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Factors associated with and barriers to completeness of sexuality information among young people in the Island Communities of Uganda

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Abstract

Purpose: The completeness of sexuality information (SI) has been ignored by many scholars who focus more on access to SI. Yet, completeness is the critical first step towards achieving Comprehensive Sexuality Education (CSE) for young people (10–24 years). This study examined the determinants and barriers to complete SI among young people in Uganda's island communities.

Methods: This convergent mixed-methods study with surveys collected from 569 young people using structured digital questionnaires, analyzed using descriptives and logistic regression. Qualitative data involved 16FGDs and 20KIIs with parents, teachers, and community leaders, analyzed thematically. Ethical approval, consent, and safeguarding procedures were strictly followed.

Findings: The study found very low, 3.7%, SI completeness among young people in Uganda's island communities, across all eight UNESCO-recommended topics. Living with biological parents was the only significant (aoR=13.684[1.483-126.291], p=0.021) determinant of SI completeness at the multivariate level, while being female, a student, a club member, were significantly more likely to have complete SI at the bivariate level, highlighting the importance of gender, schooling, social participation, and parental co-residence. SI was mainly verbal or observational, with limited reading or digital access. Barriers included cultural taboos, parental neglect, gender bias, environmental risks, and digital misinformation, underscoring the need for integrated, context-sensitive interventions.

Conclusion: Achieving complete SI requires interventions that enhance parental capacity to deliver context-specific SI, alongside supporting schools and peer networks to reach the out-of-school young people. These efforts should be gender-inclusive and address the challenges of digital misinformation, particularly in isolated and resource-constrained communities.

Keywords: Sexuality; Sexuality information; Completeness; Comprehensive sexuality education; Sexual health

1. Introduction

Sexuality information (SI) is critical to young people's development and sexual health outcomes. Some evidence has shown that young people who receive complete and accurate SI are more likely to delay sexual initiation, use contraceptives consistently, and negotiate safer relationships(1–3). Conversely, SI incompleteness has been linked to early marriages, unplanned pregnancies, coercive relationships, and limited health-seeking behaviour(4). Young people, aged 10-24 years, constitute 33.5% of Uganda's population (5). This demographic structure places SI at the centre of Uganda's development agenda, since the health and well-being of young people directly affect human capital, productivity, and intergenerational progress. SI refers to the set of knowledge, skills, values, and attitudes that

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individuals acquire about 1) healthy relationships, 2) values and rights, 3) gender, 4) violence prevention and safety, 5) skills for health and well-being, 6) human body development, 7) sexual and reproductive health, and 8) the sexual lifecycle as recommended by UNESCO(6). This combo is globally known as comprehensive sexuality education (CSE) and can't be achieved without completeness of SI.

Completeness of SI, as used in this paper, refers to the coverage of all eight topics as guided by UNESCO. Incomplete SI often manifests as the omission of one or more of the topics, and the consequences of incomplete SI are not trivial, as they translate to misinformation, poorer decision-making, and a higher risk of negative sexual health outcomes(2,7).

Despite the international consensus on the importance of CSE, many low-and middle-income countries, including Uganda, face challenges in delivering SI even with a well-laid Uganda National Sexuality Education Framework(8). The implementation of this framework has been uneven and contested, with national debates and local resistance shaping what is actually provided (9). There have been political and social pushbacks with concerns about its inappropriateness to the culture and religion, and fears of promoting promiscuity. The framework also faced several reversals and has, in some instances, narrowed classroom content or led to ambiguous guidance for teachers (10). Some evaluations of school-based CSE programs in Uganda reveal improved knowledge and positive shifts in attitudes among young people, but also reveal persistent gaps in content coverage and teacher comfort with sensitive topics such as contraception, sexual values and rights, and sexual expression (11,12). These implementation realities demonstrate that an official policy or framework is necessary but not sufficient to ensure completeness in SI delivery. These challenges are amplified in geographically and socially marginalised settings, such as island communities on Lake Victoria, where logistical, infrastructural, and cultural barriers often constrain service delivery and educational coverage (13).

Island communities in Uganda present a unique case. These communities often lack sufficient schools and health facilities. Transport challenges, poverty, and seasonal mobility linked to fishing livelihoods further limit exposure to structured sexuality education(13). Additionally, strong cultural and religious norms frequently discourage open discussions about sex, leading to silence at the family level and resistance to school-based SI. Young people in these contexts may therefore rely on peers or informal sources of information, which can be incomplete or inaccurate. Studying the completeness of SI in such communities is thus vital for both equity and public health, as these youth are among the most underserved.

Existing literature shows that several factors affect the completeness of SI given to young people. First, government policies and school rules play a big role. When national guidelines are clear and backed with resources and follow-up, the lessons are usually more complete. But when policies are unclear, conflicting, or restricted, important topics are often left out. (10) Second, the skills and teaching methods of teachers matter a lot. Teachers who have not been well-trained, or who lack confidence in using interactive approaches, often stick to only biology and warning messages, leaving out issues about relationships, rights, and consent (11,14). Third, community beliefs and parental views also shape what is taught. Parents and religious leaders often act as gatekeepers, and their resistance can make teachers avoid certain topics(15). Fourth, limited resources, such as few teaching materials, little ongoing training, and too many students per teacher, make it harder to cover all important content (16). Lastly, how teaching is monitored also matters. If checks only look at whether something was taught, and not whether the information was broad and of good quality, then missing content goes unnoticed. However, all this is in a school context, which leaves out the out-of-school young people, prominent in Island communities. Many studies have ignored the importance of parents, guardians, and siblings in the provision of SI. The study uses the bioecological theory that navigates the socialization of young people in the five systems: the microsystem comprising family, siblings, and other guardians; the mesosystem that comprises community members; the exosystem, macrosystem, and the chronosystem, where the young people don't interact directly with the SI sources (17,18). The study also used the social learning theory that explains how young people learn certain behaviors by observing others, imitating actions, and noting outcomes; reinforcement, environment, and cognition shape whether behaviors are adopted, including in SI.

