Therapie und Nachsorge von suspekten zervikalen Läsionen in ausgewählten Regionen in Äthiopien und Tansania

---

Dissertation zur Erlangung des akademischen Grades

Doktor der Medizin (Dr. med.)

vorgelegt

der Medizinischen Fakultät

der Martin-Luther-Universität Halle-Wittenberg

von Clara Yolanda Stroetmann

Betreuerin: Prof. Dr. Eva Johanna Kantelhardt

Gutachter*innen: Prof. Dr. med. Nicole Schmidt

PD Dr. med. Gregor Seliger

Datum der Verteidigung: 08.12.2025

Referat

In dieser Dissertation beschreibe ich Therapie und Nachsorge von Frauen mit zervikalen Läsionen in Teilen Äthiopiens und Tansanias. Der Fokus dieser Arbeit lag dabei insbesondere auf der Teilnahmerate an Nachsorgeuntersuchungen und Gründen für die Nichtteilname. Dabei beziehen wir uns auf die WHO- bzw. Leitlinien-Empfehlung, dass Frauen bei denen zervikale Läsionen mit einer ablativen Therapie (Cryotherapie, Thermoablation) behandelt wurden, an einer Nachsorge ein Jahr nach Therapie teilnehmen sollten, da diese präkanzerösen Läsionen in rund 15% der Fälle trotz Therapie persistieren oder wieder auftauchen. Screening kann die Inzidenz und Mortalität von Zervixkarzinomen nur dann senken, wenn auf auffällige Ergebnisse adäquat reagiert wird. Daher fällt diesen Aspekten eine wichtige Rolle innerhalb erfolgreicher Screeningprogramme zu.

Wir ermittelten die Teilnahmeraten an den Nachsorgescreenings durch ein retrospektives Review der Screeninglogbücher, in welchem wir alle Frauen mit zervikalen Läsionen identifizierten. Dann überprüften wir, ob diese Frauen laut Dokumentation eine Therapie und eine Nachsorgeuntersuchung erhalten hatten und falls Telefonnummern dokumentiert waren, riefen wir die Frauen an, um sie in Fragebogen-basierten Interviews nach Therapie, Nachsorge und wahrgenommenen Hindernissen zu fragen. Dabei fanden wir, dass die meisten essigweißen Läsionen therapiert werden und zudem in Äthiopien eine hohe Adhärenz zu dem sogenannten *Single-Visit-Approach* (Therapie am Tag des Screenings) zu verzeichnen ist. In Tansania werden regelmäßig auch Pap-Abstriche als Screeningmethode genutzt, welche einen *Single-Visit-Approach* nicht erlauben. In beiden Ländern viel jedoch auf, dass die Teilnahmerate an Nachsorgeuntersuchungen mit 44,7% bzw. 65,3% noch deutlich unter dem von der WHO angestrebten 90%-Ziel lag.

Zusätzlich führten wir qualitative Interviews mit in den Einrichtungen beschäftigtem Gesundheitspersonal durch, um ihre Erfahrungen mit Therapie und Nachsorge kennenzulernen. Unsere Ergebnisse aus Interviews mit Patientinnen und medizinischem Personal legen nahe, dass viele der bekannten Hindernisse für die erstmalige Teilnahme am Gebärmutterhalskrebsscreening (u.a. niedriger sozio-ökonomischer Status, weiter Weg von zuhause zur Gesundheitseinrichtung) sich auch negativ auf die Einhaltung der Nachsorgeuntersuchungen auswirken. Zudem wurde uns wiederholt berichtet, dass Patientinnen ihre Nachsorgetermine vergessen und Erinnerungssysteme (z.B. Telefonanrufe oder SMS nahe am Nachsorgetermin) noch nicht ausreichend etabliert sind.

Stroetmann, Clara Yolanda: Therapie und Nachsorge von suspekten zervikalen Läsionen in ausgewählten Regionen in Äthiopien und Tansania, Halle (Saale), Univ., Med. Fak. Diss., 26 Seiten, 2025.

Inhaltsverzeichnis

Abkürzungen und Akronyme

CIN	–	Cervical intraepithelial lesion
HIC	–	*High income countries*
HIV	–	Humanes Immundefizienz-Virus
HPV	–	Humanes Papilloma-Virus
LEEP	–	*Loop electrosurgical excision*
LMIC	–	*Low and middle-income countries*
SVA	–	*Single-visit-approach*
VIA	–	Visuelle Inspektion mit Essigsäure
WHO	–	Weltgesundheitsorganisation

1. Einleitung und Zielsetzung

1.1 Gebärmutterhalskrebs – Inzidenz, Mortalität und Präventionsmöglichkeiten global

Als Harald zur Hausen 1976 postulierte, dass Gebärmutterhalskrebs durch humane Papillomaviren (HPV) mitverursacht wird, war das eine Sensation (1). Viren, die Krebs verursachen, waren bislang unbekannt. Dieser Zusammenhang war jedoch nicht nur ein theoretischer Durchbruch, für den er Jahre später den Medizinnobelpreis erhielt, sondern hatte auch unmittelbare Auswirkungen auf die Praxis. Ein Krebs, der durch eine Virusinfektion ausgelöst wird, kann durch eine Impfung verhindert werden. Das wurde in die Realität umgesetzt und so gibt es seit 2006 die Möglichkeit primärpräventiv gegen HPV zu impfen und damit Gebärmutterhalskrebs zu verhindern (2).

Zusätzlich zu der Verursachung durch Viren gibt es bei Gebärmutterhalskrebs noch eine weitere Besonderheit: der Krebs entwickelt sich meist langsam über mehrere Vorstufen (fakultative Präkanzerosen), dadurch ist er besonders geeignet für Screenings (3). Anfang des 20. Jahrhunderts entwickelten Wissenschaftler die ersten Screeningverfahren, Hinselmann die Kolposkopie und Papanicolau den Pap-Abstrich (4). Über die Zeit wurden noch weitere Screeningverfahren entwickelt, von denen ich die wichtigsten im Folgenden kurz vorstellen möchte:

A) **Zytologie-basierte Verfahren**: Dazu gehören die bereits erwähnten **Pap-Abstriche**, bei diesem Verfahren wird mit einer Bürste ein Zellabstrich des Gebärmutterhalses entnommen. Die Zellen werden auf einen Objektträger aufgetragen, dort werden sie fixiert und gefärbt und anschließend unter dem Mikroskop begutachtet. Als ältestes Screeningverfahren sind Pap-Abstriche in vielen Ländern mit hohem pro-Kopf Einkommen (HIC) etabliert und konnten in diesen die Inzidenz und Mortalität von Gebärmutterhalskrebs erfolgreich senken (5). Allerdings ist das Verfahren ressourcen-intensiv: es braucht entsprechende Laborkapazitäten und ausgebildete Patholog*innen – deswegen empfiehlt die Weltgesundheitsorganisation (WHO) für Länder, in denen noch kein Screeningprogramm etabliert ist, bevorzugt andere Verfahren (3).

   Eine neuere Entwicklung in diesem Bereich ist die **Liquid-based cytology**, bei der die entnommenen Zellen in einer Flüssigkeit suspendiert und dann in einem Labor weiterverarbeitet werden. Dies bietet einige Vorteile gegenüber den Pap-Abstrichen, da die Proben häufig eine bessere Qualität haben und die Analyse im Labor schneller geht (6). Allerdings ist auch dieses Verfahren sehr ressourcen-intensiv, da es ausgebildete Patholog*innen und Labormaterialien benötigt. (7)

B) **Visuelle Inspektion mit Essigsäure (VIA)**: Die visuelle Inspektion mit Essigsäure ist eine kostengünstige Screeningmethode, die nur geringe Ressourcen erfordert. Hierbei wird bei der Untersuchung mit Spekulum 5%ige Essigsäure auf die Zervix aufgetragen, verändertes Epithel färbt sich dabei weiß. Diese Methode ist jedoch nur anwendbar, wenn die Übergangszone sichtbar ist. Außerdem sind die gefundenen Läsionen relativ unspezifisch, ursächlich können maligne Veränderungen, Krebsvorstufen aber auch Entzündungen und Infektionen sein. Außerdem ist die Interpretation der Ergebnisse aktuell stark untersucherabhängig - das könnte sich jedoch in Zukunft durch den Einsatz von KI-gestützter Bildanalyse ändern (8). Ein weiterer Vorteil der VIA ist, dass Frauen mit auffälligen Läsionen bereits in derselben Untersuchung eine entsprechende Therapie erhalten können. Dieser Ansatz wird auch als *single-visit-approach* (SVA) bezeichnet. Ein entscheidender Vorteil des SVA ist, dass besonders viele auffällig gescreente Frauen eine Therapie erhalten. Besonders in Umgebungen mit begrenzten Ressourcen erweist sich diese Methode als eine vielversprechende Wahl und wird in diesen Settings von der WHO empfohlen (9).

C) **HPV-DNA-Tests**: HPV-DNA-Tests sind eine neuere Screeningmethode, die sich durch ihre hohe Sensitivität und Spezifität auszeichnet und dementsprechend laut WHO die Screeningmethode der ersten Wahl ist, wo immer möglich (9). Mit Hilfe einer kleinen Bürste wird dabei ein Abstrich der Zervix genommen und dieser wird im Labor auf HPV-DNA untersucht. Allerdings ist auch diese Methode ressourcenintensiv und die hohe Sensitivität könnte potenziell zu Überdiagnostik führen. Besonders in Ländern mit mittlerem/niedrigen pro Kopf Einkommen (LMIC) führt das zu Herausforderungen, da auch die Kapazitäten für Therapie und Nachsorge aller so auffällig gescreenten Frauen nicht immer vorhanden sind. Ein weiterer interessanter Aspekt dieser Screeningmethode besteht darin, dass durch Self-Sampling eine flexible Anwendung ermöglicht wird, was einen weiteren Schritt in Richtung Anwenderfreundlichkeit darstellen könnte (10).

Wenn Vorstufen von Gebärmutterhalskrebs erkannt werden, sind diese in der Regel gut behandelbar. Therapieoptionen in diesen Fällen sind Kryotherapie/Thermalablation (Anwendung von Kälte bzw. Wärme, um abnormale Zellen zu zerstören) und Konisation (chirurgische Entfernung eines kegelförmigen Gewebestücks zur Untersuchung und Behandlung mittels einer elektrischen Schlinge, eines Skalpells oder Laser).

Die Präventionsmöglichkeiten haben in vielen Ländern zu einer Abnahme der Inzidenz und der Mortalität von Gebärmutterhalskrebs geführt. Das ist zwar bereits ein riesiger Erfolg, allerdings kommt dieser bisher nicht allen Frauen weltweit gleichermaßen zugute. In vielen Settings mit weniger Ressourcen (z.B. Ländern in Subsahara-Afrika) sind Impfungen und Screenings noch

nicht so implementiert wie beispielsweise in Deutschland, was zu einer höheren Inzidenz und Mortalität des Krebses in diesen Ländern führt (11). Die altersadjustierte Inzidenzrate für 2022 liegt in Deutschland bei 7,1; in Äthiopien bei 22,3 und in Tansania bei 64,8 (12). Da die Inzidenz von Gebärmutterhalskrebs bei Frauen zwischen 50-54 Jahren am höchsten ist und die Bevölkerung von Äthiopien und Tansania durchschnittlich jünger ist als die deutsche, sind die Unterschiede in den rohen Inzidenzraten geringer (Deutschland 10,7; Äthiopien 13,5; Tansania 34,3) (11, 12). Allerdings steigt das Durchschnittsalter in beiden afrikanischen Ländern und auch einige Lebensstil-Risikofaktoren (z.B. Adipositas, Nikotinabusus) nehmen zu, so das abzusehen ist, dass das durch Gebärmutterhalskrebs verursachte Leid in diesen Regionen in den kommenden Jahren noch weiter zunehmen wird.

Im Jahr 2018 startete die WHO eine Initiative zur Elimination von Gebärmutterhalskrebs und proklamierte in diesem Zuge die sogenannten „90-70-90“-Ziele: bis 2023 sollen weltweit 90% der Mädchen bis zum Alter von 15 Jahren geimpft werden, 70% aller Frauen sollen mindestens im Alter von 35 und 45 Jahren auf Gebärmutterhalskrebs gescreent und 90% der Frauen mit positivem Screening und/oder Gebärmutterhalskrebs sollen adäquat behandelt werden (13). Diese Ziele sind sehr ambitioniert, beispielsweise ist auch Deutschland noch weit von einer 90%igen Impfquote entfernt – 2019 lag die bundesweite Quote für eine vollständige HPV-Impfserie mit zwei Impfdosen unter 15-jährigen Mädchen bei 47,2% (14, 15).

Eine 2024 im deutschen Ärzteblatt veröffentlichte Studie nahm für den Zeitraum von 2016-2018 einen Anteil von 39,9% vollständig gegen HPV-geimpfter 15-jähriger Mädchen in Deutschland an. Fokus ebendieser Studie lag auf der Untersuchung der Inzidenzraten von Zervixkarzinomen in Deutschland nach Einführung der HPV-Impfung. Obwohl die rohen Inzidenzraten stiegen, scheinen die Inzidenzraten in den geimpften Altersgruppen bereits zu sinken. Obwohl sich der absolute Effekt wohl erst in den nächsten Jahren einstellen wird, wenn die geimpften Kohorten in Altersgruppen mit höherem Zervixkarzinomrisiko kommen, sind diese Zahlen bereits jetzt eine gute Nachricht für die Primärprävention. (16)

1.2 Gebärmutterhalskrebs-Prävention in Äthiopien und Tansania

In Äthiopien wurde die erste nationale Leitlinie zur Prävention von Zervixkarzinomen 2015 veröffentlicht (17). Aktuell ist die zweite Auflage von 2021 gültig (18). Die einzige tansanische Leitlinie ist von 2010 (19).

