

Creative Arts to Enhance Cervical Cancer Awareness: A Thematic Analysis of Art-Based Messages Submitted to a Nigerian Crowdsourcing Open Call

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Abdulhammed O Babatunde¹ MBBS; Ekenechukwu Kokelu² BA; Olufunto A Olusanya³ MD, PhD, MPH; Peter Kalulu⁴ MPH, CPH; Agatha E Wapmuk² MBBS; Titilola Gbaja-biamila² MBBS, PhD; Temitope Ojo⁴ PhD, MPH; Ucheoma Nwaozuru⁵ PhD; Chisom Obi-Jeff⁶ MSc; Onyekachukwu Anikamadu⁷ MPH, CPH; Folahanmi T Akinsolu² PhD; Hong Xian⁸ PhD; Jennifer S Smith⁹ PhD, MPH; Kayode A Olusegun¹⁰ MBBS; Jason Ong^{11, 12} PhD; Benedict Azuogu^{13, 14} PhD; Collins O Airhihenbuwa¹⁵ PhD, MPH; Joseph D Tucker^{16, 17} MD, PhD, AM; Oliver C Ezechi² MBBS, PhD; Juliet Iwelunmor⁴ PhD

¹ College of Medicine University of Ibadan Ibadan NG

² Nigerian Institute of Medical Research Lagos NG

³ Division of Infectious Diseases, John T. Milliken Department of Medicine, School of Medicine Washington University in St. Louis St. Louis US

⁴ Division of Infectious Diseases, John T. Milliken Department of Medicine School of Medicine Washington University in St. Louis St. Louis US

⁵ Department of Implementation Science School of Medicine Wake Forest University Winston-Salem US

⁶ Brooks Insight Abuja NG

⁷ Brown School of Social Work Washington University in St. Louis St. Louis US

⁸ College for Public Health and Social Justice Saint Louis University St. Louis US

⁹ Department of Epidemiology University of North Carolina Chapel Hill US

¹⁰ Obafemi Awolowo University Osun NG

¹¹ Department of Clinical Research London School of Hygiene & Tropical Medicine London GB

¹² Central Clinical School Monash University Clayton AU

¹³ Alex Ekwueme Federal University, Ndufu-Alike Ebonyi NG

¹⁴ Ebonyi State University Ebonyi NG

¹⁵ School of Public Health, Georgia State University Atlanta US

¹⁶ Institute for Global Health and Infectious Diseases School of Medicine University of North Carolina at Chapel Hill Chapel Hill US

¹⁷ Department of Clinical Research Faculty of Infectious and Tropical Diseases London School of Hygiene & Tropical Medicine London GB

Corresponding Author:

Peter Kalulu MPH, CPH

Division of Infectious Diseases, John T. Milliken Department of Medicine
School of Medicine

Washington University in St. Louis

660 South Euclid Avenue

St. Louis

US

Abstract

Background: Cervical cancer is a leading cause of cancer deaths among women in Nigeria, yet awareness is low. Historically, art has served as a medium for processing emotions and sharing experiences, which can be effective in promoting health and behavior change.

Objective: Our study examined art submissions and social media engagement from a crowdsourced open call to co-design promotional strategies for preventing cervical cancer among women in Nigeria.

Methods: From October to November 2023, we launched an open call for art on social media, inviting adult women to submit artwork that raises awareness about cervical cancer prevention. Participants' submissions were anonymized and reviewed by an independent panel of judges. Six finalists were selected to participate in a social media contest during Cervical Cancer Elimination Week, and three winners were identified based on their total likes and comments on social media, including grading rubric scores. We analyzed participants' art entries through thematic analysis in six steps: 1) familiarization, 2) creating categories, 3) identifying themes, 4) reviewing themes, 5) defining themes, and 6) discussing findings. The emerging themes included using art to express emotions, utilizing art to convey health-related content, and employing art as a form of self-

regulation, which were further analyzed using the PEN-3 cultural model.

Results: Forty-three entries from participants aged 18 to 27 (Mean age 22.2 years) were analyzed. The entries included visuals (n=14), audiovisual (n=14), text (n=14), and audio (n=1). Most entries (97.6%; 42/43) focused on cervical cancer and HPV, covering definitions, risk factors, treatment, and prevention. Using the PEN-3 cultural model's Relationship and Expectation domain for analysis, 62.8% (27/43) addressed “perceptions” about art as a means of mental and emotional expression, reflecting feelings like humor, sadness, hope, faith, unity, and fear relating to cervical cancer prevention. A majority (79.1%; 34/43) aimed to promote HPV screening and vaccination, categorized as “Enablers” that viewed art as a tool for health awareness, including educational resources. Additionally, 7.0% (3/43) included “Nurturers” representing self-regulation addressing stresses linked to having relatives with cervical cancer. Six finalist entries were shared on social media, promoting cervical cancer awareness, reaching 8,685 individual Instagram accounts and generating 2,727 likes and 782 comments on Instagram.

Conclusions: This study utilized art to increase awareness about cervical cancer on social media. Art can serve as a tool for promoting health by incorporating visual, emotional, and contextual messages to influence the target audience's behavior.

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Original Manuscript

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1. College of Medicine, University of Ibadan, Ibadan, Nigeria
2. Nigerian Institute of Medical Research, Lagos, Nigeria
3. Division of Infectious Diseases, John T. Milliken Department of Medicine, School of Medicine, Washington University in St. Louis, St. Louis, MO, United States
4. Department of Implementation Science, School of Medicine, Wake Forest University, Winston-Salem, United States
5. Brooks Insight, Abuja, Nigeria
6. Brown School of Social Work, Washington University in St. Louis, St Louis, MO, United States
7. College for Public Health and Social Justice, Saint Louis University, St. Louis, MO, United States
8. Department of Epidemiology, University of North Carolina, Chapel Hill, Chapel Hill, United States
9. Obafemi Awolowo University, Osun, Nigeria
10. Department of Clinical Research, London School of Hygiene and Tropical Medicine, London, UK
11. Central Clinical School, Monash University, Clayton, Australia
12. Alex Ekwueme Federal University, Ebonyi, Nigeria
13. Ebonyi State University, Ebonyi, Nigeria
14. School of Public Health, Georgia State University, Atlanta, GA, United States
15. Institute for Global Health and Infectious Diseases, School of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, United States
16. Department of Clinical Research, Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, United Kingdom

Corresponding Author

Peter Kalulu, MPH

Division of Infectious Diseases, John T. Milliken Department of Medicine
School of Medicine

Washington University in St. Louis

660 South Euclid Avenue

St. Louis, MO, 63110-1093

United States

Phone: (314) 537-4587

Email: kalulu@wustl.edu

Abstract

Introduction: Cervical cancer is a leading cause of cancer deaths among women in Nigeria, yet awareness is low. Historically, art has served as a medium for processing emotions and sharing experiences, which can be effective in promoting health and behavior change. Our study examined art submissions and social media engagement from a crowdsourced open call to co-design promotional strategies for preventing cervical cancer among women in Nigeria.

