

Myths and misinformation: An analysis of text messages sent to a sexual and reproductive health Q&A service in Nigeria

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Abstract

The almost 50 million young people age 10-24 in Nigeria face many challenges to their sexual and reproductive health (SRH). *MyQuestion* is a platform that allows young people to ask SRH questions via text message. Trained counselors provide responses using a database of answers to frequently asked questions or customized replies. We analyze the content of more than 300,000 text messages received by the service since 2007 to answer three questions: which health topics are most frequently submitted to the *MyQuestion* service; what kinds of questions are asked about these topics; and what language is used to convey the questions? We find a substantial unmet need for basic SRH information, communicated in ways that convey considerable confusion, misinformation, and urgency. The analysis can be used to improve similar Q&A services but is also useful for improving the provision of SRH services for young people more generally.

Introduction

Background

The almost 50 million young people age 10-24 in Nigeria face many challenges to their sexual and reproductive health. Among 18 year olds, more than one in three has already had a child or is pregnant. A minority of 15-19 year olds know about any modern contraceptive methods and even fewer have ever used one (National Population Commission [Nigeria] and ICF Macro 2009). Young people age 15-24 account for 60 percent of the 300,000 new HIV infections every year; prevalence among young women age 15-24 (2.9 percent) is three times higher than among men of the same age (1.1 percent) (National Agency for the Control of AIDS and UNAIDS 2011). Only about 40 percent of 15-19 year old women and 52 percent of men of the same age know where to get an HIV test, and less than 7 percent of those who are sexually active have been tested (National Population Commission [Nigeria] and ICF Macro 2009) .

In Nigeria and similarly challenging environments, mobile phones are increasingly being used as tools in the public health field. SMS-based applications have been employed in the health arena for a wide range of purposes, including appointment reminders, notification of test results, communication between health workers and patients, reminders to take medications and contraceptive pills, and sending bulk health education messages. There are a few descriptions in the literature of SMS question and answer services of various types (e.g., in the UK and US, Australia, India, Kenya) although very few evaluations of their impact (Lim, Hocking et al. 2008). The advantages of a text message system for sexual and reproductive health (SRH) information aimed at young people include its convenience, anonymity, and low cost to the user (Gurman, Rubin et al. 2012). Adolescents and young women in focus group discussions in Nigeria also cited ‘going back to the message for future reference’, ‘sharing the message with others’, and the possibility of texting even when mobile network coverage is poor, as benefits of an SMS-based system (Akinfaderin-Agarau, Chirtau et al. 2012).

As in much of sub-Saharan Africa, the use of mobile phones has grown rapidly in Nigeria. Between 2002 and 2012, the number of mobile phone subscriptions per 100 inhabitants increased from 1.2 to 67.7; in 2010, roughly 60 percent of households had a mobile phone (International Telecommunications Union 2013). While statistics on access to mobile phones are not available by age and sex, a qualitative study of a sample of girls and young women age 12-30 years in seven states in Nigeria showed that almost all had access to a mobile phone, either their own or by borrowing one from parents, siblings, friends, other relatives, or a partner or husband. However, participants in the study also cited some barriers to the use of borrowed

mobile phones to get SRH information, including needing to get permission and privacy concerns (Akinfaderin-Agarau, Chirtau et al. 2012).

The MyQuestion Platform

MyQuestion is a platform that allows young people to ask sexual and reproductive health related questions via text message, email, or internet. Access is also available through voice calls to an existing number provided through the Nigerian National Agency for the Control of AIDS (NACA). *MyQuestion* is a component of Learning about Living (LaL) Nigeria, a cross-media and life skills program developed by OneWorld UK and Butterfly Works (Netherlands) that enables and encourages young Nigerians to engage with sexual and reproductive health issues. It combines a computer-based eLearning system to support the government approved Family Life and HIV/AIDS Education (FLHE) curriculum in schools with the mobile phone question and answer service that connects young people to trained counselors through a free SMS service developed by OneWorld UK in collaboration with Education as a Vaccine (EVA), a Nigerian civil society organization located in Abuja. This combination of digital tools and content formats is intended to extend the reach and impact of sexuality education in Nigeria and to empower young Nigerians to access information on their own terms (OneWorld 2009).