Die Regierungen beider Länder und verschiedene Nichtregierungsorganisationen setzen sich dafür ein, die Verfügbarkeit von HPV-Impfstoffen zu verbessern und öffentlichkeitswirksame Kampagnen durchzuführen, um das Bewusstsein für die Erkrankung, die Impfraten und die

Bereitschaft zur Teilnahme an Screenings zu erhöhen. In Äthiopien wurde die erste nationale Impfkampagne 2018 gestartet (18). Ein Review von 2023 fand eine Impfrate von circa 42% unter äthiopischen Mädchen (20).

Die Standard-Screeningmethode in Äthiopien ist die VIA, in Tansania werden außerdem auch Pap-Abstriche angeboten. In beiden Ländern bieten neuerdings einige Gesundheitseinrichtungen auch HPV-DNA-Tests an, vorwiegend für HIV-positive Frauen. Das äthiopische Gebärmutterhalskrebs-Screening-Programm wurde erstmalig 2009 im Rahmen des *Pathfinder*-Projekts (https://www.pathfinder.org/countries/africa/ethiopia/) eingeführt und konzentrierte sich damals auf HIV-positive Frauen (21). Auch in Tansania standen HIV-positive Frauen zunächst im Fokus, da diese zum einen bereits an HIV-Kliniken angebunden waren und zum anderen ein erhöhtes Risiko für Gebärmutterhalskrebs haben. Im Anschluss wurden die Screeningprogramme in beiden Ländern auf HIV-negative Frauen ausgeweitet und stehen nun in Gesundheitseinrichtungen landesweit zur Verfügung.

In Äthiopien wird empfohlen, dass HIV-negative Frauen alle 5 Jahre und HIV-positive Frauen alle 2 Jahre gescreent werden (18). Die tansanische Leitlinie empfiehlt ein jährliches Screening HIV-positiver Frauen und ein dreijähriges Screening HIV-negativer Frauen (19).

Obwohl die Teilnahme am Gebärmutterhalskrebs-Screening in beiden Ländern in den letzten Jahren gestiegen ist, sind die Screeningraten noch recht niedrig. In Äthiopien wurden bisher nur etwa 15% aller Frauen zwischen 30-49 Jahren mindestens einmal gescreent (22, 23). Daraus folgend schätzt die äthiopische Regierung, dass ungefähr 9,98 Millionen äthiopische Frauen aktuell ein Screening benötigen (18). Basierend auf den Daten der letzten *Demographic and Health* Studie in Tansania waren nur 12,8% der befragten Frauen bereits gescreent worden, unter Frauen mit HIV oder arterieller Hypertension war der Anteil etwas höher (28,5%) (24).

Die Screening-Empfehlungen der WHO sowie die Screening-Praxis in Äthiopien, Tansania und Deutschland sind in *Abbildung 1.* dargestellt. Für Deutschland wurden die Algorithmen vereinfacht wiedergegeben, eine detaillierte Übersicht dazu bieten beispielsweise Matovina et al (25). Im Vergleich fällt auf, dass auch in Deutschland das primäre Screening mit HPV nicht etabliert ist, was daran liegt, dass HPV-Tests insbesondere bei jungen Frauen häufig positiv sind, ohne dass Krebsvorstufen vorliegen. Deswegen sollte sich an ein positives HPV-Testergebnis ein Triagetest anschließen. (3)

WHO-Empfehlungen Ideal: primär HPV-Test, dann Triage In Settings mit weniger Ressourcen auch VIA oder Pap-Abstriche In Ländern mit etablierten Pap-basierten Screeningprogrammen können diese fortgeführt werden		
Äthiopien	**Tansania**	**Deutschland**
VIA (alternativ Pap-Abstriche v.a. im privaten Sektor)	VIA oder Pap-Abstrich	Jährlich Pap-Abstriche, ab 35 zusätzlich alle 3 Jahre HPV-Test
Wenn möglich, ablative Therapie im SVA, sonst Überweisung an höhere Ebenen des Gesundheitssystems	Wenn möglich, ablative Therapie, sonst Überweisung an höhere Ebenen des Gesundheitssystems	Bei auffälligem Pap-Abstrich: HPV-Test und/oder Kolposkopie, weitere Abklärung

Abbildung 1. Gebärmutterhalskrebsscreening: WHO-Empfehlung u nd deren praktische Umsetzung in Äthiopien, Tansania und Deutschland (vereinfacht)

1.3 Gründe für niedrige Screening-Raten & Concept of Access

Die niedrigen Teilnahmeraten am Gebärmutterhalskrebs-Screening in Äthiopien und Tansania können auf verschiedene Gründe zurückgeführt werden, welche sich nach dem erweiterten *Concept of Access* (26, 27) in 6 Kategorien einteilen und somit systematisch beschreiben lassen.

1. **Availability (Verfügbarkeit)**: Dazu zählt die Bereitstellung von ausreichend vielen Screeningzentren, die mit entsprechend geschulten Fachkräften und allen benötigten Materialien ausgestattet sind. Aktuell wird das Screening in rund 1.000 Zentren in ganz Äthiopien angeboten. Das letzte „Service availabilitiy and readiness"-Assessment zeigte Mängel in der Ausstattung mit Essigsäure, Spekula, Leitlinien und geschultem Personal (28, 29).
2. **Awareness (Bewusstsein)**: Wenn Screenings verfügbar sind, sollte die Bevölkerung auf die Notwendigkeit der Screenings und auf die entsprechenden Orte/Einrichtungen aufmerksam gemacht werden (29).
3. **Accessibility (Zugänglichkeit)**: Die Frauen sollten fähig sein leicht auf Gesundheitsdienste zuzugreifen. Dies umfasst Aspekte wie die geografische Nähe von Gesundheitseinrichtungen, finanzielle Zugänglichkeit und kulturelle Sensibilität.
4. **Affordability (Bezahlbarkeit)**: Die Screenings einschließlich der Therapie (prä-)kanzeröser Läsionen und ggf. weiterer benötigter Diagnostik sollten für die breite Bevölkerung erschwinglich sein. In Äthiopien wird die Früherkennung von Gebärmutterhalskrebs im

Rahmen der Grundversorgung in öffentlichen Gesundheitseinrichtungen grundsätzlich kostenlos angeboten, zum Teil können jedoch Kosten für notwendiges Material wie bspw. Handschuhe oder Händedesinfektion entstehen. Außerdem gibt es indirekten Kosten, also Kosten die entstehen, z.B. weil die Frau am Tag des Screenings nicht zur Arbeit gehen kann (insb. bei langen Fahrtwegen). Neben den öffentlichen Gesundheitseinrichtungen bieten auch private Gesundheitseinrichtungen Screenings an – diese müssen bezahlt werden, zum Teil sind gegen Gebühr auch Zytologie- und HPV-Tests verfügbar.

5. **Accommodation/Adequacy (Angemessenheit)**: Die Terminvergabe, die Öffnungs- und Wartezeiten sollten angemessen sein und Patientinnen sollten in der Lage sein Kontakt zu dem ärztlichen Personal aufzunehmen.
6. **Acceptability (Akzeptanz)**: Die Einrichtung der Gesundheitseinrichtung und die Nachbarschaft sollten akzeptabel sein, so dass sich die Patientinnen wohl fühlen können.

1.4 Therapie von suspekten zervikalen Läsionen

Wie bereits erwähnt, ist einer der Vorteile der VIA, dass die Therapie von essigweißen Läsionen mittels Kryotherapie/Thermoablation noch während des Screenings möglich ist. Dieser SVA wird sowohl in Äthiopien als auch in Tansania empfohlen. Frauen mit größeren oder malignom-suspekten Läsionen sollten zu einem Krankenhaus weitergeleitet werden, wo entweder eine LEEP oder die entsprechende weitere Diagnostik erfolgen kann. Da in Tansania auch Pap-Abstriche regelmäßig verwendet werden und bei diesen kein SVA möglich ist, ist es dort häufiger, dass Frauen für die Therapie ein erneutes Mal in die Gesundheitseinrichtung kommen müssen. (18)

Es gibt verschiedene Gründe aus denen Frauen mit suspekten Läsionen keine Therapie erhalten: In einigen Einrichtungen mangelt es an den für die Therapie benötigten Ressourcen – für die Kryotherapie ist das insbesondere Gas, für die thermische Ablation eine ausreichende Stromversorgung. Bietet eine Einrichtung beide Therapieoptionen an, so ermöglicht das einen Umstieg auf das jeweils andere Therapieverfahren bei Knappheit einer Ressource. Beide Methoden erfordern außerdem qualifiziertes Fachpersonal, um eine sichere und effektive Anwendung zu gewährleisten. Das Vorhandensein von gut ausgebildetem Personal ist daher entscheidend, um den Erfolg und die Verfügbarkeit beider Therapieoptionen sicherzustellen. (21)

Kann die Therapie aus den genannten Gründen an einem bestimmten Tag nicht durchgeführt werden, werden die betroffenen Frauen in der Regel gebeten an einem anderen Tag zurückzukommen oder zu einer anderen Einrichtung zu gehen. Dadurch kommen nicht alle

Frauen zu der Therapie. Die Adhärenzraten sind unklar, die Studie von Shiferaw et al berichteten in Äthiopien von einer Therapieadhärenz von über 90%, ob das aber außerhalb von Projekten der Realität entspricht ist fraglich (21). Eine ähnliche Zahl ergab eine retrospektive Studie aus Tansania: hier erhielten über einen Zeitraum von 8 Jahren 91.1% der Frauen, die mit Kryotherapie behandelt werden konnten, diese auch (30).

Eine weitere Ursache dafür, dass Frauen möglicherweise keine Therapie in Anspruch nehmen, besteht natürlich darin, dass sie die Behandlung ablehnen können. In solchen Fällen spielt eine umfassende Beratung eine entscheidende Rolle, wobei besonders auf einfühlsamen Umgang mit Ängsten, beispielsweise vor möglichen Schmerzen während einer Kryotherapie, geachtet werden sollte. Zusätzlich kann die Empfehlung, nach der Therapie für sechs Wochen auf sexuelle Aktivitäten zu verzichten oder Kondome zu verwenden, Frauen abschrecken, auch hier ist eine sensible Beratung sinnvoll. In einigen Fällen möchten Frauen vor einer Zustimmung zur Therapie mit ihren Ehemännern, Partnern oder Familienangehörigen darüber sprechen. Das birgt jedoch leider auch das Risiko, dass sie nicht zurückkehren, sei es, weil es vergessen wird oder aufgrund erneut entstehender (Fahrt-)Kosten oder aus anderen Gründen. In diesem Kontext spielt das Bewusstsein des nahen Umfelds für Gebärmutterhalskrebsprävention eine entscheidende Rolle, weshalb gezielte Aufklärungskampagnen, die sich explizit auch an Männer richten, initiiert werden. Zusätzlich gibt es medizinische Gründe, die gegen einen SVA sprechen können, darunter akute Infektionen mit sexuell übertragbaren Krankheiten oder eine Schwangerschaft.

1.5 Nachsorge und Risiko von wiederkehrenden/bleibenden Läsionen

Allen Patientinnen, die wegen einer präkanzerösen Läsion behandelt wurden, wird geraten ein Jahr nach der Behandlung zu einer Nachsorgeuntersuchung zurückkehren, da einige dieser Läsionen bestehen bleiben oder nach der Behandlung erneut auftreten (9, 18). Laut der WHO-Leitlinie sind ablative Therapien von präkanzerösen Läsionen in etwa 10% der Fälle nicht von dauerhaftem Erfolg – verlässliche Studien über die Versagensraten fehlen jedoch immer noch und ein höherer Wert des Risikos eines Versagens bei HIV-positiven Frauen wird diskutiert (9).

Die Datenlage zur Einhaltung der Leitlinienempfehlungen nach VIA-positiven Screenings ist für Äthiopien unzureichend. Die Etablierung von Zervixkarzinomscreenings in Äthiopien durch das Pathfinder-Programm wurde wissenschaftlich begleitet. In diesem Projekt nahmen 51% der Frauen, die eine Therapie für eine VIA-positive Läsion erhalten hatten, an einem Nachsorgescreening teil. Dabei fielen jedoch gravierende Unterschiede zwischen den Regionen auf (29,8% Teilnahme an der Nachsorge in Addis Abeba vs 81,1% in Tigray) (21). In einer anderen,

aktenbasierten Studie kehrten nur 27,9% der Patientinnen für ihre Nachuntersuchung ein Jahr später zurück (31).

