administered by trained fieldworkers between December 2004 and March 2005. The duration was to ensure that any of the randomly selected circulator who had travelled prior to or at the beginning of the fieldwork, would have returned. Both questionnaires tapped information on respondents' socio-economic, demographic and relevant cultural variables. They also sought information on sexual practices and attitudes. The circulators' questionnaires covered other issues that are not of interest to this paper.

Data Analysis

Analyses were conducted using SPSS V.10. The first in the series of analyses compared the socio-economic characteristics of the two groups, employing descriptive and t-test statistic to test the statistical significance of some obtained results. Next was a similar comparative analysis of the sexuality risk variables, testing also for statistical significance. Thereafter, logistic regression analysis was employed to compare the set of variables retained in the BSTEP_(LK) model on the committal of commercial sex in the last one year. Series of variables were entered based on theoretical expectation as well as cue from literature. Among variables selected were age, ever/never married, youth period environment, education, business capital, business experience, age at first sex experience, previous sexual infection experience, relative recency of HIV knowledge. The major parameters of the models in particular the Nagelkerke's R^2 were examined in deciding on the fit status of each model.

Results

Table 2 illustrates and compares the socio-economic and related relevant characteristics of the two groups. Several interesting facts emerge from the table.

TABLE Selected Socio-Demographic Characteristics of Circulators and Non-Circulators

Sex	Non-Circulator		Circulator	
	No	(%)	No	(%)
Male	426	95.1	395	89.6
Female	22	4.9	46	10.4
Age				
18-24	193	44.5	73	16.2
25-49	239	55.1	349	77.6
50-66	2	0.5	28	6.2
Mean/Median		31.9/31		36.3/36
Regional Origin				
S/East	416	93.5	408	91.9
S/West	16	3.6	22	5.0
Others	13	2.9	14	3.1
Religion				
Christian	432	96.0	433	96.2
Non-Christian	18	4.0	17	3.8
Denominational Groups				
Orthodox/protestant	51	11.3	161	35.8
Pentecostal	156	34.7	134	29.8
Catholic	226	50.2	133	29.6
Unspecified	17	3.8	22	4.8
Marital status				
Single	264	59	177	39.3
Married	167	37	266	59.1
Others	19	4	7	1.6

Educational Level

None/Incomplete Primary	73	16.2	123	27.3
Primary 6/Full Secondary	305	67.8	216	48.0
Post Secondary/Tertiary	52	11.6	101	22.4
Unspecified	20	4.4	10	2.3
12-32 years	89	21.2	216	48.1

Duration of stay in Lagos

Born in Lagos	35	7.8	56	12.4
0-9 years	182	40.4	88	19.5
10-15 years	125	27.8	127	28.2
16-40 years	108	24.0	179	39.8

Business Experience

1-7 years	183	43.7	95	21.2
8-11 years	147	35.1	138	30.7
12-32 years	89	21.2	216	48.1

Business Capital employed

Less than ₦500,000	183	46.7	124	28.2
Between ₦500,000 and ₦1million	93	23.7	131	29.7
Above ₦1million	116	29.6	186	42.2

The sex distribution shows the dominance of men; 86.6 % of circulators and 95.1 per cent of non-circulators were men. The pattern is consistent with set of markets selected. They are different from the normal ubiquitous markets found in parts of the metropolis. Age structures appear to be similar for both groups; however, the non-circulators appear younger, as only 16.2% of circulators are in the age range of 18-24 against 44.5% of non-circulators.

Over 90% of respondents in each of the groups belonged to Igbo ethnic group. This is reflected in the religion pattern, as most Igbo are dominantly Christians. Catholics (50.2%) are more dominant among the non-circulators in contrast the relative domination of

circulators by the Orthodox/Protestant group (35.8%). More of circulators (59.1%) are married than non-circulators (37%). Primary 6/Full Secondary is the modal Education attainment: 48% and 67.8% respectively of circulators and non-circulators are in that category. A greater percentage of circulators than non-circulators have Post Secondary/Tertiary education.