Barriers to completeness are particularly salient in settings with compounded marginalization, among them Uganda's island communities. Islands face amplified logistical constraints such as limited transport, fewer trained teachers, and weaker access to educational materials and health services, which affect both access, quality, and completeness(19). Living in isolated areas often means that traditional or conservative beliefs are stronger, making it harder to talk openly about sexuality. As a result, teachers may skip sensitive or controversial topics. Most research on CSE has focused on cities or mainland rural areas, while island and river communities have been studied less, even though they face unique social and structural challenges that affect how complete the information is(9,20–24). Understanding these local factors is important for designing programs that provide not just access to sexuality education but also complete, accurate, and useful information.

Empirical evidence from Uganda and comparable contexts highlights the consequences of incomplete SI. School-based CSE interventions often produce gains in factual knowledge and intentions to delay sex, but effects are weaker or absent for more complex outcomes related to gender norms, negotiation skills, and attitudes to sexual diversity domains frequently least covered in curricula and classroom practice(11,25). Studies of parent–adolescent communication further show that many families do not discuss sexuality topics in detail, leaving adolescents to rely on peers or the internet, where misinformation is common(26,27). Additionally, teacher-facing qualitative syntheses document frequent conflict and moral dilemmas that teachers experience when attempting to deliver CSE, which pushes them towards safer biomedical content and away from relational or rights-based topics(14). Together, these findings show that incomplete SI is both prevalent and consequential, limiting the transformative potential of CSE.

This study assessed the level of completeness of SI and examined the determinants and barriers influencing the provision of complete SI among young people in Uganda's island communities. The study aligns with Uganda's commitments under the Sustainable Development Goals, particularly SDG 3 on health and SDG 4 on quality education, highlighting the critical importance of delivering comprehensive, accurate, and age-appropriate sexuality information to young people in marginalized and hard-to-reach communities.

2. Methods

2.1. Study design and setting

This study adopted a convergent mixed-methods design that integrated both quantitative and qualitative approaches to examine the factors associated with and barriers to between of SI among young people in Uganda's island communities. Mukono District was randomly selected from the seven island districts of Lake Victoria using the ballot method, where the names of all eligible island districts were written on identical slips of paper, mixed in a container, and one was drawn blindly to ensure fairness and transparency. Within Mukono District, Kkoome Subcounty, the only island subcounty was purposively chosen because of its geographic isolation, diverse youth population, and relevance to the study objectives. From the four parishes that make up Kkoome (Bugombe, Busanga, Lwomolo, and Mubembe), Busanga and Bugombe parishes were selected using the ballot method. The study population comprised young people aged 10–24 years, estimated at 345,000(5), and adults and community actors, including parents, guardians, religious leaders, cultural representatives, community leaders, healthcare workers, and teachers living in the island communities of Lake Victoria.

2.2. Survey data collection and analysis

The sample size of young people was determined while using Yamane & Israel, (1967) formula for determining the sample size of a known population to have a representative sample of young people in the Island Communities of Lake Victoria.

$$n=N/(1+Ne^2)=345,000 /(1+345,000 (0.05)^2))=399.5 \approx 400$$

Where: n=Sample Size, N=Size of the Target Population (345,000), e=Margin Error/Level of Precision (which is 0.05). An allowance for the design effect of 1.5 translated the sample to 600, and a control for a non-response rate of 10% realized in the field; the sample size became 660 respondents.

Data were collected at a single point in May 2025, following ethical approval from TASO and a research permit (SS3785ES) from the Uganda National Council for Science and Technology, using structured interviewer-administered surveys. A sampling frame of all villages in each of the two parishes was developed in collaboration with the subcounty Community Development Officer, parish officials, and Local Council (LC I) leaders. From each parish, six villages were purposively selected based on three key criteria: (1) presence of a relatively high concentration of young people aged 10–24 years, (2) accessibility during the study period, and (3) representation of both landing-site and inland communities to capture socio-economic and cultural variation. Within each selected village, a household listing was developed with the help of village leaders to identify households with at least one eligible young person, with a target of selecting 60 young people per village, 360 per parish.

In households with more than one young person aged 10–24 years, a simple random method specifically drawing numbered slips corresponding to each eligible young person was used to select one respondent. This approach minimized intra-household selection bias. In each village, 60 young people were selected, comprising 30 males (10 aged 10–14years, 10 aged 15–17years, and 10 aged 18–24) and 30 females (with the same age stratification). Local Council leaders and other community leaders supported community entry and helped confirm the presence of eligible

participants, ensuring inclusivity while maintaining randomness at the household level. Ethical and safeguarding procedures were followed strictly to ensure voluntary participation and the protection of minors.

Completeness of SI, the dependent variable, was measured against eight UNESCO (2018) comprehensive sexuality education topics:

- Healthy relationships,
- Values and rights,
- Gender equity,
- Privacy and staying safe,
- Communication, negotiation and decision-making,
- Human body and development,
- Sexual and reproductive health.
- Sexual lifecycle and response.

Independent variables included socio-demographic characteristics, mode of receiving SI, and the sources of SI. Young people's socio-demographic characteristics included:

- Parish of residence,
- Age
- Sex
- Religion
- Schooling status
- Education level
- Employment status
- Group/club membership
- Living arrangements.

The survey also captured the mode of receiving SI:

- Verbal,
- Observation,
- Reading,
- Video and gaming.

Sources of SI were captured as

- Microsystem: parents, siblings, and other guardians;
- Mesosystem: friends/confidants, peer educators, teachers, religious leaders, healthcare workers, community leaders, the internet, books, or recordings.
- The exosystem: a member of the microsystem being employed and belonging to a club or group;
- The macro system: knowledge of laws and cultural practices that promote the provision of sexuality education; and
- The chronosystem: major life's changes.

Data confidentiality and anonymity were ensured through pseudonymization with unique IDs, and participants were reassured that their responses would never be traced back to them.

