Original Article

Not Lost in Translation: The Use of Standardized Patients Technology among Health Professional Students in Tanzania

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ABSTRACT

Health professionals in Tanzania report a perceived need for sexual and reproductive health communication training to meet patient needs and reduce disparities. Simulation optimizes clinical performance and public entrustment. The study describes the development, feasibility, and acceptability measures of evidence-based, Afrocentric, standardized patient scenarios to train nursing, medical, and midwifery students in sexual and reproductive health in Tanzania. Standardized patient simulation cases with embedded cultural, language, gender, age, sexuality, and legal complexity issues were identified by stakeholders in Dar es Salaam centring on;1) adolescent health, 2) women's health, and 3) male health cases. Twenty-four health professional students evenly split across nursing, midwifery, and medicine were recruited and enrolled to participate in a pilot trial of the standardized patient simulations conducted in Kiswahili and the results were recorded. Videos were evaluated by trained bilingual research staff using standardized behavioural checklists. Descriptive statistics and bivariate analyses were used to assess the pilot data. The study found that seventy- five percent (N =18) of baseline participants (N=24) returned for the 3-month follow-up simulation assessment. While not powered for statistical significance, students showed improvement in all cases and a significant improvement in the male erectile dysfunction concerns case for both interpersonal communication (t (17) = -3.445, p < .005) and medical history taking checklist (t (17) = -3.259, p < .005). Further, most students found the opportunity to practice using the simulations helpful or very helpful in their sexual and reproductive health education. It was therefore concluded that preliminary sexual and reproductive health simulation data using standardized patients demonstrated feasibility and acceptability among student participants.

INTRODUCTION

Tanzania faces significant disease burdens with adverse sexual and reproductive health (SRH) outcomes. An estimated 1.7 million people in Tanzania over 15 years of age live with the human immunodeficiency virus (HIV) as of 2019 (UNICEF, 2020). Tanzanian adolescent and young adult (AYA) women are particularly vulnerable to experiencing adverse SRH outcomes. The country has one of the highest unplanned adolescent pregnancy rates in Sub-Saharan Africa, with nearly half of reproductive-aged girls currently pregnant or already giving birth to at least one child by age 19 (Nkata et al., 2019). Few studies have focused on men's SRH in Tanzania and Sub-Saharan Africa. However, two studies conducted in Dar es Salaam revealed that erectile dysfunction (ED) was common in 24% of adult men in community settings and 55% of those receiving diabetes care (Mutagaywa et al., 2014; Pallangyo et al., 2016). Male SRH has also been virtually ignored in national strategic plans and policies, resulting in unmet care needs (Nyalile et al., 2020). This study is therefore significant as it focuses on men in reproductive health issues such as sexual functioning, a group that has been often neglected in addressing sexual and reproductive issues in Tanzania.

Many of the sexual health disparities in Tanzania stem from the country's socio-cultural structure and legal system (Keogh et al., 2015). Tanzania is a socially diverse country with over 120 tribes, over 100 ethnic groups, and three main religions: Christianity, Islam, and Indigenous (Human Right Watch, 2015). Early marriage is deeply rooted in Tanzanian culture; approximately 40% of girls are married before their eighteenth birthday (Human Rights Watch, 2014). Some tribes and groups view intimate partner violence as a sign of love, and 33-47% of urban women have experienced physical violence (García-Moreno & Temmerman, 2015). Such violence has often resulted in abortion. In a Tanzanian context, abortion is illegal and highly stigmatized even though statistics show that abortion is the third leading cause of maternal death (World Health

Organization, 2019). Women admitted to a health facility for abortion-related complications were six times more likely not to receive care (Keogh et al., 2015). Finally, homosexuality is illegal and stigmatized in Tanzania (Human Rights Watch, 2020). In 2016, the Tanzanian government unveiled policies that included banning sexual lubricants and enforcing the arrests of lesbian, gay, bisexual, transgender, and queer (LGBTQ) persons or anyone promoting homosexuality on social media. In addition, drop-in centres that provided HIV testing and other SRH services to vulnerable populations were closed down, and police raids and arrests at meetings and events by health and rights activists sharply increased (Human Rights Watch, 2020). Men who have sex with men (MSM) and those who identify as LGBTQ alongside women and adolescents are considered vulnerable populations in Tanzania. There are few means to receive comprehensive, appropriate, and high-quality health services for these populations, leaving them at risk for adverse sexual health outcomes and disparities.