Duration of stay in Lagos shows that more of the circulators (12.4%) than non-circulators (16.2%) were Lagos born. The largest single percentage of the circulators (39.8%) have stayed for between 16-40 years in Lagos, in contrast to a modal 40.4% of non-circulators, who had stayed for between 0-9 years. Business experience is consistent with age differentials. Slightly above 48% of circulators have been in business for at least 12 years, in contrast to 21.2% of non-circulators in that cadre. The modal class for the non-circulators (43.7%) is 1-7 years of business experience. Size of business capital employed shows that greater proportions of circulators employ larger capital for business. The #1million and above capital base is the modal class (42.2%) among circulators in contrast to 46.7% modal percentage who employed less than #0.5m among non-circulators.

Analyses so far tend indicate that the two groups differ noticeably on certain grounds which may influence their propensity for risky sexual orientations. Two hypotheses employing age and length of years in business are tested for significance as Tables 3 and 4 illustrate.

Test of Hypotheses on bio-social characteristics

Tables 3 and 4 respectively show the parameters of the test of the two hypotheses as well as results obtained.

Hypothesis 1

Ho: There is no significant difference between the mean ages of Non-circulators and their circulatory counterparts.

H₁: There is a significant difference between the mean ages of Non-circulators and their circulatory counterparts.

TABLE 3: Statistics for Test of Equality of Age: Non-circulators and Circulators

Statistics	Non-circulators	Circulators
Mean	31.87	36.06
S.D. of the Mean	.31	.31
Calculated Mean Difference	-4.1866	
Calculated t-value	9.720	
Degrees of freedom (df)	862.873	
N of cases	432	435

Sources: Fieldwork Survey (Dec-March) 2004/2005

Decision rule: $\alpha/2 = .05/2 = .025$

Reject Ho: if $t \leq -1.960$, $t \geq 1.960$; otherwise do not reject.

Decision: Reject Ho. observed differences between the mean ages of the two groups are statistically significant.

Hypothesis 2

Ho: There is no significant difference in the mean years of business experience of Non-circulators and their circulatory counterparts.

H₁: There is a significant difference in the mean years of business experience of the Non-circulators and their circulatory counterparts.

TABLE 4: Statistics for Test of Equality of Years of Business Experience: Non-Circulators and Circulators

Statistics	Non-circulators	Circulators
Mean	9.11	12.7
S.D. of the Mean	.247	.325
Calculated Mean Difference	-3.584	
Calculated t-value	9.204	
Degrees of freedom (df)	846.559	
N of cases	419	438

Source: Fieldwork Survey, (Dec-March) 2004/2005.

Decision rule: $\alpha/2 = .05/2 = .025$

Reject H_0 : if $t \leq -1.960$, $t \geq 1.960$. Otherwise do not reject

Decision: Reject H_0 . The observed difference between the years of business experience for the population groups is statistically significant

Analysis of Risk Dimensions in Sexual Transactions

Table 5 shows that both the mean and the median ages at first sexual intercourse for circulators are generally higher. However, the earlier entry of the non-circulators into sexuality did not translate to a greater rate of sexual partnership, as witnessed to by the values of TSPEH. Although the circulators' means value of 14.8 partners almost doubles that of the non-circulators, the marginal difference in the median values of 6.5 and 6.0 partners respectively for the circulators and non-circulators, is an indication of some few circulators with extremely high values of TSEP.

Comparing the statistics on (AGESEX), (DEAS) and MNSEXPYR reveals two main features of the two groups. The first is that although non-circulators tend to get inducted into sexuality earlier than the circulators, the significantly older ages of circulators translated to longer years of exposure to sexual activity.

TABLE 5 General Sexuality Parameters

	NON-CIRCULATORS			CIRCULATORS		
	Mean	Median	N	Mean	Median	N
AGESEX	19.5	19.0	324	20.8	21	342
TSPEH	8.2	6.0	408	14.8	6.5	412
DEAS	12.5	12.0	327	15.4	1.5	324
MNSEXPYR	0.76	0.52	292	1.2	0.54	308

Secondly, the fact of greater sexual activity of circulators also reflects in the values for the MNSEXPYR. Thus, despite the circulators delayed commencement of sexual activity, its mean/median scores of 1.2/0.54 are greater than their corresponding values (0.76/0.52) for non-circulators. Once again the import of few large extreme values among circulators is evident in the closeness of the median scores of MNSEXPYR.