Method: From October to November 2023, we launched an open call for art on social media, inviting adult women to submit artwork that raises awareness about cervical cancer prevention. Participants' submissions were anonymized and reviewed by an independent panel of judges. Six finalists were selected to participate in a social media contest during Cervical Cancer Elimination Week, and three winners were identified based on their total likes and comments on social media, including grading rubric scores. We analyzed participants' art entries through thematic analysis in six steps: 1) familiarization, 2) creating categories, 3) identifying themes, 4) reviewing themes, 5) defining themes, and 6) discussing findings. The emerging themes included using art to express emotions, utilizing art to convey health-related content, and employing art as a form of self-regulation, which were further analyzed using the PEN-3 cultural model.

Results: Forty-three entries from participants aged 18 to 27 (Mean age 22.2 years) were analyzed. The entries included visuals (n=14), audiovisual (n=14), text (n=14), and audio (n=1). Most entries (97.6%; 42/43) focused on cervical cancer and HPV, covering definitions, risk factors, treatment, and prevention. Using the PEN-3 cultural model's Relationship and Expectation domain for analysis, 62.8% (27/43) addressed "perceptions" about art as a means of mental and emotional expression, reflecting feelings like humor, sadness, hope, faith, unity, and fear relating to cervical cancer prevention. A majority (79.1%; 34/43) aimed to promote HPV screening and vaccination, categorized as "Enablers" that viewed art as a tool for health awareness, including educational resources. Additionally, 7.0% (3/43) included "Nurturers" representing self-regulation addressing stresses linked to having relatives with cervical cancer. Six finalist entries were shared on social media, promoting cervical cancer awareness, reaching 8,685 individual Instagram accounts and generating 2,727 likes and 782 comments on Instagram.

Conclusion: This study utilized art to increase awareness about cervical cancer on social media. Art can serve as a tool for promoting health by incorporating visual, emotional, and contextual messages to influence the target audience's behavior.

Keywords: Cervical cancer, HPV vaccines, Education, Cancer Prevention, Art, Social Media

Introduction:

Invasive cervical cancer is a leading cause of death among women, resulting in about 350,000

deaths yearly.¹ The burden of cervical cancer is highest in low and middle-income countries,² with the majority of the cases and deaths occurring in sub-Saharan Africa (SSA), Central America, and South-East Asia.¹ Regional disparities in cervical cancer incidence are linked to unequal access to vaccination, screening, and treatment services, as well as risk factors that include HIV prevalence, social barriers, gender biases, and poverty.² In Nigeria, cervical cancer is the second leading cause of female cancer mortality in women aged 15-44.³ About 12,000 cases and 8,000 deaths are reported annually, with an incidence rate of 18.4 per 100,000 women.⁴ Sociodemographic characteristics, including low levels of education, limited knowledge, and low levels of health-seeking behavior, are linked with a higher incidence and mortality rate of cervical cancer in Nigeria.⁵ These issues arise from misconceptions, stigma, and fear, resulting in delays in seeking screening and care that lead to late presentation and worsened outcomes.⁵

Cervical cancer is largely attributed to persistent high-risk human papillomavirus (HPV) infection, which is linked to about 99% of cervical cancer cases in women.⁶ Thirteen types of high-risk HPV cause cervical cancer, with types 16 and 18 being the most common and responsible for approximately 70% of cervical cancer cases. HPV infection is the most common sexually transmitted infection, with the peak age of infection being 25 years.⁷ The average age for global cervical cancer diagnosis is 59 years.⁸ Studies have demonstrated that HPV vaccination is highly effective in preventing cervical cancer, particularly those caused by vaccine-associated types HPV types 16, 18, 31, 33, 52, 58, 72, and 78.^{6,9}

In 2020, the World Health Assembly launched a global initiative aimed at eliminating cervical cancer by 2030. The goal is to achieve an incidence rate of fewer than 4 cases per 100,000 people globally, alongside the 90-70-90 targets: vaccinating 90% of girls by age 15, screening 70% of women at least twice by 35 and 45 years, and treating 90% of women diagnosed with cervical cancer premalignant lesions.¹⁰ This approach emphasizes the importance of HPV vaccination and screening in the fight against cervical cancer.¹¹ However, in some parts of Nigeria, there is a lack of awareness and knowledge about HPV vaccination and cervical cancer. A study in Lagos found that just about 12% of female participants aged 15 - 49 years were aware of cervical cancer, its risk factors, and modalities of prevention.¹² Additionally, research among women of reproductive age in Kwara State, Nigeria, found that only 39% were well-informed, and just 6.9% had undergone screening.¹³ Similarly, in a study conducted in Taraba, Nigeria, among 978 women of reproductive age, religion, especially those who identified as Muslims, were less likely to know about cervical cancer and the practices of cervical cancer screening.¹⁴ Adequate knowledge and awareness of HPV vaccination and cervical cancer screening have been shown to result in a higher uptake of these preventive services.¹⁵ Furthermore, cultural values and beliefs have been shown to influence the utilization of health services among women in Nigeria.¹⁶ Culture shapes beliefs, values, norms, and behaviors, influencing the type of health information an individual encounters while seeking health services.

Historically, art has been used to process emotions and convey experiences that can promote health, increase health awareness and advocacy, and potentially change behavior.¹⁷ Bunn et al. revealed that art-based approaches have been employed in sub-Saharan African countries to raise awareness about infectious diseases such as HIV/AIDS, malaria, and Ebola.¹⁸ However, the potential of using art as a method to address cervical cancer morbidities and mortalities has not been fully explored. In response, we organized an art contest to increase awareness of cervical cancer in

Nigeria, using a participatory action research framework, especially a crowdsourcing open call aimed at soliciting artwork among adult women to raise awareness and knowledge and ultimately reduce cervical cancer mortalities and morbidities. Crowdsourcing open call involves inviting a group of people, such as adult women impacted by cervical cancer, to solve a problem and share selected solutions with the public.¹⁹ This research examines how art utilizes cultural contexts to improve health education and promotion, specifically regarding health perceptions of HPV vaccination and screening in Nigeria. We analyzed textual data from participants' art submissions and social media interactions collected during an open art contest intended to raise cervical cancer awareness among Nigerian women.