A two year pilot project was initiated in 2007 and, after demonstrating successfully that eLearning and mobile technologies can support and extend sexuality education in the classrooms and beyond, a scale-up phase was undertaken from February 2009-January 2012. During this period, the project was scaled up from three to 19 states across Nigeria including the Federal Capital Territory. By the end of April 2012, over 120,000 students in 239 schools and seven out-of-school centers had used the eLearning platform, with over 2,500 teachers and about 1,000 peer educators trained.

Users of the *MyQuestion* service can send their questions to a free short code through their mobile phone, or they can send an email, call a phone number, or complete a web form on the project website. The service is used anonymously and is free to users via four telecommunications providers in Nigeria. Trained counselors at EVA provide responses through a web platform built by OneWorld, via SMS, email or other web based interface, using a database of answers to frequently asked questions (FAQ) or customized replies when needed. Since the project started in November 2007, it has been extremely popular; approximately 12,000-15,000 questions are now received on the platform each month through text messages. The majority are received via text which is by far the most common mode of accessing the service.

In this paper, we analyze the content of more than 300,000 text messages received by the *MyQuestion* service since its inception. We examine three primary questions: which health topics are most frequently submitted

to the MyQuestion service; what kinds of questions are asked about these topics; and what language is used to convey the questions? The analysis contributes to improving knowledge about the sexual and reproductive health information that young people desire, the misperceptions and myths they have acquired, as well as their concerns and worries. This knowledge can be used to improve the *MyQuestion* service and other similar services but is also useful for improving the provision of SRH services for young people more generally.

Methods

The data for this analysis consist of 366,605 text messages received by the *MyQuestion* service since its inception. OneWorldUK removed the phone numbers from which the messages were sent from the data prior to sending to the Population Council research team for analysis. Given that mobile phones are shared, one phone may be used to send multiple messages, and one individual may have multiple phones or phone numbers, the data are not linkable to individuals.¹ The research team further ‘anonymized’ the quotes – a procedure based on similar issues faced by researchers using text-based medical records (i.e., doctors’ notes)². This paper does not use any verbatim quotes that are descriptions of an individual’s symptoms or personal situation (e.g., “I had a positive HIV test, what should I do?”), or any quotes that provide information about the text message’s author (e.g., “I am from Abuja.” Or, “I am 19 years old.”). The MyQuestion service is marketed to young people and, based on the limited information the service has collected on its users, they are primarily between the ages of 16 and 25; however, there are users outside of the target age range.

We uploaded the full *MyQuestion* database (413,664 entries) to Microsoft Access for cleaning. We removed queries that lacked any health-related content, resulting in a file containing 366,605 queries as the dataset used for analysis. Most commonly, excluded queries addressed mobile phone providers, services, or contests; requested financial support; expressed frustration or satisfaction with the service; or were queries with only unreadable content. Given the size of the database, it was not feasible to analyze each line of text as is common in traditional qualitative methodologies (Strauss & Corbin, 1998). For deep engagement with a subset of the data, we drew a random sample of 1,000 text messages. Three members of the research team individually coded the sample line-by-line both for key terms and for observations on text message content and framing to formulate a proposed taxonomy of question type. We compiled a master list of 76 key terms

¹ Population Council’s Institutional Review Board approved this project (and exempted it from full review on 2/28/2013, because it “entails the review of existing records of non-identifiable human subjects. Ethical issues related to the analysis of electronic communications are the subject of an evolving literature (e.g. Buchanan, E. and M. Zimmer (2013). Internet Research Ethics. The Stanford Encyclopedia of Philosophy. E.N. Zalta.). Unlike internet posts and tweets, a database of text messages not identifiable with individuals (only phone numbers) is not even a clear case of ‘human subjects’ research.

² Thomson et al. (2005). Central questions of anonymization: a case study of secondary use of qualitative data. *Forum: Qualitative Research*. <http://www.qualitative-research.net/index.php/fqs/article/view/511/1102>

by comparing the hand-coded key terms against a count of all words included in the database generated by the qualitative software package *MAXQDA* (Release 11.0.2).