Committal Sexuality Risk Variables

Table 6.2 compares the values for the first three variables for the two populations

Close percentage values of both groups: about 74 % circulators to 71.1% of non-circulators answered the most essential question of the event of having had at least a sexual partner in the last one year. Exactly 334 (74.2%) had at least one sexual partner in the last one year of the study, compared to the 320 (71.1%) of non-circulators. About ninety per cent (90.1%) of

TABLE 6. Multi-Partnership Sex, Commercial Sex and Contra-infection Contraventions among Circulators and Non-Circulators

SEXUALITY RISK VARIABLES	COMMITTA L LEVEL	NON- CIRCULATOR		CIRCULATOR	
		N	%	N	%
Multi-Partnership Risk	1 Partner Level	320	(71.1)	334	(74.2)
	2 Partner Level	214	(66.9)	301	(90.1)
	3 Partners level	194	60.1	287	(85.9)
Commercial Sex Risk	1 Partner Level	230	(71.9)	147	(44)
	2 Partner Level	151	(70.6)	140	(46.5)
	3 Partner Level	133	(68.6)	138	(48.1)
Inappropriate/Default in Contra- infeccion	1 Partner Level	66	(20.6)	49	(14.7)
	2 Partner Level	49	(22.9)	71	(23.6)
	3 Partner Level	50	(25.8)	90	(31.4)

Source: Fieldwork Survey (Dec – March) 2004/2005

of the 334 circulators that had a first partner, added a second partner; while 85.9 per cent (281) got to the level of a third sexual partner. This compares to 66.9 and 60.1per cents

respectively of non-circulators who had a second and a third sexual partners. Sexual transactions with commercial sexual partners, shows a reversal of the pattern of the multi-partnership risk. Greater percentages of non-circulators engaged paid sexual partners. From 71.9% at the first level, it dropped marginally to 70.6 and 68.6 per cents respectively at the second and third levels. The magnitudes of paid-for-sex among the circulators were 44%, 46.5% and 48.1% respectively for the three levels of sexual partnership. The comparative risk assessment on the use of appropriate contra-infection device is somewhat blurred. For example, 20.6% of non-circulators against 14.7% of circulators defaulted with the first partner. However, greater percentages of circulators defaulted at the second and third sexual partnership levels. The corresponding values for circulators were 23.6% and 31.4%, in contrast to 22.9 and 25.8 per cent respectively of the non-circulators.

Test of Hypotheses on the Three Sexuality Risk Parameters

Table 7 shows the results of the parameters of the hypothesis test on multi-partner sexuality.

Hypothesis of Equality of the Mean sizes of Sexual Partners

H₀: There is no significant difference between the size of sexual partners engaged by circulators and non-circulators in the last one year.

H₁: The observed means difference in the size of sexual partners engaged by circulators and non-circulators is significant.

TABLE 7: Result of Test of Equality in the Size of Engaged Sexual Partners

Parameters	Non-Circulator	Circulator
Mean Partner size	2.2609	2.6193
Standard Deviation	.9374	.8422
Standard Error Difference	0.06888	
Df, (assuming non-homogeneity of variance)		
N	322	352

Source: Fieldwork Survey (Dec – March) 2004/2005

Significance level: $\alpha/2 = 0.05 \div 2 = 0.025$

Reject H_0 : if $t \leq -1.960$, $t \geq 1.960$, otherwise do not

$$\text{Calculated } t = \frac{-0.3584}{0.0688} = -5.204$$

Decision: H_0 is rejected since the obtained t is less than -1.960 and it is therefore, concluded that the larger mean number of sexual partners values engaged by the circulators is by no means due to chance.

Hypothesis of Equality of the Mean Sizes of Commercial Sex Partners

The second hypothesis seeks to find out if the difference in the mean values of commercial sex partners engaged by the two groups is significant.

H_0 : The difference in the means values of commercial sex partners engaged by the non-circulators and circulators is not significant.

H_1 : The observed difference in the average size of commercial sex partners engaged by the two groups is significant.