Healthcare providers (HCPs) play a critical role in accessing and delivering SRH services. While HCPs face facility-level challenges to high-quality care, such as a lack of private rooms to ensure privacy and confidentially, high volumes of patients, scheduling issues, and a lack of specific SRH services and equipment (Mgopa et al., 2021c), studies demonstrate that individual-level factors such as the religious and cultural background of HCPs may also impact care delivery (Mgopa et al., 2021b). Many patients have reported SRH services being inaccessible due to a lack of confidentiality, privacy, discrimination, stigma, and negative attitudes toward HCPs (Ross et al., 2021).

Prior research by our team demonstrated that a 2-day didactic, Afrocentric, SRH curriculum adapted from the Pan-American Health Organization/World Health Organization resulted in significant pre-and post-test changes in SRH knowledge and confidence in the materials taught in the workshop (Mgopa et al., 2021a; Mwakawanga et al., 2021). In the follow-up to this work, a qualitative study was conducted using key informant interviews in Dar es Salaam, Tanzania, to gain insight into the clinical practices and education needs of HCPs in general practice, focusing on SRH. Barriers to care provision revealed were the HCP's background and values, unsupportive clinical and legal policies, reliance on guidelines unfavourable for key populations, unfriendly youth services, and the stigma, negative attitudes, judgments, and hostility patients' faced when seeking care for SRH services. Finally, gaps in care provision included a lack of confidentiality, patience, and time. HCPs also raised concerns that few services focused on the health concerns of men (Mgopa et al., 2021b; Mwakawanga et al., 2021).

Another approach to training and improving SRH communication skills and care provided by HCPs is a simulation with a standardized patient (SP). SPs are individuals trained to portray an actual patient, allowing clinicians to assess and apply new clinical skills (Gail, 2008; JHMSC - View a Course, n.d.). Well-trained SPs can provide helpful feedback to clinicians on their clinical examination skills, behaviour, attitudes, and verbal and nonverbal communication skills (MacLean et al., 2018; Papanagnou et al., 2021; Shultz et al., 2015; Wallace et al., 2018). In addition to developing new skills, trainees also report gaining a deeper understanding of patients' perspectives (Shultz et al., 2015). In Kenya, an SP clinical training intervention was developed for HCPs to improve *adolescent-friendly* competencies in providing HIV care to AYA (Mugo et al., 2019). The successful use of SPs in this East African study is foundational for expanding this work into Tanzania. However, SPs in SRH training are rare in Sub-Saharan Africa (SSA), with no known use in regular practice at the major academic centre engaged in training health professionals for Tanzania.

This pilot study aimed at developing and testing the feasibility and acceptability of evidence-based, Afrocentric SP scenarios to train nursing, medical, and midwifery students in SRH for use within a formal Afrocentric health training curriculum. This study's results highlight the useful role of SPs in improving clinical care,

providing training to medical students on history-taking practices, and practising communication strategies with patients in Tanzania and SSA. This study is also significant in imparting knowledge to healthcare providers in dealing with patients, particularly during history taking process by adopting best practices that are critical in handling patients with sexual health issues in health facilities. The study aims to improve the HCPs knowledge, experience, and clinical skills regards handling patients through improved patient-healthcare worker communication. The use of standardized patient technology helps both the SPs and HCPs reflect on their skills and knowledge and to receive feedback on their own assumptions and attitude toward patients with sexual health issues.

METHODS

Study Design and Participants

This pilot study was part of the mixed-method formative research for the Training for Health Professionals (THP) trial. The THP study seeks to create and test the effectiveness of a comprehensive sexual health training curriculum for Tanzanian health professionals in training. The study represented a collaboration between the Muhimbili University of Health and Allied Sciences (MUHAS), the University of Minnesota, and Johns Hopkins University. This pilot study focused on developing and evaluating the SP simulations for use in the curricular intervention for the THP trial. Ethical approvals were obtained from the institutional review boards (IRB) of the Tanzania National Institute of Medical Research (NIMR) and the University of Minnesota.

Study Site

This pilot study was conducted at MUHAS in Dar es Salaam, Tanzania. Founded in 1963, the accredited MUHAS has rapidly expanded in size and programs (MUHAS, n.d.). At the time of the study, there were 3,861 registered students and 306 faculties within the School of Nursing and Medicine, making it the largest and most prestigious health training institution in Tanzania (MUHAS, 2020). In addition, MUHAS actively

seeks to engage in research, policy, and scientific development through its students and staff, making it an ideal institution to engage in such a novel research study.