In Tansania gibt es eine Studie über ein 2015 durchgeführtes Projekt, in dem 81% aller Frauen an einem Nachsorgescreening nach 14 Monaten teilnahmen. In der Studie wurden verschiedene Gruppen mit unterschiedlichen Erinnerungsmethoden ans Screening gebildet: einige Frauen erhielten telefonische Erinnerungen, andere Besuche durch eine Pflegekraft bei ihnen zu Hause und wieder andere wurden zu Hause gescreent. (32)

Die Gründe für die Nichtteilnahme an der Nachsorge wurden in all diesen Studien nicht strukturiert untersucht. Zu erwarten ist eine bestimmte Überschneidung mit den bekannten Barrieren zum Screening:

1. **Availability (Verfügbarkeit)**: Alle Einrichtungen, die Gebärmutterhalskrebsscreenings anbieten, bieten auch die Nachsorgeuntersuchungen an. Hierzu sind keine zusätzlichen Materialien notwendig. Jedoch entsteht ein strukturelles Hindernis eventuell durch die teils mangelhafte Zuordnung von Patientenkarten/-IDs zu vorherigen Screenings, weshalb möglicherweise nicht alle Nachsorgeuntersuchungen als solche dokumentiert werden und der Vergleich mit früheren Screeningergebnissen erschwert sein kann.
2. **Awareness (Bewusstsein)**: Die betroffenen Frauen und das Gesundheitspersonal müssen sich der Empfehlungen zu Nachsorgeuntersuchungen bewusst sein. Hier spielen regelmäßige Fort- und Weiterbildungsmöglichkeiten für das Gesundheitspersonal und eine ausführliche Beratung von Frauen mit präkanzerösen Läsionen eine besondere Rolle.
3. **Accessibility (Zugänglichkeit)** & **Affordability (Bezahlbarkeit)** & **Accommodation (Angemessenheit)** & **Acceptability (Akzeptanz)**: Frauen, die beim ersten Besuch gute Erfahrungen in diesen Bereichen gemacht haben, erwarten im zweiten Besuch keine zusätzlichen Hindernisse, allerdings können die erneut anfallenden (Fahrt-)Kosten auch bei der Nachsorge ein Zugangshindernis darstellen.

1.6 Hierarchische Gliederung der Gesundheitssysteme in Äthiopien und Tansania

Die Gesundheitssysteme in Tansania und Äthiopien sind hierarchisch strukturiert, um Gesundheitsdienste flächendeckend bereitzustellen, wobei beide Länder sich an einem pyramidenförmigen Modell orientieren. Diese Hierarchie möchte ich zum tieferen Verständnis kurz darstellen:

In beiden Ländern bilden lokalen Gesundheitszentren und -stationen die Basis. Diese Einrichtungen bieten Grundversorgung und einfache Behandlungen an und werden häufig von ausgebildeten Krankenpfleger*innen oder *Health Officers* (eine Ausbildung zwischen Arzt und

Krankenpflege) betreut. Ärzt*innen sind auf dieser Ebene nicht oder nicht immer anzutreffen. Auf der nächsten Stufe befinden sich die Bezirkskrankenhäuser, die spezialisierte Dienste wie Geburtshilfe, Chirurgie und Präventionsprogramme anbieten.

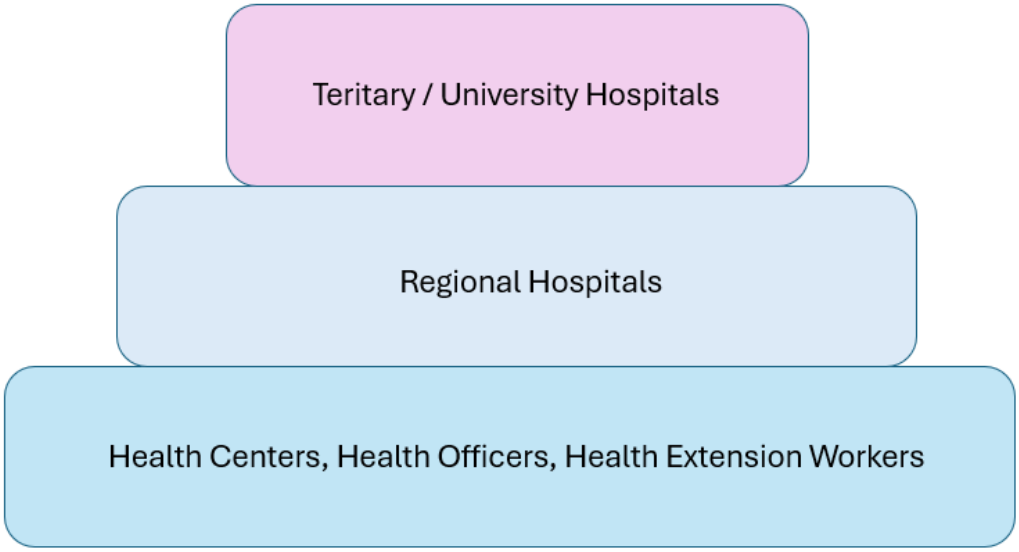

Abbildung 2. Hierarchische Struktur der Gesundheitssysteme in Äthiopien und Tansania

Die lokalen Gesundheitszentren erlauben durch ihre dezentralen Angebote einen niedrigschwelligeren Zugang zum Gesundheitssystem insbesondere in ländlichen Regionen, ihre diagnostischen und therapeutischen Möglichkeiten sind aber begrenzt, so dass ihnen eine Triagefunktion zukommt. Sie sollen Menschen mit weiterem medizinischem Bedarf an Bezirkskrankenhäuser weiterleiten. Regional- und Referenzkrankenhäuser, die sich meist in urbanen Zentren befinden, bilden die Spitze des Systems und übernehmen komplexere Fälle.

Wie bereits erwähnt finden Gebärmutterhalskrebsscreenings auf allen Ebenen des Gesundheitssystems statt, als flächendeckende Anbieter sind aber insbesondere die lokalen Gesundheitszentren relevant. Sowohl in Tansania als auch in Äthiopien sollten lokale Gesundheitszentren, in welchen Gebärmutterhalskrebsscreening angeboten wird, wenn möglich auch lokale Therapiemöglichkeiten (insbesondere Kryotherapie oder thermale Ablationen) anbieten. Bei Läsionen, für diese Therapien nicht in Frage kommen oder falls weitere Diagnostik erfolgen soll, sollen die Frauen an die höheren Ebenen des Gesundheitssystems weitergeleitet

werden (vgl. Abbildung 3). Für ein funktionsfähiges Screeningprogramm ist also die Vernetzung zwischen den einzelnen Akteuren essenziell.

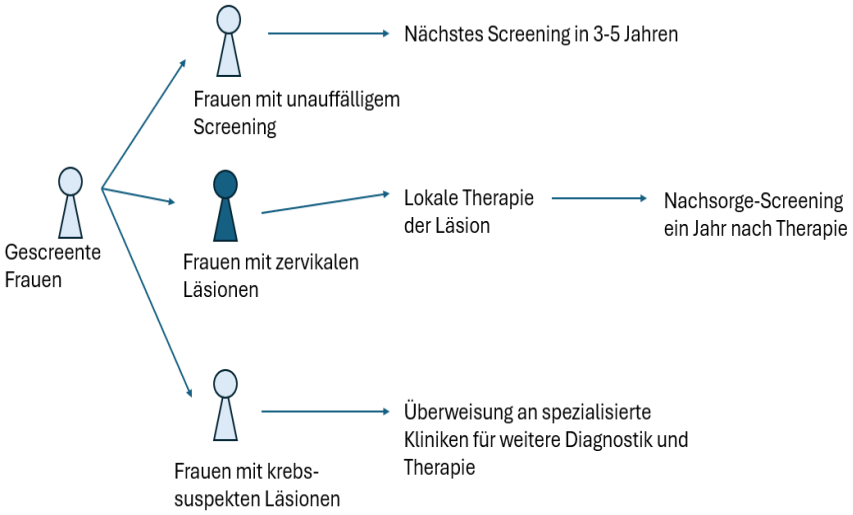

Abbildung 3. Nachsorgeempfehlungen nach initialem Gebärmutterhalskrebsscreening in Abhängigkeit vom Screeningergebnis

1.7 Zielsetzung

In unseren Studien fokussierten wir uns auf die Frauen, die im Gebärmutterhalskrebsscreening eine zervikale Läsion aufwiesen (in Abbildung 1. dunkelblau hinterlegt). Mit Hilfe qualitativer und quantitativer Methoden, wollen wir uns der Beantwortung der folgenden Fragen annähern:

1. Wie viele der Frauen mit suspekten zervikalen Läsionen in den untersuchten Gesundheitszentren in Äthiopien und Tansania bekommen eine adäquate Therapie?

2. Wie viele der Frauen mit suspekten zervikalen Läsionen in den untersuchten Gesundheitszentren in Äthiopien und Tansania erhalten ihre Therapie am Tag des Screenings (= Single-Visit-Approach)?

3. Wie viele der aufgrund von suspekten zervikalen Läsionen therapierten Frauen kommen ein Jahr später zur Nachsorgeuntersuchung?

4. Welche Gründe für die Nicht-Teilnahme an Nachsorgeuntersuchungen gaben Patientinnen und Gesundheitspersonal an?

5. Welche möglichen Interventionen wurden von Patientinnen und Gesundheitspersonal genannt, um zukünftig die Teilnahme an Nachsorgeuntersuchungen zu erhöhen?

6. Wie sind die Erfahrungen des Gesundheitspersonals mit telefonischen/persönlichen/digitalen Erinnerungen an Nachsorge-Termine?

2. Diskussion

Wir untersuchten die Therapietreue und Adhärenz zu Nachsorgeuntersuchungen von Frauen mit auffälligem Gebärmutterhalskrebsscreening in ausgewählten Regionen von Äthiopien und Tansania. Dabei berücksichtigten wir Screening-Logbuch-Einträge und Angaben aus Telefoninterviews mit den Patientinnen. Außerdem identifizierten wir im Gespräch mit Patientinnen und Gesundheitspersonal Hindernisse zur Teilnahme an Therapie und Nachsorge von suspekten zervikalen Läsionen.

2.1 Erfahrungen mit der Therapie von suspekten zervikalen Läsionen

In unserer Studie in Äthiopien erhielten 90,4 % von allen 741 VIA-positiven Patientinnen eine Therapie (meist Kryotherapie im SVA) – das Behandlungsziel der WHO wurde erreicht. Weitere Studien aus Äthiopien, berichten ebenfalls von einer hohen Therapietreue (28). In der tansanischen Studie war der Erhalt der Therapie bereits ein Einschlusskriterium, weshalb wir hier keine Aussage zur Therapieadhärenz treffen können.

Die hohe Therapieadhärenz ist sicherlich zum Teil dem SVA zu verdanken, welcher in unseren Studien in Äthiopien zu 83% und in Tansania zu 47,5% befolgt wurde. In Äthiopien konnten wir auch beobachten, dass Frauen, denen eine Therapie an einem anderen Tag empfohlen wurde, und insbesondere jene, die an andere Gesundheitseinrichtungen überwiesen wurden, öfter keine Therapien erhielten. In einigen Fällen konnte bei der erneuten Untersuchung keine therapiebedürftige Läsion mehr festgestellt werden, es könnte also eine Übertherapie verhindert worden sein.

Insgesamt lässt sich sagen, dass erfreulicherweise ein Großteil der auffällig gescreenten Frauen eine Therapie erhielt. Um eine möglichst hohe Therapieadhärenz zu ermöglichen, sollten alle Gesundheitseinrichtungen, die Gebärmutterhalskrebsscreenings durchführen, auch die entsprechenden Therapien vor Ort anbieten können und bei notwendigen Überweisungen möglichst eng mit den höheren Stufen des Gesundheitssystems zusammenarbeiten, sodass Zugangsbarrieren abgebaut werden.

2.2 Adhärenz zu Nachsorgeuntersuchungen

In unseren Studien nahmen in Äthiopien 44,7% und in Tansania 65,3% der therapierten Patientinnen an einer Nachsorgeuntersuchung ein Jahr später teil. Bisher gibt es in Sub-Sahara Afrika nur wenige Studien, die diese Fragestellung in den Blick nahmen. Unsere Ergebnisse sind vergleichbar mit einer Studie aus Uganda, in welcher 76,2% der Frauen nicht an der Nachsorge teilnahmen (33). Im Gegensatz dazu fand die tansanische CONCEPT-Studie eine sehr hohe Teilnahmequote (81%) an Nachsorgescreenings, wobei in dieser Studie Erinnerungsanrufe und

Selbstentnahmemethoden zentrale Rollen spielten (32). Ein Review von 2023 betrachtete 27 Studien aus *high-income countries* und fand auch in diesen ein inadäquate Nachsorgeadhärenz, und eine große Spannweite zwischen den eingeschlossenen Studien von 4-75%. Außerdem wurden in diesem Review 41 verschiedene Faktoren mit Einfluss auf die Nachsorgeadhärenz gefunden, unter anderem niedriger Bildungsstand und niedriger sozioökonomischer Status (34). Auch in unseren Studien beschäftigten uns die Gründe für die Nichtteilnahme an Nachsorgeuntersuchungen, auf welche ich in den nächsten Abschnitten noch detaillierter eingehen möchte.

Um die Relevanz der Nachsorgeuntersuchungen einschätzen zu können, ist natürlich auch die Rate auffälliger Ergebnisse der Nachsorgeuntersuchung interessant. In unserer äthiopischen Studie sind uns von den 300 vorgenommenen Untersuchungen in 200 Fällen die Ergebnisse bekannt – diese waren zu 83,8 % VIA-negativ; in Tansania waren alle 143 Nachsorge-Ergebnisse bekannt und davon 83,2% negativ. Damit liegen die Ergebnisse unserer Studien sehr nah beieinander und etwas über den von der WHO vermuteten 15% Therapieversagen. Eine genauere Analyse könnte untersuchen, ob bestimmte Faktoren wie das Alter, der HIV-Status oder der allgemeine Gesundheitszustand der Frauen die Wahrscheinlichkeit für ein negatives Ergebnis nach der Kryotherapie beeinflussen. Bei unzureichender Datenlage hat die WHO wiederholt Studien zum Einfluss des HIV-Status auf wiederkehrende Läsionen empfohlen. Auch zu dem optimalen Zeitpunkt der Nachsorge gibt es noch Forschungsbedarf, da dieser möglicherweise die Erkennungsrate beeinflusst und Rückschlüsse auf das Fortschreiten von Läsionen zulässt. Außerdem könnten Nachsorgetermine, die zeitlich näher am initialen Screening liegen, mit einer höheren Teilnahme verbunden sein.