Methods

Study design and Recruitment

Our approach is guided by a participatory action research framework that prioritizes combining participation and action to understand and address societal issues such as cervical cancer incidence and mortality.^{20,21} An open call for art was launched on social media between October 3, 2023, and November 5, 2023, inviting adult women aged 18 to 65 in Nigeria to submit artwork promoting cervical cancer awareness. The artwork submitted could include drawings, video art, animation, illustrations, poetry, drama, and more. We developed various promotional materials to provide information about the art contest, its benefits, and application links. These materials were shared on the 4 Girls & Women social media platforms (Instagram, X, LinkedIn, and WhatsApp) and distributed through health influencers. We also disseminated the open call through networks of girls and women who participated in the HPV Designathon in Nigeria. An informational webinar was hosted to guide interested applicants.

Crowdsourcing Open Call Submissions

Submissions were made through Google Forms, email, or WhatsApp. We collected a range of sociodemographic data points, such as name, age, and sex, and submission-specific information, such as the submission title and a brief synopsis. At the end of the open call, the entries received were anonymized and screened for eligibility by an independent panel of judges. These data elements helped to categorize participants' submissions based on both content and demographic details.

Entry Selections

Judges reviewed and evaluated 43 eligible entries using a grading rubric that included the level of innovation demonstrated in the submission, the clarity and effectiveness of expression, the originality and creativity of the content, the overall appeal and engagement factor of the submission, and its relevance and significance to public health. Each criterion was graded on a point scale from 0 to 5. Five judges evaluated each submission, and an overall score was recorded. Following this evaluation process, we shortlisted the entries that ranked in the top ten. To ensure the accuracy and reliability of the health-related information presented in these submissions, we then shared them with a panel of public health experts for further review.²² Following this review of the top 10 entries, six finalists were shortlisted. This contest was organized as part of the Actions for Collaborative Community Engaged Strategies for HPV (ACCESS-HPV) R01CA271033.

Social media contest

From December 15-17th, six finalists were shortlisted for the second phase of the social media contest. The contest was conducted on Instagram, Nigeria's third most-used social media platform,

following WhatsApp and Facebook.²³ Instagram is also the preferred social media platform for sharing images and videos. Its robust algorithms effectively promote content to selected demographics through features like hashtags.²⁴ The artwork from each of the six finalists was posted on the *4 Girls and Women* account in collaboration with the participants' accounts, including the synopsis as a caption. The network among participants promoted the posts to drive engagement (views, likes, and comments) while educating users about cervical cancer. Three winners were determined based on their level of engagement on social media and the overall score from the judge using the same judging rubric from the first round. The winners were announced at the Instagram Live session on December 17, 2023, and awarded cash prizes of NGN200,000 (USD 200), NGN150,000 (USD 150), and NGN100,000 (USD 100) for first place, second place, and third place, respectively. The three winning artworks are included in the supplement and will also be featured in an international art magazine on health promotion.

Data analysis

A descriptive analysis examined the participants' characteristics, including age, gender, ethnicity, and educational level. Additionally, the level of engagement linked to participants' social media posts (e.g., likes, shares, comments) was analyzed, providing valuable insights into digital reach and interactions.

For qualitative analysis, we adopted the inductive-deductive approach for qualitative thematic analysis, categorizing submitted artwork into text-based, visual, audio-visual, and audio types. As guided by Lakh et al., 2021, our study employed thematic analyses to classify participants' data into meaningful themes and explore their underlying experiences and perspectives. Thematic analysis was used to identify emerging themes from the art submissions, while direct observation and interpretation of the submissions were employed to draw conclusions. For the thematic analysis, we used the six-step process, which included 1) researchers' familiarization with the submitted arts and accompanying texts, audios, or visuals, including identification of relevant items to the research question, 2) creation of categories based on the identified relevant items and comparing them back to the art entries, 3) identification of emerging themes, while comparing the art entries and the categories, 4) review of emerged themes while comparing the themes with the art entries, and the texts, audios or visuals to ensure they were relevant to the research question, including refining, splitting, combining, and discarding some themes during this step, 5) naming and giving definition to the emerged themes, including organizing the themes, and 6) writing the findings, and discussion, while referring to the literature. The entire process involved referring to the initial art entries.²⁵ By following the six steps, themes emerged that outlined the key areas where art intersects with medicine and classified participants' responses into three emerged themes: 1) art as an avenue for mental and emotional expression, 2) art as a vehicle for raising awareness of health-related content, and 3) art as a means of self-regulation. These themes were further analyzed using the PEN-3 cultural model,²⁶ which includes three essential domains: Cultural Identity, Relationships and Expectations, and Cultural Empowerment. Our research explicitly focused on the Relationships and Expectations domain of the PEN-3 model. This model has previously been used to provide a deeper understanding of how culture and environment influence health behavior interventions.²⁷

Results

We received a total of 43 entries (Table 1). Participants were aged 18 to 27 years (Mean age 22.2), and all identified as women. The art entries included visuals (n=14), audiovisual (n=14), text-

based pieces (n=14), and audio content (n=1) (Table 1). Most participants' entries (97.6%; 42/43) focused on content related to cervical cancer and human papillomavirus (HPV), such as definitions, risk factors, treatment, and prevention. Using the framework from Lakh et al. and the Relationships and Expectations domain of the PEN-3 cultural model for thematic analysis, we categorized participants' entries into three emerged themes: perceptions, enablers, and nurturers.

Art as an avenue for mental and emotional expression (Perception)

Over two-thirds (62.8%; 27/43) of participants' entries focused on "perceptions" related to art as a means of emotional expression encompassing feelings such as humor, sadness, hope, faith, unity, and fear in the context of cervical cancer and its prevention (Table 2). Hope was the most recurring emotion (n=10), as described by one of the participants (#01), *"Making a difference is not a superpower, and it is not a privilege only to the people who we think can. Sometimes, if we can feel a little bit more and allow our hearts to get stirred, it can lead our feet to where change resides."* The green color was also used to symbolize hope, as explained in the synopsis of #08 - *"I also used the green color to write HOPE because green depicts growth and hope itself, and it is part of our Nigerian color."* Entries also depicted the 'fear of death' and 'pain' of loss attributed to cervical cancer (#04) as a means of emphasizing the need for cervical cancer prevention, *"She reminisces her life before the cervical cancer. Then she tells us about the struggles of being a cervical cancer patient..."* Other emotions expressed include faith (#02), where *"women who are metaphorized as "lilies," "roses," more than rubies that should take proper care."* Other perceptions reported are those of susceptibility and awareness regarding cervical cancer and its prevention (#09), highlighting the crucial role of awareness and early detection and promoting regular screenings and HPV vaccination. One of our entries also depicted perceptions of unity in the face of diversity to prevent cervical cancer by demonstrating *"Nigerian women, who, regardless of age, status, tribe or religion, are susceptible to and share the bane that is cervical cancer"* (#40).