Next steps in data analysis were carried out using the *MAXQDA* software. We automatically coded the full MyQuestion database with the list of key terms and ran frequencies for each term. The software allows for advanced lexical searching with truncated search strings and wild card characters to capture various word forms and misspellings (e.g. the search string <(protect) would pick up instances of protects, protection, protective and “v?rginity” would detect virginity, verginity, vurginity, etc.). For parsimony in the coding scheme, multiple word forms were coded together under one umbrella term (e.g. ‘menstruate’ and ‘menstruating’ were both coded as ‘menstruation’). Terms can also be excluded from the search; for example, searching for “sex AND NOT male AND NOT female” will eliminate results where queries include the word “sex” to identify gender. After the full database was coded, terms were cross referenced to count the number of times key terms co-occur within individual text messages. We created word maps in the software to visualize key terms that intersect most frequently for a selection of topics.

Results

Which health topics are most frequently submitted to the MyQuestion service?

Table 1 outlines the 21 key terms that appear most frequently in the database. The first five rows also show the five key terms that have the largest number of co-occurrences with a given topic (meaning both terms are used within a single text message).

HIV/AIDS is the most commonly referenced sexual and reproductive health topic. This is not surprising since *MyQuestion* was initially marketed primarily as an HIV/AIDS information platform. While this study analyzes only submissions with sexual and reproductive health content, it is worth noting the volume of queries about non-reproductive health topics. A large number of messages simply state one or more symptoms or the name of a disease or health condition (“*typhoid*”). It is not always clear in these cases if submissions are requesting an explanation of the term specified or information on diagnosis or treatment. Malaria is the sixth most frequent term found in the data (16,194 hits). Cancer appears 2,668 times. Submissions reporting general aches and pains (headache: 9,981 hits, ache: 1,543), fever (5,581 hits), cold symptoms (cough: 2,704 hits, cold: 1,928, chest: 1,803), stomach issues (stomach; 5,367 hits, waist (*waist pain*): 1,814, ulcer: 1,803), and eye pain and vision problems (eye: 1,855 hits) are prevalent.

There is a lot of curiosity around early adolescence and what can be expected during puberty (*“what is puberty?”*, *“when does a boy start puberty?”*). What could be called ‘standard teen issues’, both physical and emotional struggles associated with puberty and sexual development, are readily apparent across the *MyQuestion* database (*“please i want to know if pimples have a cur”*, *“Is it possible for a person at puberty stage to control all the inconveniences associated with it?”*).

Table 1. Most Frequent Sexual and Reproductive Health Key Terms, by Number of Queries and Key Term Co-occurrences

Topic	Number of Queries	1	2	3	4	5
HIV	57,105	AIDS	contract	infect	sex	test
sex	32,034	HIV	pregnancy	condom	AIDS	menstruation
AIDS	31,652	HIV	contract	sex	symptom	prevent
menstruation/ cycle	12,269	pregnancy	sex	cause	ovulation	normal
pregnancy	12,190	sex	menstruation	prevent	HIV	condom
love	6,908	sex	boyfriend	HIV	relationship	marry
sperm	6,470	count	sex	cause	release	pregnancy
condom	6,331	sex	HIV	AIDS	pregnancy	prevent
blood	4,814	HIV	cause	sex	AIDS	infect
virginity	4,740	sex	vagina	pregnancy	discharge	blood
penis	4,341					
virus	4,003					
breast	3,910					
vagina	3,882					
kiss	3,864					
STI	3,481					
masturbation	2,794					
ejaculation	2,591					
marriage	2,580					
relationship	2,478					
skin problems	2,048					

The data frequently address the most basic elements of the topic in question. Submissions often ask “what is?” (*“what is HIV?”*, *“what is sex?”*) or request fundamental information about a disease or condition (*“how is HIV contracted?”*, *“what are examples of STIs?”*). Table 2 charts language use to indicate the type of information that questions in the database most often seek about health topics. Of the key terms specified, questions most often address cause (16,946 text messages) and meaning (9,714), such as *“what causes menstruation?”* and *“what is the meaning of HIV?”*.