2.3 Gründe für Nicht-Teilnahme an Nachsorgeuntersuchungen

Adäquate Beratung und Erinnerungssysteme

Wie in der Einleitung unter dem Aspekt der *Awareness* beschrieben, geraten die empfohlenen Nachsorgeuntersuchungen oft in Vergessenheit. Dieses Problem lässt sich durch verschiedene Maßnahmen minimieren: Zum einen sollte während des ersten Termins eine angemessene Beratung, einschließlich einer Erklärung zur Relevanz der Nachuntersuchung, erfolgen; zum anderen könnten Erinnerungssysteme in zeitlicher Nähe zur Nachsorgeuntersuchung implementiert werden.

Während der ersten Untersuchung sollten die Gründe für die Nachsorge verständlich erklärt werden. In unseren Studien berichteten 19,7 % der äthiopischen Frauen, dass ihnen keine Empfehlung zur Teilnahme an einem Nachsorgescreening gegeben wurde. Aufgrund der

Telefoninterview-Methode mit teils großem zeitlichem Abstand zum initialen Screening sowie des Effekts sozialer Erwünschtheit – also der Tendenz, Antworten gemäß erwarteter Normen zu geben – ist jedoch anzunehmen, dass tatsächlich mehr Frauen zur Nachsorge aufgefordert wurden. Allerdings wurde auch in den Tiefeninterviews mit Gesundheitspersonal die unzureichende Beratung immer wieder als Problem thematisiert. Außerdem kann das Gespräch beim initialen Screening eine Chance sein, Ängste zu nehmen und Lösungen für Zugangsbarrieren zum Gesundheitssystem anzubieten (35).

Des Weiteren gaben 6,6% der äthiopischen ohne Nachsorgescreening an, den Termin vergessen zu haben. In Äthiopien ist der Standard, dass Frauen eine Erinnerungskarte erhalten (also einen Zettel mit ihrem Namen und dem Datum, an dem sie zur Nachsorge erscheinen sollen), für diese gibt es eine Vorlage im Anhang der aktuellen Leitlinie. In unserer Studie erhielt die überwiegende Mehrheit (80,3%) der befragten Frauen so eine Karte. Allerdings können diese Karten leicht verloren gehen und erfordern, dass sich die Frauen sowohl an deren Erhalt als auch an den darauf vermerkten Termin eigenständig erinnern. In beiden Ländern gibt es auch Erfahrungen mit *Patient Navigators* und *Health Extension Workers*, also zusätzliches Gesundheitspersonal, dass Frauen an Termine erinnert, sie eventuell zu Hause oder in Einrichtungen des öffentlichen Lebens aufsucht. Diese Art der Erinnerung ist zwar wirkungsvoll, aber auch sehr personal- und kostenintensiv.

Effektivere Erinnerungsmöglichkeiten bestehen aus Anrufen oder SMS (36). Studien haben gezeigt, dass diese beiden Methoden in der Lage sind das Einhalten der Nachuntersuchungen auch in ressourcenarmen Umgebungen erfolgreich zu steigern (37). In unserer Stichprobe erhielten 28,2% der äthiopischen Frauen solche Erinnerungsanrufe, in Tansania werden Erinnerungsanrufe außerhalb von Pilotprojekten noch nicht durchgeführt. Erinnerungs-Textnachrichten spielen in der äthiopischen und tansanischen Regelversorgung (noch) keine Rolle. Eine aktuelle Studie aus Tansania konnte außerdem durch den Versand von Nachrichten keine höhere Teilnahme an der Nachsorge erreichen (38).

Auf dem Weg zur erfolgreichen, regelhaften Implementierung effektiver Erinnerungssysteme gibt es in beiden Ländern diverse Hindernisse:

- In allen Fällen muss eine gute Dokumentation der Frauen mit Bedarf für Nachsorge vorliegen. Digitale Systeme könnten das Tracking erleichtern, aber bisher wird vielerorts noch auf Papier dokumentiert. Im Anhang der äthiopischen Leitlinien findet sich eine Druckvorlage für ein Dokument, auf dem nur Frauen mit die einen Nachsorge benötigen mit

Kontaktdaten und-Termin vermerkt werden können. Jedoch wird dies nicht in allen Kliniken in einer angemessenen Qualität geführt oder regelmäßig durchgesehen.

- Persönliches Aufsuchen ist sehr personal-, zeit- und kostenintensiv und daher in Deutschland keine praktikable Option. In Äthiopien wird dies teilweise genutzt, jedoch sind die genannten Herausforderungen auch hier relevant und telefonische/digitale Erinnerungen werden bevorzugt eingesetzt.
- Lücken in der Strom- und Internetinfrastruktur spielen in der Bevölkerung, aber auch in den Gesundheitseinrichtungen, eine entscheidende Rolle.
- Häufig wechselnde Handynummern limitieren die Erreichbarkeit von Frauen über Telefon/SMS. Geteilte Handys werfen zusätzlich Probleme des Datenschutzes auf.

Barrieren im Gesundheitssystem und deren Zusammenhang mit soziodemographischen Faktoren

In unserer Studie in Äthiopien zeigten Alter, Bildungsniveau, wahrgenommene Barrieren in Gesundheitseinrichtungen und die Verwendung von Erinnerungen einen Zusammenhang mit der Adhärenz zu Nachsorgeuntersuchungen. In Tansania zeigten sowohl das Nichtwissen um die Gründe für die Nachsorgeuntersuchung als auch wahrgenommene Barrieren in Gesundheitseinrichtungen einen negativen Einfluss auf die Teilnahme an der Nachsorge. In den Tiefeninterviews mit Gesundheitspersonal wurden gleichsam verschiedene sozioökonomische Faktoren als patientenbezogene Hindernisse für die Einhaltung des Nachsorge-Screenings diskutiert.

Das Konzept der *Health Literacy* stellt eine Verbindung zwischen soziodemographischen Faktoren und Gesundheitsverhalten her. Dabei bezeichnet *Health Literac*y die Fähigkeit, Gesundheitsinformationen zu finden, zu verstehen und anzuwenden, um fundierte Entscheidungen zur eigenen Gesundheit zu treffen. Menschen mit höherer *Health Literacy* können Gesundheitsinformationen besser verstehen und anwenden, was zu besseren Gesundheitsentscheidungen führt – im Falle unserer Studien zum Beispiel zu der Einhaltung des Nachsorgescreenings. Die *Health Literacy* ist dabei abhängig von soziodemographischen Faktoren wie bspw. Bildungsstand, Alter und Geschlecht, aber auch von den angebotenen Informationen und der Angepasstheit der Beratungsangebote. Durch gute Beratung kann die *Health Literacy* gesteigert werden. (39)

Ein weiterer in diesem Zusammenhang genannter Aspekt ist, dass Frauen, die sich nicht krank fühlten, oft keinen Grund sahen die Gesundheitszentren für die Nachsorge erneut aufzusuchen. In den Tiefeninterviews wurde diese Einstellung oft mit fehlendem Bewusstsein für

Gebärmutterhalskrebs und für Prävention generell in Verbindung gebracht – welches wiederum durch die *Health Literacy* und die angebotenen Informationen beeinflusst wird.

Auch die geografische Lage des Wohnorts zur Gesundheitseinrichtung spielt eine Rolle für die Adhärenz zur Nachsorge – je weiter die Entfernung, desto höher sind in der Regel Transportkosten und Wegzeiten. Auch in einer Studie in Honduras wurde die Entfernung von der Klinik als Hindernis für die Einhaltung der Nachsorgeuntersuchungen erwähnt (37). In unserer Studie in Äthiopien wurden außerdem häufige Wohnortwechsel (u.a. bei Saisonarbeiterinnen) als ein Hindernis zur Nachsorge besprochen.

Unterschiede in den Perspektiven von medizinischem Personal und Patientinnen

Das Gesundheitspersonal diskutierte den Einfluss der Ehemänner auf das Gesundheitsverhalten der Patientinnen. Sie wurden als Hindernisse genannt, da sie die Empfehlung einer sechswöchigen sexuellen Abstinenz nach der Behandlung nicht befürworteten; aber auch als Quellen der Unterstützung erwähnt, etwa als Ermutigung zur Nachsorge, als Angebot emotionaler Unterstützung, bei der Aufrechterhaltung der Abstinenz nach der Behandlung und als Quelle bei der Überwindung von Transporthindernissen. (40, 41)

Lange Wartezeiten für Patientinnen, die zum Screening kommen, wurde sowohl von den Patientinnen selbst als auch vom Gesundheitspersonal als Hindernis wahrgenommen. In den Tiefeninterviews mit dem Personal stellte sich jedoch heraus, dass diese Wartezeiten oft weniger durch einen großen Andrang zum Screening entstehen, sondern eher durch zu wenig Personal in der entsprechenden Abteilung. Häufig ist nur eine Person in einem Health Center für das Screening geschult und wenn diese krank oder mit anderen Aufgaben beschäftigt ist, können in diesen Zeiten keine Screenings stattfinden. Viele Fachkräfte erzählten uns, dass sie in anderen Teilen des Krankenhauses aushelfen müssen, insbesondere während der Corona-Zeit. So kann es auch passieren, dass Frauen zum Screening oder zu ihrer Nachuntersuchung kommen und keine Untersuchung durchgeführt werden kann oder die Abteilung an dem Tag geschlossen ist.

2.4 Stärken und Limitationen unserer Studien

Die Kombination aus quantitativen und qualitativen Methoden erlaubte es uns, Barrieren auf dem Weg zur Nachsorgeuntersuchung aus vielfältigen Perspektiven zu erfassen. Für die quantitative Auswertung kombinierten wir Informationen aus Telefoninterviews und Logbüchern, um eine möglichst verlässliche Datenbasis herzustellen.

Die in der äthiopischen Studie eingeschlossenen Regionen (Addis Abeba und Oromia) unterscheiden sich stark voneinander und bilden so Teile der ländlichen sowie der städtischen Bevölkerung ab. In der tansanischen Studie wurde ein Großteil der Fälle an einem

Tertiärkrankenhaus gesammelt, was dazu führte, dass vor allem der Einzugsbereich dieses Krankenhauses repräsentiert ist und mehr HIV-positive Frauen in der Stichprobe sind als zu erwarten gewesen wären.

In Bezug auf die befragten Patientinnen besteht ein Selektionsbias, da die Telefoninterviews nur mit jenen durchgeführt werden konnten, die Zugang zu einem funktionsfähigen Telefon mit einer korrekt registrierten Telefonnummer hatten. Die Teilnahme an den Telefoninterviews fiel insbesondere in der tansanischen Studie gering aus. In Äthiopien führten höhere Teilnahmeraten in Addis Abeba zu einer Unterrepräsentation der ländlichen Gebiete. Da der fehlende telefonische Kontakt zwischen Gesundheitssystem und Patientinnen Teil der tatsächlichen Situation ist, gehen wir davon aus, dass unsere Rücklaufquoten bei den Telefoninterviews dieses Problem widerspiegeln.

Eine besondere Stärke unserer Studien ist, dass viele Aspekte der Nachsorge unabhängig von der genutzten Screeningmethode relevant bleiben und eventuell sogar auf weitere Erkrankungen übertragbar sein könnten. Allerdings ist die Häufigkeit der Persistenz bzw. des Wiederauftauchens der präkanzerösen Läsionen noch nicht ganz ermittelt, wodurch es schwer ist den Einfluss der Nachsorge auf die Mortalität exakt abzuschätzen.

2.5 Fazit und Ausblick

Die Adhärenz zu Therapie und Nachsorge nach auffälligen Gebärmutterhalskrebsscreenings ist entscheidend, um die übergeordneten Präventionsziele zu erreichen: die Verringerung der Inzidenz und Mortalität von Gebärmutterhalskrebs. Erfreulicherweise zeigen unsere Studien, dass in Tansania und Äthiopien der Großteil der Frauen mit zervikalen Läsionen eine Behandlung erhält, viele sogar am Tag des Screenings. Dennoch besteht hinsichtlich der Teilnahme an der empfohlenen Nachsorge Verbesserungsbedarf.

Zahlreiche Barrieren, die den Zugang zu initialen Gebärmutterhalskrebsscreenings erschweren, beeinträchtigen auch die Teilnahme an Nachsorgeuntersuchungen. Dementsprechend wäre es sinnvoll, den Zugang zu Screening-Programmen zu verbessern, um die Beteiligung an Nachsorgeterminen zu erhöhen. Bildungsinitiativen zur Aufklärung über die Bedeutung der Nachsorge und die potenziellen Konsequenzen einer Vernachlässigung könnten helfen, das Bewusstsein und die Motivation zu stärken. Unsere Tiefeninterviews mit Gesundheitspersonal zeigten Lücken in deren Wissen über die Nachsorgeempfehlungen auf und machten auf Mängel in der Beratung von Patientinnen und der Dokumentation aufmerksam. Auch die Implementierung von Erinnerungssystemen (wie bspw. Anrufen) und ggf. mobiler Gesundheitsdienste wurde immer wieder besprochen und diverse in diesem Zusammenhang

relevante Probleme wurden diskutiert, beispielsweise Mangel an Personal, unzureichende Dokumentation und fehlende Telefonanschlüsse. Langfristig sollten Bemühungen zur Stärkung der Gesundheitssysteme und zur Verbesserung der Infrastruktur intensiviert werden, um sicherzustellen, dass alle Frauen Zugang zu Screenings, Therapien und Nachsorgeuntersuchungen haben.