Recruitment and Training of Standardized Patients and their Train of Trainer (TOT)

Five research staff at MUHAS were trained via Zoom by senior investigators with expertise in SRH, medical and nursing education, recruitment of SPs for simulations, and execution of the simulations with trainees. SPs (N = 12) were then recruited from Bagamoyo College of Arts in Bagamoyo, Tanzania, and received in-person training by the trained MUHAS research staff for participation in the pilot trial.

Standardized Patient Cases

Three simulation cases were tested in the pilot study based on qualitative data from phase I of the THP project, during which Tanzanian HCPs and students identified teen pregnancy by "sugar daddies," intimate partner violence, erectile dysfunction, and sexuality concerns as areas for needed training. These scenarios are summarized below:

"Aliyah" (teen pregnancy/sugar Daddy): 16-year-old female who presents after obtaining a positive home pregnancy test. Her chief complaints are abdominal pain and vaginal bleeding. She also has been sexually active with a 55-year-old man who happens to be a family friend and financial supporter of "Aliyah" and her family after the recent death of her father. "Aliyah" comes to the clinic scared and unsure of her steps.

"Rehema" (intimate partner violence): a 37-year-old married mother of three children who is experiencing domestic and sexual violence. She presents a chief complaint of injury manifest by bruising throughout the body, cut wounds on the face, severe pain, severe hematoma, and swelling around her left eye. Her husband is 20 years older and her only sexual partner, and she has been treated twice for a Sexually Transmitted Infection during her marriage. She reports that her husband

has uncontrolled rage and alcoholism, which contributes to the violence she experiences. He is the family's breadwinner and is unprepared to leave with her children but wants assistance.

"David" (erectile dysfunction/sexuality concerns): 42-year-old who married a man with one child. His chief complaint is being unable to maintain an erection during intercourse with his wife for about a month. He reports previously having intimate relationships with male partners before marriage and recently finds himself watching gay pornography coinciding with less desire to engage in sex with his wife. She is unaware of his sexual history. He is concerned about documentation in his chart due to confidentiality concerns.

Simulations were developed using an Objective Structured Clinical Examination (OSCE) format (Mkonyi et al., 2021; Rosser et al., 2022), and an interpersonal communication skills checklist was adapted with permission from the Clinical Foundations of Medicine skills curriculum at the Johns Hopkins School of Medicine (JHMSC - View a Course, n.d.). Expected historical data collection and interpersonal communication behaviour skills (*Table 1*) for senior students and clinicians were assessed using checklists at the baseline and follow-up. *Table 1* shows the Interpersonal Communication Behavioral Checklist.

Table 1: Interpersonal communication behavioral checklist

	Done (2)	Partially Done (1)	Not done (0)
Introduced himself or herself and explained his/her role (Includes greeting, introducing themselves, use of SPs surname, explanation of their role as a nursing/medical student, setting an agenda for the visit).			
Asked if I had any ADDITIONAL CONCERNS symptoms or issues BEYOND my chief concern (Best if done after opening statement or EARLY in the encounter)			
Treated me respectfully (Includes being non-judgmental, ASKING my preferences/beliefs about condition, responding to my perspective, valuing my opinion, PARTNERING with me to determine treatment course)			
Asked the researcher OPEN-ENDED type questions AT FIRST so that he/she could tell my story, then filled in gaps with "details" type (close-ended) questions (Encouraged me to tell my story, allowing me to guide the direction of the interview by being open-ended in asking questions)			
Summarized and synthesized things I said to make sure they understood me (Used summarization to clarify the patient's presenting story and asked the patient to verify that their understanding was accurate).			
Showed they were listening attentively to me (Includes body language, posture/seating, eye contact, facial expressions, tone of voice, paraverbal utterances, and professional appearance that was not distracting)			
Expressed EMOTIONAL support and caring for me (Includes demonstration of concern, acknowledging emotions/ difficulty of the situation, making empathetic statements that seem genuine).			
Asked about my worries or expectations about MY PROBLEM (Elicits and acknowledges your concerns, follows up on concerns and expectations of problem/treatment)			

	Done (2)	Partially Done (1)	Not done (0)
Used language I easily understood (Avoided technical terms or medical jargon, EXPLAINED terminology well in plain language)			
Provided closure to the interview with a summary and next steps/plan of care.			