Table 2. Information Requested about Health Topics, Key Term Frequency by Number of Queries

Key Term	Number of Queries
cause	16946
meaning	9714
infect	9040
contract	8336
test	6140
prevent	5946
effect	5337
symptom	5331
cure	5033
treat	2918
transmit	2627
protect	2090
eat	2050
harmful/bad	1757
information	1715

What kinds of questions are asked about the topics?

Requests for factual information

The majority of text messages about sexual and reproductive health in the *MyQuestion* sample are requests for factual information. Specifically, queries ask for definitions (eg, “*what is HIV?*”, “*what is sex?*”) or information about what causes different diseases and how to prevent, detect, and treat them.

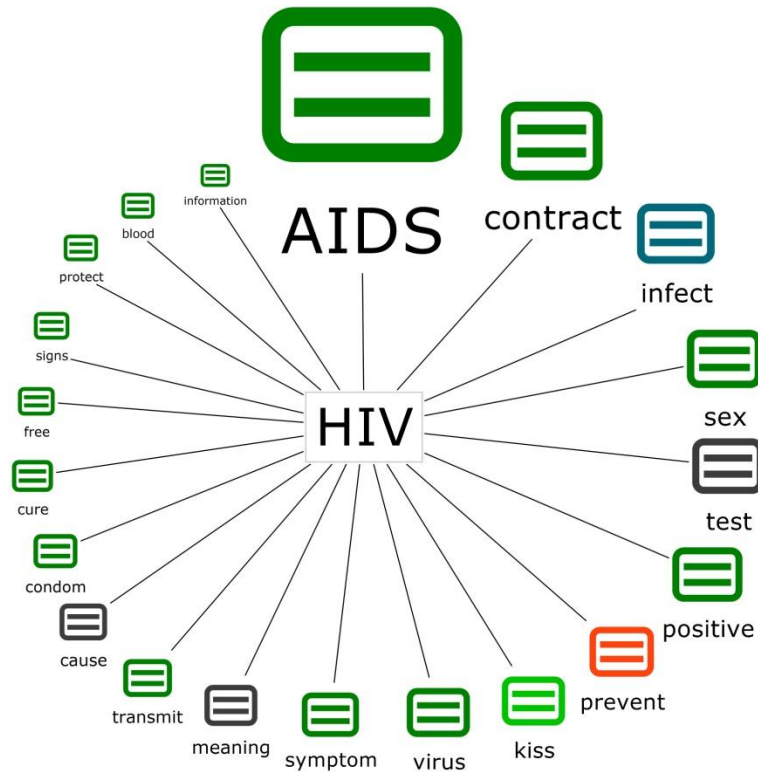
Table 3 lists the twenty key terms that co-occur most frequently with the term ‘HIV’. Figure 1 maps the relative volume of intersections by key term. Other than an intuitive overlap with ‘AIDS’, ‘contract’ is the term that co-occurs most frequently (5,644 times). Many submissions ask if HIV can be contracted from various forms of non-sexual contact (hugging, sharing food, swimming in a pool with someone who is infected) or from objects (fomites) such as clippers or razors. The majority of questions about contracting or preventing the disease focus on sexual transmission. Submissions often ask about transmission from specific types of sexual activity (oral and anal sex, sex or foreplay during menstruation), and variations of ‘can you have sex with someone who is infected with HIV’. There are 2,379 queries that reference kissing in conjunction with HIV. Queries about detection and treatment address symptoms, how you can ‘know’ if someone is HIV positive, when to get tested (often referencing the ‘window period’), progression from HIV to AIDS, and whether or not the disease can be cured. Numerous submissions about HIV are simply broad

appeals for ‘information’ (794 co-occurrences) about the disease. Submissions also request information on the origins of the HIV virus and its distribution in Nigeria and other countries.