Wir begrüßen die Aufnahme von Therapietreue und Nachsorge als Schlüsselindikatoren für die Qualität von Screening-Programmen. Darüber hinaus empfehlen wir interventionelle Forschung zur Optimierung oder Einrichtung von Erinnerungssystemen. Unsere Ergebnisse zeigen, dass das Fehlen eines effektiven Patientenmonitoringsystems und ausbleibende Erinnerungen wesentlich zur niedrigen Adhärenz bei Nachuntersuchungen beitragen. Die fortschreitende Digitalisierung könnte hier vielversprechende Lösungen bieten.

3. Literatur

1. zur Hausen H. Condylomata acuminata and human genital cancer. Cancer Res 1976; 36(2 pt 2):794.

2. Weltgesundheitsorganisation. A brief history of vaccines [Stand: 14.01.2023]. Verfügbar unter: https://www.who.int/news-room/spotlight/history-of-vaccination/a-brief-history-of-vaccination.

3. World Health Organization. WHO guidelines for screening and treatment of precancerous lesions for cervical cancer prevention. Geneva: World Health Organization; 2014. Verfügbar unter: http://gbv.eblib.com/patron/FullRecord.aspx?p=2046601.

4. Jung L, Klamminger GG, Bier B, Eltze E. From Satirical Poems and Invisible Poisons to Radical Surgery and Organized Cervical Cancer Screening-A Historical Outline of Cervical Carcinoma and Its Relation to HPV Infection. Life (Basel) 2024; 14(3). doi: 10.3390/life14030307.

5. Cohen PA, Jhingran A, Oaknin A, Denny L. Cervical cancer. The Lancet 2019; 393(10167):169–82. doi: 10.1016/S0140-6736(18)32470-X.

6. Smith JHF. Cytology, liquid-based cytology and automation. Best Pract Res Clin Obstet Gynaecol 2011; 25(5):585–96. doi: 10.1016/j.bpobgyn.2011.04.006.

7. Dasgupta S. The Efficiency of Cervical Pap and Comparison of Conventional Pap Smear and Liquid-Based Cytology: A Review. Cureus 2023; 15(11):e48343. doi: 10.7759/cureus.48343.

8. Xue P, Ng MTA, Qiao Y. The challenges of colposcopy for cervical cancer screening in LMICs and solutions by artificial intelligence. BMC Med 2020; 18(1):169. doi: 10.1186/s12916-020-01613-x.

9. World Health Organization. WHO guideline for screening and treatment of cervical pre-cancer lesions for cervical cancer prevention, second edition. Geneva; 2021.

10. Brandt T, Wubneh SB, Handebo S, Debalkie G, Ayanaw Y, Alemu K et al. Genital self-sampling for HPV-based cervical cancer screening: a qualitative study of preferences and barriers in rural Ethiopia. BMC Public Health 2019; 19(1):1026. doi: 10.1186/s12889-019-7354-4.

11. Arbyn M, Weiderpass E, Bruni L, Sanjosé S de, Saraiya M, Ferlay J et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. The Lancet Global Health 2020; 8(2):e191-e203. doi: 10.1016/S2214-109X(19)30482-6.

12. International Agency for Research on Cancer. Cancer today: Weltgesundheitsorganisation [Stand: 24.01.2024]. Verfügbar unter: https://gco.iarc.fr/today/home.

13. World Health Organization. Cervical Cancer Elimination Initiative [Stand: 30.06.2024]. Verfügbar unter: https://www.who.int/initiatives/cervical-cancer-elimination-initiative.

14. Robert-Koch-Institut. Schulimpfprogramme als Lösung zur Steigerung der HPV-Impfquoten in Deutschland? – Entwicklung der Impfquoten in einer hessischen Modellregion mit Schulimpfprogramm [Stand: 24.01.23]. Verfügbar unter:

https://www.rki.de/DE/Content/Infekt/EpidBull/Archiv/2022/Ausgaben/20_22.pdf?__blob=publicationFile.

15. Altobelli E, Rapacchietta L, Profeta VF, Fagnano R. HPV-vaccination and cancer cervical screening in 53 WHO European Countries: An update on prevention programs according to income level. Cancer Med 2019; 8(5):2524–34. doi: 10.1002/cam4.2048.

16. Grieger P, Eisemann N, Hammersen F, Rudolph C, Katalinic A, Waldmann A. Initial Evidence of a Possible Effect of HPV Vaccination on Cancer Incidence in Germany—Focus on Cervical Cancer. Dtsch Arztebl Int 2024; 121(13):415–21. doi: 10.3238/arztebl.m2024.0062.

17. Federal democratic republic of Ethiopia. Ministry of health. Guideline for cervical cancer prevention and control in Ethiopia; 2015. Verfügbar unter: https://www.medbox.org/document/guideline-for-cervical-cancer-prevention-and-control-in-ethiopia#GO.

18. Federal democratic republic of Ethiopia. Ministry of health. Guideline for cervical cancer prevention and control in Ethiopia; 2021.

19. MOHSW-Tanzania. Tanzania service delivery guidelines for cervi-cal cancer prevention and control. 2011;1:1-78. Verfügbar unter: https://extranet. who.int/ncdccs/Data/TZA_B5_Cervical%20Cancer%20Strate-gic%20Plan2011.pdf

20. Addisu D, Gebeyehu NA, Belachew YY. Knowledge, attitude, and uptake of human papillomavirus vaccine among adolescent schoolgirls in Ethiopia: a systematic review and meta-analysis. BMC Womens Health 2023; 23(1):279. doi: 10.1186/s12905-023-02412-1.

21. Shiferaw N, Salvador-Davila G, Kassahun K, Brooks MI, Weldegebreal T, Tilahun Y et al. The Single-Visit Approach as a Cervical Cancer Prevention Strategy Among Women With HIV in Ethiopia: Successes and Lessons Learned. Glob Health Sci Pract 2016; 4(1):87–98. doi: 10.9745/GHSP-D-15-00325.

22. Ayenew AA, Zewdu BF, Nigussie AA. Uptake of cervical cancer screening service and associated factors among age-eligible women in Ethiopia: systematic review and meta-analysis. Infect Agent Cancer 2020; 15(1):67. doi: 10.1186/s13027-020-00334-3.

23. Destaw A, Midaksa M, Addissie A, Kantelhardt EJ, Gizaw M. Cervical cancer screening "see and treat approach": real-life uptake after invitation and associated factors at health facilities in Gondar, Northwest Ethiopia. BMC Cancer 2021; 21(1):1031. doi: 10.1186/s12885-021-08761-0.

24. Okyere J, Ayebeng C, Dosoo AK, Dickson KS. Cervical cancer screening among women with comorbidities: evidence from the 2022 Tanzania demographic and health survey. BMC Public Health 2024; 24(1):1093. doi: 10.1186/s12889-024-18552-4.

25. Matovina S, Schöpp K, Weiss M, Neis F, Brucker SY, Henes M. Zervixkarzinom-Screening – Status quo? Gynäkologie 2024; 57(11):738–45. doi: 10.1007/s00129-024-05288-w.

26. Roy Penchansky J,Thomas JW. The Concept of Access: Definition and Relationship to Consumer Satisfaction 1981. Medical care, 19(2), 127–140. https://doi.org/10.1097/00005650-198102000-00001

27. Saurman E. Improving access: modifying Penchansky and Thomas's Theory of Access. J Health Serv Res Policy 2016; 21(1):36–9. doi: 10.1177/1355819615600001.

28. Wasiyhun TS, Beyene MG, Deghebo AD, GetachewT, Zeleke GT, Tesema TT, Wondim GM, Getachew F, Eba GG, Wubie HT, Eshetie AT, Belayneh AB. Availability and readiness of cervical cancer screening service at health facilities in Ethiopia. JGWH 2021; 4(2):141–5.

29. Lott BE, Halkiyo A, Kassa DW, Kebede T, Dedefo A, Ehiri J et al. Health workers' perspectives on barriers and facilitators to implementing a new national cervical cancer screening program in Ethiopia. BMC Womens Health 2021; 21(1):185. doi: 10.1186/s12905-021-01331-3.

30. Maillie L, Yussuph A, Chirangi B, Schroeder K. Outcomes from 8 years of cervical cancer screening at a rural screen-and-treat site in northern Tanzania. Int J Gynaecol Obstet 2023; 160(2):604–11. doi: 10.1002/ijgo.14429.

31. Bogale AL, Teklehaymanot T, Ali JH, Kassie GM, Medhin G. The Recurrence of Cervical Precancerous Lesion Among HIV Positive and Negative Ethiopian Women After Cryotherapy: A Retrospective Cohort Study. Cancer Control 2022; 29:10732748221129708. doi: 10.1177/10732748221129708.

32. Mchome B, Swai P, Wu C, Katanga J, Kahesa C, Manongi R et al. Comprehensive Cervical Cancer Prevention in Tanzania (CONCEPT) study: Cohort profile. BMJ Open 2020; 10(9):e038531. doi: 10.1136/bmjopen-2020-038531.

33. Kajabwangu R, Ssedyabane F, Tusubira D, Maling S, Kakongi N, Turyakira E et al. High Rate of Loss to Follow-Up Among Patients Undergoing Treatment for Premalignant Cervical Lesions at Mbarara Regional Referral Hospital, Southwestern Uganda: A Retrospective Cohort Study. Cureus 2023; 15(10):e46542. doi: 10.7759/cureus.46542.

34. Martinez-Gutierrez J, Chima S, Boyd L, Sherwani A, Drosdowsky A, Karnchanachari N et al. Failure to follow up abnormal test results associated with cervical cancer in primary and ambulatory care: a systematic review. BMC Cancer 2023; 23(1):653. doi: 10.1186/s12885-023-11082-z.

35. Pornsinsiriruck S, Sumdaengrit B, Kongrot S, Jengprasert K, Puntusopon N. The effect of colposcopy counseling with a feminist model on anxiety in Thai women with abnormal cervical cytology results: A time-series quasi-experimental study. Belitung Nurs J 2023; 9(6):611–8. doi: 10.33546/bnj.2924.

36. Yabroff KR, Kerner JF, Mandelblatt JS. Effectiveness of interventions to improve follow-up after abnormal cervical cancer screening. Prev Med 2000; 31(4):429–39. doi: 10.1006/pmed.2000.0722.

37. Thomson KA, Sandoval M, Bain C, Holme F, Bansil P, Figueroa J et al. Recall Efforts Successfully Increase Follow-Up for Cervical Cancer Screening Among Women With Human Papillomavirus in Honduras. Glob Health Sci Pract 2020; 8(2):290–9. doi: 10.9745/GHSP-D-19-00404.

38. Linde DS, Andersen MS, Mwaiselage J, Manongi R, Kjaer SK, Rasch V. Effectiveness of One-Way Text Messaging on Attendance to Follow-Up Cervical Cancer Screening Among Human Papillomavirus-Positive Tanzanian Women (Connected2Care): Parallel-Group Randomized Controlled Trial. J Med Internet Res 2020; 22(4):e15863. doi: 10.2196/15863.

39. Ayamolowo SJ, Akinrinde LF, Oginni MO, Ayamolowo LB. The Influence of Health Literacy on Knowledge of Cervical Cancer Prevention and Screening Practices among Female Undergraduates at a University in Southwest Nigeria. AJNM 2020; 22(1). doi: 10.25159/2520-5293/6615.

40. Manga S, Kiyang E, DeMarco RF. Barriers and facilitators of follow-up among women with precancerous lesions of the cervix in Cameroon: a qualitative pilot study. Int J Womens Health 2019; 11:229–39. doi: 10.2147/IJWH.S196112.

41. Chapola J, Lee F, Bula A, Mapanje C, Phiri BR, Kamtuwange N et al. Barriers to follow-up after an abnormal cervical cancer screening result and the role of male partners: a qualitative study. BMJ Open 2021; 11(9):e049901. doi: 10.1136/bmjopen-2021-049901.

4. Thesen

1. In Äthiopien erhielten die meisten Frauen (90,4%), bei denen im Gebärmutterhalskrebsscreening eine zervikale Läsion gefunden wurde, eine adäquate Therapie – meist Kryotherapie.
2. Der Großteil der äthiopischen Frauen (83%), die Therapie für eine zervikale Läsion erhalten, erhält diese im *Single-Visit-Approach* – also am Tag des initialen Screenings.
3. In Tansania ist die Adhärenz zum *Single-Visit-Approach* mit 47,5% deutlich geringer als in Äthiopien, was unter anderem daran liegt, dass mit den in Tansania verbreiteteren Pap-Abstrichen kein *Single-Visit-Approach* möglich ist.
4. Sowohl in Äthiopien als auch in Tansania kommen nur einige Frauen (44,7% in Äthiopien, 65,3% in Tansania), die eine Therapie für eine suspekte zervikale Läsion erhalten haben, zu dem empfohlenen Nachsorgescreening nach einem Jahr; damit liegen die Anteile in beiden Ländern weit unter den von der WHO angestrebten 90%.
5. Gründe für die Nichtteilnahme an den Nachsorgescreenings sind vielfältig und schließen mangelndes Bewusstsein für die Relevanz der Nachsorge, Vergessen von Nachsorgeterminen und fehlende Erinnerungssysteme, sowie bekannte Hindernisse im Zugang zum Gesundheitssystem ein.
6. Ein relevanter Anteil der Frauen, die am Nachsorgescreening teilnehmen, hat noch oder wieder eine suspekte zervikale Läsion (in beiden Ländern ~17%).

