

“ARVs is for HIV and cream is for HPV or precancer:” Women’s Perceptions and Perceived Acceptability of Self-Administered Topical Therapies for Cervical Precancer Treatment: A Qualitative Study from Kenya

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2 Chemtai Mungo,^{1,2} Aparna Ghosh Kachoria,³ Everlyn Adoyo,⁴ Graham Zulu,⁵ Supreet Kaur Goraya,
3 ³ Jackton Omoto,⁶ Cirilus Osongo,⁴ Renée M. Ferrari,^{2,3} Lisa Rahangdale^{1,2}

4

5 **Affiliations:**

6 1. Department of Obstetrics and Gynecology, School of Medicine, University of North Carolina at
7 Chapel Hill, Chapel Hill, NC 27599, USA

8 2. Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill, Chapel
9 Hill, NC 27599, USA

10 3. Department of Maternal and Child Health, Gillings School of Global Public Health, University of
11 North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA

12 4. Kenya Medical Research Institute, Kisumu, Kenya

13 5. Butler Institute for Families, University of Denver, Denver, CO 80210, USA

14 6. Department of Obstetrics and Gynecology, Maseno University School of Medicine, Kisumu,
15 Kenya

16

17 *** Correspondence:**

18 Chemtai Mungo, MD, MPH

19 Chemtai_mungo@med.unc.edu

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23 **Abstract [349/350 words]**

24 **Background:** Women in low- and middle-income countries (LMICs) bear a disproportionate burden
25 of global incidence and deaths from cervical cancer, despite being a preventable disease. Prevention
26 efforts in LMICs are hindered in part by lack of access to cervical precancer treatment, due to weak
27 health infrastructure and a lack of adequate human resources to deliver current provider-administered
28 precancer treatments. Innovative strategies are urgently needed to close the cervical precancer
29 treatment gap in LMICs, including the use of self-administered topical therapies for which efficacy
30 evidence is available from high-income settings. We investigated African women's perceptions and
31 perceived acceptability of these therapies for cervical precancer treatment.

32 **Methods:** Between November 2022 and April 2023, we conducted five focus group discussions
33 (FGDs) with women ages 25-65 years undergoing cervical cancer screening or precancer treatment in
34 Kisumu, Kenya. The FGDs explored women's experiences with screening and precancer treatment,
35 their acceptability of topical therapies for precancer treatment, and perceived barriers and facilitators
36 to uptake. The FGDs were moderated by local qualitative research assistants, conducted in local
37 languages, transcribed, coded, and analyzed using qualitative description using NVIVO software.

38 **Results:** Twenty-nine women participated, with a mean age of 35.4 years (SD 6.5). All had
39 undergone cervical cancer screening, and 25 (83%) had a history of precancer treatment with ablation
40 or excision. Multiple themes were identified related to women's perceptions of topical therapies.
41 Participants were highly receptive of topical treatments, with many favoring the option of self-
42 administration compared to provider-administration of such therapies. Self-administration of topical
43 therapies was felt to help address challenges associated with current treatment methods, including
44 difficulty in access, pain with procedures, cost, and lack of privacy with pelvic exams. Participants
45 had a preference for topical therapies that are used less frequently compared to those used daily.

46 **Conclusions:** Among Kenyan women with a history of cervical precancer treatment, self-
47 administered topical therapies for precancer are acceptable and have the potential to address barriers,
48 including access, privacy, and cost, that hinder precancer treatment in LMICs. If supported by
49 efficacy studies in LMICs, self-administered topical therapies offer a scalable approach to closing the
50 precancer treatment gap in LMICs.

51 **Trial registration:** *Not applicable*

52 **Keywords:** cervical precancer treatment, topical therapies, self-administered treatment,
53 cervical cancer elimination, low- and middle-income countries, women living with HIV,
54 cervical cancer, sub-Saharan Africa

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68 **Background**

69 Women in low- and middle-income countries (LMICs) shoulder a disproportionate burden of the
70 incidence and mortality from cervical cancer, accounting for 85 percent of cases and 90 percent of
71 deaths in 2020[1]. Additionally, women living with HIV (WLWH), the majority of whom live in
72 LMICs, are six times more likely to develop cervical cancer and, hence, are a priority population for
73 prevention[2], [3]. In response to this, the World Health Organization (WHO) launched the 90/70/90
74 global strategy to eliminate cervical cancer[4]. This strategy, adopted by most WHO member states,
75 calls for 90% human papillomavirus (HPV) vaccination coverage of all girls by the age 15 years,
76 70% of women globally receiving cervical cancer screening with a high-performance test at least
77 twice in their lifetime, and 90% of those with a positive result adequately treated by 2030[4].
78 Modeling studies demonstrate that achieving the 90/70/90 targets will avert 74 million new cases of
79 cervical cancer and 62 million deaths in LMICs alone[5].

80
81 Among unvaccinated women, cervical cancer can be prevented through screening for and treating
82 early changes in the cervix, known as cervical precancer, caused by HPV infection. Current cervical
83 precancer treatment options include ablation or excision procedures, both of which are performed by
84 trained healthcare professionals[6]. Despite progress in screening, access to cervical precancer
85 treatment following abnormal screening results in LMICs is highly limited[7], [8], [9], [10][11]. In a
86 review of the Kenya national cervical cancer screening program in 2021, only 26% of 10,983 women
87 who screened positive for cervical precancer received treatment [12]. Similarly, between 2011 and
88 2015 in Malawi, only 43.3% and 31.8% of women with cervical precancer who required ablation or
89 excision, respectively, received treatment[13]. Challenges associated with precancer treatment in
90 LMICs include high rates of loss-to-follow-up due to cost and transportation challenges when women