Table 3. Key Term Co-Occurrences: HIV

Key Term	Number of Co-occurrences with ‘HIV’
AIDS	23081
contract	5644
infect	3689
sex	3287
test	3198
positive	2889
prevent	2406
kiss	2379
virus	2336
symptom	2102
transmit	1627
cause	1601
condom	1565
cure	1549
mean	2054
free	1127
signs	1068
protect	1025
blood	913
information	794

Figure 1. Key Term Co-Occurrence Map: HIV



Sex is the second most common topic. Submissions ask for details on different types of sexual activity, risk factors for HIV and other STIs, condom use, and signs of pregnancy. Nearly 5,000 queries address virginity. These submissions typically ask if different forms of sexual contact impact virginity, how you can tell if someone is a virgin, and how virginity relates to risk of pregnancy and disease transmission (e.g. can a virgin get pregnant or contract HIV?).

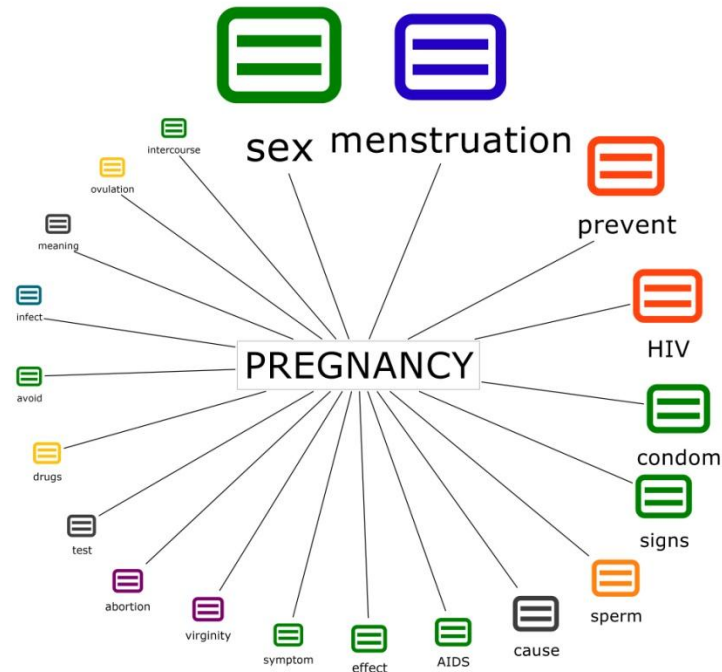
Many of the queries about pregnancy are in relation to safe sex and pregnancy prevention. Menstruation and pregnancy are the fourth and fifth most frequently addressed issues in the database, and the key term ‘menstruation’ is second only to ‘sex’ in terms of number of intersections with ‘pregnancy’ (Table 4). Many questions including these codes ask about timing of sexual intercourse in relation to a woman’s cycle. In addition to questions about menstruation, 1,710 text messages address ovulation and 1,209 address fertility. Some questions simply ask versions of ‘when can a woman get pregnant’, while others offer case-specific details (“*A woman saw her menstrual period on 18th of January & she have an intercourse with a man on 1st of February so is it possible for her 2 be pregnant thanks*”). The terms ‘prevent’ and ‘avoid’ co-occur with ‘pregnancy’ in a total of 998 queries. Text messages ask if it is possible to get pregnant before menarche or after having sex for the first time. The volume of questions asking about safe days, the ‘right time to have sex’, and when a woman is in

her 'free period' or 'safe period' indicates a reliance on fertility awareness-based methods of pregnancy prevention. While there are many questions about modern contraceptives (955 text message reference 'contraception', 'family planning', or 'birth control'), there is also demand for information on natural ways to avoid pregnancy without the use of hormonal or barrier methods (*"How can a guy avoid getting a girl pregnant, and at the same time, prevent HIV/AIDS infection if one MUST have skin-to-skin sex?"*, *"How do I know the right time to meet my wife and will not result to pregnancy without the use of pills or condom? The use of pills is against our tradition"*).