Art as a vehicle of awareness for health-related content (Enabler)

A significant portion (79.1%; 34 out of 43) of entries aimed to promote HPV screening and vaccination. These were classified as "Enablers" that highlighted art to foster health awareness, including educational materials and information about cervical cancer. The entries featured infographics, illustrations, poems, drama, explainer videos, and graphics covering the definition, epidemiology, signs and symptoms, causes, risk factors, and treatment and prevention of cervical cancer. Out of the 34 entries, most provided details on preventing cervical cancer, including HPV vaccination, Pap smear tests, HPV screening, and the importance of early detection and management. Common signs and symptoms identified were abnormal vaginal bleeding, pelvic pain, unpleasant odors, weight loss, and headaches. Participants noted that HPV infections might not show symptoms, stating that (#16) *"most infections with HPV resolve and cause no symptoms."* In addition, artistic entries creatively used symbols to raise awareness about cervical cancer. For example, a syringe represented HPV vaccination (#14 and #17), a flower depicted the female reproductive system (#20, #38), and a monster, along with a masked villain, symbolized HPV (#21, #34). (Table 2).

Art as a form of self-regulation (Nurturers)

Finally, entries (7.0%; 3/43) also included "Nurturers" via art, depicted as a form of self-regulation that addresses the stress or hurdles influenced by the experience of having relatives with cervical cancer. For instance, entry #15 *"portrays the mother's pains and struggles to protect her daughter and others from the same pain."* The cervical cancer story was also used to encourage

people in the community to embrace prevention. The story shared by entry #29 discusses *“her personal battle with the disease”* and *“encourages her community to take proactive steps toward preventing cervical cancer.”* (Table 2).

Social media contest

The six finalists were promoted on social media for 48 hours to enhance awareness of cervical cancer, reaching 8,685 accounts and generating 3,509 engagements (likes = 2727 and comments = 782) on Instagram (average likes = 454.5). Entry #40, named ‘Connected in Hope,’ attracted the highest engagement (likes = 745 and comments = 291), whereas #43 had the broadest account reach (total = 2,291), as presented in Table 3. Three winners were determined based on their level of engagement on social media and the overall grading rubric score. Artworks for the three winners are included. (Supplement Files 1,2 & 3).

Discussion

We advance the current literature by illustrating the importance of social media and art in promoting cervical cancer awareness. By utilizing a participatory approach, we demonstrate how engaging art submissions can resonate with audiences, fostering emotional connections and encouraging proactive health measures. This innovative method enhances outreach efforts and empowers women by transforming them into advocates for their health. Such integration of contemporary communication strategies represents a significant contribution to public health discourse, particularly in contexts with limited awareness and resources, such as Nigeria. This study investigated how art can serve as a cultural backdrop for health promotion to eliminate cervical cancer through participatory activities, such as an open call and a social media contest. By utilizing the PEN-3 cultural model, three overarching themes emerged.

Most of the entries included themes related to art as a mental and emotional expression regarding cervical cancer and its prevention. Emotion is a physiological experience that occurs in response to an external stimulus and influences an individual's learning process and behavior.²⁸ Educational materials that integrate emotional expression can significantly impact individuals and their behaviors.²⁸ Hope emerged as the most frequent emotional expression in the entries. Hope therapy has proven beneficial in enhancing the quality of life for cancer patients, though it should be accompanied by evidence-based management and realistic treatment expectations.²⁹ Research indicates a connection between culture and emotional expression; while certain cultural groups tend to be more expressive regarding their emotions, others may show the opposite behavior.^{30,31} Moreover, art has been recognized globally as a means of promoting awareness of cervical cancer. Art as a vehicle of awareness for health-related content (Enabler) was expressed in a majority (79.1%; 34/43) of entries, including content promoting HPV screening and vaccination. In India, art illustration was adopted by the Indian Cancer Society to educate the public on cervical cancer.²⁸ For instance, ancient Kerala Mural arts were used to educate Indian women on self-breast examination.^{32,33} Also, the illustration of women in the traditional dress of the target population can enhance effective communication and acceptability of the information.

Art contributes to health education by fostering empathy and creativity, influencing public behavior through cultural context. The submitted artworks reflected societal norms and local languages, enhancing the health message and promoting the intervention's sustainability. Vichoff et

al. noted art's appeal to cultural values, such as drawing characters in the local dress of the target population.³⁴ Entry #40 illustrated women wearing attire from the three major ethnic groups in Nigeria to promote diversity and inclusion in eliminating cervical cancer. Additionally, entries #20 and #38 used flowers to symbolize the female reproductive system, addressing the cultural stigma around cervical cancer and female sexual health in Nigeria.^{30,31} This imagery counteracts the shame associated with cervical cancer, emphasizing the importance of discussing it openly. Entries #21 and #34 depicted HPV as a monster to highlight the virus's danger and the urgency of prevention. Misconceptions in Africa often link cervical cancer to spiritual beliefs, so these entries symbolize HPV as the 'devil.'^{35,36} Entry #15 featured the Ibibio word (Ima meaning 'love') in a letter promoting cervical cancer prevention.

Finally, three entries utilized art as a tool for self-regulation and shared experiences to advocate for cervical cancer prevention. A systematic review by Fadlallah et al. examined the impact of storytelling on policy advocacy and public awareness.³⁷ A personal account or story from a cancer survivor or family can attract greater public attention and drive change. Such narratives can positively impact health education, encourage the use of preventive services, and promote engagement for an improved health system that ensures equitable access to services.³⁸ Employing art entries to share the personal experiences of cervical cancer survivors or their loved ones can encourage HPV vaccination among girls and motivate women to undergo regular cervical screenings.

The Role of Art in Health Empowerment and Communication Through Social Media

Our art contest also showed the potential of art in women's health empowerment and communication through social media. First, participants expressed creativity through text-based, visual, and audiovisual entries. Although art in public health promotion is relatively new, it has been found to increase engagement compared to other 'traditional' methods. Within 48 hours, the six finalists reached 8,685 social media accounts, generating 2,727 likes (455 on average) and 782 comments. This illustrates the potential of social media platforms to enhance the dissemination of educational messages, thus making them more accessible to a broader audience, especially younger women and remote communities.