Done" if the examinee performs the manoeuvre exactly as described (2)
"Partially done" if the examinee attempts to perform the manoeuvre but does not do it perfectly (1)
"Not Done" if the examinee does not attempt to perform the manoeuvre at all (0)

Study Procedures

After recruitment, informed consent, and enrollment, HCP students participated in the simulations with the SP via Zoom or table (during periods of internet non-connectivity) in Kiswahili. After each student completed each case, they were rated using the interpersonal communication checklist by the SP and a trained MUHAS research staff (THP team). For each of the ten items, they received a rating of 0 - "Not Done," 1 - "Partially Done," 2 - "Done." Each student's total score was taken across all ten items (for each scenario). Thus, students could obtain a maximum score of 20 (full score range: 0-20). For each scenario, there were six key takeaways that raters were looking for the student to identify as a measure of historical data collection. Students were given a rating of 0 - "Not Asked/Captured," 1 - "Captured/ Asked But", or 2 - "Well Asked/Captured." Again, to assess performance on this checklist, each student's total score was taken across all six items (for each scenario). Thus, students could obtain a maximum score of 12 (total score range: 0-12). Two investigators monitored intervention fidelity for quality control on the ground at MUHAS. In this role, they noted unusual events and engaged in real-time problem-solving, such as when internet connectivity was unavailable.

Measures

Interpersonal Communication Behavior Checklist

The Interpersonal communication behaviour checklist comprised ten communication skills student clinicians were expected to develop during their clinical training (UWSOM Intranet., n.d.) These skills included: 1) introducing themselves and agenda-setting, 2) surveying for any additional concerns beyond the chief complaint, 3) facilitating the SP feeling respected and involved in the discussion and decision-making process, 4) leading with open-ended questions first, then filling in gaps with close-ended questions, 5) using summary to capture the SP narrative, 6) using active listening skills such as body language, posture, eye contact, and tone of voice, 7) conveying empathy and emotional support, 8) assessing the patient's ideas, concerns, and expectations for a visit, 9) using language free of jargon, 10) closing the interview with a summary and next steps.

An assessment of "done" was equivalent to two points and meant the student clinician performed the manoeuvre precisely as described. A "partially done" assessment was equivalent to one point and meant the examinee attempted to perform the manoeuvre but did not perform it exactly as described. Lastly, a "not done" assessment was equivalent to zero points and meant the examinee did not attempt to complete the manoeuvre.

Historical Data Collection

For each scenario, the student clinician collected six key historical data from the SP, as described in the examples below. In all these three scenarios, students were asked to explore the client's demographic characteristics, causes/reasons for the clinical visit, onset of disease, the environment where the client lives and its safety, and barriers/facilitating factors to seeking care. For example, in the "Aliyah" scenario, these items included abdominal pain and vaginal bleeding, completion of an at-home pregnancy test, sexual relationship with an older partner, father's death, reliance on an older partner for financial support,

her personal goals, request for confidentiality, and her specific worries and expected outcomes. In the "Rehema" scenario, these items include the fact that she is 30 years old, married, has three children, experienced sexual violence since her marriage of five years, her husband is the main breadwinner of the family, she is in an unhealthy relationship, she is worried husband has an extramarital affair, she is the firstborn of seven children, she is the only one in her family to complete secondary school, and her parents depend solely on her, and her specific worries and expected outcomes. In the "David" scenario, these items included difficulty maintaining erections with his wife, the duration for one month, history of same-sex sexual experiences, the birth of a child one year ago, use of same-sex pornography at the end of wife's pregnancy, and thoughts/behaviours have escalated in recent weeks, his personal goals, request for confidentiality, and his specific worries and expected outcomes. A "Well captured/Well asked" assessment was equivalent to two points and meant the student clinician performed the manoeuvre precisely as described. A "Captured/asked" assessment is equal to one point, meaning a student clinician attempted to capture the information. Lastly, a "Not captured /Not asked" assessment is equivalent to zero points and indicates that the student clinician did not attempt to capture the information.

Quality Control

Three videos, one for each case, were closed-captioned for review by the combined international team to ensure adequate SP training (*Plate 1*), the fidelity of narrative delivery, assess student engagement, and provide sound and video quality using the Zoom™ technology in this context. Bilingual MUHAS research team members were trained to evaluate the SP videos using the checklists. Student videos were coded using the historical and communication behaviour checklists.

Baseline and follow-up data files were uploaded to a secure server through which only the research coordinator, data manager, and data analysts could access the raw data. Marginal distributions and descriptive statistics such as mean, median, and standard deviation of participants' scores were computed to assess student performance in the three SP scenarios from baseline to follow-up. All data analysis was conducted using R [R Core Team, 2021] (*R: The R Project for Statistical Computing*, n.d.).

Plate 1: Closed-captioned simulation for a MUHAS medical student engaged in a standardized patient scenario during the pilot simulation (with permission).