Table 4. Key Term Co-Occurrences: Pregnancy

Key Term	Number of Co-occurrences with 'pregnancy'
sex	2829
menstruation	2121
prevent	759
HIV	723
condom	703
signs	638
sperm	458
cause	403
AIDS	287
effect	281
symptom	278
virginity	278
abortion	272
test	263
drugs	246
avoid	239
infect	220
meaning	220
ovulation	215
intercourse	187

Figure 2: Key Term Co-Occurrence Map: Pregnancy



Many questions ask about the health effects, whether desired outcomes or unintended side effects, of a certain condition or practice. A topic particularly illustrative of the curiosity about ‘effect’ is masturbation. Requests for factual information about masturbation focus on its potential harms (“*Is masturbation dangerous to health?*”). Texts often ask if it is ‘bad’ or ‘harmful’, particularly with respect to fertility and sexual performance. A substantial number of queries reflect concerns that masturbation can decrease sperm count, cause sterility, decrease sexual desire, or otherwise ‘weaken’ a man sexually. There is also confusion about how masturbation impacts virginity.

The database is a rich source of information on myths and misperceptions about sexual and reproductive health that may be common in Nigeria. There is a wealth of misinformation submitted about virginity, pregnancy prevention and termination, HIV infection, masturbation and other sexual behaviors. Queries often ask for confirmation of inaccurate health beliefs (“*Is it true dat if there is a yellowish discharge in ones vagina is it one of d signs dat one is HIV positive?*”; “*Is it true that been a virgin for long is harmful?*”, “*it true dt som traditional therapy can cure it? [HIV]*”), and information obtained from outside sources “*I heard recently on radio that condoms dont really prevent d transmissio of HIV how true is this?*”, “*I heard that aids is american idea of discouraging sex Is it true?*”). Text messages reference various home remedies for health issues, many of which are ineffective or harmful (“*If i have sex with a girl, a day after her period and after the sex she took a bottle of fanta Can that fanta destroy the sperm?*”). Other myths address frequency of sexual activity, such as the idea that men need to ejaculate to maintain their health (“*Does high sperm in a man body leads to any danger or does it have any effect?*”, “*Is it true that lf a boy doesnt have*

sex, he will get sick”), as well as the converse belief that frequent sex is hazardous (“*Is it true that the more a man had sex, the lower the sperm count*”, “*Is it true that having sex frequently can cause a man to be stunted?*”).

Requests for advice

The data include numerous inquiries seeking advice on health behaviors, emotional issues, and interpersonal dynamics. *MyQuestion* submissions express concern about social norms and are often phrased to ask if a certain condition or behavior is ‘ok’ or ‘normal’. This theme comes through strongly in the volume of questions on traditionally taboo topics such as sex drive and sexual pleasure. The *MyQuestion* service receives many requests for validation that it is ‘right’ or common to masturbate and expressions of concern about sexual desire (“*.i luv sex dat I have bcom so attached to it pls how can I stop it*”, “*I hate sex my girlfriend love sex so much why are we different*”, “*What can we do at dis youthful age to control or avoid sexual fellings*”). Questions address sexual performance, with many submissions asking about inability to maintain duration or frequency of sex, and personal or partner satisfaction (“*My husband ejaculates so fast while ive nt yet released why?whats wrong wit his dick?...*”).

Queries request advice about sexual initiation and abstinence (“*aftr my guy disvirgin me how wil i kn?w dat he wil love me de way he use to*”, “*is it advisable to have sex with a virgin?*”, “*How can one stoping having sex?*”). There is a demand for help in decision-making about virginity. Questions about abstinence are often phrased in terms of ‘avoiding’ sex. Text messages seek authority on sex outside the context of marriage (*Is it advisable to sex before marriage?*), appropriate ages for sex and romantic relationships (“*Is it advisable to be in intimate friendship? Under 17 yrs*”, “*What time is it good to date*”, “*When will I be old enough to have sex...*”), and type and frequency of sexual activity (“*What are the stlysh positions should couples used when having coitus*”).

Many submissions ask how to navigate relationships with sexual partners. For example, frequent issues include negotiating abstinence, faithfulness, HIV testing, and condom use. For example, “*I have a boyfirned who have been asking me to hae sex with him, I have been telling him no bt e don’t want to listen I don’t what t*”, “*how can I prove love without sex*”, and “*IF I WANT TO HAVE SEX WITH MY PARTNER, HOW CAN I CONVINC HER TO LET ME USE CONDOM*”. Questions reflect the emotional complexity and struggles associated with relationships and love: “*My boy broek my hrt 2 day and am restless*”, “*... how can I know that I am in love with some one Please reply back before 700 pm today Thanks*”, and “*How will i tell a girl am madly in love with her*”).

Questions about access to services and products

The *MyQuestion* service is used not only to receive facts and advice, but also for information on service availability and accessibility. Many of the questions about HIV detection ask about testing and counseling

locations, antiretroviral medications, and testing costs. A number of users ask about the existence of an HIV prevention pill and how it can be obtained.

A number of questions ask specifically about products for pregnancy prevention or termination. Many texts cite ‘the pill to prevent pregnancy’ or specifically the product *Postinor*. Data frequently show requests for information on ‘which pill’, what the ‘correct pill’ is, and where to get it. Numerous submissions ask if it is possible to prevent pregnancy after sexual intercourse and are seeking pills to ‘remove pregnancy’ either immediately or in the early weeks or months after having unprotected sex (“*Plz want is d name of d pill...to kill d sperm ejaculated in my vagina so as not to get pregnant?*”).

There is a need for information on abortion procedures and access to the ‘drugs for abortion’. Texts include references to both medical and surgical abortion (*What is the name(s) of the pill a pregenate woman will take when she does not want the child*”, “*What is the name of the medicine for abortion?*” and “*what is the full meaning of D&C when doing an abortion*”, “*what is d&c use for abortion?*”), but indicate substantial knowledge gaps and misconceptions about what specific methods are and how they can be obtained (“*How many types of abortion do we have?*”, “*Is flushing out sperm immediately after sex abortion?*”, “*Is there a particular drug 4 abortion?*”). The importance of privacy in a context where abortion is highly stigmatized is evident: “*What are the drugs use in abortion?pls reply no matter how embarassing the question may be*”; “*Pls a friend of mine is pregnant and she does not want anybody to know she wants an abortion what should she do*”; “*How can one abort an unwanted pregnancy without going to a hospital?*”

A substantial number of questions focus on complications of abortion; frequent language includes effects, dangers, risks, consequences, and implications. Safety issues arise both in terms of stage of pregnancy (“*From which month is it not advisable 4 one 2 go 4 abortion?*”) and age of the pregnant female (“*What re D danger of abortion by d teenager?*”). Risks mentioned include infection, breast cancer, and infertility. Finally, texts express concern over incomplete or unsuccessful abortion, or complications from an abortion not performed by a medical professional (e.g. self-induced, using herbs/traditional medicine): “*I want 2 know the possible outcomes that may occur when a girl undergoes an improper abortion*”.

There is strong demand for products to improve physical attractiveness and sexual appeal. Many texts request information on diet regimens or supplements both to ‘grow big’ and to be ‘lean’, ‘slim’, and ‘reduce’.

Submissions ask for products to control body odor and clear facial acne. Over 2,000 submissions include the terms ‘pimple’, ‘acne’, or ‘clear skin’ (*What can i do to keep my body healthy? cuss am experiencing too much of PIMPLES on my face recently*). There are numerous requests for products to increase sexual performance, penis size, and breast size. Concern over side effects of medications and supplements across indications is also apparent: “*Some girls these days take drugs either to avoid or remove pregnancy. Also men take drugs to be sexually active. Do these drugs have negative effects?*”

Care-Seeking (reporting symptoms, requesting diagnosis)

The *MyQuestion* service is often treated as a virtual health care provider, with text submissions listing symptoms and requesting diagnosis or treatment advice. Many of these types of questions are about non-reproductive health issues such as cold symptoms, fever, asthma, and body aches (*"I have dis pain in my stomach dat I don't understand its making me resless it is more than 3 mths now"*).

The service is a source of private medical advice for symptoms associated with sensitive or controversial topics. Many texts report menstrual irregularities and ask for expertise on fertility issues. The data also include concern over complications of abortion (*"I undergo an abortion 4 more than a month and am still bleeding after traking so many drugspls what do I do next"*), and reports of sexual violence (*"i was raped ...and i dont want 2 be HIV porsetiv ple i depend on you ple help me"*). It is important to note that counselors responding to text messages make it clear that *MyQuestion* is not a diagnostic, treatment, or triage service and users should seek care at the nearest health facility.