91 screened in rural areas are referred to central facilities where treatment is available, due to a lack of
92 skilled healthcare providers in rural areas where most women live [9], [10], [11], [12], [14], [15]. The
93 failure to treat precancerous lesions while at a curable stage in these settings results in 85% of new
94 global cervical cancer cases occurring in LMICs, highlighting a significant disparity. This highlights
95 the urgent need for innovative yet resource-appropriate approaches to address the gap in cervical
96 precancer treatment in LMICs. One potential strategy is the use of self-administered topical therapies.
97
98 While no topical therapies are currently approved for the treatment of cervical precancer, the use of
99 self- or provider-administered topical therapies for cervical precancer treatment is an area of active
100 investigation [16], [17], [18], [19], [20], [21], [22], [23]. The feasibility, acceptability, and efficacy of
101 topical therapies for cervical precancer treatment has been demonstrated by several studies in high-
102 income countries, including randomized trials[16], [17], [20], [24]. Several of these drugs are on the
103 WHO List of Essential Medications and are readily available in LMICs in generic form[25]. One
104 such drug is Fluorouracil (5FU) cream, which has been demonstrated to be a safe and effective
105 cervical precancer treatment when self-administered intravaginally[16], [17]. Compared to provider-
106 administered precancer treatment, which is currently inaccessible for many women in LMICs,
107 patient-administered therapies may be a highly scalable and cost-effective cervical precancer
108 treatment method in these settings.

109
110 To inform ongoing (Clinicaltrials.gov identifier NCT05362955, NCT06165614, NCT05413811) and
111 future studies on topical therapies for cervical precancer in LMICs, studies on their acceptability and
112 barriers to uptake among both women and their male partners in LMICs are needed. The objective of
113 this study was to assess how African women receiving cervical cancer screening and precancer

114 treatment perceive the use of topical therapies for cervical precancer treatment and their potential
115 acceptability of such therapies were they to be available.

116 **Methods**

117 **Study design and approach:** This study is part of a larger project exploring the acceptability of
118 topical therapies for the treatment of HPV and cervical precancer, which included in-depth interviews
119 and focus groups with women undergoing cervical cancer screening and male partners in Kenya, in
120 eastern Africa. Results of a qualitative analysis of men's perspectives have been reported elsewhere
121 [23]. This current analysis encompasses focus group discussions with female participants.[26] We
122 used a constructivist paradigm to gather perspectives of women introduced to the idea of a novel
123 treatment method for HPV or cervical precancer. Constructivism suggests that knowledge is
124 constructed through individual perceptions, experiences, and social contexts [27]. We hypothesized
125 that acceptability of topical therapies is based on women's experiences (e.g., prior treatment
126 experiences, knowledge of other women's experiences) and their social contexts (e.g., relationships
127 with sexual partners).

128

129 We used focus group discussions (FGDs) to gather the breadth and depth of experiences from groups
130 of women. A predetermined sample size of five focus groups was selected based on evidence
131 indicating that most themes can be captured within a range of three to six focus groups [28]. Since
132 the topical treatment being proposed is innovative within this study's context, we conducted an
133 analysis of the data using qualitative description, which is highly suitable for enhancing
134 comprehension in a field with limited knowledge [29]. As this method remains focused on the data
135 itself and involves minimal interpretation, qualitative description effectively facilitated our objective
136 of providing a clear and direct account of the participants' perceptions, thoughts, and experiences.

137

138 **Research Team:** The principal investigator (CM), a Kenyan-born Obstetrician/Gynecologist with 10
139 years of experience, graduate students in medicine, social work, and public health (AGK, GZ, SKG),
140 and a senior qualitative investigator with 20 years of experience in qualitative methods and health
141 services research (RMF) comprised the research team. The focus groups were facilitated and
142 transcribed by two qualitative research assistants from the local community.

143

144 **Sampling, recruitment, and data collection:** We used purposive sampling and a stepped
145 recruitment process to recruit FGD participants, as described previously[23] [30]. Women age 25 to
146 65 years undergoing cervical cancer screening or precancer treatment in public clinics in western
147 Kenya between November 2022 and April 2023 were included in the study. Emphasis was placed on
148 recruiting women with a history of positive screening results or prior precancer treatment.
149 Participants were recruited from HIV clinics as well as clinics serving the general population. Most
150 women had undergone cervical cancer screening using HPV self-collection, which was available at
151 most clinics at the time of recruitment. Per the WHO guidelines, women who screened positive were
152 offered treatment with thermal ablation or referred for excision if not eligible for ablation (6). Using
153 focus group discussions (FGDs), we explored the women's perceptions and hypothetical
154 acceptability of using proposed topical, self-administered therapies for treatment of HPV or cervical
155 precancer, should such therapies become available for public use.

156

157 The FGDs were conducted by two female moderators from the same community as the research
158 participants (EA, JO). The moderators had training in qualitative research, prior experience
159 conducting focus group discussions, familiarity with the local context, and fluency in the local
160 languages. FGDs were held at facilities near the recruiting clinics and conducted in the two most