The core measures of interpersonal communication (ISC) and critical medical history (MH) elements to be collected are displayed alongside the image of the video data as used in training for the MUHAS site team for data evaluation.

Sample size Justification

As this is a feasibility study, with only one arm, with a sample size of 24 and 50, we would be able to estimate a rate of participation, compliance or drop-out rate of 80% to within a 95% confidence interval of +/- 11%. If we identify 24 eligible subjects, we can estimate a participation rate of 50% to within a 95% confidence interval of +/- 10%. In these examples, we calculated the width of the confidence interval (in %) as $1.96 \times \sqrt{(p \times (1-p) / n)}$, where p is the percentage you expect to see, and n is the intended sample size. We rely on Julious (2005) and Sim & Lewis (2012) for this recommendation. The 24 participants were drawn from three disciplines (i.e., medicine (8), midwifery (8), and nurse (8).

RESULTS

Selected Characteristics

A total of 24 students completed the baseline simulations, out of which 18 conducted the 3-month simulations. The mean age of participants was 25 years old. Most were male (62%, N= 15), and nine students were female, spread across the three clinical training disciplines (nursing, midwifery, medicine). Most were also single (96%, N= 23), of the Christian faith (58%, N= 14), and spoke mainly Kiswahili outside school (71%, N= 17). Most participants (nursing and midwifery) (67%, N= 16) were in the fourth year of their studies, while 33% (N= 8) of participants (medicine) were in year five, though all considered senior students in their fields. Most participants (83%, N = 20) identified their sexual orientation as heterosexual/straight (*Table 2*).

Table 2: Demographic characteristics of participants (n = 24)

Characteristics		N (24)	%
Age	Mean	25	
	Median	25.125	
	Range	22-28	
Gender	Female	9	38
	Male	15	62
Relationship Status	Single	23	96
	Married to one partner (monogamy)	1	4
Religion	Christian	14	58
	Muslim	10	42
Sexual Orientation	Heterosexual/Straight	20	83
	Asexual	3	13
	Bisexual	1	4
Language Most Spoken	Mainly Kiswahili	17	71
	Equally, Kiswahili and English	7	29
	Other languages	1	4
Health Profession of Study	Midwifery	8	33
	Nursing	8	33
	Medicine	8	33
Year of Study	Year 4	16	67
	Year 5	8	33

Feasibility/Acceptability

All student participants were successfully able to record videos via Zoom or tablet at baseline and follow-ups. The three translated and closed-captioned videos demonstrated student adherence to their roles and engagement with SPs. Further, SPs remained in their case roles, showing high fidelity to their assigned case for effective delivery. Of the 24 participants, seventy-five percent (N=18) of students returned to MUHAS for the 3-month follow-up recording (See *Table 3),* and 79.2% (N=19) indicated the video recording of themselves counselling on sexual health was very helpful and 20.8% (N=5) responded that it was helpful (*Table 4*).

Table 3: Inter-rater reliability across three scenarios and describes number of participants for baseline and follow-up.

SP Rater	Aliyah		David		Rehema		Freq Total
	Baseline	Followup	Baseline	Followup	Baseline	Followup	
A001	15						15
A002	9						9
A003		9					9
A004		9					9
D001			15	1			16
D002			9				9
D003				9			9
D004				8			8
R001					15		15
R002					9	9	18
R003						9	9
Freq Total	24	18	24	18	24	18	126

Table 4: Student clinicians' evaluation of the workshop

To what extent, if at all, is the workshop helpful based on the following topic/practice? Video recording session of your counselling on sexual health	N	Proportion
Very Helpful	19	0.792
Helpful	5	0.208
Neutral/Unsure	0	0.000
Unhelpful	0	0.000
Very Unhelpful	0	0.000
I missed this session	0	0.000
N/A	0	0.000

Preliminary Effectiveness

There was an overall increase in mean total scores for the interpersonal communication (IC) behaviour and medical history data collection from baseline to three-month follow-up based on ratings provided by the research staff at MUHAS across cases. Across the three cases ("Aliyah", "David", and "Rehema"), the "David" scenario showed a significant increase in average mean score rating for both interpersonal communication and historical medical checklist with over a 2.31 (SD = 0.60) and 2.10, (SD = 0.21) point increase respectively. This increase is associated with a P-value of (t(17) = -3.445, p < .005) for interpersonal communication and (t(17)= -3.259, p < .005) for medical history checklist between the baseline and follow-up, compared to other cases ("Aliyah" and "Rehema") that are not significant, see (Table 5).