Quantitative data were analysed using STATA 18. The analysis was conducted at three levels. Univariate analysis described the distribution of variables using frequencies, percentages, means, and standard deviations. Bivariate analysis employed cross-tabulations and logistic regression to compute crude odds ratios at a 95% confidence level. Variables that were statistically significant at the bivariate level were included in a multivariate logistic regression model, where adjusted odds ratios were computed to control confounding.

2.3. FGD and KII data collection and analysis

The qualitative component complemented the survey by exploring the barriers to accessing complete SI. Purposive stratified sampling was used to select participants for focus group discussions (FGDs) and key informant interviews

(KIIs). A total of 16 FGDs were conducted, each involving six participants. Eight FGDs were held in each of the two parishes, stratified by sex and age groups of 10–14, 15–17, and 18–24 years. Separate FGDs were also conducted with parents and guardians, disaggregated by sex. In addition, 20 KIIs were conducted, 11 per parish, targeting religious leaders across denominations, cultural leaders, community leaders, healthcare workers, and teachers. This distribution is summarized in Table 1.

Table 1 Distribution of the KII and FGD participants

Participation Type	Participant Group	Age Group / Role	Sex	Bugombe Participation	Busanga
FGD	Young People	10–14 years	Male	6	6
FGD	Young People	10–14 years	Female	6	6
FGD	Young People	15–17 years	Male	6	6
FGD	Young People	15–17 years	Female	6	6
FGD	Young People	18–24 years	Male	6	6
FGD	Young People	18–24 years	Female	6	6
FGD	Parents	–	Male	6	6
FGD	Parents	–	Female	6	6
KII	Religious Leaders	–	Male	1	1
KII	Cultural Leaders	–	Male	1	1
KII	Community Leaders	–	Male	1	1
KII	Healthcare Workers	–	Male	1	1
KII	Community Leaders	–	Female	1	1
KII	Healthcare Workers	–	Female	1	1
KII	Teacher	–	Male	2	2
KII	Teacher	–	Female	2	2

The FGDs and KIIs were conducted in safe and private spaces using either Luganda or English, depending on the study participants' preference. Discussions were audio-recorded with consent and supported by notes. Trained facilitators followed a discussion guide designed to probe participants' experiences, perceptions of risky sexual behaviour, and views on access to SI. Safeguarding protocols were carefully observed, particularly for minors, and participants were reminded of the voluntary and confidential nature of their involvement.

This data was transcribed and translated as necessary. Data was cleaned iteratively and imported into NVivo software for thematic analysis. Coding was inductive, allowing new themes to emerge from participants' narratives. The analysis focused on identifying recurring patterns and relationships between the completeness of SI and contextual barriers within the island communities.

Ethical approval for this study was granted by the TASO Research Ethics Committee. A research permit, No. SS3785ES was also obtained from the Uganda National Council of Science and Technology under permit. All participants provided informed consent, while those aged 10–17 years provided assent alongside parental consent. The study strictly adhered to principles of voluntary participation, confidentiality, anonymity, and child safeguarding throughout the research process.

3. Results

Table 2 shows the distribution of socio-demographic characteristics and the mode of SI among young people who participated in the survey. Participants were fairly distributed across age groups, with 31.3% aged 10–14 years, 31.1% aged 15–17 years, and 37.6% aged 18–24 years, with a mean age was 16.43 years and a standard deviation of 3.16 years.

Female young people were slightly more at 51.3% compared to 48.7% males. Most young people (83.5%) resided in peri-urban settings, while only 16.5% lived in rural areas and participated in the study. Young people who were Christians were 88.4% while those who were non-Christians comprised 11.6%. The majority (61.0%) were not currently attending school, though 98.2% had attained at least primary education. About 56.2% of young people were not engaged in income-generating activities, while 43.8% reported some form of employment. About 59.4% of respondents belonged to a club or group. Most young people, 40.3%, lived alone, while 17.8% with biological parents, 16.3% with a spouse, and 25.7% lived with other family.

Over half of the young people, 65.6%, reported receiving SI verbally, and over three quarters, 75.6%, by observation. However, very few accessed SI through reading (5.5%) or videos/gaming (0.2%).

Table 2 Summary of social demographics of study participants and their mode of receiving SI

Variables	**Categories**	**Frequency**	**Percentage**
Parish	Bugombe	280	49.2
	Busanga	289	50.8
Age group	10-14years	178	31.3
16.433±3.155	15-17years	177	31.1
	18-24years	214	37.6
Sex	Female	292	51.3
	Male	277	48.7
Residence	Rural	94	16.5
	PeriUrban	475	83.5
Religion	Christian	503	88.4
	Nonchristian	66	11.6
Schooling status	No	347	61.0
	Yes	222	39.0
Education level	None	10	1.8
	≥Primary	559	98.2
Employment status	No	320	56.2
	Yes	249	43.8
Belong to a club/group	No	231	40.6
	Yes	338	59.4
Living arrangements	Alone	229	40.3
	Biological Parent	101	17.8
	Spouse	93	16.3
	Other	146	25.7
Mode of receiving SI			
Receiving SI verbally	No	196	34.5
	Yes	373	65.6
Receiving SI by observation	No	139	24.4
	Yes	430	75.6

Receiving SI by Reading	No	538	94.6
	Yes	31	5.5
Receiving SI by video or gaming	No	560	99.8
	Yes	1	0.2

Table 3 shows the distribution of SI sources among young people in Uganda's island communities, showing strong variation across bioecological system levels. In the microsystem, within the household, only 19.2% of young people reported receiving SI directly from their biological parents or guardians, 15.3% from siblings, and 9.1% from "other guardians" contributed to just 9.1%. A composite household measure, with internal consistency reliability of 0.735, revealed that 43.1% of young people received some SI from within their households.