Publikationsteil

Publikation 1: Stroetmann, C. Y., Gizaw, M., Alemayehu, R., Wondimagegnehu, A., Rabe, F., Santos, P., Mchome, B., Mmbaga, B. T., Addissie, A., & Kantelhardt, E. J. (2024). Adherence to Treatment and Follow-Up of Precancerous Cervical Lesions in Ethiopia. *The oncologist*, oyae027. Advance online publication. https://doi.org/10.1093/oncolo/oyae027

Beitrag: Konzeption des Studiendesigns, Anleitung und Supervision der Datenakquise, Datenanalyse und Visualisierungen, Schreiben des Manuskripts.

Publikation 2: Alemayehu, R., Stroetmann, C. Y., Wondimagegnehu, A., Rabe, F., Addissie, A., Kantelhardt, E. J., & Gizaw, M. (2024). Barriers to adherence of posttreatment follow-up after positive primary cervical cancer screening in Ethiopia: a mixed-methods study. *The oncologist*, oyae305. Advance online publication. https://doi.org/10.1093/oncolo/oyae305

Beitrag: Konzeption des Studiendesigns, Anleitung und Supervision der Datenakquise, Datenanalyse und Visualisierungen, Editing des Manuskripts.

Publikation 3: Lyamuya, T., Mchome, B., Stroetmann, C. Y., Machange, R., Gizaw, M., Alemayehu, R., Addissie, A., Mlay, P., Mremi, A., Kantelhardt, E. J., & Mmbaga, B. T. (2025). Barriers to adherence to cervical cancer screening care in Northern Tanzania. *The oncologist*, *30*(5), oyaf111. https://doi.org/10.1093/oncolo/oyaf111

Beitrag: Konzeption des Studiendesigns, Datenanalyse und Visualisierungen, Editing des Manuskripts.

Die Verwendung von Publikation 1 – 3 im Rahmen dieser Arbeit sind als Teil der CC BY Lizenz von *The oncologist* gestattet.

Publikation 4: Ashenafi, T., Stroetmann, C. Y., Getachew, S., Addissie, A., & Kantelhardt, E. J. (2023). Characteristics of Women Seeking Cervical Cancer Cytology Screening in a Private Health Facility. *Medicina (Kaunas, Lithuania)*, *59*(9), 1624. https://doi.org/10.3390/medicina59091624

Beitrag: Datenanalyse und Visualisierungen, Schreiben des Manuskripts.

Die Verwendung von Publikation 4 im Rahmen dieser Arbeit ist von *Medicina* gestattet.

The Oncologist, 2024, **29**, e655–e664
https://doi.org/10.1093/oncolo/oyae027
Advance access publication 23 February 2024
Original Article

Adherence to Treatment and Follow-Up of Precancerous Cervical Lesions in Ethiopia

Clara Yolanda Stroetmann[1], Muluken Gizaw[1,2,3], Rahel Alemayehu[2], Abigiya Wondimagegnehu[1,2,3], Friedemann Rabe[1], Pablo Santos[1], Bariki Mchome[4], Blandina Theophil Mmbaga[5], Adamu Addissie[1,2,3], Eva Johanna Kantelhardt[*,1,6]

[1]Global Health Working Group, Institute for Medical Epidemiology, Biometrics and Informatics, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany
[2]Department of Preventive Medicine, School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia
[3]NCD Working Group, School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia
[4]Kilimanjaro Christian Medical Centre, Moshi, Tanzania
[5]Kilimanjaro Clinical Research Institute, Kilimanjaro Christian Medical Centre and Kilimanjaro Christian Medical University College, Moshi, Tanzania
[6]Department of Gynaecology, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany

[*]Corresponding author: Eva J. Kantelhardt, MD, Global Health Working Group, Institute for Medical Epidemiology, Biometrics and Informatics, Martin-Luther-University Halle-Wittenberg, Magdeburger Straße 8, 06112 Halle (Saale), Germany. Email: eva.kantelhardt@uk-halle.de

Abstract

Background: In Ethiopia, both incidence and mortality of cervical cancer are relatively high. Screening services, which were implemented during the past few years, are currently being expanded. The World Health Organization recommends patients with a positive VIA (visual inspection with acetic acid) result should immediately receive treatment followed by rescreening after 1 year as precancerous lesions can reoccur or become residential despite treatment.

Materials and Methods: Screening logbooks dating between 2017 and 2020 were retrospectively reviewed in 14 health facilities of Addis Ababa and Oromia region. Data for 741 women with a VIA-positive result were extracted and those women were asked to participate in a questionnaire-based phone interview to gain insights about adherence to treatment and follow-up. Data were analyzed using descriptive methods and then fitted into 2 generalized linear models to test variables for an influence on adherence to follow up.

Results: Around 13 800 women had received a VIA screening, of which approximately 820 (5.9%) were VIA positive. While over 90% of women with a positive screen received treatment, only about half of the treated patients returned for a follow-up examination. After treatment, 31 women had a VIA-positive re-screen. We found that educational status, age over 40, no/incorrect follow-up appointment, health facility-related barriers, and use of reminders are important drivers of adherence to follow up.

Conclusion: Our results revealed that adherence to treatment after VIA positive screening is relatively high whereas adherence to follow up recommendations still needs improvement. Reminders like appointment cards and phone calls can effectively reduce the loss of follow-up.

Key words: cervical cancer screening; precancerous lesions; cryotherapy; follow-up; adherence; recurrence.

Implications for Practice

This study may contribute to the development of evidence-based guidelines for the appropriate follow-up of women with abnormal cervical cancer screening results. This study emphasizes the importance of appropriate follow-up of women with abnormal cervical cancer screening results and the adherence to those. Findings from the study may have implications for health policy decisions, guideline development and resource allocation. It can inform policymakers about the necessary infrastructure, training, and equipment needed for effective follow-up after cervical cancer screening. Additionally, the study results can help to improve patient education and counseling practices and can therefore alleviate anxiety, improve patient satisfaction, and foster informed decision-making.

Introduction

Cervical cancer (CC) is one of the most prevalent cancers in women worldwide, with a disproportionate impact on women in low- and middle-income countries.[1] While screening and vaccination programs in Europe and Northern America have drastically reduced CC incidence and mortality, it is still a major health threat for women in Sub-Saharan Africa.[2] In Ethiopia, approximately 5000 women die of CC every year.[3] Higher CC mortality in Sub-Saharan Africa can be attributed to late-stage presentation, predominantly due to lack of

Received: 26 July 2023; Accepted: 23 January 2024.

information and a dearth or inaccessibility of prevention services.[2,4,5]

The Ethiopian CC screening program was first launched in 2009 as part of the Pathfinder project which focused on women living with HIV.[6] The service was subsequently scaled-up until it is now offered in health facilities throughout Ethiopia and includes HIV-negative women.[6,7] Even though the uptake of CC screening in Ethiopia increased in recent years, the percentage of women who received at least one screening remains relatively low, at approximately 15%.[8,9] The first national guideline for the prevention of cervical cancer was published in 2015, currently the second edition (2021) is used.[6,10] The standard screening method for CC in Ethiopia is visual inspection with acetic acid (VIA).[6] In addition, some health facilities recently started offering HPV testing as an alternative (mainly for WLHIV). In VIA-screenings, aceto-white cervical lesions are signs of precancerous stages of cell transformation but can also be caused by inflammation of the cervix.[11] Depending on the size and location of the lesions, they should be treated with either cryotherapy/thermal ablation or loop electrical excision procedure (LEEP).[6,11] When cryotherapy/thermal ablation is used, a single-visit-approach is recommended, meaning that the patient should receive the treatment on the same day of screening.[6] Therefore, all health centers and hospitals performing CC screening should also be equipped to perform cryotherapy or thermal ablation.[6] While the *single-visit approach* is generally feasible and beneficial in low-resource settings, it is sometimes not followed due to the lack of resources such as trained health professionals, cryotherapy machines, carbon dioxide for cryotherapy, and electricity for thermal ablation.[12–14] Non-adherence to the *single-visit approach* increases the patients' risk of not receiving treatment.[15–17] One Ethiopian study reports on a project, called the *Addis Tesfa (New Hope) project*, which aimed to enhance CC screening for women living with HIV (WLHIV) between August 2010 and March 2014.[15] According to *Addis Tesfa (New Hope)* project report, 97% of patients with cryotherapy-eligible lesions received treatment.[15] Patients with lesions non-eligible for cryotherapy will usually be referred to a hospital for LEEP treatment and further diagnostic services as needed.[6]

In Ethiopia, CC screenings are recommended every 5 years for the general population and every 2 years for WLHIV.[6] All patients who received a treatment for an aceto-white lesion should come back for a follow-up examination one year after their treatment as precancerous lesions can become residential or reoccur after treatment.[1,6] According to the WHO guideline, ablative treatment of precancerous lesions fails in approximately 10% of cases—but reliable evidence is still lacking and a higher risk of failure in WLHIV is discussed.[1,18-20]

Data on the adherence to guideline recommendations after VIA-positive screenings is insufficient in Ethiopia. In the *Addis Tesfa* project, 51% of women who were VIA positive and treated with cryotherapy or LEEP adhered to follow up; with a large variation between regions, from as low as 29.8% in Addis Ababa to up to 81.1% in Tigray.[15] In a record-based study, only 27.9% of patients returned for their 1-year follow-up.[19] The Ethiopian Ministry of Health (MoH) recommends the use of an appointment calendar to identify patients who missed their rescreening.[6] Moreover, adherence to post-treatment follow-up is listed as a core indicator to track CC screening at the national level but is not yet routinely measured within the health facilities.[6]

As of now, there is no structured follow-up reminder system implemented in Ethiopia. The 2021 guideline recommends for health facilities to use an appointment calendar and provide appointment cards to every client (those cards include the patients name and date of their follow-up appointment—an example is provided in the guideline's Appendix). The guideline also encourages healthcare providers to emphasize the importance of coming back for follow-up care and recommends that clinics should designate someone to ensure that follow-up is done. For women who do not return spontaneously as advised, the guideline points out 2 options: providers can either call women or ask health extension workers and case managers to contact women directly at home. However, the guideline does not specify how those actions can be put into practice (neither does the MoH ensure the availability of phones or an attached budget in the health facilities) wherefore the calling system is not functional in most places.[6]

The primary objective of this study is to measure the levels of adherence to treatment and follow-up in women with a positive VIA screening as well as the recurrence rate of precancerous lesions after treatment. Unlike the *Addis Tesfa* project, our study includes both WLHIV and HIV negative women which we believe to provide a more holistic reflection of follow-up rates in routine care. In addition, the current study aimed to identify enablers and barriers to adherence to follow up that could generate evidence for the development and implementation of effective CC care interventions in Ethiopia.

Methods

Study Design and Setting

We employed an institution-based, retrospective study design, including health facilities in 2 Ethiopian regions (Oromia region and Addis Ababa). Addis Ababa is Ethiopia's capital with more than 3 million inhabitants, while Oromia region is the largest region in Ethiopia and thereby has a far lower population density.[21] For each of the objectives, the sample size was determined using a single population proportion formula, applying a 5% margin of error and 95% CI (Supplementary Table S1). To reach our aim sample size of 383 data extractions, we included 10 health centers in 4 sub-cities of Addis Ababa as well as 4 hospitals in the Oromia region (each located in a different town: Adama, Assela, Bshoftu, and Weliso). For randomization, we first randomly selected 5 out of all 11 sub-cities of Addis Ababa (Arada, Bole, Gulele, Yeka, Akaki Kality), then created a list with suitable health facilities within those chosen areas (inclusion criteria: provision of CC screening service since 2017 and high patient flow) and finally randomly selected the included health facilities. For Oromia region, 4 hospitals were included, which started providing screenings before 2017. All health facilities provide screening as part of the routine CC screening service offered in Ethiopia.

Data Collection

The data collection was performed from March to May 2022 and concerned logbook entries from the time between January 2017 and December 2020. For each health facility, the total number of CC screenings per year as well as the distribution of screening results were collected. We were able to retrieve screening records for 741 women out of approximately 820

VIA-positive results, the rest of the records were lacking essential information, ie, date of screening.

A data extraction form was prepared which included name, address, phone number, age, marital status, parity, educational level, HIV status, screening date, screening result, treatment, reappointment date, and reappointment visits. All these information should ideally be available from the health facilities CC screening logbooks, where each performed CC screening has an entry. The logbooks are designed and provided by the MoH to monitor the program. Logbook entries should ideally be completed during the client's visit. One nurse from each health facility received a 1-day training and then filled out the data extraction forms. Patient files were reviewed when information was missing in the logbooks. Patient files are another place to store information, not only in regard to CC screening, within the health facilities. Their design and completeness depend on the level of use within each health facility.

For our study, patients under the age of 18 years and patients with suspected cancer lesions were not included, since the latter follow different pathways depending on further diagnostics. Two trained research assistants and one of the principal investigators digitalized the anonymized data from the hard-copy data extraction form by entering it into ODK[22] or REDCap (Research Electronic Data Capture).[23,24]

All women were invited to a questionnaire-based phone interview (Supplementary Table S2). The structured questionnaire was initially developed in English, based on related literature.[25-27] Questions on barriers and enablers were adapted to cover the "5 A's" of the concept of access: availability, accessibility, accommodation, affordability, and acceptability.[28] Modifications to the questionnaire were made after expert discussion before it was translated to Amharic and pretested on 5% of the sample size. Minor modifications were made after the pretest to ensure clarity. The final questionnaire consisted of 5 parts including socio-demographic information (age, marital status, parity, educational level, occupation, and income), information on the treatment of precancerous cervical lesions, adherence to follow up recommendations, and questions on individual and health-facility-related barriers, and enablers for follow-up. Phone interviews were conducted with 399 women (response rate of 78.6% in Addis Ababa and 36.1% in Oromia region). Only 574 of all 741 women screened VIA-positive had documented phone numbers. All the 574 women were invited to the telephone interview, but only the 399 women were reached and participated. The remaining phone numbers were either switched off, not working, or out of service or not answered during repeated attempts.