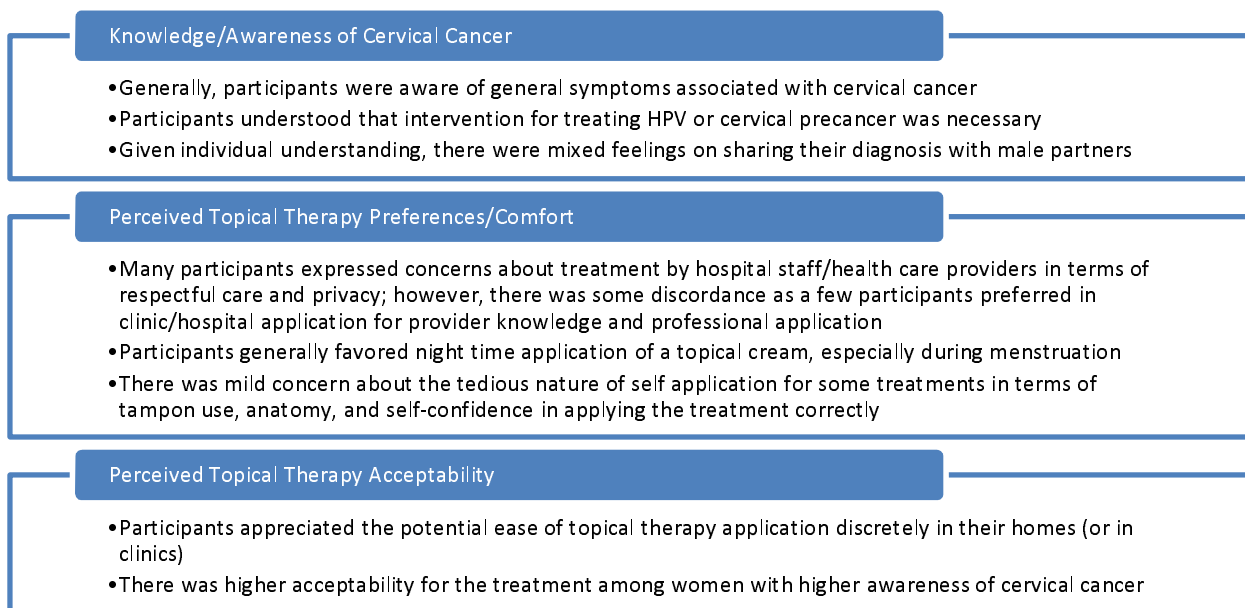
161 spoken local languages (*Swahili* and *Dholuo*). Discussions were guided by several domains of
162 inquiry: 1) baseline knowledge of HPV and cervical cancer screening and prevention, 2) the primary
163 treatment experience and perceived efficacy of treatment, 3) acceptability of self-administered topical
164 therapies as primary or adjuvant treatment to current therapies, 4) self-perceived barriers to use of
165 topical therapies, and 5) perceived barriers or facilitators of male partner's support for the use of
166 topical therapies as adjuvant treatment. Moderators used standardized language to explain cervical
167 cancer screening and prevention and the potential option of topical self- or provider-administered
168 therapies for precancer treatment. Briefly, participants were introduced to two topical therapies for
169 which data are available, 5-FU and Artesunate, including details on their frequency of use (5-FU
170 once every other week for eight applications, Artesunate daily for five days for three cycles),
171 abstinence requirements (two to three days of abstinence after each 5-FU application and none for
172 Artesunate). Participants were told that tampon use overnight was recommended following
173 application of the topical, and tampons were available for illustration using a pelvic model for those
174 who had never used one. Each FGD included 5-8 participants and lasted approximately 90 minutes.
175 All FGDs were audio recorded, and recordings were transcribed verbatim, translated to English, and
176 crosschecked to confirm accuracy.[31]

177

178 **Data Analysis:** A codebook was created a priori based on the focus group guide. Two coders (GZ,
179 SKG) read and coded two of the five FGDs to test the code application and gain a sense of additional
180 topics covered in the group discussions, adding emergent codes (e.g., informational needs,
181 interactions with health service providers) to a final codebook. All FGD transcripts were coded using
182 the final codebook. To ensure agreement between coders, a random sample of transcripts was chosen,
183 and the codes were compared for concurrence. Any inconsistencies were addressed through
184 discussion and mutual agreement, and any modifications made were recorded in the codebook. The

185 team reviewed and summarized code reports and explored the data for patterns and themes. Content
186 analysis and thematic development were supported using NVIVO Version 13. Although the focus
187 group discussions covered multiple topics, this analysis focuses on three primary topics: 1)
188 participants' knowledge and awareness of cervical cancer; 2) treatment preferences and comfort with
189 topical therapy; and 3) perceived acceptability of topical therapy for cervical precancer treatment
190 (Figure 1).

191 **Figure 1.** Summary of themes regarding women's perceptions of topical, self-administered therapies
192 for cervical precancer treatment



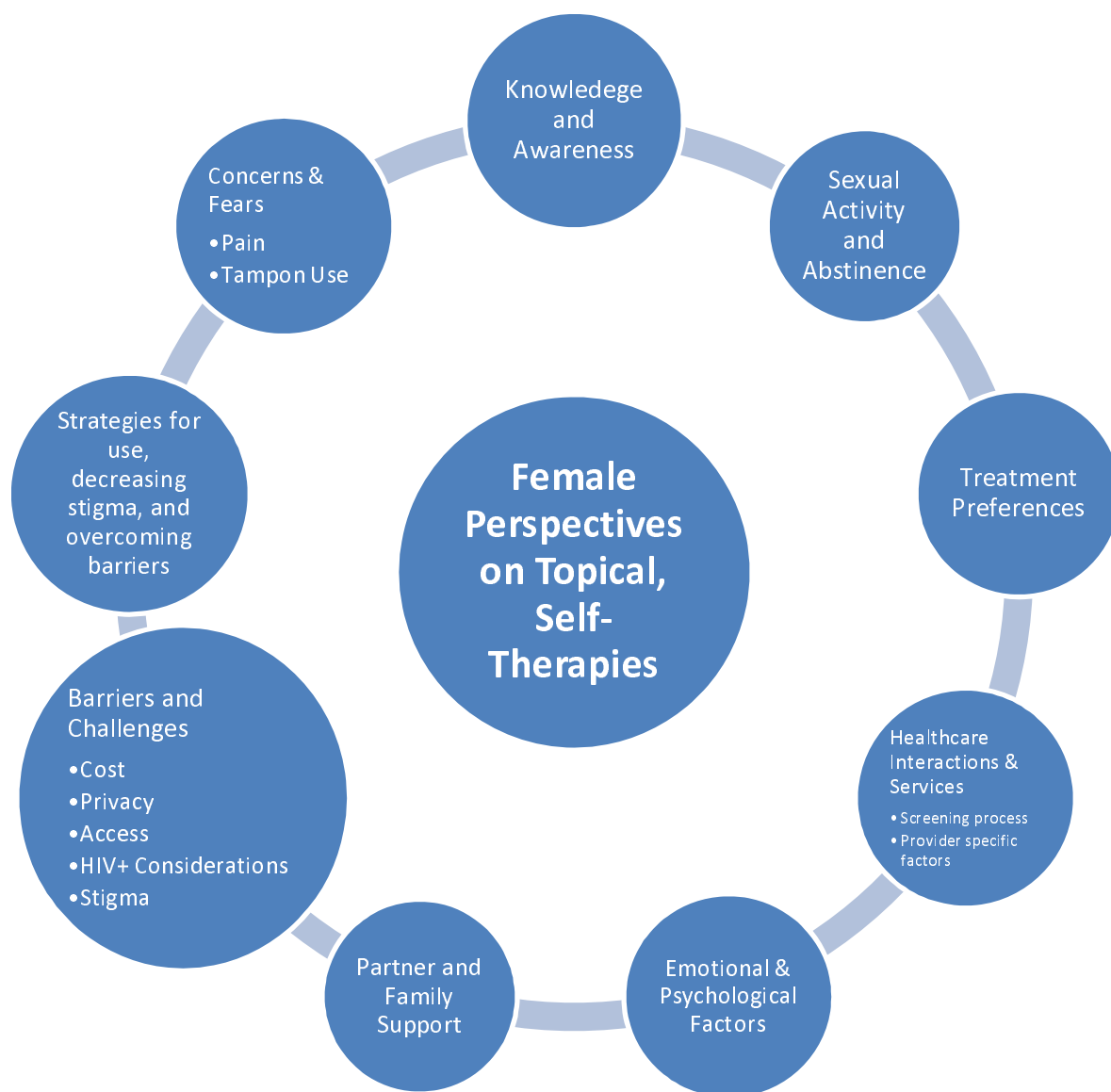
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194 **Results**