In contrast, utilizing traditional media for health promotion—such as newspapers, billboards, and television—can be more costly and reach fewer target groups. Moreover, unlike offline media, social media content remains continuously available without extra costs. However, increasing engagement on social media necessitates specific strategies, as not all individuals utilize social media platforms. A study from Brazil that examined Instagram posts about cervical cancer found an average of 153 likes per post.³⁹ This variation may stem from the art contest being part of a campaign focused on the cervical elimination day of action. Salako et al. noted that social media engagement regarding cancer tends to be greater during global campaigns than before or after those events.⁴⁰

The art contest was open only to females, thereby empowering girls and women to lead change. The art contest not only informed social media users about cervical cancer but also empowered women to act by leading change as health creatives, inspiring girls and women to get screened, vaccinated, or share information within their networks. For instance, entry #01 shared a story of a young woman who initiated community-based awareness and likened this to a 'superpower' by saying, "Making a difference is not a superpower, and it is not a privilege only for those we think can." Entry #06 also centered on empowering girls and women to take charge of their health. One major cultural challenge of cervical cancer vaccination and screening in LMICs is the

inability of girls and women to make health decisions independently, as men often hold decision-making power. The entry was described as “The girl, a central figure, symbolizes empowerment, and her skin showcases words like “Screening” and “Survivor.” This visual manifesto encourages self-awareness, urges women to take charge of their health, and fosters community solidarity.” Art and social media also helped break down cultural stigmas and misconceptions surrounding cervical cancer and HPV in different communities. Some of the common misconceptions in Nigeria include the association of cervical cancer with promiscuous women, ignorance of risk, and fear of contracting STIs from screening.⁴¹ Additionally, entry #41, titled ‘it,’ used spoken words to creatively lend a voice to the need to discuss cervical cancer publicly without stigmatization, “...what does the silence really do but hurt us?... all it takes is to break the silence with one person, and maybe our vagina (it) will not worsen.” Lastly, social media promotes peer-to-peer education through the ‘share’ feature. Other social media users shared finalist entries multiple times to drive health conversations on their pages, thereby increasing the reach and impact of the artworks. It also supports the ownership and sustainability of the intervention.

Implications for Future Public Health Campaigns

The three winning art entries (Supplementary Files 1, 2, & 3) are currently being utilized to raise awareness about cervical cancer and vaccination on print and social media. Specifically, the first runner-up visual was printed and branded on T-shirts and a magazine to raise cancer and vaccination awareness.

As digital engagement continues to expand, leveraging social media will become increasingly vital in increasing the reach of health information, particularly among younger populations. Moreover, incorporating arts and creativity into health communication strategies will be essential for driving more effective health-seeking behaviors. Future initiatives should prioritize people-centered artistic approaches, tailoring content to diverse age groups, cultural backgrounds, and educational levels. By doing so, health messaging can become more inclusive, engaging, and impactful, ultimately fostering a more informed and proactive society in addressing health challenges.

Limitations

Art contests on social media can promote health, but they have some limitations. Although internet access is growing in Nigeria and SSA, many people, particularly in rural areas, still struggle to access mobile phones and the internet. Older individuals may also be left out of health promotion initiatives because most social media users are younger. Moreover, art interpretation is inherently subjective, influenced by context, culture, and personal perspectives. Consequently, some health messages might not be easily understood without an artist's explanation.

Additionally, there is a potential for bias in judging art submissions. Although established judging criteria were designed and five independent judges evaluated the entries to minimize bias, the final entries were ultimately assessed based on social media engagement, which can also be subjective. Nonetheless, this approach enhances the accessibility of art for educating social media users.

Conclusion

In conclusion, this study shows the potential of using art and social media to empower women through cervical cancer prevention and screening education. It demonstrates the integration of cultural context in creativity to drive health promotion and increase impact. We encourage health organizations to adopt similar approaches to other women's health issues, especially those affecting

young women, by leveraging creative and culturally relevant tools to increase awareness and promote health equity.

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Conflicts of Interest

The authors declare that to the best of their knowledge, there is no conflict of interest.

Multimedia Appendix of supplementary

First winner: <https://doi.org/10.5281/zenodo.15225974> Supplementary File 1

Second winner: <https://doi.org/10.5281/zenodo.15226027> Supplementary File 2

Third winner: <https://vimeo.com/881040081?&login=true#> = Supplementary File 3

Abbreviations

HPV: human papillomavirus

SSA: sub-Saharan Africa

ACCESS-HPV: Actions for Collaborative Community Engaged Strategies for HPV

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Table 1: Demographic and Overview of the Art Contest Entries