Data Analysis

Data cleaning, plotting, and statistical analyses were performed using R software.[29] Conversions between Ethiopian and Gregorian dates were done in Python.[30] Values missing in the logbook data were filled using data from the phone interviews whenever possible. The remaining cases (19 in $Model_1$, 24 in $Model_2$) were imputed using the variables' median (Supplementary Table S3). Generalized linear models (binomial family) were fitted to the data to assess the possible influence of education, parity, eligibility for cryotherapy, region, marital status, HIV status, follow-up appointment, occupation, income, health facility-related barriers, individual barriers as well as the use of reminders on adherence (binary outcome). In other words, we modeled the influence of a set of explanatory variables (listed above) on the binary variable "adherence to follow up" using a logistic regression. All explanatory variables included in the models were tested a priori for collinearity and only included if r^2 (squared Pearson's correlation index) was below 0.35. In the first model, we included only variables from the logbooks, so that the model could be applied to all 671 treated patients. In a second model, information from the phone interviews was additionally considered (applied to 371 patients). The questions on barriers and enablers were grouped into health-facility-related or patient-related barriers and a score was created for each group. Each affirmed barrier added one point to the score and thus higher scores corresponded to patients facing more barriers (Supplementary Table S4). Reminders were treated as a separate explanatory variable as they portray the linkage between the healthcare system and patients and therefore depend on both sides. The Sankey plot (Fig. 1) was generated using SANKEYmatic.[31]

Operational Definition of Adherence to Follow-Up

Adherence to follow up was defined as having any rescreening after the initial VIA-positive screening. Follow-up after VIA-negative screenings was not considered in this study, as it is known that women with a VIA-positive screening even after treatment have a higher risk of developing precancerous lesions. To combine the information from logbooks and phone interviews, a 2-step approach was used: First, the data extracted from the logbooks was checked for a rescreening date. Then, for those patients with no rescreening date in the

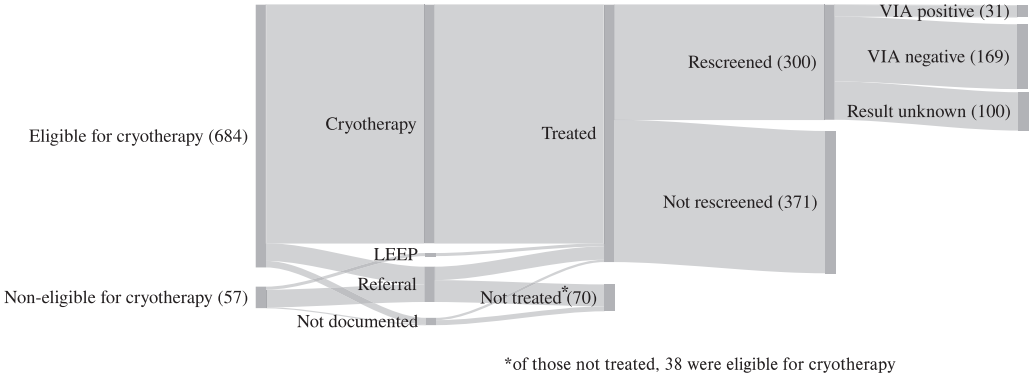

Figure 1. Pathways of patients with VIA-positive CC screening.

logbook, information from the phone interviews was added, if available.

Ethical Considerations

Ethical clearance was provided by the School of Public Health, Addis Ababa University, and the responsible health bureaus for both regions. The objective of the study was explained to all phone interview participants and their oral consent was obtained and documented.

Results

The study sample consisted of all 741 women screened VIA-positive. This corresponds to approximately 5.4% of all 13 801 women screened in the 10 health facilities and 4 hospitals in the stated time frame.

Socio-Demographics Description of the Sample

The socio-demographic composition of the sample is described in Table 1. Most of the detected lesions were eligible for cryotherapy. Over 80% of the women were in the primary target age group for CC screening (30–49 years). Three-fourths (74.4%) of women were married and 65.5% had at least primary education. Most women (87.6%) had given birth with a median of 2 births per woman. In total 43.6% of our sample were WLHIV, HIV status was unknown for nearly a fifth of the sample. Occupation and income were assessed during the phone interviews, which is why this information was available for 399 women. The median (self-declared) monthly income was 3000 ETB (58.61 USD, using the exchange rate from March 1st, 2022[32]).

Pathways of Patients With a VIA-Positive Screening

The pathways of all 741 women who had a VIA-positive screening result are depicted in Fig. 1. We found logbook documentation on treatment for 630 patients. Additionally, 69 of the 111 patients without documented treatment were interviewed and 41 of these stated that they had received treatment (partly treated in other health facilities, partly not documented). Thus, 671 (90.6%) of all patients received treatment for their precancerous lesions. A total of 83% of those women with lesions eligible for cryotherapy received their treatment on the day of screening—adhering to the *single-visit approach*. Of those 134 women who did not receive the treatment on the same day, 88 received treatment within 2 weeks (median time to treatment 5 days; ranging from 1 to 227 days). Of all 92 referred patients, 38% received treatment. Additionally, 9 women reported having a negative screening at the hospital which they were referred to for treatment and therefore, did not need treatment. Of all 148 patients with cryotherapy-eligible lesions who did not adhere to the single-visit approach, 38 (25.7%) did not receive treatment at all.

A rescreening date had been documented for 203 treated patients. In addition, 97 others stated that they had received a rescreening "about a year after screening." In total, 44.7% of the treated patients received any rescreening after the initial screening, but only 61.1% (124/203) of the rescreenings documented in the logbooks took place within 395 days after treatment. The median time between treatment and rescreening was 378 days with a range between 80 and 1714 days. In the logbooks, we found result codes for

Table 1. Socio-demographic and clinical characteristics of women with a positive VIA screen.

Characteristics		All women *n* = 741	Percentage
Eligibility for cryotherapy	Yes	684	92.3
	No	57	7.7
Region	Addis	309	41.7
	Oromia	432	58.3
Age (years)	≤29	120	16.2
	30–34	249	33.6
	35– 39	198	26.7
	≥40	165	22.3
	Unknown	9	1.2
	Median (IQR)	34 (8)	
Marital status	Married	551	74.4
	Divorced	89	12
	Single	54	7.3
	Widowed	38	5.1
	Unknown	9	1.2
Parity	0	70	9.4
	1	168	22.7
	2	203	27.4
	3	117	15.8
	>3	161	21.7
	Unknown	22	3
	Median	2	
Education	Illiterate	184	24.8
	Can read and write	57	7.7
	Primary education	218	29.4
	Secondary education	142	19.2
	College	125	16.9
	Unknown	15	2
Employment[1]	Housewife/ unemployed	119	29.8
	Private employee	117	29.3
	Government employee	97	24.3
	Daily laborer	35	8.8
	Merchant	21	5.3
	Other	4	1
	Unknown	6	1.5
Own monthly income[1] (USD)	No income	40	10
	Low income (<61)	176	44.1
	Middle income (61-194)	150	37.6
	High income (>194)	20	5
	Unknown	13	3.5
	Median	58.61	
HIV status	Positive	323	43.6
	Negative	271	36.6
	Unknown	147	19.8

[1]Information only available for patients who participated in the phone interviews (*n* = 399). Values converted from ETB to USD using exchange rate from March 1st, 2022 (1 USD = 51.2 ETB).[32] Income categorization based on Gebremariam et al[33].

200 rescreenings, of which 84.5% were VIA negative. In total, 31 women had a VIA-positive follow-up screening (13 WLHIV, 11 HIV-negative women, and 7 women with unknown HIV status). The calculated recurrence rates of precancerous lesions after treatment were 10% for WLHIV and 10.7% for women with negative or unknown HIV status.

Factors Influencing Adherence to Follow-Up Recommendations

Figure 2 shows a forest plot with the main results of the first model including the logbook information of the 671 treated women, 300 of whom (44.7%) adhered to follow up. Compared to younger women, women aged over 40 years were more likely to adhere to follow up. Women with higher educational status adhered to the follow-up recommendation more often. In the group of re-screened women, 24.6% had no formal education, in comparison to 39.7% in the group without a rescreening. Most patients (93.7%) had received a correct follow-up appointment and those patients were more likely to adhere to follow up than their counterparts without a correct appointment date.

A forest plot with the key findings of the second model is shown in Fig. 3. In this model, all variables from logbooks and phone interviews were considered and, in comparison to Fig. 2, the effects of region, age, and follow-up appointment are not evident. The positive impact of education on adherence to follow up is still visible. Occupation and income did not show significant changes in adherence to treatment. Patients with a higher score for health facility-related barriers (*Hf-score*) were at higher risk of loss to follow up. Concerning reminders for follow-up, 73 women reported that they did not receive any reminders, while 202 women received an appointment card and 96 received both a card and a phone call. Our model showed that both kinds of reminders drastically lowered the risk of loss to follow up.

Discussion

This study has assessed Ethiopian women's adherence to treatment and follow-up after VIA-positive screening in Addis Ababa and Oromia region. We found an overall VIA screening positivity rate of 6.9%. Out of all 741 VIA-positive patients, 90.4% received treatment and 44.7% received a rescreening. Out of the 200 known rescreening results, 83.8% were VIA-negative. We found that age, educational level, perceived health facility barriers, and the use of reminders were associated with adherence to follow up.

Adherence to Treatment and Single-Visit-Approach

In this study, the WHO target of a 90% treatment rate for identified cervical cancer precancerous lesions was met. This is in line with other recent studies in Ethiopia, reporting high rates of adherence to treatment.[12,30] The single-visit approach was followed in 83% of the cases with lesions eligible for cryotherapy/thermal ablation. In total, 88 (43.1%) of the patients who did not receive treatment the same day had been referred to other clinics, while the other patients received a recommendation to return to the same clinic for treatment. Of the referred 57 (64.8%) did not receive treatment versus

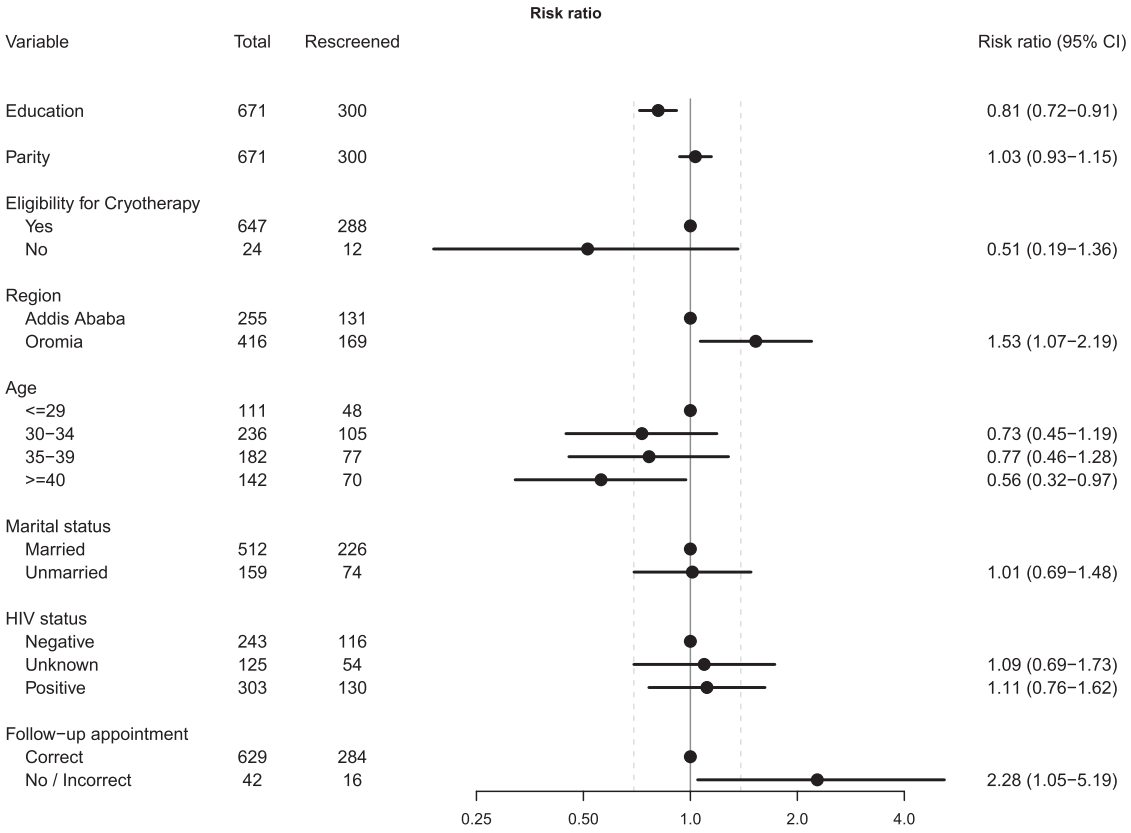

Figure 2. Forest plot showing risk ratios for non-adherence to follow-up after VIA-positive screening for factors assessed from the CC screening logbooks.