195 A total of 29 women participated in five FGDs. The mean age was 35.4 years (SD 6.5). The majority,
196 25 (83.3%), had a history of prior precancer treatment, including during the visit they were recruited
197 into the study. Analysis of the FGDs identified 15 themes related to the potential use of self-

198 administered topical therapies for cervical precancer treatment in the study population, summarized
199 in Figure 2.

200 **Figure 2.** Key findings on women’s general perceptions of topical therapies



201
202
203 ***Participant Experiences with Cervical Cancer Screening and Precancer Treatment***

204 FGD participants shared their experiences of learning their HPV or cervical precancer diagnosis
205 following screening. Many mentioned having symptoms of pelvic pain or bleeding during intercourse
206 and wanting to see a doctor for screening and treatment to learn more.

207 *“I was suspecting something was wrong because I had some pelvic pain and also some spots*
208 *whenever I had sex, I would have some blood spotting. And I used to hear that those are some*
209 *of the symptoms suggestive of cervical cancer.” -R4, FGD1*

210

211 Others underwent cervical cancer screening after being advised to do so by clinic staff. One woman
212 shared on why she had screening.

213 *“I cannot refuse because each person just wants good health. They tested and told me that I*
214 *would be called by somebody after some time.” -R6, FGD4*

215

216 While there was acknowledgment and awareness of the symptoms of cervical cancer, awareness of
217 HPV was less common. Following notification of a positive HPV test, some participants noted that
218 they were initially not aware of the difference between HPV and cervical precancer or cancer, and
219 they often needed to seek more information to understand the differences.

220 *“When I was told that I was HPV positive from the screening test results, I was very afraid*
221 *from that day and all I could do was to GOOGLE about it and learn as much as I could. But*
222 *what calmed me down was that when I was being treated for the HPV, I was told that having*
223 *HPV doesn’t mean that I have cancer. It can be treated early before it progresses to cancer.”*

224 *- R7, FGD3*

225

226 Generally, participants shared that knowledge and awareness led to greater acceptance of the
227 recommended treatment, particularly as it relates to the difference between receiving an HPV or
228 cervical cancer diagnosis.

229 *“I discovered after reading a lot of different materials and I also consulted from other people
230 that I found that virus [HPV] is different from cancer.” - R7, FGD1*

231

232 *“I was told that having HPV doesn’t mean I have cancer and so when I went through
233 treatment, I didn’t feel much pain except for the day of treatment, but for a few minutes then I
234 was told to abstain for 6 weeks for the cervix to heal. Then I followed that, and I feel better
235 now.” - R7, FGD3*

236

237 Some women recounted their clinic experiences, noting how they felt when they had nice providers
238 compared to others who had previously scared them in some way, an important factor in accepting
239 the news of their screening and the precancer treatment they were prescribed:

240 *“My test results for my last precancer test are out, and they are positive, and I needed to
241 come for more information and treatment...[the staff] lady who called talked to me...didn’t
242 scare me she talked nicely to me then I came [to the hospital]. I was treated and I was told
243 the discharge will be there for one week, 10 days. But what I felt when I was being treated, I
244 was counseled first, I felt some cramps for some minutes, and I even screamed a little there.”*
245 *-R2, FGD3*

246

247 The focus groups highlighted how participants' experiences varied in learning about their screening
248 results and becoming aware of the treatment options available. The discussions consistently showed

249 that participants' understanding of HPV and cervical cancer—from prevention through screening to
250 treatment—played a crucial role in overcoming stigma and pursuing treatment after their diagnosis.

251

252 ***Experiences with Ablative or Excisional Precancer Treatment and Perceived Advantages of***
253 ***Topical Therapies***

254 During the FGDs, participants shared their experiences with traditional precancer treatments (thermal
255 ablation, cryotherapy, excision) and were introduced to intravaginal topical therapies (creams or
256 suppositories) currently being studied that can be self- or provider-administered. Participant's views
257 on these topical therapies, their potential integration into their lives, and comparisons with traditional
258 treatments were explored.

259

260 Many FGD participants showed a greater preference for topical treatments over traditional precancer
261 treatments, which many had undergone, citing topical therapies perceived fewer side effects,
262 especially pain, compared to treatments they had received.