Table 8 shows the parameters on which the test is based and supports the rejection of H_0

TABLE 8: Parameters for the Test of Equality of Means for Commercial Sex Patronage

Parameters	Non-Circulator	Circulator
Mean number of commercial sex	1.5963	1.2168
Standard Deviation	1.2574	1.3713
Standard Error Difference	.1017	
Df	665.856	
N	322	346

Sources: Fieldwork Survey (Dec – March) 2004/2005

Significance level: $\alpha/2 = 0.05/2 = 0.025$

Reject H_0 : if $t \leq -1.960$, $t \geq 1.960$, otherwise do not

$$\text{Calculated } t \text{ value} = \frac{0.3795}{0.0688} = 3.732$$

0.1017

Decision: The Null hypothesis (H_0) is rejected as the obtained t value of 3.732 is larger than the critical t – values ± 1.9 . Thus, the observed difference in the mean patronage of commercial sex partners is not due to mere chance or sampling error.

Hypothesis of Equality of the Mean Number of Contra-infection defaults

The third hypothesis examines if the observed differences in the degree of contra-infection default between the non-circulators and their circulatory counterparts are significant.

H_0 : The difference in the mean number of contra-infection default among the non-circulators and the circulators is not significant.

H_1 : The difference in the mean number of contra-infection default between the circulators and the non-circulators are indeed significant.

Table 9 shows the parameters by which the test of mean difference is based.

Table 9: The Parameters for the Test of Equality of Means Values for Contra-infection Default

Parameters	Non-Circulator	Circulator
X of contra-infection default	1.0313	1.2500
Standard Deviation	1.2574	1.3713
Standard error of the difference	.1017	
df.	308.114	
N	160	168

Source: Fieldwork Survey (Dec – March) 2004/2005

Significance level: $\alpha/2 = 0.05/2 = 0.025$

Reject H_0 : if $t \leq -1.960$, $t \geq 1.960$, otherwise do not

Calculated $t = \frac{-0.2188}{0.1017} = -1.839$

Decision: H_0 is retained. The difference observed in the rate of contra-infection default between the two populations may be due rather to chance than to a significant difference.

Comparative Logistic Regression Modelling of Commercial Sexuality Risk

The event of commercial sex has been employed in fixing and comparing the sets of covariates for the two populations. The bio-social analyses of the two groups as well as sexuality risk parameters show some significant differences. Tables 10- illustrate the results of logistic regression to model the event of commercial sex for the two populations. A crostabulation analysis of the selected nine variables, namely, Youth environment (YUTHENV), Ever married (EVAMAR), Age (GRPAGE), Education (EDUGRUP), Business experience in years (GRPBEXP), Age at first sex (GPAGESEX), Size of business capital (GPCAPITAL) Previous experience of sexual infection (EVHADSTI) and Recency of HIV/AIDS awareness (HIVKNOW) were carried out to determine their apparent relevance. The inclusion of the last variable was, that is, HIVKNOW helped only to boost the size of the population selected automatically for the model by the SPSS programme. It however, never had similar effect in the circulators model.

The analysis employed the Back Stepwise (likelihood ratio) method in order to highlight in each case the difference between the model containing all the specified variables and the final parsimonious model.

Table 10 shows the parameter of the initial model containing all the nine relevant variables. All the nine variables combined reduced the value of the scaled deviance (D_0) that is, the $-2\log$ likelihood of 278.527 of the initial intercept-only model to 135.052 (51.5% reduction). Only two variables, that is, EVAMAR($\alpha=.000$) and EVHADSTI($\alpha=.001$) are significant.

TABLE 10: Results of the Parameters for The First Step Iteration* (Non-Circulators)

Variables	B	S.E	Wald	D	Sig	EXP (B)
YUTHENV			1.168	2	.558	
YUTHENV(1)	-.237	.982	.058	1	.809	.789
YUTHENV(2)	.392	1.040	.142	1	.706	1.480
EVAMAR	-4.914	.777	40.023	1	.000	.007
GRPAGE			2.079	2	.354	
GRPAGE(1)	-1.253	.869	2.079	1	.149	.286
GRPAGE(2)	-.752	.728	1.068	1	.301	.471
EDUGRUP			2.601	2	.272	
EDUGRUP(1)	1.153	.948	1.479	1	.224	3.167
EDUGRUP(2)	1.183	.736	2.584	1	.108	3.265
GRPBEXP			2.559	2	.278	
GRPBEXP(1)	.943	.730	1.671	1	.196	2.569
GRPBEXP(2)	1.003	.650	2.376	1	.123	2.726
HIVKNOW(1)	.158	.511	.096	1	.757	1.172
GPAGESEX			3.076	2	.215	
GPAGESEX(1)	.196	.652	.091	1	.763	1.217
GPAGESEX(2)	1.049	.601	3.045	1	.081	2.854
GPCAPITAL(1)	-.153	.525	.086	1	.771	.858
EVHADSTI	2.084	.599	12.088	1	.001	1.298
Constant	.261	1.266	.042	1	.837	

Source: Fieldwork Survey (Dec – March) 2004/2005

* Initial -2log likelihood = 278.527; Step 1 -2log likelihood = 135.052;

Step 1 Nagelkerke (R^2) value = 67.7%

The results of other parameters in Table 11, in particular, the classification table (86.9%) and the Nagelkerke R^2 , (67.7%) appear fairly good, except that only 67.7% variations in the event of commercial sexuality risk could be explained by all the nine covariates.

Table 11: Other Parameters of the First Iterated Model (Step 1) (Non-Circulators)

Parameters Classification	Results
Correct prediction of commercial sex committal	86.9%
Nagelkerke's R^2	67.7%
Hosmer and Lemeshow χ^2 , sig.	7.520, .482

Source: Fieldwork Survey (Dec – March) 2004/2005

The BSTEP procedure terminated at the seventh iteration, retaining only three covariates, namely EVAMAR ($\alpha=.000$), GPAGESEX ($\alpha=.000$) and EVHADSTI ($\alpha=.000$) as shown in Table 12. Two of the three variables retain their initial level of statistical significance as in

Table 12: Parameters Of The Final Iterated Model of Commercial Sexuality Risk (Non-Circulators)

Variable	B	SE	Wald	Df	Sig	EXP (B)
EVAMAR	-4.369	.598	53.428	1	.000	.013
GPAGESEX			5.460	2	.065	
GPAGESEX(1)	.375	.551	.463	1	.496	1.455
GPAGESEX(2)	1.239	.531	5.457	1	.019	3.454
EVHADSTI	1.949	.568	11.781	1	.001	7.021
Constant	.919	.350	6.917	1	.009	2.507

Source: Fieldwork Survey (Dec – March) 2004/2005

the first iterated model. The third variables GPAGESEX was not significant in the model. The Wald statistics of the variables shows improvement in the value of EVAMAR from 40.023 in the all variable model to 53.428 in the reduced-variable model. For EVHADSTI, there was a slight reduction – from 12.088 to 11.781. GPAGESEX changed from 3.076 to 5.460.

The result of the categorical analysis of the variable EVAMAR shows that the never-married non-circulators are less likely to engage in commercial sex. In order words, those who are

currently married or have once been married, are more likely to engage in commercial sex by an odd of 13 per cent compared to those who are yet to get married.

The result of EVHADSTI on the other hand shows that those who had once had a venereal infection are less likely to engage in commercial sex. The odd is much greater than the differences observed between the married and the unmarried. In the present case, the odds of committing commercial sex is about 7 times less likely for those who had once had sexual infection to engage in commercial sex in comparison with a never-infected person.

The odds of committal with respect to the third variable shows that those who by age group, were the last to enter into active sexual life are generally less likely to engage in commercial sex in comparison with the two age groups who entered into sexuality earlier. Precisely while the odds of committal by the youngest GPAGESEX group was over 100 per cent in comparison to the oldest group, the median GPAGESEX group, on the other hand, had an odds of over 300 per cent greater likelihood than the oldest group.

The results of the other parameter of the model as displayed in Table 13 show that the removal of six variables only marginally reduced the good fit status of the model. The R^2

Table 13 Other Parameters of Final Iterated Model (Non-Circulator)

PARAMETERS	RESULTS
Correct prediction of Commercial sex committal	85.9%
Nagelkerke's R^2	65.0%
Hosmer and Lemeshow X^2 , sig.	5.825, .560
The scaled deviance (D_0) (-2log likelihood)	143.036

Source: Fieldwork Survey (Dec – March) 2004/2005

value reduced marginally by 2.7%, while the percentage achieved in correctly classifying the committal and not committal cases reduced only by 1%. The removed six variables, in essence, accounted for only 2.7 per cent of the variation observed in the target variable in contrast to the three variables in the final model which jointly accounted for 65 per cent. The result of the Hosmer and Lemeshow test at 0.560 shows that the model fits relatively well the event of commercial sex risk committal among the non-circulators.

Logistic Regression Modelling of Commercial Sex Risk by the Circulators

Table 14 shows the result of the first stage iteration of the circulators' model. Only 316 respondents were selected automatically by the system to fit the model. The result of the first stage of iteration which included 8 covariates led to a reduction in the -2log likelihood of the intercept-only model from 425.256 to 252.161. The first iteration model, consisting of all the variables selected for the non-circulators with the exception of HIVKNOW, shows that EVAMAR with a Wald parameter value of 61.803 is significant at $\alpha = .000$. The variable EVHADSTI also with a Wald value of 7.191 is significant at $\alpha = .007$. Other parameters of the 8 covariates model portray it as achieving a good fit of the event of commercial sex among the circulators.

Table 14: The Results Of The Parameters For The First Step Iteration (Circulators)

Variables	B	S.E	Wald	D	Sig	EXP (B)
EVAMAR	-3.544	.441	61.803	1	.000	.029
YUTHENV			4.529	2	.104	
YUTHENV(1)	1.284	.905	1.858	1	.173	3.435
YUTHENV(2)	1.719	.910	3.570	1	.059	5.581
EVAHADSTI	1.042	.389	7.191	1	.007	2.836
GRPAGE			4.022	2	.134	
GRPAGE(1)	.965	.584	2.735	1	.098	2.625
GRPAGE(2)	.116	.502	.054	1	.817	1.123
EDUGRUP			1.725	2	.422	
EDUGRUP(1)	-.681	.519	1.724	1	.189	.506
EDUGRUP(2)	-.369	.426	.751	1	.386	.691
GRPBEXP			.724	2	.696	

GRPBEXP(1)	-.465	.554	.704	1	.401	.628
GRPBEXP(2)	-.230	.508	.205	1	.650	.795
GCAPITAL			.104	2	.949	
GCAPITAL(1)	.015	.480	.001	1	.975	1.015
GCAPITAL(2)	.123	.405	.092	1	.761	1.131
GPAGESEX			3.889	2	.143	
GPAGESEX(1)	.744	.432	2.964	1	.085	2.104
GPAGESEX(2)	.686	.400	2.940	1	.086	1.985
Constant	-3.547	1.179	6.792	1	.009	21.594

Source: Fieldwork Survey (Dec – March) 2004/2005

For example, Table 15 shows the correct prediction of committal and non-committal as 84.1%, while the Hosmer and Lemeshow shows P-level is above 0.500.

Table 15: Other Parameters of the First Stage Iteration Model (Circulators)

Parameters	Results
Correct prediction of Commercial sex (%)	84.1%
Nagelkerke's R^2 (%)	57.1%
Hosmer and Lemeshow X^2 , sig.	7.342, .500
-2log likelihood	252.181

Source: Fieldwork Survey (Dec – March) 2004/2005

The results of the final stage iteration model in Table 16 provide a slimmer model with only two variables, namely EVAMAR and EVHADSTI, in contrast with that of non-circulators which had GPAGESEX as a third covariate.

Table 16 The Parameters Of The Final Stage Iteration Model of Commercial Sex Committal (The Circulators)

Variables	B	S.E	Wald	D	Sig	EXP (B)
EVAMAR	-3.598	.357	101.804	1	.000	.027
EVHADSTI	1.012	.354	8.192	1	.004	2.751
Constant	4.781	.526	82.696	1	.000	119.190

Source: Fieldwork Survey (Dec – March) 2004/2005

The co-efficient (β) values of both variables are both significant: for EVAMAR at .000 and EVHADSTI at .004 levels. The Wald value for the variable EVAMAR, has increased from its initial value of 61.803 at the first stage to 101.804. EVHADSTI had only a marginal improvement in the Wald estimate, from 7.191 to 8.192. The orientation of committal between the categories of each of the two variables is similar to that observed among the non-circulators. Thus, the married circulators are more likely to engage in commercial sex than the unmarried. The odds is about 27 per cent more likely. Similarly, those who had once had sexual infection are less likely to engage a commercial sex partner. The odds of their less likelihood are close to 3 times. The results of the other parameters of the final model show some minor differences by comparing their values in Tables 16 and 17.

Table 17 Other Parameters of Final Iterated Model (Circulators)

Parameters	Results
Correct prediction of Commercial sex committal (%)	84.1
Nagelkerke's R^2 (%)	53.7
Hosmer and Leme show X^2 , sig. (%)	2.282, .320
The scaled deviance (D_0) (-2log likelihood)	265.583

Source: Fieldwork Survey (Dec – March) 2004/2005

First, the level of correct prediction of the committal / non-committal variable for the whole model remained 84.1 per cent as in the first iteration stage. The Hosmer and Lemeshow significance level (.320) is poorer compared to the first stage model of .502. In like manner,

the reduction, in the scaled deviance, that is the -2 log likelihood is not as large as in the first model. The 53.7% of the variations explained by the two variables, shows that the other six variables in the first model accounted for 3.4% of the variation in the committal pattern of commercial sex among circulators.

Discussion and Conclusion

The paper adopted a novel methodology which enabled it to capture two related population groups, comprising fairly itinerant and non-itinerant groups. It confirms the expected bio-social differences between the two groups, which tend to contradict the common trend in migrants selectivity. The circulators are among others, significantly older and have greater proportion of married folks than non-circulators.

The patterns observed of the three sexuality risk variables show that circulators are more vulnerable on multi-partner sexuality. The proportions of those in sexual intercourse from the first to the third sexual partnership, were successively greater among circulators than non-circulators. The non-circulators on the other hand have a greater tendency for commercial sexuality risk. Default in appropriate contra-infection presents a mixed pattern, which appears to tilt more against the circulators. The implication of the finding is that the tendency for risky sexual orientations, may present different scenarios, depending on the variable of analysis. The generalized impression of greater vulnerability of itinerant persons to sexual risk may have to be qualified. More research would be needed in this direction.

The results of the logistic models show that despite the notable bio-social differences between the two groups, the factors which account for variations in the patterns of committal of commercial sex are not too radically different. Nearly identical sets of variables were selected in the two separate analyses.

Observed differences were few, affecting only the nature of the likelihoods for commercial sex, either between or among the sub groups of some of the categorical variables. The obtained results tend to show that the same set of variables tend to underlie sexual behavioural risk of the circulators and non-circulators, particularly in the context of commercial sexual transactions. Moreover, the nature of the likelihoods between or among the sub-groups of the categorical variables is the same in the two final iterated models of the two groups. Although, three variables show significant values in the non-circulators' final model in contrast to two in the circulators', a closer analysis reveals that the third of the explanatory variables for non-circulators (GPAGESEX) was dropped only at the penultimate iteration stage of the circulators' final model. Even in the non-circulators model in which it was retained, the variable GPAGESEX was not significant in that final model. Observation of the strong showing of the marital status variable is a pointer to the need to step up various programmes that encourage in-marital sex. The result which shows that the ever-married have greater likelihoods in both populations, is an indication of diminishing love in marital setting; heightening the degree of paid-for sex by the two ever-married groups.

The import of the statistically significant status of the variable EVHADSTI, that is the variable on previous experience of a sexually transmitted infection, supports the move by various organizations to employ the services of HIV/AIDS victims in spreading the campaign against the imbibitions of risky sexual behaviour. Their capability to express both pains and other personal experiences convincingly may influence the laggards to imbibe avoid risky sexual practices.

Finally, previous efforts both by governments and related agencies at addressing the problem of HIV/AIDS have identified the markets as a major domain for intervention programmes. It does not appear that such interventions recognized subtle differences that may exist in the different markets and which may enhance further the nature of results from intervention programmes. This study has shown

for example, that the likelihoods for different sexually risky practices are not the same between traders who circulate and those who do not. The knowledge of such differences may assist in repackaging the nature as well as the method of intervention to be deployed in addressing the problem of risky sex orientations between distinct categories of markets workers, or others in similar or different settings.

References

Adegbola, O., O. Babatola and J. Oni. (1995). Sexual Networking in Freetown Against the Background of the AIDS Epidemic. *Health Transition Review* 5 (Supplement): 81-112.

Anarfi, J. K. (1993). Sexuality, Migration and AIDS in Ghana - a Socio-behavioural Study. Pp. 45-68 in *Sexual Networking and HIV/AIDS in West Africa*, ed. J. C. Caldwell et al. Supplement to *Health Transition Review* 3. Canberra: Australian National University.

Anarfi, J. K. (1997). Vulnerability to Sexually Transmitted Disease: Street Children in Accra. *Health Transition Review* 7 (Supplement): 281-306.

Anarfi, J. K. and Antwi P. (1995). Street Youth in Accra city: Sexual Networking in a High-Risk Environment and its Implications for the Spread of HIV/AIDS. *Health Transition Review*, Supplement to Vol. 5, 131-151.

Anarfi, J. K., Ernest W. Appiah and Kofi Awusabo-Asare (1997). Livelihood and the Risk of HIV/AIDS Infection in Ghana: The Case of Female Itinerant Traders. *Health Transition Review*, Supplement to vol. 7, 225-242

Anarfi, J. K. and K. Awusabo-asare. (1993). Experimental Research on Sexual Networking in Some Selected Areas of Ghana. Pp. 29-44 in *Sexual Networking and HIV/AIDS in West Africa*, ed. J.C. Caldwell, G. Santow, I. O. Orubuloye, P. Caldwell and J. K. Anarfi. Supplement to *Health Transition Review* 3. Canberra: Australian National University.

Anarfi, J. K. (1992). Sexual Networking in Selected Communities in Ghana and the Sexual Behaviour of Ghanaian Female Migrants in Abidja, Cote d'Ivoire. Pp. 49-64 in *Sexual Behaviour and Networking: Anthropological and Socio-cultural Studies on the Transmission of HIV*, ed. T. Dyson. Liege: Derouaux-Ordina.

Bilsborrow, R.E. , Oberai, A.S. and Standing G. (1984). *Migration Surveys in Low Income Countries: Guidelines for Surveys and Questionnaire Design*. Croom Helm, London.

Caldwell J. C. , Orubuloye I. O. and Caldwell. P. (1994) Methodological Advances in Studying the Social Context of AIDS in West Africa. In I.O. Orubuloye, J. C. Caldwell, Pat Caldwell and Gigi

Santow (eds) *Sexual Networking and AIDS in Sub-Sahara Africa: Behavioural Research and the Social Context* pp. 1-12 Canberra: Australian National University

Hopkins, W. G. (2001) A New View of Statistics Internet Society for Sport Science: <http://www.sports.org/resources/stats/>.

Lankoande, S., N. Meda, L. Sangare *et al.* (1998). HIV infection in truck drivers in Burkina Faso: a seroprevalence survey (in French). *Medecine Tropicale* 58,1:41-46.

Marck, J. (1999). Long-distance truck drivers' sexual cultures and attempts to reduce HIV risk behaviour amongst them: A review of the African and Asian literature. *Resistance to Behavioural Change to Reduce HIV/AIDS Infection*. 91-100

Marie-Marcelle Deschamps, Jean William Page, Alice Hafner, and Warren D. Johnson (1996) Heterosexual transmission of HIV in Haiti *Annals of Internal Medicine*, vol. 125, 324-330

Orubuloye, I. O., P. Caldwell and J. C. Caldwell. (1993). The role of high-risk occupations in the spread of AIDS: truck drivers and itinerant market women in Nigeria. *International Family Planning Perspectives* 19:43-48,71.

Orubuloye, I. O., Pat Caldwell and John C. Caldwell. (1994). Commercial sex workers in Nigeria in the shadow of AIDS. Pp. 101-116 in Orubuloye *et al.* 1994.

Varga, A. (1997). Barriers to condom Use among Commercial Sex Workers in Durban, South Africa. *African Journal of Reproductive Health*, vol.1. No 1. pp. 74-88