In the mesosystem, outside the household but within the community, young people received information as follows: from teachers (29.9%), from friends/confidants (28.7%), from religious leaders (25.0%), from healthcare workers (20.9%), from community leaders (20.6%), from peer educators (3.3%), from the internet (0.9%), and books or recordings (0.9%). The composite meso-level measure, with internal consistency reliability of 0.751, showed that 61.2% of young people had accessed some SI from these sources directly from the community.

Table 3 Actual SI Sources

Variables	**Categories**	**Frequency**	**Percentage**
Microsystem			
Biological Parent	No	460	80.8
	Yes	109	19.2
Brother, Sister, Cousin	No	482	84.7
	Yes	87	15.3
Other guardian at home	No	517	90.9
	Yes	52	9.1
Microsystem: The Household: *(composite)*	No	324	56.9
Cronbach's alpha 0.735	Yes	245	43.1
Meso system			
Friend /confidant	No	406	71.4
	Yes	163	28.7
Peer Educators	No	550	96.7
	Yes	19	3.3
Teacher	No	399	70.1
	Yes	170	29.9
Religious Leader	No	427	75.0
	Yes	142	25.0
Community leader	No	452	79.4
	Yes	117	20.6
Healthcare worker	No	450	79.1
	Yes	119	20.9

Internet	No	564	99.1
	Yes	5	0.9
Book or recording	No	564	99.1
	Yes	5	0.9
Mesosystem: Community*(composite)*	No	221	38.8
Cronbach's alpha 0.751	Yes	348	61.2
Exosystem			
Parent has a workplace	No	444	78.0
	Yes	125	22.0
Parent belongs to a Club	No	533	93.7
	Yes	36	6.3
Sibling is employed	No	487	85.6
	Yes	82	14.4
Sibling belongs to a group	No	565	99.3
	Yes	4	0.7
Other guardian at home has a workplace	No	527	92.6
	Yes	42	7.4
Other guardian at home belongs to a group	No	543	95.4
	Yes	26	4.6
Exosystem *(composite)*	No	311	54.7
Cronbach's alpha 0.752	Yes	258	45.3
Macro system			
Knowledge of the law promoting SI	No	548	96.3
	Yes	21	3.7
Knowledge of culture promoting SI	No	491	86.3
	Yes	78	13.7
Macrosystem: *(composite)* Cronbach's alpha 0.724	No	470	82.6
	Yes	99	17.4
Chronosystem: Ever had major Life changes	No	407	71.5
	Yes	162	28.5

In the exosystem sources, where young people indirectly get SI through the engagements of their household members were much weaker. Only 22.0% reported that a parent had a workplace, while 14.4% mentioned employed siblings. Very few young people reported their family members' participation in groups or clubs; siblings, 0.7%; parents, 6.3%; and other guardians, 4.6%. The composite measure of the exosystem, with internal consistency reliability of 0.735, indicated that 45.3% young people had formal engagements at work and in a club or group.

Only 3.7% knew laws promoting SI. Awareness of cultural norms was slightly higher, with 13.7% acknowledging cultural practices that promote SI. The macro system composite measure, with internal consistency reliability of 0.724, indicated that only 17.4% of young people reported awareness of laws and cultural practices that promote the provision of SI.

Over a quarter, 28.5%, of young people reported having experienced major life changes. This dimension suggested that transitions over time, such as changes in schooling, living arrangements, or family dynamics.

Table 4 Completeness of SI

Variables	Categories	Frequency	Percentage
Topic 1: *Healthy Relationships*	No	275	48.3
	Yes	294	51.7
Topic 2: *Sexual values, rights, and practices*	No	416	73.1
	Yes	153	26.9
Topic 3: *Gender equity*	No	408	71.7
	Yes	161	28.3
Topic 4*: Privacy, bodily integrity, and staying safe*	No	430	75.6
	Yes	139	24.4
Topic 5: *Communication, negotiation, and decision-making*	No	354	62.2
	Yes	215	37.8
Topic 6: *Human Body changes and development*	No	373	65.6
	Yes	196	34.5
Topic 7: *Pregnancy, HIV, and STIs*	No	349	61.3
	Yes	220	38.7
Topic 8: *Sex, sexual expression, and sexual response*	No	427	75.0
	Yes	142	25.0
Completeness of SI (*Cronbach's alpha 0.752)*	No	549	96.3
	Yes	21	3.7

The analysis of SI completeness across the eight topics in Table 5 revealed that over half of respondents (51.7%) reported having received information on healthy relationships, making it the most commonly addressed topic. This was followed by topics on sexual and reproductive health, 38.7%; communication, negotiation, and decision-making, 37.8%; human body changes and development 34.5%; gender equity, 28.3%; sexual values, rights, and practices, 26.9%; sex, sexual expression, and sexual response, 25.0%; and privacy, bodily integrity, and staying safe, 24.4%. A composite variable, with internal consistency reliability of 0.752, from the different topics, indicated that only 3.7% of respondents had received SI that covered the full range of topics considered essential for comprehensive understanding, while 96.3% had incomplete exposure

Table 5 Bivariate association of sociodemographic characteristics, mode of receiving SI, and completeness of SI

Categories	SI Completeness		CoR [CI]	p-value
	Incomplete	Complete		
Parish				
Bugombe	264(94.3)	16(5.7)	1	1
Busanga	284(98.3)	5(1.7)	0.290[0.105, 0.804]	0.017*
Age group 16.433±3.155				
10-14years	174(97.7)	4(2.3)	1	1
15-17years	167(94.4)	10(5.6)	2.605[0.801, 8.467]	0.111