S/ N	Age (in years)	Type (visual, audiovisuals & text)	Title Submission of	Synopsis/brief explanation (100 word limit)	Total Score
#0 1	27	Text-based	A Harmattan Illustration	Making a difference is not a super power and it is not a privilege only to the people who we think can. Sometimes, if we can feel a little bit more and allow our hearts to get stirred, it can lead our feet to where change resides. The illustrator in this work realizes this early and as ordinary as she considers herself, she does extraordinary things...because there's nothing ordinary about joining the fight against cervical cancer.	95
#0 2	18	Text-based	Poem	STANZA ONE: Starting with a rhetorical question, the poem illustrates how dear our health is, Thus women who are metaphorized as "lilies", "roses", more than rubies should take proper care. STANZA TWO: This stanza introduces to us cancer has a deterrent to a health. And it spreads even in the "cervical cancer". Bringing about the vaccine brings about security. However, its brings about security. STANZA THREE: In addressing women and young girls, the poem deems them fit to be concerned in the vaccination and screening exercise against cervical cancer in order to have "Freedom and Immunity". Essentially This poem is an advocate to #Endcervicalcancer.	76
#0 3	21	Visual (infographics)	In Time	My work is inspired by vintage illustrated magazine adverts. My objective with this illustration was to make an advert of the Human Papilloma Virus vaccine marketed towards young women who I believe are an ideal audience for the promotion of the vaccine due to the strong sense of community associated with this group. With this illustration, I wanted to convey a hopeful outlook towards the elimination of cervical cancer in society as well as present information in an easily digestible way.	88
#0 4	21	Text-based	Poem title: a nemesis for cervical cancer.	This poem talks about a young woman that has been diagnosed with stage IV cervical cancer. She reminisces her life before the cervical cancer. Then she tell us about the struggles of being a cervical cancer patient. Most importantly, she also decides to spend the remaining time she has creating awareness about HPV vaccine, HPV screenings and tests; As well as cherishing her time with friends and family.	89
#0 5	24	Audiovisual	Video about cervical cancer awareness.	This video basically sensitize people about the causes, signs and symptoms, the treatment and the HPV vaccine. It touches all area of cervical cancer as it's important to sensitize people about the 4th common cancer among women. My video exceeds 10MB so I'm going to send it to the email tagged on this form. Thank you for your understanding.	75
#0 6	20	Visual	EmpowHER	"EmpowHER" is a powerful drawing that promotes cervical cancer awareness by imprinting words directly on a girl's body. This innovative artwork emphasizes empowerment, advocacy, and self-awareness. The girl, a central figure, symbolizes empowerment, and her skin showcases words like "Screening" and "Survivor." This visual manifesto encourages self-awareness, urges women to take charge of their health, and fosters community solidarity. By wearing these words on her skin, the girl embodies the idea that knowledge is power in the fight against cervical cancer, inspiring individuals to be health advocates and agents of change.	94
#0 7	22	Text-based	A Poem on Cervical Cancer Elimination	The elimination of cervical cancer refers to the global goal of eradicating this disease as a public health problem. In order to achieve this, various strategies are being implemented worldwide, including widespread access to vaccination against the human papillomavirus (HPV), which is the main cause of cervical cancer. Additionally, regular screening programs, such as Pap smears and HPV testing, are crucial in detecting pre-cancerous lesions early and allowing for timely treatment. Efficient healthcare systems, education and awareness campaigns, as well as improved access to healthcare services, are essential in achieving the elimination of cervical cancer as a significant public health issue.	88
#0 8	23	Visual	Makeup representation of Cervical Cancer Awareness	Cervical Cancer Awareness is reaching out to women in different age groups on cervical cancer, symptoms, preventive measures and vaccines. Cervical Cancer occurs in the cervix. In my makeup representation, I used red colour to indicate the reproductive system of a woman which consists of the uterus, fallopian tube and the cervix. I used teal colour because that is the colour being used for cervical cancer awareness. I also used the green colour to write HOPE because green depicts growth and hope itself and it is part of our Nigerian colour. Thank you very much.	100
#0 9	19	Text-based	END CERVICAL CANCER	"End Cervical Cancer" is a poignant poem that advocates the eradication of cervical cancer through the combined power of knowledge and action. It emphasizes the importance of awareness and early detection, encouraging regular screenings and HPV vaccinations. The verses highlight the devastating impact of this preventable disease and the lives it claims. With unity and informed decision-making, the poem calls for a world where cervical cancer is but a memory, emphasizing that through education and proactive measures, we can triumph over this silent killer, sparing countless lives and alleviating the suffering it inflicts.	83
#1 0	22	Audiovisual	TEAL RIBBON DRESS	The #Endcervicalcancer art challenge is a great way to combine my many interests as a 5th medical student and as a fashion, art and design enthusiast. The teal and white ribbon represents cervical cancer globally and for the challenge I used these ribbons to create a dress, something inarguably feminine, as we are the ones affected by the cancer. With this entry, I hope to inform more women about cervical cancer, HPV infection and most importantly vaccination and screening. As a woman, sister and future mother, this is playing my part in reducing the incidence of Cervical cancer in Nigeria.	103
#11	25	Audiovisual	Igniting hope: uniting against cervical cancer	This artwork is a combination of spoken words and visual art. The second image indicates a shadowy figure representing cervical cancer gradually fading as a group of women reach towards a shining light. The third Image illustrates a woman with symptoms of discomfort, pain and bleeding. Next, a woman stands tall ready to win the fight against cervical cancer. Then a scientific laboratory with a beam of light shining on a model of the HPV virus. Then a vaccine guarding women against cervical cancer. Then a key symbolizing prevention within reach of a diverse group of people, emphasizing the importance of education. Women's hands joined together in unity, reaching out to support and protect each other. Finally, women determined to conquer.	47
#1 2	25	Visual (infographics)	Engaging Families Through Door-To-Door Outreach For Cervical Cancer Screening and Vaccination	In our community-focused initiative, we plan to implement a comprehensive door-to-door approach to promote cervical cancer screening and vaccination. Recognizing the importance of early detection and prevention, our goal is to reach every household, engage families, and empower them with knowledge about cervical cancer and the available preventive measures. Through this door-to-door initiative, we aspire to create a community that is well-informed, proactive, and supportive of cervical cancer screenings and vaccinations. By engaging families at their doorstep, we believe we can significantly increase awareness, reduce stigma, and contribute to a healthier, empowered community, free from the threat of cervical cancer.	64
#1 3	19	Text-based	Endcervicalcancer	It a story of young girl who has been neglected by her single mother who was always out in the street hustling to provide. Chineye is taken advantage of on her 14th birthday. For the first time she had sex and it was a great experience for her. She wanted more which she got from other people when John was away in school. She begins to notice changes in her body. She gathers courage to tell her mum. Who took her to a hospital where she ran test. chineye had high risk HPV which has lead to cervical cancer.	88
#1 4	23	Visual	Vaccinate and support her	Topic: Vaccinate and Support Her Cervical cancer is known to be the most preventable cancer in the world. The common cause of cervical cancer is the Human Papilloma Virus (HPV) and a breach in the cervix during activities like coitus (sexual intercourse) can allow for its penetration, hence, cervical cancer. The theme of my pencil artwork encompasses various outstretched hands, signifying that the girl child needs support in this course. The illustration of an injection being administered shows the need for a vaccination. The schematic diagram of the cervix and a blue ribbon indicates the cervix and cervical cancer awareness respectively.	72
#1 5	24	Text-based	A Letter to Ima	A Letter to Ima is a poetry piece written as a letter from a mother bedridden with cervical cancer to her daughter, Ima (a 10 year old). It portrays the pains of the mother and her struggle to protect her daughter and others from going through the same pain. In this piece, Ima is vaccinated against HPV, tells her classmates about it and never loses hope of her mother's survival. P.S: Ima is an Ibibio word for love. It is also a make of a person.	101
#1 6	27	Visual	Feminine Fertility	Contemporary art, acrylic on canvas The teal ribbon represents awareness on cervical cancer. Cervical cancer develops in a woman's cervix. Almost all cases are linked to infection with high-risk human papillomaviruses (HPV) transmitted through sexual contact. Although most infections with HPV resolve and cause no symptoms, persistent infection can cause cervical cancer in women. Effective primary (HPV vaccination) and secondary prevention (screening and treating precancerous lesions) will prevent most cervical cancer cases.	92