Table 5: Descriptive Statistics for Total Scores from THP Team for Interpersonal Communication and Historical Medical

	Interpersonal communication (IC) Behavioral checklist						
Case	**Baseline**		**Follow-up**		**t-statistics**	**Df**	**p-value**
	M	**SD**	**M**	**SD**			
Aliyah	13.917	1.954	14.222	1.353	-1.1747	17	0.2563
David	13.083	2.283	15.389	1.685	-3.445		0.003092*
Rehema	11.583	1.886	12.111	2.494	-0.92947		0.3657
	Medical Historical Checklist						
Aliyah	5.958	1.989	6.5	1.505	-1.4451		0.1666
David	6.792	1.668	8.889	1.997	-3.2588		0.004624*
Rehema	6.458	2.167	6.556	1.653	-0.31013		0.7602

*Note: *P< .01*
Df = Degree of Freedom, M = Mean, SD = Standard Deviation
Hypothesis: True difference in the mean is not equal to 0 (two-tailed test)

DISCUSSION

This study provides the first evidence for using SPs in a virtual format for simulated cases designed to train health professional students in SRH communication in Tanzania. While not powered for statistical significance, the "David" scenario, which addressed ED and homosexuality concerns, resulted in insignificant differences in the scoring outcomes from baseline (M = 2.31) to follow-up (2.10). "David" Scenario topics are not commonly discussed issues in the Tanzanian culture, and homosexuality is illegal. Therefore, these topics have the potential to significantly impact student training in SRH and how they communicate the same with their patients and the larger community. Providing a safe environment for trainees to practice communication and clinical skills using simulations is novel, but in this context, they were also able to engage in challenging SRH topics. Simulated cases are specifically helpful for training health professional students to navigate diagnostic uncertainty, implicit bias, existing norms, stereotypes, and the emotional state of the patient the SP is portraying (Papanagnou et al., 2021; Wallace et al., 2018).

A few previously conducted studies have examined SRH services in Tanzania. Unfortunately, the cultural, religious, and moral background, attitudes, and perceptions of HCPs have been shown to serve as a barrier to SRH services based on the stigma, discrimination, and issues of confidentiality patients are uncomfortable facing (Mgopa et al., 2021b; Mkonyi et al., 2021; Rosser et al., 2022). Therefore, integrating SPs into their curriculum allows trainees to develop skills and experiences in navigating unfamiliar discussions and treating populations or diseases in a safe space before completing their training is critical.

The findings from this work must be considered in light of several general limitations. First, due to the COVID-19 pandemic, this study was adapted to an online format. This change led to unprecedented challenges, including network connectivity interruptions at the study site in Tanzania. MUHAS research staff team training was conducted via Zoom™, but unreliable connectivity resulted in using alternative technology for some video recordings. Finally, as a pilot study, there is a small sample size and limited generalizability given the execution at a single educational institution. The subsequent planned study will expand upon this pilot study with the feasibility established and will recruit over 400 participants in line with the power calculation for the trial.

CONCLUSION

This study demonstrates that even with the barriers posed by COVID-19 and the logistical challenges of executing an online

communications platform for simulated interviews, the use of this novel simulation using standardized patients for training health professional students is acceptable to students and feasible to execute in Tanzania. Training the next generation of health professionals with the skills and knowledge for addressing SRH issues using an Afrocentric curriculum aligns with clinicians. Student stakeholders have indicated the need for training that may ultimately help to mitigate the SRH disparities in Tanzania and other regions throughout SSA, pending the outcomes of the larger trial.

Credited Author Statement

Writing-Original draft, Reviewing and Editing, Visualization, Formal Analysis, Data Curation, EM, and MT; Writing- Reviewing, and Editing, NBS, GGL, IM, DLW, MWR, AFM, SM LRM and SEM; Formal Analysis, Visualization, CTR, EM, and NK; Methodology, MT, and NK; Investigation, Conceptualization, Supervision, Funding Acquisition, Reviewing and Editing. B.R.SR

Declaration of Interest Statement

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REFERENCES

Gail E, F. (2008). The role of standardized patient and trainer training in quality assurance for a high-stakes clinical skills examination. *The Kaohsiung Journal of Medical Sciences, 24*(12). https://doi.org/10.1016/S1607-551X(09)70031-2

García-Moreno, C., & Temmerman, M. (2015). Commentary: Actions to end violence against women: A multi-sector approach. *Global Public Health, 10*(2), 186–188. https://doi.org/10.1080/17441692.2014.986163