18-24years	207(96.7)	7(3.3)	1.471[0.424,5.108]	0.543
Sex				
Male	291(99.7)	1(0.4)	1	1
Female	257(92.8)	20(7.2)	22.646[3.018, 169.922]	0.002*
Residence				
Rural	91(96.8)	3(3.2)	1	1
PeriUrban	457(96.2)	18(3.8)	1.195[0.345, 4.140]	0.779
Religion				
Christian	482(95.8)	21(4.2)	1	1
Nonchristian	66(100.0)	0(0.0)	1	1
Schooling status				
No	346(99.7)	1(0.3)	1	1
Yes	202(91.0)	20(9.0)	34.257[4.563, 257.173]	0.001*
Education level				
None	10(100.0)	0(0.0)	1	1
≥Primary	538(96.2)	21(3.8)	1	1
Employment status				
No	299(93.4)	21(6.6)	1	1
Yes	240(100.0)	0(0.0)	1	1
Belong to a club/group				
No	220(99.1)	2(0.9)	1	1
Yes	317(94.4)	19(5.6)	6.593[1.520, 28.593]	0.012*
Living arrangements				
Alone	228(99.6)	1(0.4)	1	1
BiologicalParent	82(81.2)	19(18.8)	52.829[6.962, 400.904]	0.000*
Spouse	93(100.0)	0(0.0)	1	1
Other	145(99.3)	1(0.7)	1.572[0.098, 25.336]	0.750
Receiving SI Verbally				
No	195(99.5)	1(0.5)	1	1
Yes	353(94.6)	20(5.4)	11.048[1.472, 82.949]	0.020*
Receiving SI by Observation				
No	139(100.0)	0(0.0)	1	1
Yes	409(95.1)	21(4.9)	1	1
Receiving SI by Reading				
No	517(96.1)	21(3.9)	1	1
Yes	31(100.0)	0(0.0)	1	1
Receiving SI by video or games				
No	539(96.3)	21(3.7)	1	1

Yes	1(100.0)	0(0.0)	1	1
Microsystem: the household				
No	317(97.8)	7(2.2)	1	1
Yes	231(94.3)	14(5.71)	2.745[1.091, 6.908]	0.032*
Mesosystem: the community				
No	221(100.0)	0(0.0)	1	1
Yes	327(94.0)	21(6.0)	1	1
Exosystem: Other spaces of interaction for household and community members				
No	304(97.7)	7(2.3)	1	1
Yes	244(97.6)	14(5.4)	2.492[0.990, 6.270]	0.052
Microsystem: the household				
No	450(95.7)	20(4.3)	1	1
Yes	98(99.0)	1(1.0)	0.230[0.030, 1.371]	0.153
Chronosystem: Ever experienced major Life changes				
No	387(95.1)	20(4.9)	1	1
Yes	161(99.4)	1(0.6)	0.120[0.016, 0.903]	0.039*

**Significant at 95%*

The Bivariate analysis in Table 5 used cross-tabulation and crude odds ratios (CoR). Only parish, sex, schooling status, verbal mode of receiving SI, the microsystem as a source of SI, and the chronosystem. Young females were significantly almost twenty-three times more likely, (coR=22.646[3.018, 169.922], p=0.002) to have complete SI than young males. Those at school were significantly over thirty-four times more likely (coR= 34.257[4.563, 257.173], p=0.001) to have complete SI compared to those who were not. Young people belonging to a club were significantly almost seven times more likely (coR=6.593[1.520, 28.593], p=0.012) to have complete SI compared to those who didn't. Those staying with Biological parents were significantly over fifty-two times more likely (coR=52.829[6.962, 400.904], p=0.000) to have complete SI compared to those who stayed alone. Young people who received SI verbally were significantly over eleven-times more likely to (coR=11.048[1.472, 82.949], p=0.020) have complete SI than those who didn't. Young people receiving SI from the microsystem were significantly almost three times more likely (coR=2.745[1.091, 6.908], p=0.032) to have complete SI. On the other hand, young people in Busanga were significantly less likely to (coR=0.290[0.105, 0.804], p=0.017) compared to those staying in Bugombe. Young people who had major life changes were significantly less likely to (coR= 0.120[0.016, 0.903], p=0.039) to have complete SI than those who hadn't.

3.1. Multicollinearity Check for Multivariate Analysis

Table 6 Multicollinearity check: Variance Inflation Factor (VIF) analysis

Variable	**VIF**	**1/VIF**
Living arrangement	3.62	0.275989
Exo system	2.23	0.447704
Micro system	2.06	0.484868
chronosystem	1.84	0.544088
sex of a young person	1.67	0.600233
Verbal SI	1.64	0.609432
Belonging to a Club/Group	1.4	0.715836
Schooling status	1.33	0.750304

Parish	1.12	0.893123
Mean VIF	1.88	

Before multivariate analysis, the Variance Inflation Factor (VIF) analysis was conducted to assess potential multicollinearity among independent variables included in the regression model. The results show that all VIF values were well below the conventional threshold of 10, and even the more conservative threshold of 5, indicating that multicollinearity was not a major concern. The highest VIF was observed for living arrangement (VIF = 3.62; tolerance = 0.276), suggesting a moderate correlation with other predictors, but still within acceptable limits. Other variables, such as exosystem (VIF = 2.23), microsystem (VIF = 2.06), and chronosystem (VIF = 1.84), also showed some correlation but did not raise concerns. Demographic and behavioral variables, including sex of the young person (VIF = 1.67), verbal SI (VIF = 1.64), belonging to a club or group (VIF = 1.40), schooling status (VIF = 1.33), and parish (VIF = 1.12), all demonstrated very low levels of collinearity. The overall mean VIF was 1.88, further confirming the absence of problematic multicollinearity across the predictors. This suggests that the regression estimates are reliable, and the included variables contribute independently to explaining the variation in completeness of SI.

Table 7 Multivariate association of sociodemographic characteristics, mode of receiving SI, and completeness of SI

Categories	**AoR [CI]**	**p-value**
Parish		
Bugombe	1	1
Busanga	0.356[0.115, 1.100]	0.073
Sex		
Male	1	1
Female	1.918[0.069, 53.219]	0.701
Schooling status		
No	1	1
Yes	3.061[0.298, 31.471]	0.347
Belong to a club/group		
No	1	1
Yes	4.579[0.977, 21.470]	0.054
Living arrangements		
Alone	1	1
BiologicalParent	13.684[1.483, 126.291]	0.021*
Spouse	1	1
Other	2.707[0.036, 203329]	0.651
Receiving SI Verbally		
No	1	1
Yes	0.979[0.074, 13.000]	0.987
Macrosystem: Knowledge of laws and cultural practices on sexuality information		
No	1	1
Yes	2.056[0.695, 6.082]	0.193
Chronosystem: Ever experienced major Life changes		
No	1	1
Yes	0.402[0.013,12.027]	0.599

*Significant at 95%

Multivariate level analysis results in Table 6 indicated that among the variables, Parish, sex, schooling status, belonging to a club or group, living arrangements, receiving SI verbally, the microsystem as a source of SI, and the chronosystem, only Living arrangements was a significant associate of completeness of SI. Young people staying with their biological parents were thirteen times significantly more likely (aoR=13.684[1.483, 126.291], p=0.021) to have complete SI compared to those staying alone.

3.2. Barriers to young people in island communities accessing SI from different sources.

Most Study participants reported low awareness of the laws governing the provision of SI. A young male admitted, *"I also don't know"* (FGD-02-01, Male Young people 18-24 years). Young people are not aware of their right to information, nor the mandate of the people in their social system to provide them with SI. *"I have not heard of any legislation or policy… "* (KII-02-11, Community Leader). *"Have you heard of the Parenting Guidelines? No"* (KII-01-01 Community Leader). This limits community members' responsibility to provide SI or enforce protective measures to young people.

Proactive provision of SI was not considered a priority by community members, even in schools where it is supposed to be formally provided.*"We try to, but we don't do it the way you would wish to do it. It is not a priority"* (KII-01-07 Teacher). SI was provided informally at the discretion of teachers and other community members, with limited resources and capacity.*"If there is any help, especially a program that provides information to teachers to provide information to these young people, that would be very beneficial because what we have and know is not enough"* (KII-01-07 Teacher). It was only on demand that SI was provided, which compromised the consistency of its provision. "*I might not go to the villages to talk about these issues unless I am called to specific communities or homes… If they call me, I will go there"* (KII-01-05 Healthcare worker). There were also reports of parental neglect in providing SI.*"Some parents seem not to understand their role. The children seem to be at free range; they do whatever they want. You find parents, just wake up, they move, others go fishing... nobody is attending to do so"* (KII-01-01 Community leader). This left many young people without consistent access to SI from anywhere in their social matrix.

Reactive and unfriendly provision of SI was also mentioned as a barrier. Parents often provide SI reactively, addressing issues only after a young person has *"done something wrong."* A female parent (FGD-01-01) explained, *"We talk to them especially when they have done something wrong... We explain why they are not supposed to be doing certain things... But if they persist, we still call them and talk to them."* Another mentioned *"You need to talk to them about issues of sex when they reach 15years... they need to use protection"* (FGD-01-01 Female Parents). Young people were having sex as early as 10 years, but some parents were not providing such information timely manner. Some parents confessed to enforcing SI to young people. *"I make my rules at home, so I will tell the young people in my home what I want and what I don't want"* (FGD-02-06 Male Parents), reflecting a preference for control rather than open dialogue, which comprised young people's reception of the SI.

Community members reported young people's resistance to SI to undermine provision efforts. *Because sometimes they will not listen to you, but rather they will listen to other people who are not their parents*" (FGD-01-01 Female Parents). Another noted, *"They do not listen to anyone and behave poorly... Young people are driven by money... Some will not go to school without money"* (FGD-01-02 Male Parents). Such young people's attitudes challenge the provision of SI.

Another prominent barrier was the breakdown of community support and parental neglect. *"If you try to advise, a neighbor's child... it becomes a very big issue"* (KII-02-12 Cultural Leader), posing reluctance to provide SI beyond one's own children. Parents also overprotected their young people, but neglected guidance and SI. *"The behavior of children today should be blamed on parents… You can only provide information to your own children, especially those that you have talked to right from a young age"* (FGD-01-01, Female Parents). These combined brought concerns about the breakdown of community parenting. *"I think there should be a law to guide us on that... If you try to advise, a neighbor's child... it becomes a very big issue"* (KII-02-12 Cultural Leader). The loss of such community responsibility deters some young people, especially those with absent parents, from accessing SI

Gendered provision of SI was commonly mentioned. '*We get our day in a week and talk to these young people separately, boys behave differently from the girls" (*KII-02-08 Teacher), and some young females noted,*"…a lot of pressure is put on us, than the boys"* (FGD-01-04, Female Young People 18–24 years), suggesting that young males often receive less attention than them during SI sessions. Another teacher also highlighted, *"The emphasis is usually placed more on girls than on boys"* (KII-02-01, Teacher). This selective focus indicates the systemic neglect of young males in the provision of SI.

Some community members reported feeling ashamed, fear, or discomfort discussing sexuality issues due to cultural norms and expectations. One cultural leader explained, "*It is their responsibility as mothers to provide this information"*

(KII-02-12, Cultural Leader). The social assignment of mothers to provide SI leaves the fathers inactive in this process. The difficulty for young males to access SI may be coupled with the mothers' focus on girls. A teacher also noted, *"Because in our Buganda culture, we are forbidden to talk to our children about things regarding sex… they have to send us to our paternal aunties, who are much more open"* (KII-02-07, Teacher). Such practices of secrecy, tabooing conversations on sex, and reliance on extended family for sexual guidance limit consistent and comprehensive communication on sexuality topics. However, some community members reported the erosion of traditional knowledge and cultural confusion caused by urbanization and cross-cultural mixing as a barrier to providing SI. "*We are now cross-cultural… People do not know their culture, their tribes, and their practices… It is very difficult for young people to know these practices…even elderly persons in the community are no longer focused on them because they are busy"* (KII-02-04 Religious Leader). This disrupted the natural transmission of sexuality knowledge within families and communities.

Environmental barriers and misinformation. Community members admitted the isolated settings of 'camps' homes in the islands and how they exposed young people to immorality and risky sexual behaviors: *"young people stay in camps… there is a lot of immorality"* (KII-01-07, Teacher). This, coupled with media, exposed young people to *"We have TVs… We have phones… not everything that is on the phone is beneficial or good for these young people"* (KII-02-12, Cultural Leader)."*Even smartphones have done a lot to spoil our young people... all the sites that have bad information are accessible as long as one types whatever they want. Without consideration of whether this person is of age*" (KII-02-04 Religious Leaders). Continuous misinformation distorts the little SI that young people have. One participant noted, *"It is a persistent problem, even with many interventions. Something is not adding up"* (FGD-02-01, Male Young people 18-24 years).

4. Discussion

The study examined the factors associated with and barriers to completeness of SI among young people in Uganda's island communities, looking at their social demographic characteristics, their social matrix using the bioecological theory, and the mode of receiving SI using the social learning theory. The study revealed two important results: firstly, that the completeness of SI was extremely low, and secondly, that living with biological parents was the strongest predictor of completeness of SI. These findings reinforce the importance of family-level influences within the broader ecology of young people's development, while also shedding light on contextual barriers particular to island communities.

There were high levels of incomplete SI among young people in Island communities, making the journey of comprehensive sexuality education one that is far from being achieved. These findings rhyme with recent literature that SI works when delivered fully and with fidelity, with teachers and parents as key delivery channels, and (c) sociocultural barriers and weak implementation limit coverage(13,28,29). The study affirms that some topics, such as HIV/pregnancy, are better covered than those on rights, which are often omitted in practice(30). Most literature focuses on mainland and school settings, ignoring or partially explaining patterns in geographically isolated island settings(31). Thus, the literature is helpful for generalization but insufficiently speaks to the island-specific dynamics. The study aligns with the Bioecological Theory, which describes how young people receive SI from the different systems, directly from the micro and meso systems, and indirectly from the exosystem, macrosystem, and the chrono system. Similar studies miss out on the importance of studying completeness and focus on access to SI.(13,30) This study sampled community populations, including out-of-school young people, and better captures realities where schools are absent or inconsistent, arguably providing a more realistic picture of SI completeness in marginalized communities. Different: the magnitude and persistence of household effects, the almost complete absence of media/reading sources, and the role of life-course disruptions. Comprehensiveness can only be achieved after completeness.

The study also revealed that staying with biological parents was the strongest predictor of the completeness of SI. This study reveals that living arrangements 'biological-parent' retained significance in multivariate analysis, suggesting that parental presence can override other sources of SI in the bioecological systems. Parental co-residence, therefore, substitutes for otherwise limited institutional reinforcement and may explain why parental presence shows such a strong association because parents serve as the primary, stable microsystem in which young people are socialized, particularly in contexts where there is limited or inconsistent interaction with the mesosystem. Both the Bioecological Theory, the microsystem, and the social learning theory point to the repeated opportunities for direct guidance and supervision across all topics of sexuality and the consistent exposure to parental norms, behaviors, and reinforcement of parents (17,32). In island or remote communities where institutional supports are weak, parental co-residence compensates for gaps in schools, peer clubs, and health outreach, ensuring continuity across life stages and filtering misinformation from peers or digital media. Additionally, parents reinforce cultural and social norms, shaping content emphasis and ensuring that sensitive topics such as sexual rights, negotiation, and expression are addressed(30,33). Parental presence emerges as the strongest predictor of complete SI in geographically isolated and resource-

constrained settings, such as Uganda's island communities. Unlike many school-based studies where schooling dominates, this study sampled community populations, including out-of-school youth, capturing realities where schools are absent, inconsistent, or weak. The unexpectedly strong parental effect likely reflects cultural patterns of dependency and isolation that amplify household influence. By operationalizing "completeness" rather than mere access, the study demonstrates how parental co-residence shapes the completeness of SI. Findings underscore the need for context-specific strategies that strengthen parental capacity for complete SI. The study also reinforces the relevance and purpose of the Uganda National parenting guidelines(34).

Although schooling and peer-group participation were not significant predictors in the multivariate model, their strong bivariate associations indicate important secondary influences on SI (SI) completeness. Students were 34 times more likely, and peer-club members nearly seven times more likely, to report complete SI, highlighting schools and clubs as structured environments where knowledge is introduced, reinforced, and normalized. The Information–Motivation–Behavioral Skills (IMB) model explains this by showing how these settings enhance knowledge, foster motivation through peer norms, and provide opportunities to develop communication and negotiation skills(35). Social Learning Theory further clarifies that observational learning and peer influence reinforce information retention(32). However, qualitative findings revealed gaps: teachers deprioritized sensitive topics, and peer clubs were inconsistently resourced, demonstrating that access does not ensure completeness of SI. Structural and cultural barriers, selective curriculum delivery, and under-implementation of national frameworks like Uganda's Sexuality Education Framework (2018) contribute to fragmented SI, particularly for the out-of-school young people(6). The Bioecological theory highlights the primacy of the microsystem, where parental presence may override school or club influence(17). Thus, while schools and peer clubs in the mesosystem play important roles in exposure and norm-setting, their contribution is secondary to the microsystem unit. The study emphasizes that incompleteness persists even where access is high, differing from prior work that reports strong school effects. These findings underscore the need for integrated, context-sensitive interventions linking parents, schools, and peer structures to ensure complete SI rather than relying solely on institutional or peer-based programming.

Gender strongly influenced the completeness of SI, with girls nearly 23 times more likely than boys to report comprehensive knowledge. Qualitative data indicated that communities prioritize girls due to fears of early pregnancy and child marriage. This aligns with broader sub-Saharan evidence showing that sexual and reproductive health interventions often target girls, perceived to be at higher risk of adverse outcomes (36). The Bioecological Model highlights how macrosystem-level cultural expectations shape program priorities, directing attention toward girls(17), while Social Learning Theory explains that repeated instruction and monitoring reinforce their learning (32). Gender and power frameworks further show that unequal investments reflect broader social anxieties about female sexuality. However, boys' exclusion has unintended consequences, leaving them vulnerable to misinformation, harmful masculinities, and risky sexual behaviors. Qualitative narratives revealed that boys were assumed to be "less at risk," illustrating that neglect is a structural outcome of gendered fears. This gap underscores how unequal SI delivery can reinforce inequities and undermine the goals of comprehensive sexuality education. In isolated or marginalized communities, such as Uganda's islands, cultural anxieties amplify the emphasis on girls, explaining the unexpectedly large gender gap. Unlike studies showing narrowing disparities (16). This study demonstrates a widening gap, highlighting the need for inclusive, gender-sensitive interventions. By combining quantitative and qualitative evidence, the research quantifies the gender imbalance and provides context-specific explanations, emphasizing that complete SI and effective CSE must equip both boys and girls with knowledge, skills, and decision-making capacity to promote equity.

The study found that verbal communication and microsystem sources were initially associated with the completeness of SI, though these effects diminished after adjustment, highlighting the influence of family. Prior literature notes that verbal-only, reactive discussions often produce fragmented knowledge and limit protective skills(13,37). The Bioecological Model situates microsystem actors as key entry points, while exosystem and macrosystem factors, including schools, religious institutions, and cultural norms, constrain delivery (17). Social Learning Theory emphasizes the role of observation and modeling (32), and the IMB model explains why unstructured communication fails to foster motivation and behavioral skills (35). The study extends these insights by demonstrating how island-specific contexts, such as camp-style living, isolation, and exposure to unregulated digital content, amplify the limitations of verbal SI. Structural barriers, including weak teacher training, parental discomfort, and inconsistent policy enforcement, further constrain effectiveness. Peer influence in high-risk environments can introduce misinformation, challenging assumptions that peers are uniformly protective. Chronosystem factors, including sociopolitical shifts and the provision of SI politicization, disrupt implementation. Overall, while verbal communication remains central, it is insufficient for completeness in island communities. Findings underscore the need for context-sensitive interventions that enhance how SI is delivered through structured, participatory, and digitally literate approaches, integrating policy, family, and community support for effective comprehensive sexuality education.

The study highlights that structural, cultural, and systemic barriers continue to limit the completeness of SI among young people in Uganda's island communities. Barriers include low awareness of sexuality education policies, minimal prioritization of sexuality topics in schools, and parental discomfort discussing sexual issues. These findings align with national-level studies, which report sociocultural resistance, teacher under-preparedness, and policy ambiguities as persistent obstacles to SI (13,29). The Bioecological theory situates these barriers across multiple layers: at the exosystem level, institutions and schools lack resources and training; macrosystem norms stigmatize open sexual dialogue; and chronosystem shifts, including urbanization and politicization of SI, exacerbating inconsistencies. Similarly, the IMB model shows how gaps in information and low motivation hinder the development of protective behavioral skills(35). This study extends prior literature by emphasizing the unique challenges of island contexts, including geographical isolation, fishing-related livelihoods, and "camp" environments that deprioritize formal education. Additionally, digital technology introduces new vulnerabilities, as unregulated online content interacts with structural barriers to worsen SI incompleteness. While national policies like Uganda's National Sexuality Education Framework (2018) exist, poor localization and limited community awareness reduce effectiveness. Unlike urban-focused studies, these findings reveal how environmental and technological factors intersect with sociocultural barriers, shaping SI access and quality. The study underscores that structural, cultural, and systemic barriers are compounded by ecological and digital realities, highlighting the need for context-specific interventions. Complete SI in island communities requires integrated, multi-level approaches that localize policy, enhance parental and teacher capacity, and incorporate digital literacy to ensure completeness of SI.

This study offers valuable insights into the completeness and barriers of SI among young people in Uganda's island communities. Limitations include reliance on self-reported data, potential social desirability bias, and a cross-sectional design that prevents causal inference. Findings may not generalize to mainland rural or urban settings, where cultural norms, family dynamics, and access to education differ. Strengths include a mixed-methods approach, focus on an under-researched population, and theoretical grounding in ecological and behavioral frameworks. Future research should employ longitudinal or observational designs to track SI acquisition over time, explore parent–school–community interventions, and compare island and mainland young people. Innovative methods, such as participatory diaries, digital tracking, or structural equation modeling, could clarify causal pathways. Practically, the study underscores the importance of integrated, family-centered, school-supported, and community-empowered strategies for delivering complete SI, informing policies and programs that enhance knowledge and choice of behaviour.

5. Conclusion

This study set out to examine the completeness of sexuality information (SI) among young people in Uganda's island communities, focusing on social-demographic characteristics, microsystem influences, and modes of SI delivery. The findings reveal that SI completeness is extremely low, with parental co-residence emerging as the strongest predictor. This underscores the critical role of the microsystem within the broader bioecological context, particularly in geographically isolated settings where schools, peer clubs, and health services are limited or inconsistent. The results suggest that a combination of the Bioecological Model and Social Learning Theory is useful for understanding how microsystem actors, repeated guidance, and observational learning shape SI completeness. They also highlight that current approaches focusing predominantly on schools or peer groups may overestimate their effectiveness, as access alone does not ensure complete SI. The study emphasizes the need for context-specific, integrated strategies that strengthen parental capacity, support inclusive school and peer interventions, and address digital misinformation. Policy-makers, educators, community leaders, and organizations implementing sexual and reproductive health programs can benefit from these insights by designing interventions that recognize the unique challenges of island or remote communities, including gender disparities and ecological constraints. Future research using longitudinal designs, experimental interventions, and comparative studies between island and mainland youth could provide a more nuanced understanding of SI acquisition, the interplay of family and institutional influences, and the effectiveness of integrated, multi-level strategies for improving comprehensive sexuality education. This study contributes to evidence-based planning, guiding policies and programs toward achieving complete, equitable, and context-sensitive SI delivery in marginalized communities.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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