				When diagnosed, it is one of the most successfully treatable forms of cancer if it is detected early and managed effectively.	
#1 7	22	visual	"Pathway to Protection" to (acrylic painting, 24/24inches)	"Pathway to Protection" is a painting that symbolizes the journey of HPV vaccination and screening. It portrays the importance of preventive measures in safeguarding individuals from the risks. We can see a woman representing an individual taking control of their health. She takes a confident and determined pose, holding the doctor symbolizing the decision to undergo HPV vaccination and screening, the syringe represents protection. The surrounding colors represent health and growth, while the pathway represents the journey towards HPV prevention and early detection. The lady's shadow shaped like a microscope emphasizes the importance of regular check-ups and early detection. Written amidst the tree twigs is the statement "HPV screening"	81
#1 8	24	Audiovisual (spoken words)	Hope	Spoken word is aimed at creating an awareness of cervical cancer and how it can be detected and prevented. Giving hopes to those who have cervical cancer that it is not a death sentence. There is hope for them.	106
#1 9	23	Text-based	The Tale of Aunty	This poem is a story about someone who was my Aunty in the way Yoruba people call everyone older than them Aunty. She was dear to me even though she was not family and though it is after a decade, it still hurts that her death was avoidable.	103
#2 0	26	Visual	Nectar	This art piece was painted with food colours. It is an image of the lower part of a woman with a sunflower on her womb region.. I like to remind all women especially cervical cancer patients that we should always see our body as flowers.. it is attractive in all its essence, outwardly and inwardly.. nurture and care for your body like a vineyard	56
#2 1	24	Audiovisual	"Guardian of the Cervix: The battle against sneaky villain"	In "Guardian of the cervix: The battle against sneaky villain," we embark on an engaging narrative within the realm of women's health. We encounter the stealthy villain of cervical cancer, often masked as HPV, as it threatens the cervix. Our protagonist faces cryptic warning signs like unusual bleeding and pelvic discomfort. It's a captivating story of vigilance, protection, and personal heroism on the path to better health.	113
#2 2	24	Visual	Learn with Bisola about HPV vaccination in school!	Bipolar is a 15 year old girl in SS1 who is learning about HPV vaccines in Biology class. Join her as she learns about how HPV vaccines save the lives of women all over the world!	95
#2 3	18	Text-based	Poem	My eyes beholdeth, God, is! To I am see enlightened to the behold wonders works of His Hand, is! How beautiful My I look to the left and eyes see how wide the earth is, me, It Am astonishes so overwhelmed My Also, I look to the right to observe eyes nature and see that the Lord is good, His is good, work, it. His goodness shows His aesthetics the and beauty of sight of His My Every living and non-living things eyes around me are bright and fearfully beholdeth, made, All Glory to God!	33
#2 4	18	Audiovisual	End Cervical Cancer	The video is set to enlighten all females about the Cervical Cancer and the possible prevention. A lot of young ladies are unaware of this type of cancer. Every one is familiar with breast cancer and the likes but it's rare to find information about cervical cancer just anywhere! The goal is to publicize cervical cancer and it's vaccine. Every one has the right to awareness and the video is set to achieve that.	85
#2 5	23	audiovisual (drama)	Conquering the Silent Enemy	In a tight-knit family of three, Mama Ijeoma's life takes a turn when abnormal vaginal bleeding disrupts a family outing. Relying on herbal remedies, her strength continues to wane, tragically leading to her demise. Afterward, the doctor counsels on the cause of death (cervical cancer) and outlines crucial steps for prevention. Ijeoma bravely commits to the Human Papilloma Virus Vaccine regimen and regular Pap smears. This dedication results in a life free from cervical cancer, as she raises her joyful family. This tale highlights the conquerable nature of cervical cancer, but only if prevention is maximized.	113
#2 6	22	Visual	Don't give up cervical	Video link: https://drive.google.com/file/d/1SSu0yqm3tj3Vt80rhLH7dBCH7HGtM1bw/view?usp=drivesdk Rooted deep inside to my lugues womanhood A causing threat death to my the globe A disease cancer that is among knows me not cervical cancer is destroying my organs I have seen others suffering their from this agony An illness was that calls for neighbor attention daughters beware of of cervical cancer HPV beware I fear death is but pains I couldn't endure what Thanks to NGO who is now has the cure to my cure? pains Today we celebrate the elimination of this deadly diseases.	59
#2 7	23	Text-based	Break The Silence, Protect Against Cervical Cancer.	Cervical cancer is the commonest gynecological cancer in developing countries. It is the 4th commonest cancer among women globally. There were 604,000 new cases and 342,000 deaths in 2020. About 90% occurred in resource-poor settings. It is primarily caused by Human Papilloma Virus (HPV), especially the high-risk types 16 and 18 which account for 70.7% of cases. Detectable and treatable premalignant lesions precede cervical cancer for years. This poem serves to create awareness on the need for vaccination of young girls aged 9-13 years and routine Pap smear screening in sexually active females for early detection of abnormalities within the cervix.	89
#2 8	23	Audiovisual	Killer on the loose!	Slow and steady may win the race, but when the life of a woman is the prize, something must be done. Often underestimated, cervical cancer slowly but surely crept it's way to being the second leading cancer in women globally. However, we are not unarmed. With HPV vaccinations for girls 9-14 and screening services for women above 30, cervical cancer can and will be eliminated. The world has come together before and can do so again. It takes massive participation that starts with individual proactivity, by men and women alike. Find your role in this, we all have one, we all need.	103
#2 9	19	Text-based	HER STORY	"HER STORY" is a flash fiction piece that follows the journey of a young girl who becomes a beacon of inspiration for her community. In the face of the looming threat of cervical cancer, she courageously shares her personal battle with the disease, highlighting the importance of HPV vaccination and screening. Through her narrative, she not only triumphs over adversity but also encourages her community to take proactive steps towards preventing cervical cancer. This powerful story underscores the significance of early detection and vaccination, fostering awareness and unity in the fight against this life-threatening illness.	76
#3 0	26	Audiovisual (spoken words)	HPV vaccine (fight against cervical cancer)	Human papilloma virus is the most sexually transmitted infection (STI). HPV spread through skin-to-skin contact. You can get HPV by having vaginal, anal or oral sex with someone who has the virus, even if they don't know signs or symptoms. Most people with HPV do not know they have the infection. They never develop symptoms or health problem from it. Some people find out they have HPV when they get genital warts. Women may find out they have HPV when they get an abnormal pap test(during cervical cancer screening). A vaccine (HPV vaccine)has been introduced to Nigeria and Africa at large to prevent this deadly virus from our girls aged 9 to 26 years before they become sexually active and screening for adult women who are 30 years and above.	73
#3 1	18	Text-based	A POEM TITLED: GUARDIANS OF WELLNESS	"Guardians of Wellness" is a poetic masterpiece, intertwining art and advocacy to illuminate the crucial mission of HPV vaccination and screening for girls and women. Through lyrical verses, it paints a canvas where health, resilience, and unity converge. The poem is an ode to the courage of those who step into the light of protection and self-care, embracing the shield of vaccination and the gift of early detection. It eloquently celebrates the transformation brought about by art and words, compelling society to embrace the role of guardians of wellness. The poem is a profound call to action, offering a vision of a healthier, empowered future.	75
#3 2	21	Visual	SCREEN HPV, VACCINATE HPV	Cervical cancer, a malignant tumor of the lowermost part of the uterus, is the fourth on the list of the abnormal growth that affect the female demography. It is caused by the Human Papiloma Virus(HPV). Wherever the name cervical cancer sounded, it reminds one of cost and losses; the expensive treatment it demands and the lives of beautiful girls and women it is claiming.	75

				Today, armed with screening and vaccination, the female gender now stands a chance against this cancer. With the advent of improved treatment, the threat cervical cancer is now being threatened and on the path of extinction.	
#33	18	Text-based	Pain, a sign of a bigger problem.	A poem that captures the pain, confusion and other feelings that a woman experiences when she has cervical cancer.	92
#34	22	Visual	The definition of protection and the end of an era	There's a lot of symbolism in this art piece. The monster's head representing what HPV does to the cervix, the primarily female warriors, the dull weapons lighting up when held to symbolize the effectiveness of vaccination, even the monster's hands sign HPV (via sign language). I poured hope into this artwork, praying that this vaccination campaign will bring an end to the suffering of a vast number of girls and women around the country. The monster has wrecked a lot of havoc in the past (visualized by the burning city behind it) and condemned too many women to a life of pain and suffering, it's time to end the destruction!	92
#35	20	Visual (infographics)	Hpv awareness comic	A comic telling a story of an aunt who gets HPV and gets her nieces to get vaccinated	94
#36	20	audiovisual	Letters Mother Left Behind	Sometimes we need someone to remind us to never give up even if it's almost too late and sometimes not giving up on ourselves is another way of saving someone else because who knows, someone might just be watching.	87
#37	26	Text-based	Guardiance of Our Health	This is a spoken word that gives a narration of how women and girls 4GW have come together to put an end to the silent killer HPV. It goes further to explain the steps to protection which are vaccine and screening. Finally, it talks about the determination to win against HPV	73
#38	25	Visual	The inVASEon	The artwork depicts the female reproductive system symbolically as a neglected flower vase placed on a stool in a garden infested on by a parasitic 'corpse flower' with wilted flowers. The purpose of this artwork is to inspire individuals to prioritize the well-being of their reproductive system. It emphasizes the importance of taking preventative measures, such as undergoing HPV vaccination and screening methods for early detection, in order to prevent the development of cervical cancer. Recognizing the significance of timely detection and overcoming hesitancy towards vaccination is crucial, to curtail the spread of cervical cancer to other organs.	67
#39	22	audiovisual	Endcarvicalcancer	Human papillomavirus vaccines are vaccines that prevent infection by certain types of human papillomavirus. Available HPV vaccines protect against either two, four, or nine types of HPV. All HPV vaccines protect against at least HPV types 16 and 18, which cause the greatest risk of cervical cancer.	81
#40	22	Visual	Connected in Hope	The work represents, using Nigerian women, who, regardless of age, status, tribe or religion are susceptible to and share the bane that is cervical cancer. The theme is of 'unity in the fight against cervical cancer and in the possibilities of finding healing.'	109
#41	21	Audiovisual (spoken words)	"It"	This piece aims at addressing the issues behind low turn outs on HPV vaccine and calling for action.	111
#42	20	audio (poem)	"HPV Vaccination and Screening".	HPV is a virus that can cause cancer, but there is a safe and effective vaccine available. The poem encourages listeners to get vaccinated and screened regularly to protect themselves from HPV and its associated cancers. It describes HPV vaccination as a gift that can save lives, and highlights the importance of protecting our children from HPV. The poem concludes by calling for unity and action in the fight against HPV, urging listeners to get vaccinated and screened, and to support efforts to make these preventive measures accessible to everyone.	97
#43	25	audiovisual	A fighting chance	The aim of this work is to promote the HPV vaccine which is crucial in preventing HPV infections and reducing the risk of cervical cancer. To keep spreading awareness and making a difference!	105

Table 2: Thematic Analysis of the Art Contest Entries using the Relationships and Expectations Domain of the PEN-3 Cultural Model

Pen-3 domain	Themes (total entries)	Subthemes	Number of Mentions per Subthemes
Perceptions	Art as an outlet for emotional expression	Fear and anxiety	4
		Humour	1
		Sadness	1
		Hope	10
		Faith	2
		Others	9
Enablers	Art as a medium for expressing awareness on health-related content	Definition, pathophysiology and epidemiology	7
		Signs & symptoms e.g. abnormal vaginal bleeding, pelvic discomfort, pain, foul smelling, headache, weight loss, painful urination, diarrhoea	10
		Cause e.g. HPV, unprotected sexual intercourse	5
		Risk factors	1
		Treatment e.g. chemotherapy, psychosocial therapy	6
		Prevention e.g. HPV vaccination, screening, and early detection	34
Nurtures	Art expressed as a form of self-regulation		3

Table 3: Social Media Engagements and Data Analytics of the Six Finalist Entries

S/N	Title	Likes	Comments	Total engagement (Like + Comment)	Accounts reached
#43	A fighting chance	697	98	795	2291
#19	The Tale of Aunty	432	61	493	692
#41	"it"	125	19	144	1343
#40	Connected in Hope	745	291	1036	1573
#18	hope	173	78	251	881
#21	"Guardian of the Cervix: The battle against sneaky villain"	555	235	790	1905
	TOTAL	2727	782	3509	8685

Supplementary Files 1,2 & 3

First winner: [Supplementary File 1](#)

Second winner: [Supplementary File 2](#)

Third winner: [Supplementary File 3](#)