Human Right Watch. (2015, June 19). *United Republic of Tanzania—World Directory of Minorities & Indigenous Peoples*. Minority Rights Group. https://minorityrights.org/country/united-republic-of-tanzania/

Human Rights Watch. (2014). *No Way Out: Child Marriage and Human Rights Abuses in Tanzania*. Available at: https://www.hrw.org/report/2014/10/29/no-way-out/child-marriage-and-human-rights-abuses-tanzania

Human Rights Watch. (2020). *"If We Don't Get Services, We Will Die": Tanzania's Anti-LGBT Crackdown and the Right to Health*. https://www.hrw.org/sites/default/files/report_pdf/tanzania0220_web_0.pdf

John Hopkins Medicine Simulation Center (JHMSC) (n.d.) View a Course Training Program (hopkinsmedicine.org)

Julious, S.A. (2005). Sample size of 12 per group rule of thumb for a pilot study. *Pharm Stat.* 4:287-291

Keogh, S. C., Kimaro, G., Muganyizi, P., Philbin, J., Kahwa, A., Ngadaya, E., & Bankole, A. (2015). Incidence of induced abortion and post-abortion care in Tanzania. *PLOS ONE, 10*(9), e0133933. https://doi.org/10.1371/journal.pone.0133933

MacLean, S., Geddes, F., Kelly, M., & Della, P. (2018). Simulated patient training: Using inter-rater reliability to evaluate simulated patient consistency in nursing education. *Nurse Education Today, 62*, 85–90. https://doi.org/10.1016/j.nedt.2017.12.024

Mgopa, L. R., Ross, M. W., Lukumay, G. G., Mushy, S. E., Mkonyi, E., Massae, A. F., …Rosser, B. R. S. (2021a). Perceptions of sexual healthcare provision in Tanzania: A key informant qualitative study. *Sexuality Research and Social Policy*, *19*(3), 849–859. https://doi.org/10.1007/s13178-021-00607-5

Mgopa, L. R., Rosser, B. R. S., Ross, M. W., Lukumay, G. G., Mohammed, I., Massae, A. F., … Bonilla, Z. E. (2021b). Cultural and clinical challenges in sexual health care provision to men who have sex with men in Tanzania: A qualitative study of health professionals' experiences and health students' perspectives. *BMC Public Health, 21:1*, *21*(1), 1–12. https://doi.org/10.1186/S12889-021-10696-X

Mgopa, L. R., Rosser, B. R. S., Ross, M. W., Mohammed, I., Lukumay, G. G., Massae, A. F., … Leshabari, S. (2021c). Clinical care of victims of interpersonal violence and rape in Tanzania: A qualitative investigation. *International Journal of Women's Health*, *13*, 727– 741. https://doi.org/10.2147/IJWH.S301804

Mkonyi, E., Mwakawanga, D. L., Rosser, B. R. S., Bonilla, Z. E., Lukumay, G. G., Mohammed, I., … Wadley, J. (2021). The management of childhood sexual abuse by midwifery, nursing and medical providers in Tanzania. *Child Abuse & Neglect*, *121*, 105268. https://doi.org/10.1016/j.chiabu.2021.105268

Mugo, C., Wilson, K., Wagner, A. D., Inwani, I. W., Means, K., Bukusi, D., … Kohler, P. (2019). Pilot evaluation of a standardized patient actor training intervention to improve HIV care for adolescents and young adults in Kenya. *AIDS Care*, *31*(10), 1250–1254.

https://doi.org/10.1080/09540121.2019.1587361

Muhimbili University if Health and Allied Sciences (MUHAS) (n.d.) *A Brief History of MUHAS*. Retrieved July 18, 2022 from https://www.muhas.ac.tz/brief-history-2/

Muhimbili University if Health and Allied Sciences (MUHAS). (2020). *Home website*. [cited 2021 Aug 19]. Available from: https://www.muhas.ac.tz/

Mutagaywa, R. K., Lutale, J., Aboud, M., & Kamala, B. A. (2014). Prevalence of erectile dysfunction and associated factors among diabetic men attending diabetic clinic at Muhimbili National Hospital in Dar-es-Salaam, Tanzania. *The Pan African Medical Journal*, *17, 227*. https://doi.org/10.11604/PAMJ.2014.17.227.2695

Mwakawanga, D. L., Mkonyi, E., Mushy, S. E., Trent, M., Bonilla, Z., Massae, A. F., … Rosser, B. R. S. (2021). Would you offer contraception to a 14-year-old girl? Perspectives of health students and professionals in Dar es Salaam, Tanzania. *Reproductive Health*, *18*(1), 245. https://doi.org/10.1186/s12978-021-01294-6

Nkata, H., Teixeira, R., & Barros, H. (2019). A scoping review on sexual and reproductive health behaviors among Tanzanian adolescents. *Public Health Reviews*, *40*(1), 4. https://doi.org/10.1186/s40985-019-0114-2

Nyalile, K. B., Mushi, E. H. P., Moshi, E., Leyaro, B. J., Msuya, S. E., & Mbwambo, O. (2020). Prevalence and factors associated with erectile dysfunction among adult men in Moshi municipal, Tanzania: Community-based study. *Basic and Clinical Andrology*, *30*(1), 20. https://doi.org/10.1186/S12610-020-00118-0

Pallangyo, P., Nicholaus, P., Kisenge, P., Mayala, H., Swai, N., & Janabi, M. (2016). A community-based study on prevalence and correlates of erectile dysfunction among Kinondoni District Residents, Dar Es Salaam,

Tanzania. *Reproductive Health*, *13*(1), 140. https://doi.org/10.1186/s12978-016-0249-2

Papanagnou, D., Klein, M. R., Zhang, X. C., Cameron, K. A., Doty, A., McCarthy, D. M., … Salzman, D. H. (2021). Developing standardized patient-based cases for communication training: Lessons learned from training residents to communicate diagnostic uncertainty. *Advances in Simulation*, *6*(1), 26. https://doi.org/10.1186/s41077-021-00176-y

R: The R Project for Statistical Computing. (n.d.). Retrieved July 18, 2022, from https://www.r-project.org/

Ross, M. W., Leshabari, S., Rosser, B. R. S., Trent, M., Mgopa, L., Wadley, J., … Agardh, A. (2018). Evaluation of an assessment instrument for a sexual health curriculum for nurses and midwifery students in Tanzania: The sexual health education for professionals scale (SHEPS). *Applied Nursing Research*, *40*, 152– 156. https://doi.org/10.1016/j.apnr.2018.01.005

Ross, M. W., Newstrom, N., & Coleman, E. (2021). Teaching sexual history taking in health care using online technology: A PLISSIT-Plus Zoom approach during the coronavirus disease 2019 shutdown. *Sexual Medicine*, *9*(1), 100290–100290. https://doi.org/10.1016/j.esxm.2020.100290

Rosser, B. R. S., Mkoka, D. A., Rohloff, C. T., Mgopa, L. R., Ross, M. W., Lukumay, G. G., … Bonilla, Z. E. (2022). Tailoring a sexual health curriculum to the sexual health challenges seen by midwifery, nursing and medical providers and students in Tanzania. *African Journal of Primary Health Care & Family Medicine*, *14*(1), 1–9. https://doi.org/10.4102/phcfm.v14i1.3434.

Shultz, C. G., Chu, M. S., Yajima, A., Skye, E. P., Sano, K., Inoue, M., … Fetters, M. D. (2015). The cultural context of teaching and learning sexual health care examinations in Japan: A mixed methods case study assessing the use of standardized patient instructors among Japanese family physician trainees of the Shizuoka Family Medicine Program. *Asia Pacific Family Medicine*, *14*(1), 8. https://doi.org/10.1186/s12930-015-0025-4

Sim, J, & Lewis, M. (2012) The size of a pilot study for a clinical trial should be calculated in relation to considerations of precision and efficiency. *Jourrnal of Clinical Epidemiology,* 65:301-308

UNICEF (October, 2020). *HIV and AIDS fact sheet. UNICEF United Republic of Tanzania:* https://www.unicef.org/tanzania/media/2436/file/HIV%20Programme%20Fact%20Sheet.pdf" Fact Sheet.pdf (unicef.org)

UWSOM Intranet. (n.d.) *OSCE: General Information*. Retrieved July 18, 2022, from https://education.uwmedicine.org/curriculum/exams/osce/

Wallace, J., Rao, R., & Haslam, R. (2002). Simulated patients and objective structured clinical examinations: Review of their use in medical education. *Advances in Psychiatric Treatment*, *8*(5), 342–348. https://doi.org/10.1192/apt.8.5.342

Wojcicki, J. M. (2017). Silence sexual and reproductive health discussions and we fuel the rise of HIV/AIDS in sub-Saharan Africa. *Reproductive Health*, *14*(1), 131. https://doi.org/10.1186/s12978-017-0395-1

World Health Organization (2019). *Abortion Health Profile: United Republic of Tanzania 2019*. Retrieved from: https://www.afro.who.int/sites/default/files/2020-12/Tanzania_CAC.pd