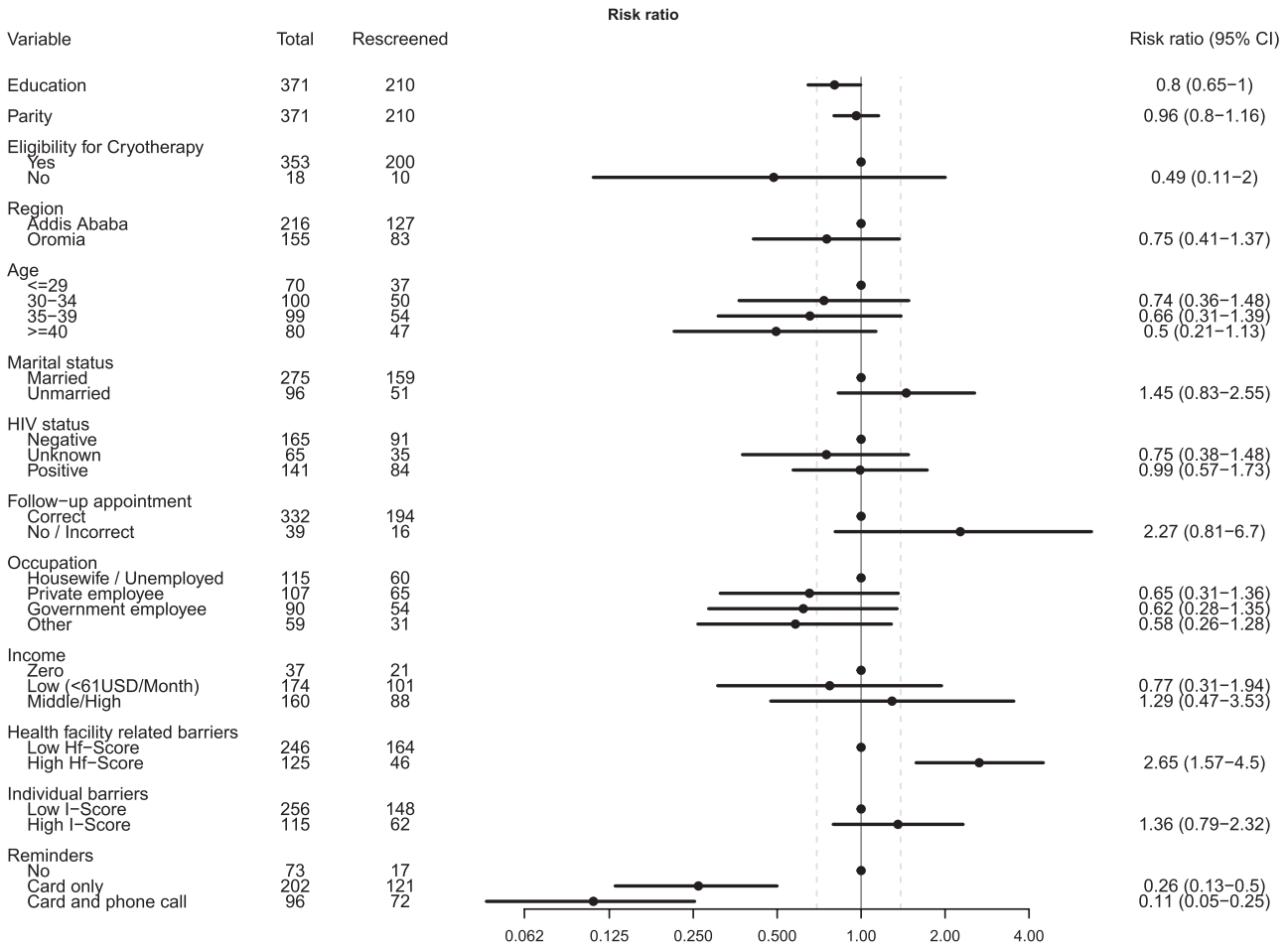

Figure 3. Forest plot showing risk ratios for non-adherence to follow up after VIA-positive screening for factors assessed from the CC logbooks and phone interviews with patients.

13 (11.2%) of the patients asked to come back to the same health facility. Particularly patients referred to other health facilities face access barriers—like additional transportation costs and time of travel.

Out of those cryotherapy-eligible patients who did not receive treatment the same day, 38 (25.7%) never received treatment. This is lower than the findings of a study in Côte d'Ivoire, Guyana, and Tanzania where only 52% of patients with postponed treatment returned.[16] Both findings stress the importance of the *single-visit approach* to minimize patients' risk of not receiving treatment. However, for those patients who managed to return for treatment, we found that delay was usually short (median of 5 days). Adherence to post-treatment recommendations like abstinence from sexual intercourse as well as treatment complications were not assessed in our study.

Adherence to Follow-Up and Recurrence of Pre-Cancerous Lesions

The level of adherence to follow up found in our study (44.7%) is higher than purely record-based findings from 2 hospitals in Addis Ababa[19] and comparable to those from the Addis Tesfa project.[15] This is encouraging since our assessment evaluated everyday service functionality rather than project-based follow-up.

The timing of the follow-up was not included in our definition of adherence to follow up, even though it is important to the process. Early rescreenings give health professionals the chance to monitor their patients more closely. However, more examinations are required as lesions can reoccur more than 6 months after treatment. Nevertheless, some health facilities opt for 6-month follow-up appointments (especially for WLHIV). On the other hand, late rescreening's bear the risk of further progress of the lesions with the need for more radical treatments. Still, the WHO stresses that the best time for follow-up has yet to be verified by further studies.[1] In this study, 0.9% of treated patients received wrong re-appointments (up to 5 years after screening) and 5.4% were not reappointed at all. To ensure that health professionals are aware of the follow-up recommendations in the guidelines, it is crucial to address the lack of access to the guidelines in many CC screening facilities as revealed in the last SARA assessment.[12]

We found an overall recurrence rate of (10.4%), which is lower than the 15.7% published previously for Addis Ababa.[19] On the other side, our findings agree with the results of a study in Harar, Eastern Ethiopia[34] as well as the 10% recurrence rate that the WHO estimates for the general population after treatment.[1]

Factors Influencing Adherence to Follow-Up

Our study identified women's education as an important factor influencing adherence to follow up: higher education corresponded to higher likelihood of follow-up adherence.

Other studies have shown a relationship between CC screening uptake and education, with illiterate women facing higher barriers to accessing the healthcare system.[5,6,9,27,35] Educational status may impact health literacy, financial status, financial independence, occupation, and household responsibilities as well as traditional gender roles and sexual autonomy.[9,36-38] In a qualitative study from Kenya, health professionals perceived "lack of knowledge" as the most important barrier toward the treatment of precancerous lesions.[39] In our study, women aged over 40 years were more likely to adhere to follow up than younger women. This trend has already been shown by other studies, in which lower CC risk perception and higher stress levels in younger patients were mentioned as underlying reasons for their higher risk of non-adherence to CC screening recommendations.[38,40]

The *Hf-Score*, including health facility-related barriers to follow up screenings such as lack of counseling and long waiting times (Supplementary Table S5), revealed an influence on adherence to follow up: higher scores correspond to a higher risk of non-adherence. Several studies have discussed health-facility-related barriers and how to overcome them.[25-27,41,42] The health-facility-related barrier reported the most—by 131 (35.3%) patients (adherent and non-adherent to follow up) was "having to wait in the health facility for a medium/long time" (compare Supplementary Table S4). In the group of women non-adherent to follow up 55 (34.2%) said that they did not receive counseling about the follow-up from the healthcare provider vs 17 (8.1%) in the group of women adherent to follow up. This highlights the need for adequate counseling during the initial visit.

A significant effect of the individual barriers score could not be shown in our study. The individual barrier mentioned most frequently by our study participants (184 times) was "Fearing an adverse outcome of the follow-up screening" such as advancement of the lesion or treatment failure. Fear has repeatedly been mentioned as one of the major barriers to the uptake of screening.[43,44] Interestingly, in our sample, 133 (63.3%) of all women adherent to follow up reported fearing an adverse outcome of the screening compared to only 51 (31.7%) of those non-adherent to follow up. This suggests that fear of the advancement of the disease could also work as a motivator to attend follow-ups. One might also speculate that some fears can decrease after a positive CC screening experience and therefore have a lesser impact on adherence to follow up. Distance between home and health facility proved difficult to assess as many patients could not answer the question and not all entries seem plausible. We recommend a qualitative approach to gain insight into those barriers and enablers.

In our study, marital status and parity did not influence the risk of loss to follow up. Other studies have previously suggested the influence of male partners on adherence to post-treatment recommendations both in a supporting and hindering way.[39] Based on the research on uptake of CC screening it is likely that involvement and education of male community members will benefit women in all steps of their CC screening.[45,46] In our sample 149 (40.2%) stated that their partners were supportive of the CC screening and follow-up, while only 11 women (3%) reported that their partners denied support for CC screening.

The prevalence of HIV in our sample was very high (43.6%) in comparison to the HIV prevalence of Ethiopia's general population (1.2% for women between 15 and 49 years; up to 3.6% for women living in urban areas).[21] This can be explained as CC screening programs were initially targeting WLHIV,[6] as they are at higher risk of developing cancer. When those programs were opened for HIV-negative women, they often remained linked to HIV clinics. HIV has not shown to have a significant impact on adherence to follow up in our study, but as the HIV rates greatly vary between different health facilities and other unknown variables that could impact these results, adherence rates might be different in a sample of patients with HIV rates at the population level.

The follow-up adherence varies between the 2 regions included in our study. This difference could be for one, the levels of health facilities included were not the same: hospitals in the Oromia region vs primary health centers in Addis Ababa. Second, the telephone response rate was much higher in Addis Ababa than in Oromia region. Finally, the socio-demographic aspects of the regions vary[21] All this makes it difficult to interpret the differences in adherence to follow up between Oromia region and Addis Ababa. The *Addis Tesfa* project had shown a variation of adherence to follow up screenings between regions, with a higher level of adherence to follow up in Oromia region than in Addis Ababa.[15]

Reminder Systems as Enablers to Adherence to Follow-Up Screenings

Most interviewed women (298/371) received a reminder card and 96 received additional phone calls. Interestingly, 29% of WLHIV received reminder calls vs 25.4% of HIV unknown/negative women—therefore, we can conclude that the call-based reminder system has already been partially implemented for both women with and without HIV. Experiences with reminder systems show that text messages as well as phone calls can successfully increase adherence to follow up in low-resource settings.[47-50] In a study from Nigeria, only about half of the women could be reached via phone, even though phone numbers were registered for nearly all of them.[49] In the health facilities included in our study we experienced that often phone numbers are not registered for every client. Implementing an evidence-based patient reminder system is likely to improve adherence to follow up and phone-based systems carry a great potential, as the availability of phones increases, but consistent registration of patients in need of follow-up and their contact details are the basic requirements for this.

A difficulty in the interpretation of the impact of reminders in our study is, that we did not assess whether the phone call was made before or after the follow-up appointment. In case reminder calls were made only for those who had already missed their reappointment date, their efficacy might be even higher than shown in our model.

Strengths and Limitations

This study assesses levels of adherence in Addis Ababa and Oromia region and can be used as a baseline when measuring adherence to treatment and follow-up after CC screening over time. The large sample size and inclusion of various health facilities provide a solid basis. However, we were not able to retrieve records of all 820 VIA-positive women, which might enhance the adherence rates measured in our study, as patients with incomplete records might be less likely to

have received appropriate treatment and follow-up. The used definition of adherence to treatment and follow-up combines information from phone interviews and logbooks. While the registration in the logbooks might underestimate the adherence rates (by a lack of documentation or treatment/rescreening in other health facilities or not finding documented data during data extraction), phone interviews might tend to overestimate adherence rates due to social desirability and recall bias. We tried to minimize both biases by asking precise questions and assuring that interviewees were aware that the interviewer was not part of the health facility's team. We believe that our approach to relying on the logbooks as the primary source of information and adding information gathered in the phone interviews strengthens the reliability of our estimated adherence rates.

A selection bias applies to the interviewed women as the phone interviews could only be led with those women with access to a functional phone and a correctly registered phone number. This bias would particularly affect the number of women who received reminder phone calls in our sample, as those women whom we could not reach most likely also could not be reached by health professionals when making reminder calls. Since the lack of phone contact between the healthcare system and the patient is part of the actual scenario, we assume that our phone interview response rates reflect this issue.

Conclusions

Adherence to treatment and follow-up after positive screens is essential to reach the overall prevention goal of reducing the incidence and mortality of CC. While our study has shown that treatment services already work well, with a high rate of adherence to the *single-visit approach*, adherence to follow up still needs to improve. It was shown that many of the well-studied barriers to the uptake of CC screening also negatively affect the adherence to follow up recommendations. We welcome the addition of adherence to treatment and follow-up as key indicators of quality of screening programs in the official monitoring. We also recommend prospective studies into modifiable factors to increase adherence to follow up, as well as implementation research improving or establishing patient reminder systems.

Acknowledgments

The authors would like to acknowledge the efforts of the data collectors and the patients for participating.

Funding

The work was supported through the German Ministry of Research and Education, Grant 01KA2220B. This study was also supported by Else Kroener-Fresenius-Foundation Grant No. 2018_HA31SP. The study was also supported by a grant from Hospital Partnership through Deutsche Gesellschaft für Internationale Zusammenarbeit funded by the Ministry for Economic Cooperation and Development (ID 81281315).

Conflict of Interest

The authors indicated no financial relationships.

Author Contributions

Conception/design: C.Y.S., M.G., R.A., A.W., F.R., A.A., E.J.K. Provision of study material or patients: C.Y.S., M.G., R.A., A.W. Collection and/or assembly of data: C.Y.S., R.A. Data analysis and interpretation: C.Y.S., M.G., R.A., A.W., F.R., P.S., E.J.K. Manuscript writing: C.Y.S., M.G., R.A., A.W., F.R., B.M., B.T.M., E.J.K. