Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ _____

Joseph H. A. Davies Date

Effect of Interrupted Interview on Survey Responses and Data Quality: an Implication for Validity of Demographic Health Survey Outcome

By

Joseph H. A. Davies
Master of Public Health

Hubert Department of Global Health

Robert Stephenson, PhD, MSc
(Committee Chair)

Deborah A. McFarland, PhD, MPH
(Committee Member)

Effect of Interrupted Interview on Survey Responses and Data Quality: an Implication for Validity of Demographic Health Survey Outcome

By

Joseph H. A. Davies

Bachelor of Science
University of Sierra Leone
1999

Thesis Committee Chair: Robert Stephenson, PhD, MSc (Associate Professor)

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in the Hubert Department of Global Health
2012

Abstract

Effect of Interrupted Interview on Survey Responses and Data Quality: an Implication for Validity of Demographic Health Survey Outcome

By

Joseph H. A. Davies

Background

The Demographic Health Survey (DHS) is one of, if not the only, most widely used source of data for critical policy decision making, planning, and implementing, as well as monitoring and evaluating health and public health programs. Like most survey data collection, it is not devoid of data quality issues resulting from interrupted interview because, even though it reports the presence of a third party during interview, it fails to provide measures to correct for this effect on data quality, which can have implications for the validity of such data.

Aim of study

This study assesses the effect of Interrupted Interview on data quality of 2008 DHSs of two West African countries: Ghana and Nigeria. This study also proposes some implications for policy and public health programs and provides recommendations to improve future DHSs.

Method

Bivariate and multivariate logistic regression analysis was done on/for an individual married women survey to assess the level and significant association of interrupted interview on response pattern in relation to both nature of question and socio-demographic characteristics of respondents.

Result

Results show a relatively low proportion of interrupted interview among married women from both countries: Ghana, 7.8%; Nigeria, 6%. They also show significant association between interrupted interview and socio-demographic characteristics, such as education, place and region of residence, and household wealth status of respondents as follows: Ghana, place of residence p=0.002; region of residence, p=0.000; and wealth, p=0.003; Nigeria, age, p=0.000; education, p=0.000; religion, p=0.000; parity, p=0.001; and place/region of residence, wealth and ethnicity, p=0.000. The result, however, indicates no significant association between interrupted interview and nature of question except for >1 sex partners in the last 12 months among married women in Nigeria.

Conclusion

It is therefore concluded that the issue of interrupted interview should not be overlooked because it has an effect on the responses provided, which can have an implication for the quality of data generated by one of the most reliable data sources, the DHS. Measures should be instituted to correct for such effects in not only the data collection process, but also the design, collection, and analysis processes of future DHSs.

Effect of Interrupted Interview on Survey Responses and Data Quality: an Implication for Validity of Demographic Health Survey Outcome

By

Joseph H. A. Davies

Bachelor of Science
University of Sierra Leone
1999

Thesis Committee Chair: Robert Stephenson (Associate Professor), PhD, MSc

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in the Hubert Department of Global Health
2012

Acknowledgement

The outcome of this thesis is the product of the many hard and marvelous works and support of numerous individuals and Institutions that I would want to recognize in this document.

At Emory University, my sincere thanks and appreciation go to faculty and staff of Hubert Department of Global Health, Rollins School of Public Health. I am grateful to Dr Robert Stephenson and Dr Deborah McFarland, thesis advisors for standing by me in enhancing a thorough work, helping me think through the topic and process of analysis and final write up. Also for their moral support even when the work was becoming challenging.

At the Measure DHS, special thanks to the team for granting me permission to have access to the dataset use for this study. Also, special thanks to the Ghana Statistical Service (GSS) and The Nigeria National Population Commission (NNPC) and respective research teams for their effort in putting together such a wonderful and excellent piece of work, the 2008 DHS Dataset.

My special thanks also go to Dr William H Foege and members of the Foege fellowship management and funder, not forgetting staff of CARE International and CARE Sierra Leone, for providing such an opportunity that led to my submission of this piece of work. To my few friends here and out of Rollins School of public health, thanks for all the support in brainstorming, collaborations and support throughout the past 20months.

I cannot end without acknowledging the role of my family here and back in Sierra Leone for their patience and understanding in all the time spent away from them. Special love and thanks to my beloved wife, Elizabeth and daughters Doris, Munjay and Nyanga. You are most special and appreciated.

Contents

Chapter 1

Introduction

In recent years, surveys such as the Demographic Health Survey, have been and continue to be used as a critical method of generating data for program and policy decision making in low and moderate income countries. The DHS is a fundamental data source in the design, planning, implementation and evaluation of development programs by government and development agencies (DHS statistical guide 2006). Ensuring that data for such critical decision making are of high quality has been a concern of many researchers. The context of events, thoughts and feelings that lead to a given response should be considered as constituting a totality of the circumstances operating while data is being collected during a survey interview (Tabane and Bouwer, 2006).

However, DHS has failed to demonstrate what measures are instituted to adjust for the effect of an interrupted interview due to third party presence, during data analysis. Responses provided by participants in an interrupted interview can be affected by what is referred to as the social desirability effect especially when the topic being investigated is considered sensitive (Aquilano 2000). The tendency to assert a behavior or attitude normatively acceptable by society by either refuting or hiding a socially undesirable behavior is referred to as social desirability effect (Kuncel et al, 2009; Randall et al, 1993; Smith, 2007). The conduct of an interview in the presence of a third party (interrupted interview) has ethical implications and but also data quality implications emanating from the response patterns of respondents who might be found in such situations. In spite of the fact that the DHS trains and instructs interviewers to ensure privacy of survey participants and to record any interruption due to the presence of a third party, little has been on how this guidance is implemented, what effect interview

interruption has on the data collected and how analysis of DHS data make adjustments for such interruption if recorded.

The Demographic Health Survey (DHS), which was started in 1984 as follow-on to the World Fertility and Contraceptive Prevalence Survey projects, with funding from United States Agency for International Development (USAID), has for over twenty five years contributed to advance global understanding of health and population in over 85 countries. It has collected national representative data on health issues such as fertility, family planning, maternal and child health, gender, HIV/AIDS, malaria, and nutrition. In addition to its objective of collecting data for policy formation, program planning, monitoring and evaluation, the DHS also aims at fostering and reinforcing country ownership of data collection, analysis and use; use of the most appropriate data collection methods in a cost effective way; and increasing capacity of host countries in the collection and use of data for programming and policy formulation (Measure DHS brochure 2006).

The DHS, like most other surveys, have incorporated measures to ensure well trained and skilled interviewers, well designed data collection tools and process and privacy during interviews (DHS Statistical Guide 2006). Studies that recognize that participants can be made vulnerable by participating and value the need for nonjudgmental attitudes from researchers, are more likely to empower participants by reducing this threat through greater acknowledgement of the ethical accountability and how rights and responsibilities can be integrated into design, conduct and dissemination of findings (Trudi James and Hazel Platzer 1999). Data collection tools used by the DHS have undergone review and standardization to ensure compliance to survey standards. Interviewers are trained and instructed to ensure privacy and confidentiality of the interviewee before proceeding with interview especially surveys on sensitive issues.

Despite the measures instituted by the DHS to ensure privacy during interviews, this is sometimes compromised by the presence of a third person - the spouse, other relatives, mother-in-law, or bystanders who might be curious to know what the interview is about and who might be tempted to interject in the discussion.

The quality of data generated during a survey is influenced by a range of factors such as the survey instrument, the design process, interviewer characteristics, interviewing context (culture and environment) and the nature of the issue being investigated (Galestic et al, 2009; Groves, 2006; Tseng, 2001; Aquilano and Singer et al, 1993). If a survey is carried out by an untrained, unskilled, judgmental interviewer, in an unsafe environment where the issue being investigated is socially desirable, the data collected from such survey has a high potential of being erroneous and unreliable. Three possible outcomes that may originate from research on issues considered to be intrusive, socially desirable and a threat of disclosure are refusal to participate in the research (survey response rate), refusal to respond to a particular item (item response rate) and misreporting by answering in a socially desirable way (response accuracy). Together these are key contributors to survey errors and biases.

The nature of the question and the presence of a third person during a survey interview have been shown to have influenced the pattern of responses provided by survey respondents (Tourangeau et al, 2000). Issues such as sexual behaviors, domestic violence, female genital cutting, drug use and contraceptive use, are considered sensitive in some research contexts and so investigating these issues requires skill, well designed tools and consideration of high ethical standards (WHO 2001).

Similarly, the presence of another person during interviews on a sensitive issue does not only have data quality issues but also ethical implications. A participant's

privacy may be compromised and confidentiality threatened if adequate measures are not taken to ensure ethical standards are met. . An interrupted interview might lead to a respondent providing inaccurate responses in a socially desirable way. Respondents may tend to underestimate or overestimate their behavior in order to have a balance with societal expectations (Chung and Monroe 2003). The issues of socially desirability effects continue to be a challenge to the quality (validity) of survey data and have been a widely investigated phenomenon since the 1960s (Uriell et al, 2009; Tourangeau et al, 2000; Richman et al, 1999; Taylor, 1961).

The ethical responsibilities of those who conduct human research involve obligations to ensure that research participation is based upon informed consent and that subjects are not harmed by their participation in the research. In accordance with the WHO ethical guidelines for conducting research on sensitive topics with human subjects, interviews should be conducted only in a private setting; participants should feel free to reschedule (or relocate) the interview to a time (or place) that may be more safe or convenient for them; obtaining initial consent, the sensitivity of the research topic should be raised; and process consent should ensure introduction of any section enquiring about violence carefully, forewarning the respondent about the nature of the questions and giving them the opportunity to either stop the interview, or not to answer these questions (WHO 2001). Interviewers may try to ensure privacy but may not want to jeopardize the smooth process of the survey by insisting on a more private environment to conduct the interview.

Aim of study

This study aims at ascertaining the effect of an interrupted interview on response patterns and quality of data of the 2008 DHS data from two West African countries, Ghana and Nigeria. It is focused on the individual women's survey on selected questions

classified by me as ‘sensitive’ and ‘non sensitive’. Some questions included in the survey are thought to have a high probability of creating discomfort, threat, or may influence social desirability responses. These were considered to be ‘sensitive questions’. Comparison is made with responses to questions considered non sensitive to assess the level of social desirability responses among participants. The study analysis was conducted on responses provided by married respondents in the women’s survey from the two countries.

Specific objectives

In accomplishing the aims of the study, the effect of interrupted interview and direction of response will be assessed by answering the following questions:

- What is the level of interruption during interviews of married women respondents in the 2008 DHS of Ghana and Nigeria?
- Is there any significant association between an interrupted interview and the nature of the question, sensitive and non-sensitive?
- How does this association vary by socio-demographic characteristics of study participants when they are interrupted during an interview in each of the study countries?
- Are there differences in response pattern between the two study countries?

An assessment of the effect of a third party presence during interviews on response patterns during an interview will provide a base for corrective measures during survey data collection and analysis. It will also contribute to literature on the effect of an interrupted interview and its relationship to the social desirability effect. Understanding effect of an interrupted interview on response patterns and hence the data quality will help future surveys enhance better quality of data provided for critical decision making. It will also contribute to maximize ethical consideration in survey data collection process.

Chapter 2

Literature Review

There is a small, but consistent, literature on effects of the presence of a third person during a face to face interview. Studies have focused on data quality (Edward et al, 1997; Drew et al, 2004), ethical issues (Taylor & Vocht, 2011 and the social desirability effect (Pollner & Adams, 1997; Aquilano et al, 2000; Zagorsky, 2003; Zipp & Toth, 2002; (Aquilano, 1993; Laumann, Gagnon and Michaels, 1994)). Third party presence is common and has potential effect on responses provided during interview (Zipp & Toth, 2002; Taylor & Vocht 2011). Available studies on biases due to response patterns resulting from the presence of a third party during interviews are limited partly because of the varying methodological approaches that have been used to investigate this issue.

Social Desirability effect and Data quality

Studies have shown that data from self reporting during interviews as well as self administered questionnaires and telephone interviews may be prone to the social desirability effect depending on the nature of the issue being investigated and the context (Edwards et al, 1997; Aquilano et al, 2000; Anderson et al, 1994; Zagorsky, 2003). This may have an implication for the quality and validity of the study outcome. The tendency for someone to assert desired behavior or attitude normatively acceptable to society by refuting or hiding socially undesirable behavior (s) is called the social desirability effect (Kuncel et al, 2009; Randall et al, 1993; Smith, 2007). In order to conform to socially acceptable behaviors and values, participants tend to present themselves in a positive way to gain social approval or avoid criticism (King and Brunner, 2000; Huang et al, 1998). This effect is more likely to occur when the question is sensitive (King and Brunner 2000). Such effect has been reported for studies on

dietary intake (Tooze et al 2004; Scagliusi et al 2003), domestic violence (Babcock et al 2004) and sexual practices (DiFranceisco et al 1998). Some researchers believe that social desirability is a personal trait that can be divided into conscious effort to claim positive features, denying undesirable ones and deliberately posing oneself in a favorable way (Schoderbek et al, 1996).

The pattern of responses, when investigating sensitive topics, mostly do not reflect respondent's true behavior or attitudes, resulting in a misrepresentation of values that measure socially desirable or undesirable items (Kuncel et al 2009; Tourangeau et al, 2000). Such misreporting is a major contributor to systematic error and as the sensitivity of the topics increases, the quality of the responses decreases hence an increase in systematic error (Tourangeau et al (2000)

In a research context, sensitive questions are aimed at exploring possible deviation from social norms by respondents. If the nature of a question is so sensitive to the extent that respondents may provide socially desirable responses, potentially resulting in underestimation or overestimation of their behavior in order to have a balance with societal expectations (Chung and Monroe 2003), this will ultimately produce less valid data. The issue of socially desirability effect continues to be a challenge to the quality (validity) of survey data and has continued to be a widely investigated phenomenon since the 1960s (Uri ell et al, 2009; Tourangeau et al, 2000; Richman et al, 1999).

Literature suggests that the characteristics of an interview situation have become increasingly important in affecting responses. As survey items become more threatening or sensitive, so does the response pattern in a more desirable way. The more sensitive or threatening the topic, the greater the probability there is for survey characteristics, such as interview mode, to affect tendencies toward socially desirable responding

(Aquilano 1990). Krum pal (2007) reported that aspects of the survey design, the interviewer's characteristics and the survey situation, influence the occurrence and the degree of social desirability bias. "Survey designers could generate more valid data by selecting appropriate data collection strategies that reduce respondents' discomfort when answering a sensitive question" (Krum pal. 2007). Questions asking about taboo or sanctioned topics such as sexual activities, illegal behaviour such as social fraud, or unsocial attitudes such as racism, often generate inaccurate survey estimates which are distorted by social desirability bias due to respondents underreporting socially undesirable behavior and over reporting socially desirable ones. "Sensitive questions are prone to systematic measurement error due to the respondents' social desirability concerns…. perceived social norm has the strongest and most consistent effect on the respondents' propensity to self-report socially undesirable behavior in a more acceptable manner" (Naher & Krumpal 2011).

Aquilano (1993) reported that disparity in interview privacy can be a source of response effects in survey data on marriage. Spousal presence influenced reporting on sensitive factual information concerning marriage. Respondents were more likely to report cohabiting with spouse before marriage if spouse was present (Aquilano, 1993). He also stated that spousal presence in household surveys is a common practice especially among married couples and is not a non-random occurrence but a function of marital companionship, employment status, socioeconomic status, household type and age, race and sex of respondent. This then influences survey responses on sensitive questions and trips a potential for response effect in married surveys (Aquilano, 1993). He however indicated that the direction of response depends on the nature of the question.

The characteristic of the person present during an interview also has an influence on the pattern of response (Smith, 1997; Aquilano et al, 2000). Age and relationship of the interviewee to the third party may influence the response in a socially desirable manner. Adolescents are less likely to report illicit drug use if their parent or an older person is present. Parents are less influenced by the presence of their children under 6 to report inappropriate (socially desirable) sexual behavior but as the child's age increases the tendency to report inappropriate sexual behaviors in their presence reduces (Smith, 1997).

According to the World Health Organisation, interviews are a systematic way of talking and listening to an individual for the purpose of obtaining valid information from the respondent's genuine perception and interpretation of a given situation. "It is not simply concerned with collecting data about life. It is part of life itself and its human embeddedness is inescapable" (Cohen, Manion and Morrison 2000). It is therefore the responsibility of the interviewer to present questions in the best and most appropriate way in order to obtain valid response (Annabel 2008). Interviews should have a dual goal of motivating respondents to provide full and accurate responses while avoiding biases resulting from social desirability, conformity, or other constructs of disinterest (Hoyle, Harris and Judd 2002).

Fundamentals of cultural diversity should be considered in the collection, analysis, interpretation and dissemination of data from studies involving human subjects. Mostly, data collection is less concerned with the process that makes data available than the information it provides. The context of events, thoughts and feelings that lead to a given response and in which the responses are then made should be considered as constituting a totality of the circumstances operating while data is being generated and collected (Tabane and Bouwer, 2006).

In most cases, interviewers may suggest to respondents the need for privacy but respondents cannot always control the behavior of other family members and the interviewer may be reluctant to antagonize a respondent by insisting on complete privacy and thereby jeopardize the completion of the interview (Aquilano 1993). Smith (1997) recommended that although third party impacts are fairly rare, small or vary, the need to better understand their relationship to the survey context and appropriately address possible negative effect on ethical and data quality should be considered in survey designs. Edwards et al (1997) emphasized that a review of the question and decision on privacy should be done before data collection. The interviewer should have the skills to ensure privacy for the survey participant in order to minimize measurement errors emanating from third party presence during interview especially on sensitive topics.

What is expected to be cross-interaction and cross-exchange of information during an interview can be hampered by extraneous factors such as nature of question, interviewer characteristics, culture and who is present (if any) which affect the accuracy of the data. Tseng (2001) reported that an interview is a complex situation and this complexity can be influenced by factors affecting the interviewer and interviewee and hence the outcome of the communication between them. Responses to research questions, in the presence of another adult, are not only influenced by the nature of the question but also by the gender of either the respondent, the third person present or the interviewer (Anderson et al, 1994; Smith, 1997; Drew et al, 2004). Literature also indicates that significant bias exists in responses provided by wives in relation to deprivation questions that do not hold for husbands (Cantillon and Newman 2005). Zagorsky (2003) found wide discrepancies between husbands' and wives' answers to the same question when interviewed together initially and then separately at the same

time in different rooms on issues of household income. Men are more like to over report income status and women are more likely to over report debt. Other research has shown that the presence of one's partner in a joint interview will influence the experience of participation and also the description he/she provides to an event (Taylor & Vocht, 2011). Similarly, Zipp et al (2004) in assessing whether agreement between husbands and wives on stereotypical men's and women's issues increased when one of the spouses heard the other's responses before answering himself or herself, found that wives were much more likely than husbands to agree with their spouses' known answers no matter whether or not she is better placed socioeconomically.

In another situation, Fisher (2007) found that men have the tendency to report inflated sexual experience and number of sexual partners when they are either being interviewed by a female research assistant or when they discover that women are reporting more sexual permissiveness and experience. But this pattern of response by men did not occur in the case of male research assistants. This could have been as a result of male social dominance and a defensive reaction to the feminized study environment (Connell, 2001) and could be seen as a way men try to maintain the status quo of hyper masculinity. McConaghy (1999) indicated that disparity in self reported number of sex partners by men and women is a major example of bias and unreliability of survey data on sexual experience.

Individuals have the potential to portray themselves in a positive way by self reporting behaviors that are socially desirable in order to avoid negative assessment (Latkin, 1998; Loo and Thorpe, 2000). This has an implication for epidemiologic studies on sexual behaviors for HIV transmission (Brody 1995). This is a threat, as put by King and Bruner (2000) and Pauhus (1991), to the validity of survey research findings because 'it (social desirability bias) has been consistently neglected in scale

construction, evaluation and implementation' (King and Bruner 2000). "The tendency for individuals to provide socially desirable responses (endorsement of questions in a manner to portray a positive view of oneself) was identified as potentially clouding the interpretation of responses to structured personality inventories (Block, 1965). Similar concerns have been raised for self-reports of intravenous drug use (Celentano, Muñoz,

Cohn, Nelson, & Vlahov, 1994; Latkin, 1998, Latkin, Vlahov & Anthony, 1993), adolescent sexual behavior (Cecil & Pinkerton, 1998), condom use (Sheeran & Abraham, 1994; Williams & Suen, 1994), and self-presentation effects of HIV sexual risk self-reports (DiFranceisco, McAuliffe, & Sikkema, 1998).

However, not all studies indicate social desirability responses; some reports indicated that self reporting of condom use was not influenced by social desirability effect in a study of condom use among commercial sex workers as was validated by STI data obtained from social hygiene clinics in Philippines (Morisky et al 2003). Also, most cross-cultural studies on social desirability have indicated that the effect of response bias across different ethnic groups was found to be negligible and not significant (Hebert et al., 2001; Kijima, Tanaka, Suzuki, & Kitamura, 2000; Pole et al, 2001).

Achieving an ideal private interview situation has been difficult even though over the past 3 or so decades the presence of a third person during an interview has continued to decline from 57% to 37% in high-quality national in-person surveys such as the National Opinion Research Center (NORC) (Smith 1995). Surveys that deal with sensitive issues and emphasize caution against the presence of others can further minimize the effect of a third person presence. Smith (1995), despite recommending the critical importance of privacy in face-to-face interviews reported rare and small impact of third party effect on responses during interviews. His report is consistent with Michael and Michaels (1994), who indicated that spousal presence has no statistical significant

association with interview responses. They however conclude that the nature of the topic being investigated, the mode of interview (computer versus paper filled and self-completed response), sample size and questions being discussed during the interviews are key to determining the direction and pattern of response (Aquilano et al 2000; Smith, 1995). Issues that are closely related to marital matters (Aquilano 1993) show statistically significant differences compared with those that are not (Smith 1995). Smith (1995) further reported that because of consistency between his and Aquilano's work on the little or no significant effect of a third party on responses during interview, an understanding of this effect requires a number of steps: understanding of the nature (who, how long was s/he present and extent of third party involvement) of the third party present (Suhao Tu, 2000); the demographic and socioeconomic characteristics (gender, education) of respondents; susceptibility of questions to such effect; validating studies to determine the level of such effects; focus on why such effects occur; and experimental studies (with random assignment of third party) should be used to determine such effect.

As a result of issues of social desirability and its subsequent effect on data quality in research, some studies have incorporated mechanisms to correct for such biases. Studies found to be affected by social desirability should incorporate new indicator/scales of measure to validate the report (Mortel, 2008). The National Institutes of Health (NIH) strongly recommend the inclusion of social desirability scales in the assessment of STI/HIV risk behavior (Merson, 1997). Among most commonly used scales is the Marlowe Crowne Social Desirability Scale (MCSDS) which has been shown to correlate with self-report of psychopathology (Paulhus, 1991), reactions to persons with disabilities (Jones & Stone, 1995), aggressive behavior (Lange, Dehman, & Beurs, 1995), self-reported HIV serostatus for injection drug users (Latkin, 1998), and tendency

to report lower levels of anxiety and loneliness and higher levels of self efficacy (Watson, Milliron, & Morris, 1995).

Social desirability effects in a survey can be assessed by various approaches. Pretesting of the survey to determine item susceptible to social desirability (Tourangeau et al, 2007) and inclusion of social desirability scale in the survey instrument in order to make statement about a possible effect (Sandal et al, 2005; Moon, 1998) are ways by which such effects have been assessed. These can contribute to the validity and reliability of the research outcome.

Studies comparing survey methods of computerized and paper-pencil questionnaires showed variation in findings on social desirability biases, response rates and response accuracy. Richman et al (1999) found that computer-administered surveys generated lesser social desirable response biases than paper-pencil surveys did. But this was contradicted by Wood (2006). Face-to-face interviews usually pose a problem of getting respondents to provide answers to sensitive questions due to either the demographics of the interviewer or the nature of the topic being investigated. This situation is made worse by the presence of a third person especially when the question being discussed has social desirable potentials.

Recently, however, the results from Kim et al (2008) of a comparison of computerized surveys to paper-pencil surveys supported prior findings of computerized approach gaining higher disclosure of sensitive topics than paper-pencil questionnaires.

Data Quality

Another challenge to data quality is errors due to the length of the questionnaires. Research indicate that longer surveys, compared to shorter ones, have more missing data and lower unit response rate (Stanton et al, 2002; Wood et al, 2006). The reported decline in response rate by researchers has been explained to be related

to the sensitivity of the topics and the how they are approached (Groves, 2006, Singer et al 1993; Olbrook, A.L., 2006). Other schools of thought believe that the length of the survey (Galestic et al, 2009), the topic (Heberlein et al 1978) and not its sensitivity determine participation.

A comparative analysis by Wutich et al (2010) on the degree of responses produced on sensitive topics in focus groups versus open-ended self-administered questionnaires indicated that 'moderate sensitive topics' has similar responses both in the focus groups and questionnaires, but 'highly sensitive topics', provided less information in focus groups than on open-ended questionnaires. However, focus groups provide more information on highly sensitive topics if such discussion yields constructive contribution to an urgent problem (Wutich et al 2010). Aday et al (1995) suggested that the composition of the interview setting can also in itself influence response biases, i.e., over reporting on certain behavior in the presence of peers, and on the contrary, underreporting in the presence of authority figures.

The sensitivity of topics may reduce the reliability and validity in collected data. Since business ethics is by nature a sensitive topic, researchers within this field will be confronted with the challenges of conducting valid data collection (Einarsen 2004).

Religion, measured in a variety of ways, appears to exert significant direct and indirect influence on a range of personal attitudes and behaviors (Regnerus 2003). The same can be said for religious influences on the emotional and physical health and behaviors (Sherkat and Ellison 1999). However, some scholars are skeptical about claims of religious influence, and instead attribute the seeming effects of religion to selection effects, social desirability bias or lack of candidness in survey responses, spurious artifacts, or a combination of these (Cochran, et al. 1994; Sloan, et al. 1999).

Ong et al (2000) did research on what impact anonymity in questionnaires has on responses to sensitive questions. Results showed that normalization did not influence response accuracy but privacy did. Thus, trivializing sensitive topics in surveys is likely to not have any effect on enhancing the data quality

Ethical consideration

When interviews are conducted ethical issues with respect to safety and confidentiality of respondents must be a paramount concern. Interview outcomes should not be a source of harm or devious means of promoting something to a respondent (Gray 2004). Interviews that might cause unease for the respondent should be discontinued or postponed and ethical consideration should be instituted (Patton, 2000; Gray, 2004); and researchers must take cognizance that the purpose of the research is to collect data and not to change respondents or their opinion (Gray 2004).

In compliance with biomedical research standards, studies involving human subjects must ensure maximum ethical standards in terms of privacy and confidentiality in order to protect the subject from any harm (CIOMS-WHO, 2002). Or better put, participants must suffer no harm from research involving human subjects, or the likelihood and degree of possible harm must be outweighed by the benefits of the research to the participants or the larger society. The ethical responsibilities of those who conduct human research involve obligations to ensure that research participation is based upon informed consent and that subjects are not harmed by their participation in the research (CIOMS, 2002). The standard practice by researchers in compliance with ethical principles is to have a signed informed consent by participants during data collection (Callahan & Hobbs, 1998), conduct interviews in a private environment (Zipp & Toth, 2002) and ensure confidentiality of research outcomes. In many situations the traditional method of obtaining informed consent makes it challenging or even

impossible for the need of process consent (Munhall, 1993) because strict adherence to details of ethical consideration may make data collection cumbersome or even non achievable within the specified time frame. Attention should be given to development of risk of participation throughout the study process (Raudonis, 1992). Ethical concerns about psychological and social well-being of respondents are heightened when the focus of the investigation is on highly private, sensitive, threatening and sanctioned human behaviors such as sexual behaviors, illicit drug use, contraceptive uptake etc (Tourangeau et al, 2000). Ethical concerns may arise during data collection and dissemination of study findings by researchers on even seemingly innocuous aspects of peoples' lives. The fear of using disseminated study report, which is no longer in the control of the researcher, for personal and 'political' gains by powerful persons in a community is of much concern. Results may be used in ways, for example, that may bring about arduous, harmful changes in the lives of the people being studied if privacy and confidentiality are ignored during such data collection.

Studies that recognize that participants can be made vulnerable by participating and that value the need for nonjudgmental attitudes from researchers are more likely to empower participants by reducing this threat through greater acknowledgement of the ethical accountability, and how rights and responsibilities can be integrated into design, conduct and dissemination of findings (James and Platzer 1999). Vulnerability can be determined by the sensitivity of the issue and the subject under study. The nature of the topic means that issues of safety, confidentiality and interviewer skill and training are comparatively even more important than for other areas of research. Similarly, the safety and well-being of both the subject and researcher is subject to risk if precautionary measures are not instituted (WHO 2001).

The World Health Organization (WHO) in its 'Putting Women First' report recommended ethical standards for research with women on sensitive and threatening issues like domestic violence. This document also stated that if interviews are conducted in nonjudgmental and appropriate settings, women can discuss their experiences of violence (WHO 2001). Such interviews, on sensitive topics, should be conducted only in a private setting; participants should feel free to reschedule it to a time or place that may be safe or convenient for her; sensitivity of the topic should be communicated to her during consent procedure; and participants should be forewarned at every section about the nature of the question with the opportunity to discontinue the interview or not provide response to such question (Tourangeau et al, 2000).

Confidentiality is also vital in the selection and training process of the interviewer. The interviewer is the bridge between the subject and the principal investigator who has the primary responsibility of protecting the rights and welfare of the subject and ensuring maximum ethical standards. The process of assuring confidentiality and informed consent should be strictly followed. The investigator may have the highest ethical standards but unless these have been conveyed to and internalized by the interviewer, the subject's rights may be violated. Interviewer training should stress that under no circumstances are staff to succumb to pressure from any individuals to disclose confidential material (Ringheim, 1995). Women, for example, must be protected from any pressure on the part of husbands to learn of their answers.

Protecting confidentiality and ensuring privacy are essential to ensuring both participant's safety (Current Issues in Research Ethics, 2011) and data quality. This should be emphasized in training of interviewers; key safeguards are not having another person listening or present during interview, not writing names of respondents, safe keeping of recordings and tapes or photographs if any. For research to be useful in

understanding sexual behavior, training and instructions must underscore that the method is ethical, accurate and conscientious. The Council of International Organizations of Medical Sciences (CIOMS, 2002) maintains that research involving human subjects should be done in accordance with the four ethical principles of respect for persons (autonomy), beneficence, non-malficience and justice. 'Sexual behavior research must particularly satisfy these criteria if not to be suspicious of voyeuristic or political motives' (Schoepf, 1991). No matter the goal of the research, it must not endanger the psychological well being of participants or put them in at risk of social ostracization or repercussion from family or community (CIRE, 2011). The search for knowledge and truth must not compromise the safety of the participants.

While it has not been uncommon, particularly in developing country surveys, for interviews to be conducted with individuals who are surrounded by curious children, spouses and neighbors(Aquilano 1993), the nature of questions regarding sexual behaviour demands either absolute privacy or a self-administered questionnaire. Individuals should be interviewed in private**,** out of earshot of others, including children, spouses, parents, family, friends, teachers and neighbors (Ringheim, 1995). The nature of the survey topics does not only have an impact on the response pattern, which ultimately affect on validity and reliability of the study outcome, it also has ethical implications. Some questions may be considered intrusive of respondent's privacy (Tourangeau et al, 2000). This tendency might also affect the interviewer who might think by asking such question s/he is being intrusive and therefore fail to ask it (Einarsen, 2004). This may have a direct implication for response rate and data quality. Another ethical issue is that the respondent might believe that study outcomes might end up in the wrong hands or confidentiality might be breached (threat of disclosure); if so, s/he might refuse to participate (Singer et al, 1992) or worse provide inaccurate (under

report or over report) response (Aday et al, 1995; Horm et al 1996). Ensuring privacy and confidentiality has been argued by some researchers to ironically lower response rate (Singer et al, 1992) by letting respondent to be 'conscious to a dilemma' that he/she did not give prior thought to. It was further reported that confidentiality assurance to sensitive questions does have an effect (Singer et al, 1993).

An interviewer's physical presence does not appear to be of importance in data quality, what matter is "the threat that someone whom the respondent reports… will learn something embarrassing about the respondent or will learn something that could lead them to punish the respondent in some way" (Tourangeau et al, 2007). In contrast, in qualitative studies, the presence of an interviewer and an extended interaction between the interviewer and respondent in order to create comfort and rapport are inevitable. But this has some pitfalls especially during interviews on a sensitive topic. The characteristics of the interviewer such as psychological, physical and background can have an impact on responses (Miyazaki et al 2008). Holbrook et al (2006) tested the hypothesis that 'indigenous interviewers' were better in gaining sensitive information than 'in-house interviewers'. The theory behind this hypothesis was that respondents are more trustful and feel less uncomfortable if the interviewer has similar background to the respondent. The findings showed, on the contrary, that the in-house interviewers obtained higher degree of honest responses on sensitive topics, and the indigenous did not obtain better cooperation with the respondents. Two possible explanations were forwarded for this finding: the in-house interviewers have more training and experience than indigenous interviewers, and more importantly there is a greater social distance between in-house interviewers and the respondent, and as a result, respondents are more comfortable to respond on sensitive topics. Despite the sensitive nature of issues

like domestic violence, over 50 studies have been successfully conducted worldwide (WHO, 1997; Heise et al., 1999) by adhering to ethical and safety considerations.

Morton-Williams (1993) reiterated that the assurance of a privacy and confidentiality in interviews involving especially sensitive issue is crucial and the primary responsibility of the interviewer who initiates and conducts the discussion. Usually, control of the environment (place, time and presence of others) where the interview is taking place is beyond the ability of the interviewer hence profound examination is not given to it (Suhao Tu, 2000).

Rates of disclosure are also related to the nature and length of other questions in the interview, the number of opportunities respondents are given to disclose, and the presence or absence of others during the interview (Ellsberg et al., 2001). The number of item non-responses is determined by social distance and/or interview rapport, with a focus on responses of “refusal” and “don’t know”, implying the respondent’s lack of willingness and ability to provide substantive responses to sensitive questions (Su-Hao & Pei-Shan, 2007). Confidentiality is also essential to the validity of the study, since those who do not trust that their answers to highly sensitive questions will be held in strict confidence are likely to either refuse to participate or to be less than forthright in their answers (Ringheim, 1995).

In spite of the many works on the effect of third party presence on response, there exists limited published work on such effects in Ghana and Nigeria, the countries focused on in this thesis and the DHS surveys conducted in the same countries. Also, the extent to which statistical methods are being used to adjust for possible effects in available studies is still limited. Studies that have reported such effect have done so in either one of the following areas: participant’s responses are more likely to be socially desirable when questioned about their competencies (Blair and Coyle; Cossette et al

2005) or socially sensitive topics such as domestic violence (Henning et al 2005), controlling behavior (Mahalik et al 2005); violence toward dating partners (Straus 2004); levels of drug and alcohol use (McGilloway and Connelly 2004); and dietary intake (Tooze et al 2004)

Not only is the tendency for social desirability bias pertinent to DHS survey protocols, it can also lead to reporting false results. Few reasons why previous empirical studies have not been able to provide adequate theoretical explanation for the non significant effect of third party response effect and the importance of privacy are that the issue has been treated as a minor situational variable in the response effect model and possibly the interaction of this effect with other major variables such as respondents and interviewer characteristics (Hartmann, 1994/95), survey administration and question content (Suhao Tu, 2000).

In highlighting the complexity and limitation of social desirability in research on sensitive issues, Steenkamp et al (2010) stated that "this phenomenon introduces extraneous variation in scale scores, which compromises the validity of marketing survey data" and when encountered the sensitive nature of business ethics research social desirability present a greater threat to the validity of the data collection than in other organizational research (Randall et al, 1991). Chung and Monroe (2003) found that the more unethical the action, the higher degree of social desirability responses.

The study will assess the extent of a third party influence on 2008 DHS data for two West African countries of Ghana and Nigeria; determine the significance of such effects on data quality; and make recommendations for future similar surveys.

Chapter 3
Methodology

Study context

The study was conducted using 2008 DHS from two West African countries, Ghana and Nigeria. Both countries were British colonized, English speaking countries that gained independence in the late 1950s and early 1960s. They lie on the coastal plain of West Africa separated by Togo and Benin.

Ghana is centrally located with a land area of 238,537 square kilometers. It is a lowland country with a range of hills and a mountain, Mt. Afadjato, 884meter above sea level. It has the world's largest artificial lake, Lake Volta. Ecologically, Ghana is divided into 3 zones: a sandy coastal line with coastal plains and several rivers and streams; middle belt, heavily forested with many streams and rivers; and Northern savannah drain by black and white rivers (DHS 2008). Ghana is a tropical country with average annual temperature of 26^0C (79^0F) and annual rainfall ranging from 1,015ml and 2,030ml. It has two distinct seasons, Rainy and Dry seasons, separated by a dry desert wind, Hamattan, which blows between December and March.

The country has a population of 25 million people with 47% living in rural areas (World Bank 2010). It is administratively divided into 10 regions and 170 districts. It has over 25 ethnic groups with the 4 main ethnic groups each having more than 8% of the population (GSS, 2002). Literacy rate in Ghana is 75% (79% for women 15-24 years); life expectancy is 64years (male) and 66yrs (female); birth rate is 4 per woman; HIV/AIDS prevalence among population age 15 – 49yrs is 1.8%; contraceptive prevalence 24%; maternal mortality, 450 (UNICEF 2011) and under five mortality 74/1000 live births (World Bank, 2010).

Primary sources of data include censuses, administrative/routine data, and surveys with population censuses providing more comprehensive demographic data but expensive to conduct. The DHS which is an example of a sample survey is much more less resource intensive and cheaper to conduct than the population census. As one of its objectives, to strengthen capacity of national structures, the 2008 DHS was conducted by the Ghana Statistical services (GSS) and Ghana Health services (GHS) with funding and technical support from USAID, ICF Macro and Ghanaian government. The 2008 Ghana DHS is the fifth national demographic and health survey conducted on fertility, family planning, maternal and child health and nutrition, childhood mortality, HIV/ AIDS-related knowledge and behaviour, and domestic violence.

Nigeria, also on the coast of West Africa, is the 14th largest country in Africa with 923,768 square kilometers land area. It has a diverse climate and topography with uplands stretching between 600-1,300 meters in the North central and east highlands, and lowlands less than 20 meters. The tropical climate has two distinct seasons, wet and dry seasons. The seasons are linked with two dominant winds, the rain bearing south westerly and the north easterly cold, dry and dusty wind (harmattan). The average rainfall ranges from 600 ml and 2,650 ml with temperatures between 23^{0}C and 40^{0}C. Economically, Nigeria primarily depends on the exportation of petroleum, petroleum products, cocoa and rubber.

The population is 152.4 million people (Bureau of African Affairs, 2011) evenly (50%) distributed into urban and rural areas. The country consists of 36 states and one federal territory divided into 6 administrative regions with 774 local government areas. The country is made up of over 300 identifiable ethnic groups with Fulani, Igbo, Hausa and Yoruba each forming the greater (10%) proportion of the population (DHS 2008).

The population is composed of two main religious groups, Muslims (50%), Christians (40%) and other indigenous groups (10%).

In Nigeria, life expectancy is 51 years, literacy rate is 61% (World Bank 2009), and education (15-24year) is 78% (male) and 65% (female) with school enrollment at 61% (UNICEF, 2010). Under five mortality is put at 143/1000 live births; maternal mortality, 550; contraceptive prevalence, 15%; total fertility rate, 5.5/woman; and HIV/AIDS prevalence, 3.6% (UNICEF 2009).

The main sources of data include censuses, vital registration systems and sample surveys (DHS 2008). The Demographic Health Survey (DHS) like other sample surveys has been conducted to generate reliable data on fertility; nuptiality, sexual activity; awareness and use of family planning methods; breastfeeding practices; nutritional status of mothers and young children; early childhood mortality and maternal mortality; maternal and child health; and awareness and behaviour regarding HIV/AIDS and other sexually transmitted infections. Most recent DHS surveys have included data collection on violence against women. The 2008 DHS is the fourth round of National DHS implemented by the National Population Commission from June to October 2008 on national representative data.

Dataset

This study assesses the effect of a third party presence during interview on sexual behavior questions from two West African countries in the 2008 Demographic Health Survey (DHS). It also compares this effect between the two countries. Flat files dataset from the 2008 individual women's DHS from two West African countries are used. Only married women within the reproductive age bracket of 15-49 years were included in the study analysis because they form the greater proportion of female respondents in the survey.

The 2008 DHS of both countries has respective sampling frame from the 2000 and 2006 population and Housing census of Ghana and Nigeria. The DHS uses stratified two stage cluster design to obtain samples for respective surveys in the study countries. Sampling selection was done to ensure each region or state has separate estimate of key indicator for both countries. In Ghana, 412 clusters were selected through a systematic sampling method with probability proportion to size. A systematic sampling of households resulted in the selection of 30 households per cluster. A sample of 12,323 households was selected out of an expected 12360 households. One of the clusters was not surveyed because of security reasons. In Nigeria 888 clusters in 286 urban and 602 rural areas were selected. A sample frame of 36,800 households was selected with a minimum target of 950 completed interviews per state. Households were distributed in an urban-rural proportion and mapped out as sampling frame. An average of 44 households was selected per cluster by systematic sampling. Women (15-49) eligible for interview were selected on the bases of permanent residence and/or visitors overnighting the day prior to the survey. The respective response rate for women's survey in is 97% for both countries.

The questionnaire for both DHS surveys was divided into three parts: household, women's and men's questionnaires. The women's questionnaire that was used in this study has questions related to data on the following health indicators, fertility, nuptiality, sexual activity; awareness and use of family planning methods, breastfeeding practices, nutritional status of mothers and young children, early childhood mortality and maternal mortality, maternal and child health, and awareness and behaviour regarding HIV/AIDS and other sexually transmitted infections.

Interviewers' Training

The DHS, as part of it standardization of survey procedure in each country, developed basic guides such as Interviewer's Manual, Supervisor's and Editor's Manual, Sampling Manual, Household Listing Manual and Guidelines for Interviewer Training used alongside questionnaires in order to achieve comparison across countries. A total of 160 Ghanaian and 368 Nigerian enumerators, most with prior survey experience, were trained on interviewing techniques, completing the questionnaire, mock interview following standard DHS training procedure. Emphasis was laid on same sex interviewing as a way of reducing discomfort. . A total of 46 female interviewers and 23 supervisors in Ghana and 152 female interviewers and 37 supervisors were trained for field work in Nigeria. In addition to interviewing skill, training also emphasized the observance of privacy or uninterrupted interviewing of participants. However, some interruption did occur as a result of the presence of a third person during interview. This was recorded by interviewer but was not factored as a possible influence to the result of the surveys.

Analysis samples

The "Married and recent sexual activities" section of the women's survey was used as the primary focus of this survey. Eligible participants for the women's survey are identified through the households selected in the sample. This study uses the dataset of women survey with a sampling frame of 4,916 and 33,385 women respectively from Ghana and Nigeria. After review of the dataset, women with high chance of being interrupted during interview are married (Aquilano, 1993) and they form a greater percentage of women interviewed. The table below (Table 1) presents the respective sample sizes of 2,361 (48%) and 23,479 (70%) of married women from Ghana and Nigeria that were analyzed. Among the sampled women from both countries 7.8% from Ghana and 6.0% from Nigeria were interrupted.

Variables

Variables of interest for this study were categorized into two groups: outcome and control variables. The key covariate is the interrupted interview which will be tested across all of the other variables to assess association. .

Outcome Variables

The outcome variables include, “interrupted interview, condom use at last sexual intercourse, greater than one lifetime sexual partner and greater than one sexual partner in past 12 months”. These were classed as sensitive because of their nature. They are likely to induce social desirability effect or discomfort when asked in the presence of a third person. Other outcome variables, which are considered less sensitive, include, “slept under bed net, participated in literacy program and listened to radio”. They are believed to be less intrusive and less likely to create discomfort. Out of the sample of married women analyzed for this study, 7.8% (Ghana) and 6% (Nigeria) were interrupted during interview; less than 1% did report > 1 sex partner in last 12 months.

Table 1 Presents proportion of Outcome Variables for both study countries (DHS 2008)

	Country	
Variable	Ghana (N=2,361)	Nigeria (N=23,479)
	n (%)	n (%)
Interrupted Interview	184(7.8)	1,419(6.0)
>1 Life time sex partners	1,157(49.0)	7,010(29.9)
>1 sex partners in last 12 Months	9(0.4)	126(0.5)
Use condom at last sex	49(2.1)	537(2.3)
Slept under Bed Net	799(33.8)	2,500(10.7)
Ever participated in Literacy Program	166(7.0)	599(2.6)
Listen to Radio	1,895(80.3)	14,529(61.9)

Both sub-categories of outcome variables is further categorized into binary variables, “0”, for negative (no) responses and “1”, for positive (yes) responses.

Interviewers recorded the presence of a third person (interrupted) during the interview. This is named ‘interrupted interview’ and is also made into a binary variable as ‘yes’ for interrupted and ‘no’ for uninterrupted respondents. Individuals who responded to have had one lifetime sexual partner are classed as ‘0’, and more than one lifetime sexual partner as ‘1’; those who reported no or one sexual partner in the past 12 months was assigned ‘0’, and ‘1’ for those who reported more than one sexual partner; and condom use at last sex classed into ‘0’ for ‘no’, ‘1’ for ‘yes’ responders. The non sensitive outcome variables had varying number of responses. For those who reported ‘slept under bed net’, there were 4 possible responses; participated in literacy program had 3 possible responses; and listened to radio had 5 possible responses. All of these variables are categorized as binary variables with a ‘yes’ and ‘no’ outcome respectively because aside from the fact that they indicated varying degree of behavior, they all either perform or did not perform the behavior in question. A summary table of the variables and their respective categories is found in the appendix section (Appendix 1) of this study.

Control variables

Socio-demographic variables such as age, educational attainment, religion, parity, place and region of residence, wealth and ethnicity are considered control variables because neither of the outcome variables has an influence on their outcome. Age, a continuous variable, is categorized into 5 year intervals, and grouped into 6 age groups ranging from 15 to 40 plus years. Women with ages greater than 40 years are classed into the 40 plus age category. Educational achievement is categorized into ‘no, primary, secondary and higher education; religion into Christian, Muslim and others, for those that did not fall into either of the two largest religious categories. The number of children born by respondent (parity) was grouped into 4 categories, no child, 1-2

children, 3-4 children and 5 plus children; place of residence is classed into urban and rural; and region of residence categorized into 10 categories for Ghana and 6 for Nigeria as is in the DHS. Wealth is classed into 3 categories, rich, middle and poor. The two subclasses of rich and poor were each respectively graded into 2, rich and poor. Ethnicity was also categorized into 4 groups for Ghana and 5 for Nigeria according to the respective 5% and 10% cut off limits in their sampling proportion.

Analysis Method

The Stata 12.0 statistical software was used to analyze the data from the two study countries. The file files obtained from the DHS dataset made it easier for such analysis as they were in the STATA form.

Bi-variate analysis was done to determine the distribution, frequency and statistically significant associations between the key covariate (interrupted interview), outcome variables, and control variables from two country datasets. The key covariate is cross tabulated with outcome variables and control variables such as age to ascertain distribution (frequencies) and statistical association between them.

Logistic regression analysis, including adjusted logistic regression analysis for any difference in association, is done to estimate the relationship between interrupted interview and each of the outcomes and control variables. A further multivariate logistic regression analysis was performed to determine the relationship between interrupted interviews, the outcome variables and control variables. In both logistic regression analyses, the negative responses (‘no’, also coded as ‘0’) were used as the reference points in the outcome variables. Respective adjusted logistic regression analyses were done for each case.

All missing and don’t know responses, though few, were dropped from the analysis.

Ethical Consideration

This study involves analysis of secondary data which does not entail direct interaction with human subjects and hence the need for an IRB is unnecessary. However, access to and utilization of the respective datasets was done through strict adherence to the DHS project standard by an online application with declaration of intent of use and submission of a draft proposal indicating affiliated institution and study program. Except for the countries and their respective regional identification in the study report, no item or identifier is traceable to any of the participants from whom the survey data were obtained is available.

Chapter 4

Result

Analysis was done on data on married women from the two countries' DHS datasets. Six subcategories of marital status were identified by both countries' DHS (see appendix 1) and married women form the largest proportion of respondents. Considering the fact that studies have indicated that spousal presence during interview is a common not random practice (Aquilano et al 2000), and the percentage of interruption among each category was low (<5%) except married women, data on married women who form the greater proportion of respondents was analysed. It can be seen that for the two study countries, the difference in the sample sizes for analysis is so much due to the initial samples of married women considered for the study.

In Ghana, 48% (2,361) of respondents were married women with 7.8% were interrupted (presence of a third person) during interview. Respondents who reported having had >1life time sex partners were 49%; less than 1% (0.4%) reported having had >1 sex partner in the last 12 months, 2.1% reported using condom at last sexual intercourse, 33.8% slept under bed net, 7% had participated in literacy program, 80.3% reported listened to radio and 35.5% reported currently breastfeeding.

In Nigeria, 70.3% (23,479) of respondents were married women. Among them, 6% were interrupted by the presence of a third person during interview. Those who reported having had >1 life time sex partner were 29.9%; less than 1% (0.5%) reported having had >1 sex partner in the last 12 months, 2.3% reported using condom at last sexual intercourse, 10.7% slept under bed net, 2.6% ever participated in literacy program and 61.9% listen to radio (table 1).

Tab 1 Outcome Variables with respective proportion individual responses by country

Outcome variable for Ghana and Nigeria		
	Country	
Variable	Ghana (N=2,361)	Nigeria (N=23,479)
	n (%)	n (%)
Interrupted during Interview	184(7.8)	1,419(6.0)
>1 Life time sex partners	1,157(49.0)	7,010(29.9)
>1 sex partners in last 12 Months	9(0.4)	126(0.5)
Use condom at last sex	49(2.1)	537(2.3)
Slept under Bed Net	799(33.8)	2,500(10.7)
Ever participated in Literacy Program	166(7.0)	599(2.6)
Listen to Radio	1,895(80.3)	14,529(61.9)

Bivariate Analysis

In Ghana, the bivariate analysis of the association between interrupted interview and socio-demographic (control) variables indicates no significant association between age (p=0.685), education (p=0.355), parity (p=0.197) and ethnicity (p=0.067). However, there is an association between interrupted interview and place of residence (p=0.002), region of residence (p=0.000) and wealth (p=0.003).

Similarly in Nigeria, there is an association between interrupted interview and all the socio-demographic (control) variables: age (p=0.000), education (p=0.000), religion (p=0.000), parity (p=0.000), place and region of residence (p=0.000), wealth (p=0.000) and ethnicity (p=0.000). See table 2 for details of bivariate analysis of the two study countries.

Table 2. Indicates the association between Interrupted Interview and Control variables (socio-demographic characteristics of married women from both countries (DHS 208).

Variable	Country					
	Ghana (N=4,916)			Nigeria (N=23,479)		
Age (5yr category)	% Category	% Interrupted	P Value	% Category	% Interrupted	P Value
15-19	2.2	9.8	**0.685**	8.3	4.9	**0.000***
20-24	11.2	7.6		15.4	6.4	
25-29	19.6	9.3		21.7	6.3	
30-34	19.4	8.3		17.3	8.0	
35-39	20.0	6.8		15.1	6.0	
40+	27.7	7.0		22.2	4.5	
Education			**0.355**			**0.000***
No Education	39.7	6.7		52.1	4.9	
Primary	20.2	9.0		21.2	6.6	
Secondary	36.3	8.1		20.5	8.0	
Higher	3.8	10.1		6.2	7.6	
Religion			**0.197**			**0.000***
Christian	66.6	7.6		40.6	7.1	
Muslim	21.0	9.5		56.7	5.3	
Others	12.5	6.1		2.7	7.3	
Marital Status						
Married	100.0	7.8		100.0	6.0	
Parity			**0.800**			**0.001***
0 child	5.1	9.8		8.5	5.2	
1-2 child	29.8	8.1		25.8	6.5	
3-4 children	31.8	7.5		25.7	6.8	
5+ Children	33.3	7.5		40.0	5.4	
Place of Residence			**0.002***			**0.000***
Urban	37.7	10.0		27.4	8.3	
Rural	62.4	6.5		72.6	5.2	
Region of Residence			**0.000***			**0.000***
Western	10.6	2.0		North Central	18.8	5.7
Central	6.1	16.5		North East	21.8	4.6
Greater Accra	12.0	14.5		North West	28.0	4.5
Volta	8.1	2.1		South East	8.0	8.2
Eastern	8.9	8.5		South West	10.1	9.1
Ashanti	11.2	1.5		South South	13.3	8.6
Brong Ahafo	6.1	12.4				
Northern	14.7	7.8				
Upper Eats	10.4	9.4				
Upper West	12.0	7.1				
Wealth			**0.003***			**0.000***
Poor	49.1	6.0		49.6	4.9	
Middle	14..3	8.3		18.8	5.6	
Rich	36.6	10.1		31.7	8.1	
Ethnicity			**0.067**			**0.000***
Akan	35.6	8.3		Fulani	10.0	5.0
Ewe	11.7	5.8		Hausa	27.4	4.3
Mole-Dagbani	28.6	9.5		Igbo	10.2	8.1
Other	24.1	6.0		Yoruba	12.7	8.3
				Other	39.8	6.3

indicates significant association at 95% confidence interval

Logistic regression

Results of both the adjusted and unadjusted logistic regression analysis with point estimates for the two countries are illustrated in table 3a and 3b respectively.

In Ghana, the unadjusted logistic regression shows a significant association between interrupted interview and respondents living in rural areas (i.e. at 95%, OR- 0.62, CI- 0.458, 0.839). This means that reference to urban married women, rural married women have significantly lower odds of being interrupted during interview (OR 0.62). Also, wealth status has an association with interrupted interview. At 95% confidence, women of wealthier households have significantly greater odds (1.76) of being interrupted during interview than women of poor households. The adjusted logistic regression however, did not show any association between interrupted interview and socio-demographic (control) variables.

Table 3a. Presents bivariate logistic regression for Interrupted interview and control variables of married women in Ghana (DHS 2008) N = 2,361

	Unadjusted OR		Adjusted OR	
Variable	OR	CI (95%)	OR	CI (95%)
Age (5yr category)				
15-19	1.00		1.00	
20-24	0.75	(0.268, 2.102)	0.75	(0.257, 2.211)
25-29	0.94	(0.355, 2.496)	0.91	(0.317, 2.591)
30-34	0.83	(0.313, 2.225)	0.70	(0.238, 2.085)
35-39	0.67	(0.249, 1.805)	0.54	(0.176, 1.651)
40+	0.69	(0.264, 1.837)	0.54	(0.175, 1.665)
Education				
No Education	1.00		1.00	
Primary	1.38	(0.918, 2.062)	1.36	(0.859, 2.156)
Secondary	1.22	(0.853, 1.734)	1.09	(0.669, 1.786)
Higher	1.56	(0.749, 3.258)	1.06	(0.448, 2.532)
Religion				
Christian	1.00		1.00	
Muslim	1.28	(0.899, 1.825)	1.28	(0.796, 2.078)
Others	0.79	(0.477, 1.329)	1.00	(0.560, 1.786)
Parity				
0 child	1.00		1.00	
1-2 child	0.81	((0.420, 1.556)	0.84	(0.424, 1.686)
3-4 children	0.74	(0.384, 1.424)	0.89	(0.429, 1.876)
5+ Children	0.74	(0.387, 1.428)	1.26	(0.563, 2.834)
Place of Residence				
Urban	1.00		1.00	
Rural	0.62	(0.458, 0.839)*	0.90	(0.571, 1.433)
Region of Residence				
Western	1.00		1.00	
Central	9.68	(3.604, 25.993)	9.56	(3.528, 25.920)
Greater Accra	8.27	(3.212, 21.278)	7.85	(2.922, 21.112)
Volta	1.05	(0.278, 3.962)	1.27	(0.308, 5.297)
Eastern	4.55	(1.659, 12.479)	5.36	(1.931, 14.881)
Ashanti	0.75	(0.199, 2.828)	0.66	(0.175, 2.528)
Brong Ahafo	6.91	(2.509, 19.061)	7.12	(2.541, 19.965)
Northern	4.13	(1.567, 10.881)	4.86	(1.648, 14.369)
Upper Eats	5.06	(1.889, 13.525)	5.97	(1.953, 18.268)
Upper West	3.71	(1.371, 10.041)	4.30	(1.429, 12.957)
Wealth				
Poor	1.00		1.00	
Middle	1.42	(0.903, 2.251)	1.51	(0.884, 2.583)
Rich	1.76	(1.269, 2.452)*	1.65	(0.944, 2.915)
Ethnicity				
Akan	1.00		1.00	
Ewe	0.67	(0.385, 1.183)	0.88	(0.462, 1.705)
Mole-Dagbani	1.15	(0.808, 1.645)	1.09	(0.587, 2.033)
Other	0.70	(0.458, 1.071)	0.59	(0.350, 1.014)

*****_indicate significant association at 95% confidence interval_

In Nigeria, the unadjusted bivariate logistic regression analysis shows associations between interrupted interview and some socio-demographic (control) variables. Reference to women within age bracket 15-19yrs, women in age brackets 20-

24 (95%, OR-1.3, CI 1.042, 1.702); 25-29 (95%, OR 1.3, CI 1.040, 1.665) and 30-34(95%, OR 1.7, CI 1.344, 2.150) have significantly greater odds of being interrupted during interview. The adjusted analysis shows that relative to women within age bracket 15-19yrs, those in age bracket 40+ have lower odds (OR 0.6, CI 0.456, 0.836) of being interrupted during interview.

Educational achievement also has an association with interrupted interview. Relative to women with no education, women with primary (95%, OR 1.4 CI 1.204, 1,589), secondary (95%, OR 1.7, CI 1.477, 1.927) and higher education (95%, OR 1.6, CI 1.296, 1.977) have greater odds of being interrupted during interview. The adjusted analysis does not show any significant association for the same group of women.

In reference to Christian women, Muslim women have lower odds (95%, OR 0.7, CI 0.654, 0.815) of being interrupted during interview. Conversely, relative to Christian women, Muslim women have greater odds of being interrupted during interview when the adjusted analysis was done.

Parity also has an association with interrupted interview. Relative to women with no children, those with 1-2 children (95%, OR 1.3, CI 1.002, 1.560) and 3-4 children (95%, OR 1.3, CI 1.065, 1.655) have greater odds of being interrupted during interview. No significant association was seen for the adjusted analysis. For place and region of residence, women in rural areas are less likely than urban women to be interrupted during interview (95%, OR 0.6, CI 0.549, 0.687) even when adjusted analysis was done. Reference to North Central region, women North East (95%, OR 0.8, CI 0.654, 0.934) and North West (95%, OR 0.8, CI 0.643, 0.908) have significantly lower odds of being interrupted during interview. However, those from South East (95%, OR 1.5, CI 1.184, 1.797), South West (95%, OR 1.7, CI 1.367, 1.995) and South South (95%, OR 1.5, CI 1.295, 1.849) have greater odds of being interrupted during interview. The adjusted

analysis shows similar significant association for North East, South East, South West and South South but not for North West.

Relative to poor women, rich women have significantly greater odds (95%, OR 1.7, CI 1.535, 1.945) of being interrupted during interview. No significant association was seen for the adjusted analysis. Association between interrupted interview and ethnicity can be seen only among some ethnic groups. Relative to Fulani ethnic group, women in the Igbo (95%, OR 1.7, CI 1.320, 2.124), Yoruba (95%, OR 1.7, CI 1.364, 2.151) and other minority (OR 1.3, CI 1.035, 1.559) ethnic groups have significantly greater odds of being interrupted during interview. The adjusted figures show no significant association between interrupted interview and ethnicity.

Table 3b Shows bivariate logistic regression for Interrupted interview and control variables (socio-demographic characteristics) of married women in Nigeria (DHS 2008) N = 23,479,

	Unadjusted OR		Adjusted OR	
Variable	OR	CI (95%)	OR	CI (95%)
Age (5yr category)				
15-19	1.0		1.0	
20-24	1.3	(1.042, 1.702)*	1.1	(0.818, 1.377)
25-29	1.3	(1.040, 1.665)*	0.9	(0.705, 1.200)
30-34	1.7	(1.344, 2.150)*	1.1	(0.864, 1.511
35-39	1.2	(0.975, 1.602)	0.8	(0.613, 1.119)
40+	0.9	(0.715, 1.166)	0.6	(0.456, 0.836)*
Education				
No Education	1.0		1.0	
Primary	1.4	(1.204, 1.589)*	1.0	(0.835, 1.165)
Secondary	1.7	(1.477, 1.927)*	1.0	(0.826, 1.207)
Higher	1.6	(1.296, 1.977)*	0.9	(0.706, 1.204)
Religion				
Christian	1.0		1.0	
Muslim	0.7	(0.654, 0.815)*	1.2	(1.030, 1.441)*
Others	1.0	(0.759, 1.411)	1.4	(0.986, 1.876)
Parity	1.0		1.0	
0 child	1.3	(1.002, 1.560)*	1.1	(0.880, 1.398)
1-2 child	1.3	(1.065, 1.655)*	1.2	(0.963, 1.572)
3-4 children	1.0	(0.837, 1.289)	1.2	(0.943, 1.588)
5+ Children				
Place of Residence				
Urban	1.0		1.0	
Rural	0.6	(0.549, 0.687)*	0.7	(0.618, 0.818)*
Region of Residence				
North Central	1.0		1.0	
North East	0.8	(0.654, 0.943)*	0.8	(0.626, 0.936)*
North West	0.8	(0.643, 0.908)*	0.9	(0.699, 1.117)
South East	1.5	(1.184, 1.797)*	1.6	(1.135, 2.290)*
South West	1.7	(1.367, 1.995)*	1.7	(1.395, 2.105)*
South South	1.5	(1.295, 1.849)*	1.5	(1.151, 1.879)*
Wealth				
Poor	1.0		1.0	
Middle	1.2	(0.989, 1.346)	0.9	(0.796, 1.108)
Rich	1.7	(1.535, 1.945)*	1.1	(0.922, 1.312)
Ethnicity				
Fulani	1.0		1.0	
Hausa	0.9	(0.684, 1.067)	0.8	(0.614, 1.004)
Igbo	1.7	(1.320, 2.124)*	1.0	(0.646, 1.405)
Yoruba	1.7	(1.364, 2.151)*	1.0	(0.703, 1.347)
Other	1.3	(1.035, 1.559)*	1.1	(0.831, 1.334)

**Indicates significant association at 95% confidence interval*

Multivariate Logistic Regression

Result of the multi variate analysis of the relationship between interrupted interview, the outcome and control variables is presented in tables 4ai, 4aii for Ghana and 4bi, 4bii for Nigeria. Table 4ai and 4bi shows results for variables classed as sensitive which include >1sex life time sex partner, >1 sex partner in the last 12 months and condom use at last sex for both countries. Similarly, table 4aii and 4bii show results of variables for the non sensitive questions such as participate in literacy program, slept under bed net and listen to radio.

Multivariate Logistic regression for Ghana

Result for Ghana did not show any significant association between interrupted interview and outcome variables, be it sensitive or non sensitive question. However, some association is seen between outcome variables and some control (socio-demographic) variables for both sensitive and non sensitive questions.

Multivariate Logistic Analysis for Sensitive Outcome variables

Relative to married women with no education, married women with primary (95%, OR 1.5, CI 1.145, 1.971), secondary (95%, OR 1.52, CI 1.153, 2.006) and higher (95%, OR 2.69, CI 1.523, 4.777) education have significantly greater odds of reporting having had >1 life time sexual partner when interrupted during interview. Reference to respondents with no child, women with 5+ children have lower odds (OR 0.59, CI 0.357, 0.996) of reporting having had >1 life time sexual partner.

In relation to urban women, rural women have significantly greater odds (95%, OR 1.32, CI 1.000, 1.749) of reporting having had >1 life time sexual partner in the presence of a third person during interview. Also, relative to women in the Western region, those in the Eastern (95%, OR 2.07, CI 1.349, 3.178) and Ashanti (95%, OR 1.53, CI 1.042, 2.267) regions have significantly greater odds of reporting having had >1 life time sexual partners during interrupted interview. Those in the North (95%, OR 0.55,

CI 0.350, 0.870) and Upper East (95%, OR 0.32, CI 0.194, 0.551) regions have significantly lower odds of reporting having had >1 life time sexual partner during interrupted interview relative to reporting by women in Western region.

Relative to women from the Akan ethnic group, women from the Mole-Dagbani (95%, OR 0.40, CI 0.280, 0.580) and other minority ethnic groups (95%, OR 0.51, CI 0.382, 0.704) have significantly lower odds of reporting having had >1 life time sexual partner during an interrupted interview. Result also shows that relative to women in age bracket 15-19yrs, those in 40+ years age bracket have lower odds (95%, OR 0.13, CI 0.019, 0.925) of reporting condom use at last sexual intercourse when interrupted during interview.

Table 4ai Multi Variate Logistic Regression for Interrupted interview and Sensitive questions by socio-demographic characteristics, Ghana (N=2,361)

	Adjusted OR (outcome variables)		
	> 1 Life time Sex Partners	>1 Sex Partner in last 12 months	Condom use at last sex
Variable	OR(CI)	OR(CI)	OR(CI)
Interrupted Interview	0.94(0.660, 1.347)	0.802(0.623, 10.307)	0.29 (0.685, 1.256)
Age (5yr category)			
15-19	1.00	1.00	1.00
20-24	2.59(1.102, 6.118)	omitted	0.38(0.676, 2.201)
25-29	3.40(1.460, 7.922)	omitted	0.38(0.719, 2.084)
30-34	5.81(2.464, 13.721)	omitted	0.34(0.062, 1.962)
35-39	6.03(2.539, 14.348)	omitted	0.25(0.042, 1.608)
40+	6.46(2.709, 15.410)	omitted	0.13(0.019, 0.925)*
Education			
No Education	1.00	1.00	1.00
Primary	1.50(1.145, 1.971)*	0.89(0.124, 6.421)	10.05(2.099, 48.170)
Secondary	1.52(1.153, 2.006)*	0.36(0.268, 4.935)	12.64(2.609, 61.321)
Higher	2.69(1.523, 4.777)*	10.86(0.689, 171.389)	19.95(3.171, 125.627)
Religion			
Christian	1.00	1.00	1.00
Muslim	0.77(0.580, 1.029)	0.35(0.313, 3.971)	0.67(0.243, 1.855)
Others	0.95(0.686, 1.318)	omitted	1.06(0.226, 4.996)
Parity			
0 child	1.00	1.00	1.00
1-2 child	1.01(0.637, 1.603)	0.21(0.237, 1.868)	2.36(0.521, 10.705)
3-4 children	0.74(0.462, 1.211)	0.62(0.003, 1.306)	2.87(0.582, 14.179)
5+ Children	0.59(0.357, 0.996)*	0.39(0.18, 8.674)	2.52(0.413, 15.429)
Place of Residence			
Urban	1.00	1.00	1.00
Rural	1.32(1.000, 1.749)*	2.87(0.312, 26.415)	0.63(0.274, 1.460)
Region of Residence			
Western	1.00	1.00	1.00
Central	1.15(0.735, 1.809)	2.30(0.101, 52.515)	2.61(0.691, 9.861)
Greater Accra	1.50(0.993, 2.285)	omitted	1.80(0.528, 6.154)
Volta	0.95(0.580, 1.556)	2.05(0.038, 109.279)	0.16(0.016, 1.744)
Eastern	2.07(1.349, 3.178)*	2.30(0.109, 48.605)	1.38(0.367, 5.251)
Ashanti	1.53(1.042, 2.267)*	omitted	0.94(0.245, 3.655)
Brong Ahafo	0.69(0.445, 1.088)	omitted	1.33(0.280, 6.365)
Northern	0.55(0.350, 0.870)*	omitted	0.85(0.151, 4.789)
Upper East	0.32(0.194, 0.551)*	0.13(0.003, 5.622)	1.04(0.192, 5.641)
Upper West	0.79(0.508, 1.240)	1.10(0.047, 25.868)	0.46(0.684, 3.109)
Wealth			
Poor	1.00	1.00	1.00
Middle	1.24(0.919, 1.688)	omitted	2.62(0.949, 7.245)
Rich	1.19(0.864, 1.657)	1.57(0.165, 15.029)	1.49(0.499, 4.467)
Ethnicity			
Akan	1.00	1.00	1.00
Ewe	0.96(0.651, 1.429)	0.62(0.014, 26.867)	2.47(0.906, 6.737)
Mole-Dagbani	0.40(0.280, 0.580)*	6.89(0.251, 189.426)	3.04(0.954, 9.695)
Other	0.51(0.382, 0.704)*	1.07(0.639, 17.897)	2.19(0.935, 5.140)

**indicates significant association at 95% confidence interval*

Multivariate Logistic Analysis for Non Sensitive Outcome Variables (Ghana)

Self reporting of ever participated in literacy program in the presence of a third person during interview, shows significant association among women with primary education, in Muslim and other minority religious groups, region of residence and wealth. Relative to women with no education, women with primary education have significantly greater odds (95%, OR 1.58, CI 1.016, 2.458) of reporting ever participated in literacy program when interrupted during interview.

Reference to Christian women, Muslim women (95%, OR 0.42, CI 0.245, 0.737) and women in minority religious groups (95%, OR 0.48, CI 0.287, 0.822) have significantly lower odds of reporting ever participated in literacy program when interviewed in the presence of a third party. Also, relative to poor women, wealthy women have lower odds (OR 0.48, CI 0.251, 0.930) of reporting participated in literacy program when interrupted during interview.

Result of self reporting on sleeping under bed net shows association among most control variable except parity. Relative to age bracket 15-19yrs, women in age bracket 30-34 (95%, OR 0.48, CI 0.240, 0.990), 35-39 (95%, OR 0.34, CI 0.169, 0.717) and 40+yrs (95%, OR 0.16, CI 0.788, 0.342)have significantly lower odds of reporting slept under bed net when interrupted during interview. in reference to women with no education, those with primary (95%, OR 1.37, CI 1.045, 1.814), secondary (95%, OR 1.53, CI 1.145, 1.814) and higher educated (95%, OR 1.95, CI 1.074, 3.543) have greater odds of reporting slept under bed net when interrupted during interview. Relative to Christian women, women in minority religious groups have significantly lower odds (95%, OR 0.67, CI 0.493, 0.925) of reporting slept under bed net when interviewed in the presence of a third party. In reference to urban women, rural women have greater odds (95%, OR 1.37, CI 1.036, 1.827) of reporting slept under bed net during an interrupted

interview. Also, relative to women in the Western region, women in Brong Ahafo (95%, OR 3.00, CI 1.878, 4.795) and Upper West (95%, OR 2.92, CI 1.830, 4.665) regions have significantly greater odds of reporting slept under bed net during an interrupted interview.

Wealth association indicates that, relative to poor women, wealthy women in the middle (95%, OR 0.59, CI 0.436, 0.815) and Upper wealth (95%, OR 0.68, CI 0.495, 0.958) classes have lower odds of reporting report slept under bed net when interrupted during interview. Relative to women in the Akan ethnic group, women in the Ewe ethnic group have greater odds (95%, OR 1.67, CI 1.123, 2.509) of reporting slept under bed net during an interrupted interview.

Significant association exists between women who reported listening to radio and secondary educate; from Central, Greater Accra, Northern, Upper East and Upper West regions; the middle wealth class; and minority ethnic groups. Relative to women with no education, those with secondary education have significantly greater odds (95%, OR 2.59, CI 1.753, 3.845) of reporting listen to radio when interrupted during an interview. Those in minority religious groups have lower odds (95%, OR 0.57, CI 0.413, 0.791) of reporting listen to radio relative to Christian women when interrupted during interview.

Reference to women in the Western region, those in central (95%, or 0.38, CI 0.191, 0.756), Greater Accra (95%, OR 0.28, CI 0.144, 0.563), Northern (95%, OR 0.23, CI 0.124, 0.432), Upper East (95%, OR 0.29, CI 0.153, 0.570) and Upper West (95%, OR 0.38, CI 0.202, 0.716) regions have significantly lower odds of reporting listen to radio when interrupted during an interview. In relation to poor women, women in middle (OR 2.071, CI 1.360, 3.156) and rich (OR 3.131, CI 1.936, 5.066) wealth classes have greater odds of reporting listen to radio in an interrupted interview. Relative to Akan ethnic group, women in minority ethnic groups have lower odds (95%, OR 0.55, CI

0.365, 0.853) of reporting listen to radio when interviewed n the presence of a third party.

Table 4aii. Multi Variate Logistic Regression for Interrupted interview and Non-sensitive questions by socio-demographic characteristics, Ghana (N=2,361)

	Adjusted OR (control variables)		
	Participated in Literacy Program	Slept under Bed Net	Listen to Radio
Variables	OR(CI)	OR(CI)	OR(CI)
Interrupted Interview	1.59(0.921, 2.765)	1.25(0.921, 2.765)	1.06(0.693, 1.650)
Age (5yr category)			
15-19	1.00	1.00	1.00
20-24	0.80(0.240, 2.696)	1.02(0.509, 2.064)	1.62(0.791, 3.335)
25-29	1.01(0.311, 3.276)	0.82(0.414, 1.647)	1.48(0.726, 3.047)
30-34	1.38(0.415, 4.603)	0.48(0.240, 0.990)*	1.43(0.682, 3.017)
35-39	1.13(0.334, 3.856)	0.34(0.169, 0.717)*	1.47(0.690, 3.161)
40+	1.11(0.325, 3.802)	0.16(0.788, 0.342)*	1.56(0.728, 3.352)
Education			
No Education	1.00	1.00	1.00
Primary	1.58(1.016, 2.458)*	1.37(1.045, 1.814)*	1.17(0.862, 1.611)
Secondary	1.07(0.626, 1.835)	1.53(1.145, 1.814)*	2.59(1.753, 3.845)*
Higher	na (omitted)	1.95(1.074, 3.543)*	6.42(1.891, 21.802)
Religion			
Christian	1.00	1.00	1.00
Muslim	0.42(0.245, 0.737)*	0.78(0.588, 1.058)	1.10(0.790, 1.532)
Others	0.48(0.287, 0.822)*	0.67(0.493, 0.925*)	0.57(0.413, 0.791)*
Parity			
0 child	1.00	1.00	1.00
1-2 child	1.37(0.463, 4.104)	16.24(6.882, 38.350)	1.38(0.784, 2.428)
3-4 children	1.17(0.382, 3.641)	21.54(8.963, 51.795)	1.50(0.832, 2.722)
5+ Children	1.91(0.601, 6.068)	28.83(11.726, 70.905)	1.64(0.877, 3.096)
Place of Residence			
Urban	1.00	1.00	1.00
Rural	1.22(0.724, 2.058)	1.37(1.036, 1.827)*	1.21(0.822, 1.793)
Region of Residence			
Western	1.00	1.00	1.00
Central	1.08(0.421, 2.805)	1.01(0.622, 1.662)	0.38(0.191, 0.756)*
Greater Accra	1.11(0.384, 3.216)	0.78(0.488, 1.250)	0.28(0.144, 0.563)*
Volta	1.06(0.359, 3.156)	1.07(0.637, 1.804)	0.63(0.292, 1.399)
Eastern	0.78(0.302, 2.010)	0.96(0.621, 1.487)	1.40(0.652, 3.020)
Ashanti	1.65(0.748, 3.677)	1.09(0.724, 1.666)	0.71(0.363, 1.422)
Brong Ahafo	1.64(0.649, 4.181)	3.00(1.878, 4.795)*	0.70(0.343, 1.440)
Northern	3.35(1.327, 8.462)	1.53(0.972, 2.426)	0.23(0.124, 0.432)*
Upper East	4.73(1.852, 12.077)	1.27(0.775, 2.113)	0.29(0.153, 0.570)*
Upper West	3.10(1.223, 7.888)	2.92(1.830, 4.665)*	0.38(0.202, 0.716)*
Wealth			
Poor	1.00	1.00	1.00
Middle	1.27(0.768, 2.101)	0.59(0.436, 0.815)*	2.07(1.360, 3.156)*
Rich	0.48(0.251, 0.930)*	0.68(0.495, 0.958)*	3.13(1.936, 5.066)*
Ethnicity			
Akan	1.00	1.00	1.00
Ewe	1.09(0.473, 2,536)	1.67(1.123, 2.509)*	1.50(0.799, 2.834)
Mole-Dagbani	1.04(0.489, 2.214)	1.13(0.778, 1.664)	1.18(0.732, 1.926)
Other	0.57(0.279, 1.183)	1.19(0.859, 1.651)	0.55(0.365, 0.853)*

**indicates significant association at 95% confidence interval*

Multivariate Logistic Regression of Nigerian data

Logistic regression analysis of the Nigerian data indicate no significant association between interrupted interview and all but one of the outcome variables, >1 sex partner in the last 12 months. Result shows that women who reported having had >1

sex partners in past 12 months, are 1.92 times more likely to be interrupted during interview.

Multivariate Logistic Analysis for Sensitive Outcome Variables (Nigeria)

Table 4bi presents result of the logistic regression analysis for sensitive outcome and control variable of interrupted interview participants. There exists some significant association between outcome and some control (socio-demographic) variables. Among respondents who reported having had >1 life time sexual partner, relative to women in age bracket 15-19yrs, those in other age brackets have significantly greater odds of reporting having had >1 lifetime sex partner, 20-24yrs (95%, OR 2.55, CI 2.127, 3.075), 25-29yrs, (95%, OR 4.12, CI 3.436, 4.953), 30-34yrs, (95%, OR 5.84, CI 4.836, 7.070), 35-39yrs, (95%, OR 6.06, CI 4.983, 7.371) and 40+yrs, (95%, OR 7.04, CI 5.808, 8.550) when interviewed in the presence of a third party. Reference to women with no education, those with secondary education have greater odds (95%, OR 1.29, CI 1.165, 1.436) of reporting >1 life time sex partners during an interrupted interview.

Relative to Christian women, Muslims (95%, OR 0.72, CI 0.661, 0.795) and women of minority religious groups (95%, OR 0.79, CI 0.660, 0.968) have lower odds of reporting >1 life time sex partners when interviewed in the presence of a third party. With reference to women with no child, women with 3-4 and 5+ children have respectively lower odds (95%, OR 0.62, CI 0.549, 0.721) and (95%, OR 0.51, CI 0.448, 0.594) of reporting >1 life time sex partners when interviewed in the presence of another person. Also, relative to women in North Central region, those in North East (95%, OR 1.42, CI 1.283, 1.587), South East (95%, OR 1.64, CI 1.344, 2.000), South West (95%, OR 3.46, CI 3.086, 3.886) and South South (95%, OR 2.47, CI 2.156, 2.836) regions have significantly greater odds of reporting >1 life time sex partners in the presence of a third party during interview.

Reference to poor women, rich women have lower odds (95%, OR 0.90, CI 0.819, 0.997) of reporting >1 life time sex partners when interviewed in the presence of a third party. Relative to women from the Fulani ethnic group, those from the Hausa (95%, OR 1.43, CI 1.245, 1.648), Yoruba (95%, OR 1.42, CI 1.180, 1.711) and minority ethnic groups (95%, OR 1.28, CI 1.122, 1.474) have greater odds of reporting >1 life time sex partners during interrupted interview.

Results for reported >1 sex partner in last 12 months show association among Muslim women, parity 3-4 children, and regions such as North East, North West, South East and South South. Relative to Christian women, Muslim women have lower odds (95%, OR 0.47, CI 0.285, 0.805) of reporting >1 sex partner in last 12 months when interviewed in the presence of another person. Similarly, in relation to women with no child, women with 3-4 children have lower odds (95%, OR 0.44, CI 0.219, 0.908)of reporting >1 sex partner in last 12 month in the presence of a third party during interview. Also, relative to women in North Central region, those in North East (95%, OR 0.49, CI 0.295, 0.826), North West (95%, OR 0.33, CI 0.155, 0.705), South West (95%, OR 0.11, CI 0.045, 0.299) and South South (95%, OR 0.31, CI 0.129, 0.751) have significantly lower odds of reporting >1 sex partners in last 12 months during interrupted interview.

Reported condom use at last sex is associated with secondary and higher education, parity, place of residence, regions of residence such as North East and North West, rich wealth class and Hausa and other ethnic group. Relative to women with no education, those with secondary (95%, OR 1.72, CI 1.235, 2.396) and higher (95%, OR 2.18, CI 1.478, 3.223) education have significantly greater odds of reporting condom use at last sex during interrupted interview. Women with 1-2 children(95%, OR 2.72, CI 1.718, 4.319), 3-4 children (95%, OR 2.17, CI 1.342, 3.534) and 5+ children(95%, OR

2.34, CI 1.404, 3.909)have significantly greater odds of reporting condom use at last sex relative to those with no children.

In relation to women in urban areas, those in rural areas have lower odds (95%, OR 0.80, CI 0.651, 0.988) of reporting condom use at last sex when interviewed in the presence of a third party. Similarly, reference to women in North Central region, those in North East (95%, OR 0.61, CI 0.419, 0.915) and North West (95%, OR 0.28, CI 0.163, 0.495) regions have lower odds of reporting condom use in last sex during interrupted interview. Relative to poor women, rich women have greater odds (95%, OR 1.96, CI 1.436, 2.674) of reporting condom use at last sex. Also, relative to Fulani ethnic group, women from the Hausa (5%, OR 0.43, CI 0.247, 0.764) and other minority ethnic groups (95%, OR 0.45, CI 0.280, 0.729) have lower odds of reporting condom use at last sex.

Table 4bi. Multi Variate Logistic Regression for Interrupted interview and Sensitive Questions by socio-demographic characteristics - Nigeria (N=23,479)

	Adjusted OR (outcome)		
	> 1 Life time Sex Partner	>1 Sex Partner in last 12 months	Condom use at last sex
Variable	OR(CI)	OR(CI)	OR(CI)
Interrupted	1.05(0.933, 1.191)	1.92(1.073, 3.458)*	0.95(0.688, 1.322)
Age (5yr category)			
15-19	1.00	1.00	1.00
20-24	2.55(2.127, 3.075)*	2.29(0.897, 5.865)	1.09(0.668, 1.797)
25-29	4.12(3.436, 4.953)*	2.16(0.831, 5.653)	0.77(0.468, 1.275)
30-34	5.84(4.836, 7.070)*	1.71(0.607, 4.861)	0.82(0.489, 1.389)
35-39	6.06(4.983, 7.371)*	2.25(0.787, 6.457)	0.71(0.414, 1.247)
40+	7.04(5.808, 8.550)*	1.99(0.700, 5.662)	0.60(0.346, 1.059)
Education			
No Education	1.00	1.00	1.00
Primary	1.07(0.985, 1.180)	1.37(0.859, 2.186)	1.21(0.877, 1.674)
Secondary	1.29(1.165, 1.436)*	0.84(0.459, 1.554)	1.72(1.235, 2.396)
Higher	1.15(0.996, 1.337)	0.57(0.201, 1.633)	2.18(1.478, 3.223)
Religion			
Christian	1.00	1.00	1.00
Muslim	0.72(0.661, 0.795)*	0.47(0.285, 0.805)*	0.78(0.606, 1.011)
Others	0.79(0.660, 0.968)*	0.36(0.886, 1.541)	1.21(0.680, 2.157)
Parity			
0 child	1.00	1.00	1.00
1-2 child	0.88(0.776, 1.009)	0.57(0.296, 1.099)	2.72(1.718, 4.319)*
3-4 children	0.62(0.549, 0.721)*	0.44(0.219, 0.908)*	2.17(1.342, 3.534)*
5+ Children	0.51(0.448, 0.594)*	0.61(0.298, 1.284)	2.34(1.404, 3.909)*
Place of Residence			
Urban	1.00	1.00	1.00
Rural	0.98(0.911, 1.068)	1.23(0.744, 2.039)	0.80(0.651, 0.988)*
Region of Residence			
North Central	1.00	1.00	1.00
North East	1.42(1.283, 1.587)*	0.49(0.295, 0.826)*	0.61(0.419, 0.915)*
North West	0.90(0.799, 1.035)	0.33(0.155, 0.705)*	0.28(0.163, 0.495)*
South East	1.64(1.344, 2.000)*	0.92(0.232, 3.698)	1.01(0.656, 1.573)
South West	3.46(3.086, 3.886)*	0.11(0.459, 0.299)*	1.20(0.878, 1.663)
South south	2.47(2.156, 2.836)*	0.31(0.129, 0.751)*	1.16(0.846, 1.611)
Wealth			
Poor	1.00	1.00	1.00
Middle	0.98(0.899, 1.069)	0.68(0.408, 1.158)	1.27(0.924, 1.760)
Rich	0.90(0.819, 0.997)*	1.11(0.641, 1.933)	1.96(1.436, 2.674)*
Ethnicity			
Fulani	1.00	1.00	1.00
Hausa	1.43(1.245, 1.648)*	0.81(0.332, 1.995)	0.43(0.247, 0.764)*
Igbo	1.22(0.978, 1.523)	0.32(0.678, 1.601)	0.73(0.401, 1.342)
Yoruba	1.42(1.180, 1.711)*	0.78(0.252, 2.444)	0.90(0.525, 1.573)
Other	1.28(1.122, 1.474)*	1.16(0.524, 2.576)	0.45(0.280, 0.729)*

**indicates significant association at 95% confidence interval*

Multivariate Logistic Analysis for non sensitive Outcome Variables (Nigeria)

Result for reported participation in literacy program shows association with age 40+ years, religion, place and region of residence and wealth. Relative to women within age bracket 15-19yrs, those within age 40+ years have lower odds (95%, OR 63, CI 1.026, 2.601) of reporting participated in literacy program when interviewed in the presence of a third party. Muslim women (OR 0.59, CI 0.425, 0.775) and women in other minority religious groups (OR 0.49, CI 0.257, 0.954) have lower odds of reporting participated in literacy program. Relative to urban women, those in rural areas have lower odds (OR 0.73, CI 0.593, 0.908) of reporting participated in literacy program when interviewed in the presence of a third party.

Reference to women in North Central region, those in North East (OR 1.40, CI 1.073, 1.848) have greater odds of reporting report participated in literacy program. However, women in South West (95%, OR 0.49, CI 0.338, 0.732) and South South (95%, OR 0.51, CI 0.315, 0.847)regions have lower odds of reporting participated in literacy program relative to women in North Central region. Women from both middle (OR 1.75, CI 1.410, 2.181) and rich (OR 2.41, CI 1.884, 3. 106) have relatively greater odds of reporting participated in literacy program than those in poor wealth class.

Self reporting of slept under bed net result shows association with some age categories, educational attainment, parity, place of residence, some regions of residence, middle wealth class and Hausa ethnic group. Relative to women within age bracket 15-19yrs, those within ages 30-34 (OR 0.77, CI 0.619, 0.960), 35-39 (OR 0.58, CI 0.460, 0.736) and 40+yrs (OR 0.30, CI 0.236, 0.384) have lower odds of reporting slept under bed net when interviewed in the presence of a third party.

Women with primary (OR 1.27, CI 1.122, 1.445), secondary (OR 1.44, CI 1.239, 1.677) and higher (OR 2.04, CI 1.641, 2.544) education have greater odds of reporting

slept under bed net relative to women with no education in an interrupted interview. Similarly, relative to women with no child, those with 1-2 children (OR 3.5, CI 2.735, 4.477), 3-4 children (OR 4.07, CI 3.146, 5.274) and 5+ children (OR 5.35, CI 4.101, 7.004) have significantly greater odds of reporting slept under bed net. Rural women have greater odds (95%, OR 1.35, CI 1.201, 1.522) of reporting slept under bed net relative to urban women.

Reference to women in North Central region, those in North East (OR 1.50, CI 1.296, 1.756), North West (OR 1.36, CI 1.141, 1.621) and South West (OR 1.54, CI 1.306, 1.838) have respectively greater odds of reporting slept under bed net. Similarly, relative to poor women, middle wealth class women have greater odds (95%, OR 1.22, CI 1.088, 1.378) of reporting slept under bed. Also, Hausa women have greater odds (95%, OR 1.22, CI 1.026, 1.452) of reporting slept under bed net relative to women from the Fulani ethnic group.

Self reported listened to radio is associated with all but one of the control (non sensitive) variables, parity as shown in table 4bii. Relative to age bracket 15-19yrs, women of all age brackets except 20-24 years have greater odds of reporting listen to radio when interviewed in the presence of a third party. Women with primary and secondary education have significantly greater odds of reporting listen to radio relative to those with no education. Respondents from other minority religious groups have lower odds (95%, OR 0.42, CI 0.347, 0.514) of reporting listen to radio in relation to Christian women. Relative to urban women, rural women have lower odds (95%, OR 0.84, CI 0.769, 0.920) of reporting listen to radio when interrupted during interview. Reference to North Central region, Women in North East region (95%, OR 0.82, CI 0.747, 0.912) have lower odds of reporting listen to radio; while those from North West (95%, OR 1.31, CI 1.172, 1.478) and South South (OR 2.56, CI 2.155, 3.055) have greater odds of

reporting listen to radio. Relative to poor women, women in both the middle (95%, OR 1.73, CI 1.601, 1.880) and rich (95%, OR 3.64, CI 3.281, 4.042) wealth classes have greater odds of reporting listen to radio when interviewed in the presence of a third party. Reference to the Fulani ethnic group, women in all other ethnic groups has greater odds of reporting listen to radio (see table 4bii).

Table 4bii. Multi Variate Logistic Regression for Interrupted interview and Non-sensitive Questions by socio-demographic characteristics - Nigeria (N=23,479)

	Adjusted OR (outcome)		
	Participate in Literacy Program	Slept Under bed Net	Listen to Radio
Variables	OR(CI)	OR(CI)	OR(CI)
Interrupted Interview	0.92(0.632, 1.345)	1.10(0.933, 1.311)	1.01(0.891, 1.159)
Age (5yr category)			
15-19	1.00	1.00	1.00
20-24	1.36(0.883, 2.092)	1.05(0.869, 1.285)	1.09(0.961, 1.248)
25-29	1.44(0.928, 2.242)	0.90(0.737, 1.106)	1.18(1.036, 1.360)*
30-34	1.40(0.884, 2.239)	0.77(0.619, 0.960)*	1.16(1.003, 1.347)*
35-39	1.48(0.921, 2.399)	0.58(0.460, 0.736)*	1.26(1.083, 1.477)*
40+	1.63(1.026, 2.601)*	0.30(0.236, 0.384)*	1.21(1.045, 1.411)*
Education			
No Education	1.00	1.00	1.00
Primary	1.98(1.620, 2.431)	1.27(1.122, 1.445)*	2.27(2.080, 2.481)*
Secondary	Na	1.44(1.239, 1.677)*	3.69(3.293, 4.138)*
Higher	Na	2.04(1.641, 2.544)*	8.68(6.697, 11.264)
Religion			
Christian	1.00	1.00	1.00
Muslim	0.59(0.452, 0.775)*	1.05(0.911, 1.212)	0.95(0.863, 1.058)
Others	0.49(0.257, 0.954)*	1.12(0.856, 1.482)	0.42(0.347, 0.514)*
Parity			
0 child	1.00	1.00	1.00
1-2 child	1.16(0.770, 1.773)	3.50(2.735, 4.477)*	0.94(0.834, 1.071)
3-4 children	1.23(0.797, 1.902)	4.07(3.146, 5.274)*	0.89(0.780, 1.024)
5+ Children	1.31(0.846, 2.030)	5.35(4.101, 7.004)*	0.95(0.827, 1.096)
Place of Residence			
Urban	1.00	1.00	1.00
Rural	0.73(0.593, 0.908)*	1.35(1.201, 1.522)*	0.84(0.769, 0.920)*
Region of Residence			
North Central	1.00	1.00	1.00
North East	1.40(1.073, 1.848)*	1.50(1.296, 1.756)*	0.82(0.747, 0.912)*
North West	1.36(0.996, 1.861)	1.36(1.141, 1.621)*	1.31(1.172, 1.478)*
South East	0.59(0.258, 1.360)	1.13(0.840, 1.538)	1.21(0.918, 1.596)
South West	0.49(0.338, 0.732)*	1.54(1.306, 1.838)*	1.08(0.958, 1.236)
South south	0.51(0.315, 0.847)*	0.82(0.653, 1.047)	2.56(2.155, 3.055)*
Wealth			
Poor	1.00	1.00	1.00
Middle	1.75(1.410, 2.181)*	1.22(1.026, 1.452)*	1.73(1.601, 1.880)*
Rich	2.41(1.884, 3.106)*	1.07(0.937, 1.241)	3.64(3.281, 4.042)*
Ethnicity			
Fulani	1.00	1.00	1.00
Hausa	1.08(0.787, 1.492)	1.22(1.026, 1.452)*	1.13(1.016, 1.267)*
Igbo	0.60(0.261, 1.390)	1.30(0.945, 1.796)	0.65(0.495, 0.866)*
Yoruba	0.65(0.367, 1.163)	1.03(0.783, 1.379)	0.80(0.656, 0.983)*
Other	0.81(0.585, 1.143)	1.01(0.848, 1.208)	0.50(0.451, 0.568)*

Chapter 5
Discussion, Conclusion and Recommendation

The aim of this study is to assess effects of interrupted interview on response pattern and data quality of the 2008 DHS data from Ghana and Nigeria. Results from the study indicate that among married women interviewed during the 2008 survey, 7.8% (Ghana) and 6% (Nigeria) of women were interrupted by the presence of their husband, an adult male or adult female during the survey interviews. There is significant association between reporting being interrupted and socio-demographic characteristics of respondents: such that women in Nigeria within age bracket 20-34yrs, educated, with at most 2 children, in the southern region, in wealthy households (also in Ghana) and belong to Igbo, Yoruba and other minority ethnic groups were more likely to report being interrupted. Older women (age 40+yrs) in Nigeria from Muslim households, live in rural areas (also in Ghana) and in the northern region were less likely to report being interrupted (tables 3a & 3b). The effect of being interrupted on the reporting of a range of outcomes, categorized into sensitive and non-sensitive questions, were assessed. Being interrupted is only significant with the reporting of sensitive question, >1 sex partners in the last 12 months in Nigeria (OR 1.92, CI 1.073, 3.458). Being interrupted did not show any significance association with other outcome variables.

Previous studies have shown that interruption during face to face interview is a common occurrence in most surveys and can be influenced by household structure, marital companionship, age and sex of respondent and socioeconomic status of the respondent (Zipp & Toth 2002; Tourangeau et al, 2000; Aquilano 1993; Reuband, 1992). Also some studies indicated that the presence of a third party during interview does not only create issues of ethical implications but also implications for data quality and validity

of study outcome that may result from responses provided by the interviewee which may be influenced by what is referred to as social desirability effect (Kuncel et al & Galestic et al 2009; Randall et al, 1993; Smith, 2007; Groves, 2006; Tseng, 2001 Uriell et al, 2009; Tourangeau et al, 2000; Richman et al, 1999).

The result of this study shows similar pattern of interrupted interviews in Ghana (7.8%) and Nigeria (6%). Also, the Socio-demographic characteristics of the women show significant association with being interrupted. Women from urban areas, with some education and from wealthy households were more likely to experience interrupted interviews.

It was assumed that urban residency, increased educational attainment and wealthy status of household were precursor to more private interview environment because respondents in these categories should be more aware of their right to privacy during survey interviews. The result however did not show such pattern. The tendency for interrupted interview to occur among women from urban settings, wealthier households and educated is significant as indicated in this study. Women in urban areas, with some education and from wealthy households usually take interviews for granted and might not anticipate 'embarrassing' topics or questions during the interview if not told earlier, possibly at the start of the interview. Also, some interviewers can down play the effect of a third party presence or nature of the question and may ignore the strict adherence to privacy during the interview which may have a negative effect on responses and data quality.

Surveys using face to face interviews as a primary mode of obtaining data are often marred by the presence of curious individuals wanting to know what is being discussed by the interviewer and interviewee. It becomes more prominent in situations where communities and households are very cohesive and rely on each other for

support. This is a case for married households where interviews are done when the husband is around. Married women, with their husbands around during survey interview, are likely to be interrupted by them either sitting in or eavesdropping during such interview. Similarly, interviews in households with extended family structure, which is common in the two study countries, are likely to be interrupted by a family member. The respondents as well as the interviewer may find it difficult to seek complete privacy as this may raise issues of suspicion by the spouse or relative, and interviewer may not want to jeopardize the smooth flow of the interview process by insisting on complete privacy.

In addition to identifying interrupted interview, the result of the study shows significant association only in the reporting of >1 sex partners in the last 12 months in Nigeria (OR 1.92, CI 1.073, 3.458). This question is the most sensitive among all the other questions. Asking a married woman during a face-to-face interview and in the presence of another person will create discomfort and encourage the tendency of social desirability responding. This will in effect translate into the quality of data garnered from such an interview.

In Nigeria, it was assumed that women from Muslim households should be more likely to experience interrupted interview because as literature indicates, people from the Muslim dominated north are mostly conservative, opposed to developmental programs (Asadurian et al. 2006; Mustapha 2006) and was expected to have relatively much more control households and communities where behaviors are highly monitored. This however was not the case in this study. Muslim women (OR 0.7) were much less likely to be interrupted than Christian women. A reason for this could be that Christian household is relatively more liberal with greater marital companionship than Muslim households. So husbands of Christian women tend to stay around their wives and even

provide support to the wife in answering some interview questions. A similar pattern of interrupted interview is seen among ethnic groups that are divided along regional and religious boundaries.

It is thus a proven fact that the presence of a third party during interview is common and the socio-demographic characteristics of the respondent influence this effect. This can impact the response pattern. Surveys must be aware of these issues, most important of all the presence of a third party because they are strong predictors of the direction and pattern of responses provided during survey interviews. If the issue of a third party is overlooked one can always be skeptical about the reliability and quality of the study outcome. Survey designers could generate more valid data by ensuring optimum privacy during interviews. This should be factored into survey design and mechanisms to correct for such errors incorporated into the design, data collect and analysis process.

Conclusion

Result shows that close to 10% interruption did take place during interview of married women in the 2008 DHSs of Ghana and Nigeria. It also indicates that socio-demographic characteristics of the respondents are significant association with interrupted interview. However, except for >1 sex partners in last 12 months in Nigeria, interrupted interview has no statistical significant association with outcome variables categorized into sensitive and non sensitive questions. What is most significant from the study is that interrupted interview, though it did not show much significant effect on outcome variable, should not be underestimated. Since interrupted interview has been shown to be influenced by socio-demographic characteristics which also show an effect on the pattern of response, the direction of the response has an implication for the quality of data generated from such survey interviews. The direction of this effect cannot

be predicted because respondents may tend to under report or over report a behavior. If appropriate measures are not put in place to minimize such effect, then the validity of data from surveys such as the DHS which is relied upon for critical decision making and program planning, designing and implementation will be questioned. It will not only misinform program planner and policy makers but also contribute to misdirection of scarce resources. So effort should be made to reduce this effect as at translates into the quality and validity of such data.

Recommendation

It is acknowledged that the 2008 DHS of both countries instituted measures to reduce survey errors that may result from interviewer characteristics, training and skills, designing of data collection and analysis tools as well as instructing interviewer on full compliance to privacy and even reporting presence of another person during interviews. In spite of these measures taken to reduce errors, some interrupted interviews were reported for both countries. The DHS also failed to indicate what steps were taken to correct for any possible effect the interrupted interview had on the result disseminated.

Although the reported proportion of interrupted interview among married women seem relatively small for the entire sample size, their effect on data quality cannot be under estimated. It is therefore recommended that

1. For subsequent DHS, data analysis should takes cognizance of this effect interrupted interview and correct for it by either adjusting for it or introducing scales that can detect the extent of such effect and report on it. Future analysis should ensure it assesses the level and effect of interrupted interview and report on it.
2. Further analysis of the current DHS can be done on the both the women and men individual survey to assess any difference, the extent of interruption and the

effect on quality of such data on all categories of respondents since this study was limited to only married women in the women individual survey.

3. DHS interviewers must ensure at the start of the interview, during the consent process, they should establish the need for privacy, possible clues on the issues that will be discussed, providing reasonable explanations for such privacy on the result, interviewee and possible future use of the result. Interviewers should tell interviewee what questions are expected at the start of the interview. In case this cannot be guaranteed they should provide a written report on what transpired during such interruption who was present, at what time of the interview did the interruption take place and what did they do when such interruption took place.
4. Very few studies have been reported to have incorporated social desirability scale on survey instrument. This can be an area for future research by the DHS in order to address issues of data quality emanating from social desirability responding as was seen in the result on question on more than 1 sex partners in the last 12 months. This can provide an idea of any difference in result compared to when nothing is done to adjust for interrupted interviews. Also the use of innovative data collection methods such as flash cards for sensitive questions in the presence of another person.
5. Further qualitative studies on association between interrupted interview and socio-demographic characteristics of respondents. This can look at barriers and facilitators of interrupted interview, who influence the decision on privacy and what characteristics of the interviewee is most influential in reaching these decisions and can better inform future survey design. It can also provide better idea as to what socio-demographic characteristics is most prominent in influencing Interrupted Interview and the extent.

References

- Aday, L. A. & Kovar, M. G. (1995) Discussion themes from session 4. Conference proceedings 6th Conference on Health Survey Research Methods, Breckenridge, Colorado, p. 185-187.
- Agunwamba, A., Bloom, D., Friedman, A., Ozolins, M., Rosenberg, L., Steven, D., and Weston, M., (2009). Nigeria: The Next Generation – Literature Review May 2009
- Alexander, M.G. & Fisher, T.D. (2003) Truth and consequences: Using pipeline to examine sex differences in self-reported sexuality. The Journal of Sex Research, vol. 40(1), p. 27-35.
- Anatol-Fiete, N., Krumpal, I., (2011) Asking sensitive questions: the impact of forgiving wording and question context on social desirability bias
- Anderson, B. A., Katus, K., Puur, A. & Silver, B. D., (1994) The validity of survey responses on abortion: Evidence from Estonia
- Aquilano, W. (1993) “Effects of Spouse Presence During the Interview on Survey Responses Concerning Marriage” The Public Opinion Quarterly Vol. 57 No. 3, pp. 359-376.
- Asadurian, T., Nnadozie, E., and Wantchekon, L., (2006). Transfer dependence and regional disparities in Nigerian federalism. In J Wallack and TN Srinivasan (Eds.), Federalism and Economic Reform: International Perspectives, (407-455). Cambridge: Cambridge University Press.
- Asante, R. & Gyimah-Boadi, E., (2004). Ethnic Structure, Inequality and Governance of the Public Sector in Ghana (UNRISD)
- Babcock, J., Costa, D., Green, C. and Eckhardt, C. (2004). What situations induce intimate partner violence? A reliability and validity study of the Proximal

Antecedents to Violent Episodes (PAVE) scale. Journal of Family Psychology, 18(3):433-442.

- http://www.bbc.co.uk/news/world-africa-13433791
- Blair, D. and Coyle, C. 2005. An examination of multicultural competencies of entry level certified therapeutic recreation specialists. Therapeutic Recreation Journal, 39(2):139-157.
- Bureau of African Affairs 2011
- Boeije, H. R. (2004). And Then There Were Three: Self-Presentational Styles and the Presence of the Partner as a Third Person in the Interview. Utrecht University
- Brody, S. (1995). Patients misrepresenting their risk factors for AIDS International Journal of STD and AIDS, 6, 392-398.
- Callahan, T. & Hobbs, R. (1998). Research Ethics: Ethics in Medicine, University of Washington School of Medicine
- Cantillon, S. (2005) “Personal Spending Money”, Poverty Today, December
- Cantillon, S. and Newman, C. (2005) ‘Bias in Interview Data Created by Presence of a Third Party: Methodological Issues in a Study of Intra-Household Deprivation’ Radical Statistics 90, 33-44
- Cantillon, S., B. Gannon and B. Nolan (2004), Sharing Household Resources, Dublin: Combat Poverty Agency
- Cecil, H., & Pinkerton, S. D. (1998). Reliability and validity of a self-efficacy instrument for protective sexual behaviors. Journal of the American College Health Association, 47(3), 113-121.

- Celentano, D. D., Muñoz, A., Cohn, S., Nelson, K. E., & Vlahov, D. (1994). Drug-related behavior change for HIV transmission among American injection drug users. Addiction, 89, 1309-1317.
- Chung, J. and G. S. Monroe (2003) Exploring social desirability bias. Journal of Business Ethics 44(4), p. 291-302.
- Cochran, J. K., Wood, P. B., and Arneklev, B. J. 1994. “Is the Religiosity-Delinquency Relationship Spurious? A Test of Arousal and Social Control Theories.”Journal of Research in Crime and Delinquency 31:92-123.
- Cohen, L., Manion, L. and Morrison, K. (2000, 5th ed.) Research Methods in Education. London: Routledge/Falmer
- Commission on Human Rights, Sub-Commission on Promotion and Protection of Human Rights Working Group on Minorities Ninth session 12-16 May 2003
- Connell, R. W. (2001). The social organization of masculinity. In S. M. Whitehead & F. J. Barrett (Eds.), The masculinities reader (pp. 30–50). Malden, MA: Blackwell Publishers, Inc
- Cossette, S., Cara, C., Richard, N. and Pepin, J. 2005. Assessing nurse-patient interactions from a caring perspective: report of the development and preliminary psychometric testing of the Caring Nurse-Patient Interactions Scale. International Journal of Nursing Studies, 42(6):673-686.
- Crowne, D.P. & Marlowe, D. (1960) A new scale of social desirability independent of psychopathology. Journal of Consulting Psychology, 24(4), p. 349-354. 11
- **http://www.cioms.ch/frameguidelines_nov_2002.htm**.
- Current Issues in Research Ethics: Privacy and Confidentiality (2011).

- Davis, J. A. and Smith, T. W. (1994) General Social Survey, 1972- 1994: Cumulative Codebook. Chicago: NORC, 1994.
- http://data.worldbank.org/indicator
- DiFranceisco, W., McAuliffe, T. and Sikkema, K. 1998. Influences of survey instrument format and social desirability on the reliability of self-reported high risk sexual behaviour AIDS and Behaviour, 2(4):329-337
- Drew, B. L., Mion, L. C., Meldon, S. W., Khalil, M. Y., Beaver, A., Ghazal-Haddad, L. (2004) Effect of Environment and Research Participant Characteristics on Data Quality.
- Edwards, S. L., Slattery, M. L., Khe-Ni Ma, (1997) Measurement Errors Stemming from Non respondents Present at In-Person Interviews Department of Ontological Sciences, University of Utah Medical School, Salt Lake City, Utah USA
- Ellsberg, M. C., Winkvist, A., Peña, R., Stenlund, H. (2001) Women's strategic responses to violence in Nicaragua J Epidemiology Community Health2001;55:547-555 doi:10.1136/jech.55.8.547
- Fisher, T. D. (2007) Sex of Experimenter and Social Norm Effects on Reports of Sexual Behavior in Young Men and Women Archives of Sexual Behavior Volume 36, Number 1 (2007), 89-100, DOI: 10.1007/s10508-006-9094-7
- Galesic, M. & Bosnjak, M. (2009) Effects of questionnaire length on participation and indicators of response quality in a web survey. Public Opinion Quarterly, 73(2), p. 349-360.
- Gray, D. E. (2004). Doing Research in the Real World. London: SAGE Publications.

- Groves, R. M. (2006) Nonresponse rates and nonresponse bias n household surveys. Public Opinion Quarterly, 70(5), p. 646-675.
- Guide to DHS Statistics Updated September 2006
- Haerich, P. (1992) Premarital Sexual Permissiveness and Religious Orientation: A Preliminary Investigation *Journal for the Scientific Study of Religion* Vol. 31, No. 3 (Sep., 1992), pp. 361-365
- Hartman, P. (1995), Response behavior in interview settings of limited privacy. Int. Journal of public opinion Research
- Hebert, J. R., Peterson, K. E., Hurley, T. G., Stoddard, A. M., Cohen, N., Field, A. E., & Sorensen, G. (2001). The effect of social desirability trait on self-reported dietary measures among multi-ethnic female health center employees. Annals of Epidemiology, 11(6), 417-427.
- Heeb, Jean-Luc; Gmel, Gerhard (2001) Interviewers' and respondents' effects on self-reported alcohol consumption in a Swiss health survey. Journal of Studies on Alcohol, Vol 62(4), Jul 2001, 434-442.
- Heise, L., Ellsberg, M. and Gottemoeller, M., 1999. “Ending Violence against Women.”Population Reports. Series L, No. 11. Baltimore: Johns Hopkins University School of Public Health.
- Henning, K., Jones A. and Holdford R. 2005. “I didn’t do it, but if I did I had a good reason”: minimization, denial, and attributions of blame among male and female domestic violence offenders. Journal of Family Violence, 20(3):131-139.
- Holbrook, A.L. & Popkin, S.J. (2006) Surveying a Chicago public housing development. Methodological challenges and lessons learned. Evaluation review, 30(6), p. 779-802.

- Hoyle, R. H., Harris, M. J., & Judd, C. M. (2002). Research Methods in Social Relations. NY: Wadsworth.
- Huang, C., Liao, H. and Chang, S. 1998. Social desirability and the Clinical Self-Report Inventory: methodological reconsideration. Journal of Clinical Psychology, 54(4):517-528.
- Jones, G. E. & Stone, D. (1995). Perceived discomfort associated with working with persons with varying disabilities. Perceptual Motor Skills, 81, (3 Pt. 1), 911–99.
- Kajornboon, A. B. (2008) Using interviews as research instruments Chulalongkorn University Language Institute. University of Melbourne: Australia.
- Kari Einarsen and Terje I. Våland, (2004) From research question to research design. Challenges of obtaining valid sensitive data Work in progress
- Kijima, N., Tanaka, E., Suzuki N., & Kitamura, T. (2000). Reliability and validity of the Japanese version of the Temperament and Character Inventory. Psychological Reports, 86(3), 1050-1058.
- Kim, J., Dubowitz, H., Hudson-Martin, E. & Lane, W. (2008) Comparison of 3 data collection methods for gathering sensitive and less sensitive information. Ambulatory Pediatrics, 8(4), p. 255-260.
- King, M. and Bruner, G. 2000. Social desirability bias: a neglected aspect of validity testing. Psychology and Marketing, 17(2):79–103.
- Knucel, N.R. & Tellegen, A. (2009) A conceptual and empirical reexamination of the measurement of the social desirability of items: implications for detecting desirable response style and scale development. Personnel Psychology, 62, p. 201-228.

- Krosnick, J. A. (1999). SURVEY RESEARCH 1999 Annual Review of Psychology Vol. 50: 537-567 (Volume publication date February 1999) DOI: 10.1146/annurev.psych.50.1.537
- Krumpal, I. (2011) Determinants of social desirability bias in sensitive surveys: a literature review
- Lange, A., Dehman, B., & Beurs, E. D. (1995). Validation of the Dutch Adaptation of the Buss-Durkee Hostility Inventory. Behavior Research and Therapy, 33, 229–233.
- Latkin, C. A., Vlahov, D., Anthony, J. C. (1993). Socially desirable responding and self-reported HIV infection risk behaviors among intravenous drug users. Addiction. 88(4):517-26.
- Latkin, C. A. (1998). Socially desirable response tendency as a correlate of accuracy of self-reported HIV serostatus for HIV seropositive injection drug users. Addiction, 98, 1191-1197.
- Laumann, E. 0., Gagnon, J. N., Michael, R. T., & Michaels, S. (1994). The Social Organization of Sexuality: Sexual Practices in the United States. Chicago: University of Chicago Press, 1994.
- Lee, R.M. & Renzetti, C.M. (1993) The problems of researching sensitive topics. American behavioral scientist, 35(5), p. 510-528.
- Loo, R.,&Thorpe, K. (2000). Confirmatory factor analyses of the full and short versions of the Marlowe-Crowne social desirability scale Journal of Social Psychology, 140(5), 628-635.
- Mahalik et al (2005) Variables predicting controlling behaviour in men who batter

- Mahalik, J., Aldarondo, E., Gilbert-Gokhale, S. and Shore, E. 2005. The role of insecure attachment and gender role stress in predicting controlling behaviour in men who batter. Journal of Interpersonal Violence, 20(5):617-631
- McConaghy, N. (1999). Unresolved issues in scientific sexology. Archives of Sexual Behavior, 28, 285–318.
- McGillaway, S. and Connelly, M. 2004. Mental illness in the UK criminal justice system: a police liaison scheme for mentally disordered offenders in Belfast. Journal of Mental Health, 13(3):263-275
- Merson, M. H. (1997, February). International Perspective on AIDS Prevention Research. Paper presented at the NIH Consensus Development Conference, Bethesda, M D.
- www.measuredhs.com
- Miyazaki, A. D. and K. A. Taylor (2008) Researcher interaction biases and business ethics research: Respondent reactions to researcher characteristics. Journal of Business Ethics 81(4), p. 779-795.
- Moon, Y. (1998) Impression management in computer-based interviews. The effects of input modality, output modality, and distance. Public Opinion Quarterly, 62(4), p. 610-622.
- Morisky, D. E., Ang, A. and Sneed, C. D. (2002). Validating The Effects of Social Desirability on Self- reported Condom Use Behavior among Commercial Sex Workers AIDS Education and Prevention, 14(5), 351–360, 2002
- Morton-Williams, J., Interviewer Approaches. 1993, Cambridge Dartmouth Publishing Company Ltd.
- Munhall PL. Ethical considerations in qualitative research. West J Nurs Res 1989; 10: 150-62.

- Mustapha, A. R., (2006). Ethnic structure, inequality and governance of the public sector in Nigeria. United Nations Research Institute for Social Development. Geneva.
- Nigeria Demographic and Health Survey (2008 NDHS)
- O'Hare, B. C., (2011) Interviewer Characteristics.
- Ong, A. D. & Weiss, D. J. (2000). The impact of anonymity on responses to sensitive questions. Journal of Applied Social Psychology, 30 (8), p. 1691-1708.
- Palazzo, G. & Richter, U. (2005) CSR Business as Usual? The Case of the Tobacco Industry. Journal of Business Ethics; 61, p. 387-401.
- Patton, M. Q. (2000). Qualitative Research and Evaluation Method. London: SAGE Publications.
- Paulhus, D. L. (1991). Measurement and control of response bias. In John P. Robinson et al (EDS.) Measures of personality and social psychological attitudes (Vol 1., pp. 17-59). New York: Academic Press.
- Pole, N., Best, S. R., Weiss, D. S., Metzler, T., Liberman, A. M., Fagan, J.,&Marmar C. R. (2001). Effects of gender and ethnicity on duty-related posttraumatic stress symptoms among urban police officers. Journal of Nervous Mental Disorders, 189(7), 442-448.
- Pollner, M. and Adams, R. E (1997). The Effect of Spouse Presence on Appraisals of Emotional Support and Household Strain The Public Opinion Quarterly Vol. 61, No. 4 (Winter, 1997), pp. 615-626
- Randall, D. M. and M. F. Fernandes (1991) The Social Desirability Response Bias in Ethics Research. Journal of Business Ethics 10(11), p. 805.

- Randall, D.M., Huo, Y.P. & Pawelk, P. (1993) Social desirability bias in cross-cultural ethics research. The international Journal of Organizational Analysis, 1(2), p. 185-202.
- Raudonis B. M. (1992) Ethical considerations in qualitative research with hospice patients: Qual. Health Res 1992; 2: 238-49.
- Regnerus, M. D. & Uecker, J. E. (2007). Religious Influences on Sensitive Self-Reported Behaviors: The Product of Social Desirability, Deceit, or Embarrassment? Sociology of Religion 2007, 68:2 145-163
- Reuband, K.H (1992). On third persons in the interview situation and their impact on responses. International Journal of Public Opinion, 4(3),269-274
- Richman, W. L., Weisband, S., Kiesler, S. & Drasgow, F. (1999) A meta-analytic study of social desirability distortion in computer- administered questionnaires, traditional questionnaires, and interviews. Journal of Applied Psychology, 85(5), p. 754-775.
- Sandal, G.M., Musson, D., Helmreich, R.L. & Gravdal, L. (2005) Social desirability in personality testing: implications for astronaut selection. Acta Astronautica, 57, p. 634-641.
- Scagliusi, F., Polacow, V., Artiole, G., Benatti, F. and Lancha, A. 2003. Selective underreporting of energy intake in women: magnitude, determinants, and effect of training. Journal of the American Dietetic Association, 103(10):1306-1313.
- Schatteman, T. (2000). Do interviewer characteristics influence Respondents' Participation in Panel Surveys? An analysis on a Belgian study of school-to-work transitions:faculty of Applied Economics, University of Antwerp Prinsstraat 13, B-2000 Antwerp Belgium

- Schoderbek, P. P. & Deshpande, S. P. (1996) Impression management, over claiming, and perceived unethical conduct: The role of male and female managers. Journal of Business Ethics, 15(4), p. 409-414. 13
- Schoepf B. G. (1991). Ethical, methodological and political issues of AIDS research in Central Africa. Sot. Sci. Med. 33, 749, 1991
- Sheeran, P., & Abraham, C. (1994). Measurement of condom use in 72 Studies of HIV preventive behaviour: a critical review. Patient and Education Counseling, 24, 199-216
- Sherkat, D. E. and Ellison, C. G. (1999). "Recent Developments and Current Controversies in the Sociology of Religion." Annual Review of Sociology 25: 363-394.
- Gregson, S., Zhuwau, T., Ndlovu, J. and Nyamukapa, C. A. (2002). Methods to Reduce Social Desirability Bias in Sex Surveys in Low-Development Settings Experience in Zimbabwe: Sex Transm Dis. 2002 Oct; 29(10):568-75.
- Singer, E., Hippler, H.-J. & Schwartz, N. (1992) Confidentiality assurances in surveys: Reassurance or threat? International Journal of Public Opinion Research, 4, p. 256-268.
- Singer, E., Mathiowetz, N. A. & Couper, M. P. (1993) The impact of privacy and confidentiality on survey participation: The case of the 1990 U.S. Census. The Public Opinion Quarterly, 57(4), p. 465-482.
- Singer, E., Van Hoewyk, J. & Neugebauer, R. J. (2003) Attitudes and behavior. The impact of Privacy and confidentiality concerns on participation in the 2000 Census. Public Opinion Quarterly, 67(3), p. 368-385.

- Singer, E., Von Thurn, D.R., & Miller, E.R. (1995) Confidentiality assurances and response. A quantitative review of the experimental literature. Public Opinion Quarterly, 59(1), p. 66-77.
- Sloan, R. P., Bagiella, E. and Powell, T. (1999). “Religion, Spirituality, and Medicine.” Lancet 353:664-67.
- Smith, T. W. (1994). "Attitudes toward Sexual Permissiveness: Trends, Correlates, and Behavioral Connections in Sexuality across the Life Course, edited by Alice S. Rossi. Chicago: University of Chicago Press, 1994.
- Smith, W.W. (2007) Social desirability bias and exot survey responses: The case of a first nation’s campground in Central Ontario, Canada. Tourism management, 28, p. 917-919.
- Stanton, J. M., Sinar, E.F., Balzer, W.K. & Smith, P.C. (2002) Issues and strategies for reducing the length of self-report scales. Personnel Psychology, 5, p. 167-194.
- Steenkamp, J., M. G. De Jong, (2010) Socially Desirable Response Tendencies in Survey Research. Journal of Marketing Research 47(2), p. 199-214.
- Straus, M. (2004). Prevalence of violence against dating partners by male and female university students worldwide. Violence Against
- Su-Hao Tu (2000) The presence of others and survey response: Office of survey Research, Academia Sinica Taiwan
- Su-Hao Tu and Pei-Shan Liao (2007) Social Distance, Respondent Cooperation and Item Nonresponse in Sex Survey
- Tabane,R., Bouwer, C. (2006)The influence of cross-cultural interviewing on the generation of data: SAJE Vol. 26, No 4 (2006)

- Taylor, B. and Vocht de, H. (2011). Interviewing Separately or as Couples? Considerations of Authenticity of Method
- Timothy C. Callahan, Ron Hobbs, (1998) Research Ethics: Ethics in Medicine: University of Washington School of Medicine
- Tooze, J., Sabar, A., Thompson, F., Troiano, R., Schatzkin, A. and Kipnis, V. 2004. Psychosocial predictors of energy underreporting in large doubly labeled water study. American Journal of Clinical Nutrition, 79(5):795–804.
- Tourangeau, R. & Yan, T. (2007) Sensitive questions in surveys. Psychological Bulletin, 133(5), p. 859-883.
- Tourangeau, R., Rips, L. J., & Rasinski, K. (2000). The psychology of survey response. Cambridge, England: Cambridge University Press.
- Tourangeau, Roger and Smith, Tom W., "A Comparison of Three Modes of Data Collection,N~OR C Report, 1995.
- Trudi James Hazel Platzer (1999) Ethical Considerations in Qualitative Research with Vulnerable Groups: Exploring Lesbians' and Gay Men's Experiences of Health Care – A Personal Perspective: doi: 10.1177/096973309900600108 Nurs. Ethics January 1999 vol. 6 no. 1 73-81
- Tseng, W. (2001). Handbook of cultural psychiatry. New York: Academic Press
- http://www.un.org/en/
- United Nations Children Fund (2009). Immunization: Polio Eradication in Nigeria. Retrieved 20 May 2009 from: http://www.unicef.org/immunization/index_49088.html
- http://www.unicef.org/sowc2011/fullreport.php
- Uriell, Z.A. & Dubley, C.M. (2009) Sensitive topics: Are there modal differences? Computers in Human Behavior, 25, p. 76-87.

- van de Mortel, T. F. (2008) Faking it: social desirability response bias in self report research Australian Journal of Advanced Nursing Vol. 25 Number 4
- Watson, P. J., Milliron, T., & Morris, R. J. (1995). Social desirability scales and theories of suicide correlations with alienation and self-conscientiousness. Personality and Individual Differences, 18, 701–711.
- http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTWDRS/EXTWDR2010/0,,menuPK:5287748~pagePK:64167702~piPK:64167676~theSitePK:5287741,00.html
- WHO (1999). Putting Women's Safety First: Ethical and Safety Recommendations for Research on Domestic Violence against Women. Geneva: WHO
- http://www.who.int/whr/2001
- WHO (2003). Ethical and Safety Recommendations for Interviewing Trafficked Women. Produced by the Health Policy Unit, London School of Hygiene & Tropical Medicine with support from the Daphne Programme of the European Commission and the World Health Organization. World Health
- World Health Organization (2008c). Yellow fever vaccine: Reported estimates of YFV coverage. Retrieved 21 May 2009 from: http://www.who.int/immunization_monitoring/en/globalsummary/timeseries/tscoverageyfv.htm
- World Health Organization (2009). WHO/UNICEF coverage estimates for 1980-2007. Retrieved 21 May 2009from: http://www.who.int/immunization_monitoring/en/globalsummary/timeseries/tswucoveragedtp3.htm
- http://www.who.int/whr/1997/en/index.html

- Williams, B. L.,& Suen, H. (1994). A methodological comparison of survey techniques in obtaining self-reports of condom-related behaviors. Psychological Reports, 75, 1531-1537.
- Wood, E., Nosko, A., Desmarais, S., Ross, C. & Irvine, C. (2006) Online and traditional paper- and-pen survey administration: Examining presences, sensitive, material and long surveys. The Canadian Journal of Human Sexuality, 15(3-4), p. 147-155.
- Wutich, A., Lant, T., White, D.D., Larson, K.L. & Gartin, M. (2010) Comparing focus group and individual responses on sensitive topics: A study of water decision makers in a desert city. Field Methods, 22(1), p. 88-110.
- Zagorsky, J. L. (2003) Husbands' and wives' view of the family finances, Center for Human Resource Research, Ohio State University
- Zipp, J. F. and Toth, J. (2002) She Said, He Said, They Said: The Impact of Spousal Presence in Survey Research
- Zipp, J. F., Prohaska, A., Bemiller, M. (2004) Wives, Husbands, and Hidden Power in Marriage. University of Akron

Appendices

Appendix 1. Table shows DHS Sample Frame and proportion of Interruption among respondents for both Ghana and Nigeria

Ghana (N=4,916) DHS Sample					Nigeria (N=33,385) DHS Sample				
	Overall		**Interrupted**			**Overall**		**Interrupted**	
Variables	**N**	**%**	**n**	**%**	**Variables**	**N**	**%**	**n**	**%**
Age (5yr category)					**Age (5yr category)**				
15-19	1,037	21.1	44	12.7	15-19	6,591	19.7	207	3.1
20-24	869	17.7	51	14.7	20-24	6,103	18.3	330	5.4
25-29	817	16.6	78	22.5	25-29	6,303	18.9	378	6.0
30-34	636	12.9	54	15.6	30-34	4,557	13.7	360	7.9
35-39	637	13.0	55	15.9	35-39	3,883	11.6	241	6.2
40+	920	18.7	65	18.7	40+	5,948	17.8	272	4.6
Education					**Education**				
No Education	1,247	25.4	85	24.5	No Education	13,242	39.7	632	4.8
Primary	999	20.3	81	23.3	Primary	6,591	19.7	407	6.2
Secondary	2,489	50.6	165	47.6	Secondary	10,905	32.7	583	5.3
Higher	181	3.7	16	4.6	Higher	2,647	7.9	166	6.3
Religion					**Religion**				
Christian	3,630	73.8	249	71.8	Christian	17,171	51.4	972	5.7
Muslim	832	16.9	72	20.8	Muslim	15,449	46.3	767	5.0
Others	454	9.2	26	7.5	Others	588	1.8	42	7.1
Marital Status					**Marital Status**				
Married	2,361	48.0	184	53.0	Married	23,479	70.3	1,419	6.0
Never	1,546	31.5	75	31.5	Never	8,021	24.0	239	3.0
Living Together	589	12.0	45	13.0	Living Together	475	1.4	50	10.5
Widow	104	2.1	12	3.5	Widow	763	2.3	36	4.7
Divorce	142	2.9	17	4.9	Divorce	301	0.9	16	5.3
Not Living Together	174	3.5	14	4.0	Not Living Together	345	1.0	28	8.1
Parity					**Parity**				
0 child	1,617	32.9	80	23.1	0 child	9,634	28.9	346	3.6
1-2 child	1,295	26.3	105	30.3	1-2 child	7,176	21.5	438	6.1
3-4 children	1,013	20.6	78	22.5	3-4 children	6,491	19.4	454	7.0
5+ Children	991	20.2	84	24.2	5+ Children	2,697	8.1	550	20.4
Place of Residence					**Place of Residence**				
Urban	2,162	44.0	187	53.9	Urban	10,489	31.4	700	6.7
Rural	2,754	56.0	160	46.1	Rural	22,896	68.6	1,088	4.8
Region of Residence					**Region of Residence**				
Western	438	8.9	10	2.9	North Central	6,366	19.1	318	5.0
Central	334	6.8	46	13.3	North East	6,217	37.7	264	4.2
Greater Accra	692	14.1	96	27.7	North West	7,297	59.6	305	4.2
Volta	433	8.8	5	1.4	South East	3,667	11.0	219	6.0
Eastern	479	9.7	31	8.9	South West	4,813	14.4	332	6.9
Ashanti	815	16.6	10	2.9	South south	5,025	15.1	350	7.0
Brong Ahafo	403	8.2	52	15.0					
Northern	497	10.1	37	10.7					
Upper East	373	7.6	34	9.8					
Upper West	452	9.2	26	7.5					
Wealth					**Wealth**				
Poor	2,010	40.9	110	31.7	Poor	14,101	42.2	648	4.6
Middle	897	18.3	64	18.4	Middle	6,582	19.7	324	4.9
Rich	2,009	40.9	173	49.9	Rich	12,702	38.1	816	6.4
Ethnicity					**Ethnicity**				
Akan	2,136	43.5	159	45.8	Fulani	2,460	7.4	126	5.1
Ewe	637	13.0	30	8.7	Hausa	7,086	21.2	292	4.1
Mole-Dagbani	1,071	21.8	93	26.8	Igbo	4,583	13.7	274	6.0
Other	1,072	21.8	64	18.45	Yoruba	4,961	14.6	323	6.5
					Other	14,243	42.7	768	5.4

Appendix 2 Table shows Sample Frame of Outcome Variables for both Ghana and Nigeria

	Country	
	Ghana (N=4,916)	Nigeria (N=33,385)
Variables	n (%)	n (%)
Interrupted during Interview	347(7.1)	1,788(5.4)
>1 Life time sex partners	2,245(45.8)	9,092(27.2)
>1 sex partners in last 12 Months	36(0.7)	183(0.6)
Use condom at last sex	276(5.6)	1,551(4.7)
Slept under Bed Net	1,201(24.4)	3,027(9,1)
Ever participated in Literacy Program	253(5.2)	714(2.1)
Listen to Radio	4,065(82.7)	21,906(65.5)

Appendix 3. Maps of Ghana and Nigeria (courtesy of Sklar et al. 2006 & GNU Free Documentation License).