263 *"What I feared was the LEEP [Loop electrosurgical excision procedure, a surgical precancer*
264 *treatment method] and secondly the chemoablation [thermal ablation]. A friend who came*
265 *from treatment would tell us that it is painful, and even the doctor told us that there will be*
266 *pain during the procedure, especially during heat application. And for sure, [thermal*
267 *ablation] was painful just as labor pains." R1, FGD5*

268

269 *"[Given a choice] I would choose cream because the cream I will use in the house unlike*
270 *thermo [thermal ablation] that I will have to come to the hospital, [which takes time]*
271 *...thermo is too painful." R5, FGD1*

272

273 *“During [thermal ablation] treatment procedure, there is short pain that you feel. And so I*
274 *can encourage people that it is not a very painful experience because when some people hear*
275 *about it, then they develop fear to the extent that they don't even go for treatment. I have a*
276 *friend who dropped [out of treatment], she feared thinking that it is a painful experience.*
277 *Therefore, I can encourage everybody to go for treatment and that there is no serious pain*
278 *except a short time during the procedure, which is normal like when being injected, you feel*
279 *pain and after that the pain disappears. So, we should all go for treatment, there is no*
280 *problem with it.” – R2, FGD4*

281

282 *“[With ablation,] during treatment, they were removing certain things [like] cotton wool and*
283 *in addition to that my sister had also said to me that there is a chemical they will spray, which*
284 *they did and I felt abdominal pain. I felt pain during treatment, but I just persevered for the*
285 *sake of treatment so that I get well.” - R4, FGD4*

286

287 Many were happy to hear of the potential for a self-treatment option that could be done in their own
288 home, which they felt could better fit into their daily lives, offered more privacy and less discomfort
289 compared to provider-administered treatments:

290 *“I can prefer cream because that other thermos [thermal ablation] treatment or cryo*
291 *[cryotherapy], they use strange objects in the cervix and that brings tension and discomfort*
292 *because the objects going into the cervix makes you tensed and then again that type of*
293 *treatment [cryotherapy] doesn't involve one person, you find that three or two people want to*
294 *deal with your cervix and this brings some discomfort. But this one you are alone with your*
295 *husband whom you are used to, there is no fear.” R7, FGD1*

296

297 *“I can choose [the] cream because it has some level of confidentiality, you know women don’t*
298 *like it when someone is looking at her private part. So, some people can fail to go back to the*
299 *hospital because they don’t want the doctor to look at their private part and with [the] cream*
300 *you apply it yourself and you are the only one who know how your private part looks like*
301 *[laughter] so I can choose this one” – R4, FGD1*

302

303 *“[I prefer the] cream because I apply it at my own free time, secondly, I don’t have to go see*
304 *clinician all the time, it gives you privacy. You see the society where we live, people will*
305 *quicky judge you wrongly if you are seen [in front] of the clinician all the time.” – R1, FGD4*

306

307 *“The [treatment at] the hospital that you go to be checked by the doctor, you must at least be*
308 *seen by a person when on your way there and there is no privacy there. This cream is private,”*
309 *-R4, FGD1*

310

311 Others cited the convenience and accessibility of a topical therapy that can be self-administered at
312 home as an advantage, compared to the time and costs associated with visiting clinics for provider-
313 administered treatments.

314 *“[the] cream is good due to lack of transportation all the time when going for other treatment*
315 *methods. Again, I don’t have to make a queue in the hospital waiting to be treated because*
316 *once I get the cream, I will be applying it by myself at home.” – R3, FGD4*

317

318 *“I will choose cream due to cost if transportation to the hospital all the time to go for other*
319 *treatment methods, but with cream I take it once and continue to apply by myself at home.” –*
320 R2, FGD4

321
322 Some also noted a sense of increased autonomy or empowerment with use of self-administered
323 topical therapies, which some felt would support compliance.

324 *“If I can be given this cream to take home, nothing can bar me from using [the] cream, I am*
325 *just being empowered and I use it accordingly.” – R7, FGD2*

326 *“I think that cream is very good. You cannot fear your own body and therefore you will insert*
327 *it very well because you want to get cured fully.” – R5, FGD4*

328
329 Across all focus groups, the idea of a topical treatment applied at night was embraced, citing
330 convenience as it meant that the day’s activities would be over.

331 *“A woman never has any free time during the day. So, it is good because at night, there is no*
332 *other activity to be done other than sleeping.” - R8, FGD4*

333
334 *“I feel [it] is better at night because you are just resting, I don’t like using it daytime because I*
335 *will be walking maybe the medicine can flow [out], and that is not good.” - R5, FGD2*

336
337 *“Applying it at night is very good because it is a time that I am retiring to bed. Secondly during*
338 *the day, I will pass urine a lot but in the night once I have put it [applied the cream? Used the*
339 *tampon] I know it is [in place?] until morning. Since I am the one who chooses my best time*

340 *that suits me...even if I have children, they would have slept by then, even if I have a husband*

341 *we will be just the two of us. I am the one to choose one that suits me.” – R4, FGD3*

342

343 Although most focus group discussion participants favored self-administered treatments, some
344 expressed a preference for provider-administered thermal ablation, emphasizing their comfort in
345 trusting a doctor to accurately apply the treatment to the correct area of the cervix.

346 *“I feel thermos [thermal ablation] is good because when the doctor is checking he is able to*
347 *target the most affected area, because when we went, we were told that they look at where the*
348 *virus is. You see with that one [thermal ablation] they can see where the virus is and the*
349 *other one [self-administered cream] I am going to put but I don’t know where the virus is.*
350 *And I feel the cream should come after you have used this other one [thermal ablation] to*
351 *continue with the treatment because I will not be able to see where exactly the virus is. They*
352 *have suspected that I have the virus, but I will not know where they are. So, I feel thermos*
353 *[thermal ablation] is good.” - R5, FGD3*

354

355 *“The reason I may only like the one I was done for [thermal ablation], than this [self-*
356 *administered cream], that one was done by the doctor, when she doesn’t see well, she cleans*
357 *and confirms, if not well done she does it again until it reaches where she wants, but using*
358 *cream, you are in the dark, you don’t know whether you have placed it well or not.” – R6,*
359 *FGD2*

360

361 Similarly, participants who favored having a topical treatment applied in the clinic by a healthcare
362 professional compared to self-application expressed confidence in a doctor's ability to administer it

363 more effectively than they could themselves, particularly if they encountered side effects during the
364 application, which may cause them to hesitate with self-administration.

365 *“Sometimes you can decide to try it [topical therapy] a little bit and see how it is, if you find it*
366 *itching you might stop using it. And you see with the doctor he will just go ahead and apply it,*
367 *and once he applies it is done.” – R3, FGD3*

368
369 Generally, the majority of focus group participants were open to using a self-administered treatment
370 if it were accessible. Crucially, they noted that self-administered treatments at home could shield
371 them from adverse interactions with healthcare providers in clinics, such as being shouted at, which
372 some had experienced while seeking treatment for precancer.

373 *“Women can be free to apply it [topical therapies], they have their own time without worry of*
374 *meeting a doctor, maybe one who shouted at her last time... What I felt when I was being*
375 *treated [with non-topical treatment], I was counseled first, I felt some cramps for some*
376 *minutes, and I even screamed a little there. The health providers touched my pelvic [area] and*
377 *asked me to chill.”- R2, FGD3*

378
379 *“I think that can be good and they can like it because most people fear the word hospital, so if*
380 *they can be given to go use it at home, [topical treatment] can be good.” – R3, FGD2*

381 ***Participant’s Preferences Between Two Proposed Topical Therapies***

382 In the FGDs, participants were introduced to two potential self-administered topical therapies for
383 cervical precancer treatment: topical 5FU cream and Artesunate suppositories. The differences
384 between the two therapies were described, including treatment length (5FU is used once every two
385 weeks for 8 applications over 16 weeks, while Artesunate is used nightly for 5 days, followed by a

386 week off, repeated for 3 cycles over six weeks), and abstinence requirements (abstinence is required
387 for 2 days after 5FU use, while abstinence is not required with Artesunate use). Participants were
388 then asked which of the two potential therapies they would prefer, if they needed to use it, based on
389 these described characteristics.

390

391 Those who preferred the 5FU treatment did so because of the perceived ease of the application
392 regimen – once every two weeks for 16 weeks, compared to daily use for Artesunate.

393 *“What makes it [5FU] better than the other one [Artesunate] for me is that maybe you have*
394 *traveled, so you know the one for once every two weeks, even if you apply it, even if you are on*
395 *a journey, it does not worry you.”* – R3, FGD2

396

397 *“I think 5 FU is good especially for those are not held up in their minds, there those who are*
398 *busy all the time and since the 5 FU is not complicated, for the AS [Artesunate], it is*
399 *complicated, you can forget the days, again with the menses disruption, it is not the best. I*
400 *think 5FU is the best option.”* – R1, FGD4

401

402 *“The 5FU is okay because you can continue to have sex except for one day only.”* – R3,
403 FGD4

404

405 *“[The 5FU] will suit me because I don’t have to put it all the time.”* - R2, FGD3

406

407 *“...[I] am comfortable with it once a week, for the daily one you might have some occasions*
408 *like funeral and finding a place for you for application may not be easy.”* – R7, FGD5

409

410 Others preferred Artesunate because of its use over a significantly shorter duration – only 6 weeks
411 compared to 16 weeks for 5FU- and the possibility that condom use may not be required with its use
412 *“Though the [Artesunate] is a bit tedious, you are using the medication daily, but it is a shorter*
413 *period of time then it doesn’t have a lot of restrictions.” R6, FGD1*

414
415 *“The treatment that I would prefer is [Artesunate], the one where you treat for 5 days then the*
416 *following week you rest, then you also don’t use a condom and it is a shorter period of*
417 *treatment than the one that goes for 16 weeks. Though the 16 weeks also have weeks when you*
418 *are skipping but it is a long period then it has condom use for the whole treatment period. So,*
419 *for me because condom will cause conflicts in my house, I would settle for [Artesunate].” – R7,*
420 *FGD1*

421
422 Participants noted that their treatment preferences were influenced by their perceptions of their male
423 partner’s opinions of such therapies, including the requirements for condom use. Many cited that
424 abstinence for long periods of time could be a source of conflict with their male partner’s
425 preferences. This was cited as a reason why therapies like Artesunate, which may not require condom
426 use or abstinence, may be preferable over 5FU which requires both for certain periods:

427 *“I like where there is peace...but maybe the way the husband as we were saying, they might not*
428 *understand the abstinence part and even this condom use, they usually say that they cannot use*
429 *a condom with their partners, they feel like if you insist then there is something and this alone*
430 *can cause conflicts. So, I prefer [Artesunate] even if I am applying for 5 days in peace, it is*
431 *better because I know he is going to support me, and the medication will work well than the one*
432 *where you are fighting. And you know there are some that might even end up breaking the*
433 *rules, so peace is good.” – R6, FGD1*

434

435 *“For me condoms can cause conflict, most men don’t like using a condom and there are those*
436 *who have never used a condom in their life.” – R7, FGD1*

437

438 Participants who did not favor Artesunate pointed out the inconvenience, especially the burden of
439 applying it every day. Furthermore, those with irregular menstrual cycles noted that 5FU was more
440 manageable due to its biweekly application schedule, which is simpler to follow than Artesunate's
441 daily regimen, which can be interrupted by irregular periods.

442

443 ***Considerations for Women Living with both HIV (WLWH) diagnosed with HPV***

444 In the FGDs, participants who were living with HIV (WLWH) who had also tested positive for HPV
445 or cervical precancer noted feeling an increased burden. Many expressed fears about the impact of
446 the dual diagnosis on their children or other family members, as well as the challenges of managing
447 multiple medications when treating cervical precancer alongside HIV infection.

448 *“It also bothered me, and it stressed me out following that I am also on HIV medication, I felt*
449 *very bad because I also infected my baby [with HIV]. I have been taking HIV medication*
450 *from 2009 up to now. So, when I imagined getting another terminal illness, I felt sad.” – R6,*
451 *FGD3*

452

453 *“And if I consider that I had [pre]cancer and with HIV, it was double burden. The fact that*
454 *cancer can worsen and kill you I get very bad. And if I consider that I had [pre]cancer and*
455 *with HIV, it was [a] double burden and so, I decided to clear with [pre]cancer which is*
456 *curable.” - R7, FGD5*

457

458 One participant believed that topical treatments for cervical precancer would be insufficient due to
459 their concurrent HIV and HPV diagnoses. They harbored doubts about the effectiveness of such
460 treatments when dealing with both conditions simultaneously.

461 *“According to me I feel the [topical] treatment is not 100% for those who have HIV, because*
462 *of our low immunity, our system is weak. So even if we are treated, we can still just get*
463 *[cancer].” – R7, FGD3*

464

465 Other participants likened the use of self-administered topical therapies among HIV-positive women
466 to the same way WLWH are prescribed antiretroviral therapies (ARVs), which they use at home to
467 treat their HIV disease. The participants drew parallels between their consistent use of ARVs at home
468 and their potential to similarly apply self-administered topical therapies in the same settings.

469 *“Those who are HIV+ should go for [the topical] cream because, they go to the hospital for*
470 *ARVs refill, they should take cream and use it at home just the same way they take ARVs and*
471 *adhere to its use at home.” R2, FGD4*

472

473 *“ARVs is for HIV and cream is for HPV or precancer, so you just take your medication and*
474 *also apply your cream because they treat different things.” – R7, FGD3*

475

476 Generally, participants ultimately felt that the time required to apply the topical therapies was shorter
477 in duration in the home setting versus returning to the clinic to be treated, which greatly influenced
478 their perceived acceptability and desire to use topical therapies. Regardless of HIV-seropositive
479 status, the participants noted that if they had the knowledge and the ability to apply the cream at
480 home, they would be willing to do this for the betterment of their health.

481 **Discussion**

482 In this qualitative study evaluating Kenyan women’s perceptions of topical self- or provider-
483 administered therapies for cervical precancer treatment, we find that participants, many of whom had
484 undergone traditional cervical precancer treatment, were highly receptive to topical therapies. We
485 found that many participants had fears following a diagnosis of HPV or cervical precancer, which
486 they had to overcome in order to undergo ablation or excisional treatment procedures. When
487 introduced to topical therapies as a potential alternative to available precancer treatments, participants
488 strongly favored topical therapies, citing reduced pain, improved accessibility, and privacy, compared
489 to the currently available provider-administered precancer treatment methods that many had
490 undergone. Most study participants expressed a strong preference for self-administration of topical
491 therapies, with many citing the lack of privacy associated with provider-administered treatments as a
492 barrier that those who had received precancer treatment had to overcome and that often discourages
493 other women from seeking treatment. Participants' preferences varied when given an option between
494 two potential topical therapies with different characteristics and requirements for use. Some favored
495 5FU, applied every two weeks, despite its conditions for abstinence following use and consistent
496 condom use. Meanwhile, others favored Artesunate, which requires more frequent applications but
497 may have less stringent restrictions around abstinence and condom use. Despite only having had a
498 brief education session, participants showed high levels of awareness and body autonomy in the
499 discussions by displaying keen insights into potential different trade-offs associated with the two
500 topical therapies discussed, including the impact of irregular menstrual cycles on the ability to adhere
501 to a daily topical. Given the higher incidence of cervical precancer in women living with HIV, it is
502 noteworthy to highlight that HIV-positive participants in our study indicated concerns about
503 managing their HIV disease alongside a diagnosis of HPV or cervical precancer. However, most

504 were confident about their ability to use a self-administered topical treatment for cervical precancer,
505 drawing on their experience with daily use of oral antiretroviral therapy to manage HIV infection.

506

507 To our knowledge, this is the first qualitative study to explore African women’s perceptions and
508 perceived acceptability of self- or provider-administered topical therapies for cervical precancer
509 treatment. In this study of urban and peri-urban Kenyan women who had undergone cervical cancer
510 screening and a majority of whom had undergone ablation or excisional precancer treatment, many
511 expressed conflicting emotions about their treatment, explicitly highlighting the challenges they had
512 to overcome in terms of access, pain and lack of privacy often pointing to pain and privacy issues
513 when receiving provider-administered treatments. Most showed a preference for topical therapies, if
514 available, believing they would alleviate these challenges associated with conventional treatment
515 methods that often deter other women from pursuing precancer treatment. The acceptability of
516 thermal ablation, the most widely available precancer treatment method in LMICs that was approved
517 by the WHO in 2019, has been demonstrated in a few studies[28], [29]. Thermal ablation, which
518 involves the application of a heated probe to the cervix to destroy precancerous tissue, is performed
519 without local anesthesia to the cervix[6]. Studies in LMICs report that while 83.9% - 90% report no
520 or mild pain with thermal ablation, 2.5% - 16.1% report high or moderate pain with the procedure
521 [28], [29]. In our qualitative findings, some participants described thermal ablation as “*too painful*”
522 or “*painful just as labor pains.*” Another participant noted the need to encourage women that the
523 procedure is “*not very painful*” and should not deter them from presenting for treatment, as the pain
524 perception is thought to keep women away from presenting for treatment. Studies on whether certain
525 women undergoing thermal ablation may require pretreatment analgesia are needed, alongside
526 considerations of the feasibility of providing of doing this. If topical therapies for cervical precancer
527 can be shown to be equally effective as ablative or excisional procedures in low- and middle-income

528 countries (LMICs), they could potentially alleviate the pain-related concerns associated with ablation
529 or excision.

530

531 Our findings of participants noting challenges with treatment access and privacy concerns associated
532 with provider-administered, facility-based treatments have been demonstrated in several LMIC
533 studies. Facility-based precancer treatment access challenges in LMICs include lack of functional
534 equipment or supplies[10], [13], lack of trained providers [7], [10], [13]long distance required to
535 access treatment facilities [11], [30]. These factors significantly contribute to the existing precancer
536 treatment gaps. In a study from rural Kenya, up to 40-50% of women who screened positive and
537 were referred to a central facility did not make their follow-up appointment [11]. Similarly, in a
538 qualitative study from Malawi, women with abnormal cervical cancer screening results cited lack of
539 transportation to referral facilities and high associated costs as major reasons for not presenting for
540 treatment [30]. This is reflected in our study, where women emphasized the convenience of self-
541 administered topical therapies that can be used at home, highlighted ease of access to topical self-
542 administered therapies used at home, compared to facility-based treatments, which are associated
543 with high transport costs and long waiting times at the facilities as a reason they would favor topical
544 treatments. Similarly, our findings of increased privacy as a reason women prefer self-administered
545 therapies to conventional treatments have been highlighted in prior studies, which found that fear of a
546 violation of privacy associated with pelvic exams [31], [32], [33], [34], and especially when
547 performed by a male provider [33], [34], [36], are barriers to screening and precancer treatment in
548 sub-Saharan Africa. As noted by a study participant, during her ablation procedure, “*two or three*
549 *people want to deal with your cervix, and this brings discomfort,*” stating that with a self-
550 administered treatment, “*you are alone with your husband whom you are used to, there is no fear.*”
551 The use of self-administered topical therapies, which women can apply in the comfort of their own

552 homes, can be a scalable way to address both the access challenges and privacy concerns of African
553 women.

554

555 Self-administered therapies can also promote women’s autonomy and sense of agency, as highlighted
556 by our study participants, who stated that they anticipated "*feel[ing]empowered*" and would use it
557 correctly, as "*you cannot fear your own body.*" The use of self-administered precancer treatment, if
558 backed by feasibility and efficacy studies in LMICs, also aligns with a recent guideline from the
559 World Health Organization that advocates for self-care interventions. As stated in the guideline, these
560 interventions have the capacity to “increase choice and autonomy,” address the global shortage of
561 healthcare workers, and bring us closer to achieving universal health when made “accessible,
562 acceptable and affordable[37].” While no studies have evaluated the acceptability of self-
563 administered topical cervical precancer treatment in LMICs, several studies in this setting have
564 demonstrated high acceptability of self-care interventions, including HIV self-testing [38] and the use
565 of vaginal or rectal microbicides for HIV prevention[39], [40]. Similarly, in a study on the
566 acceptability of rectal microbicide for HIV prevention among men who have sex with men in
567 Thailand, ease of use, privacy, and comfort of use at home were facilitators of uptake [41], drawing
568 similarities to our findings.

569

570 This study has several strengths, such as the inclusion of women who have had cervical cancer
571 screening, as well as a deliberate oversampling of women with a history of precancer treatment. This
572 approach ensures that the study represents the demographic that is most likely to benefit from topical
573 therapies, hence whose perceptions are important in understanding acceptability. Similarly, the use of
574 focus groups in the qualitative design facilitated in-depth discussion among study participants who
575 shared similar experiences. This enabled the identification of multiple themes that impact the

576 acceptability of this intervention to inform feasibility studies. The study's inclusion of women living
577 with HIV is a significant strength due to their higher risk of cervical cancer and current unmet need
578 for accessible precancer treatment. A limitation of this study is that participants expressed theoretical
579 acceptance of the intervention but did not actually use the topical therapies. Therefore, their views
580 might change with actual use, an aspect future studies should explore. Another limitation was the
581 limited time for focus groups; more time could have offered insights into household dynamics like
582 decision-making and empowerment, potentially affecting women's perceptions of the therapies.

583 **Conclusion**

584 Innovative measures are urgently needed to address the gap in cervical precancer treatment in
585 LMICs, which face the highest burden of cervical cancer and limited access to existing treatments.
586 Topical therapies, self-administered by women, could be a scalable solution to meet the WHO's goal
587 of treating 90% of women with cervical precancer by 2030, aiming for cervical cancer elimination.
588 Our findings from Kenya indicate that women find these therapies acceptable and that they have the
589 potential to address significant challenges like access, privacy, and cost that hinder precancer
590 treatment uptake in these regions. These results support ongoing feasibility studies and call for
591 efficacy studies in this population to inform whether these treatments can be made available to
592 women.

593

594 **List of Abbreviations**

595 5FU: Fluorouracil

596 FGD: Focus Group Discussions

597 HIV: Human immunodeficiency virus

598 HPV: Human papillomavirus

599 LEEP: Loop electrosurgical excision procedure

600 LMIC: low-and middle-income countries

601 SD: standard deviation

602 WHO: World Health Organization

603 WLWH: women living with HIV

604

605 **Declarations**

606 **Ethics approval and consent to participate**

607 **Ethical Considerations:** The study was approved by the ethics review boards at Maseno University

608 School of Medicine in Kenya and the University of North Carolina Chapel Hill in the U.S.A. All

609 participants provided written informed consent prior to study participation.

610

611 **Consent for publication:** Not applicable

612

613 **Availability of data and materials**

614 Data are available upon reasonable request. For inquiries or to request access to the data, please

615 contact Chemtai Mungo at Chemtai_mungo@med.unc.edu.

616

617 **Competing interests**

618 The authors declare no competing financial or non-financial interests.

619

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627

628 **Authors' contributions**

629 CM conceptualized the study and associated clinical trials. EA and JO conducted focus group
630 discussions with study participants . GZ, SKG, RMF, and AGK worked on qualitative methodology,
631 with GZ and SKG conducting data analysis and RF leading methods section in this manuscript. AGK
632 led manuscript writing with CM and RMF. CM, AGK. EA, GZ, SKG, JO, and RMF all read and
633 approved the final version of the manuscript.

634

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