What language is used to convey the questions?

Analysis highlights patterns in the language and phrasing used to express the health issues addressed. The strength of the desire for information is palpable across queries. We consistently noted a sense of urgency in the database.

Many submissions contain hypothetical scenarios or specific descriptions of an issue at hand. For example, *"If a girl has aids, and had sex wit his boyfriend without condom, no blood contact between d two, is it possible dat d boy will get aids? "*, or *"Anytime i'm having sex with my girlfriend, she always want me to do it without Condom When i asked why? She said "i don't feel comfortable or enjoy it" what to do."* Questions are also commonly submitted in the third person, expressing a situation that a 'friend' is experiencing and asking for advice to relay (*"Please, what advice will I give to my friend who is masturbating everyday"*, *"My friend was rape & is infected with HIV & pregnant too what can she do NOW"*).

As previously discussed, many of the questions submitted to the service ask for confirmation of perceptions and hearsay about sexual health issues. Phrases such as 'I heard' and 'people said' indicate underlying social norms and beliefs. For example, *"I have heard Some of my friends do tell me there is danger in not having frequent sex because of sperm accumulation How true is that?"*, and *"Peopple said the cure 4 this killer disease has been discover by a particular country, but they 've chosen 2 keep it,because they want 2 sell up other med"*.

Discussion

The database of text messages received from users of the *MyQuestion* service provides a unique opportunity to document questions that young Nigerians ask about sexual and reproductive health when they are free from the social taboos that restrict open discussion about these issues. In addition, an advantage of the information in this database is that the questions are unsolicited with little danger that bias will be introduced as can be the case in traditional surveys or other data collection formats. The unfiltered questions illustrate the power of technology to elicit this kind of information. The messages record questions asked in the users' own words, conveying the confusion and misinformation that are common in this population. They often communicate in terms that convey urgency, strong emotion, fear, and embarrassment.

One limitation of the study is that we are not able to assess the extent to which the text messages are representative of the concerns of Nigerian youth overall. First, users must have access to a mobile phone. Second, the service is implemented primarily in English (although sometimes in Hausa) and is text-based, which is a barrier for those who are not at least somewhat literate in written English. Survey respondents derived from a random sample of phone numbers from the *MyQuestion* database in 2010 were weighted towards those who were urban, male, and in-school (Lawal 2010). At the same time, we noted the universality of many of the topics and types of questions that are asked; we suspect that questions from young people in many countries around the world would have many similarities.

The knowledge gaps that are evident in the messages, paired with the volume of queries received by the system, indicate a substantial unmet need for basic sexual and reproductive health information and services in Nigeria. The service has clearly tapped into a desire for a confidential, anonymous way for young people to engage with sexual and reproductive health issues. Young people want to understand what is happening to their bodies and how they can make healthy decisions. There seems to be considerable demand for a service that allows them to ask even the most basic questions. Over the last five years, the system has attracted hundreds of thousands of text messages on a wide range of sexual and reproductive health issues. The database also suggests that young people need a place to access health information in general; many of the messages request information about health issues not related to sexual and reproductive health.

The *MyQuestion* database is a valuable source of data on misinformation shared among young people in Nigeria. Users submit questions seeking validation of what they think or have heard. Many myths, such as those about sexual activity and HIV transmission, flag important points of entry for health education campaigns. Reported misperceptions can highlight underlying social norms about sensitive subjects within an anonymous space and generate topics for further research. Information about how young people frame the questions that they submit to the *MyQuestion* service may be particularly helpful for designing health

promotion and education interventions to reach this population. Further, the strong culture of silence around the sexual and reproductive health of young people comes through clearly in the analysis. The requests for advice phrased as specific hypothetical or real-life scenarios, curiosity about the legitimacy of sexual pleasure, about the dynamics of sexual relationships, and the prevalence of ‘am I normal’ questions indicate the need for sources of information that can reassure young people about the uncertainties they are facing without the social taboos which prevent free discussions and thereby access to information on SRH issues.

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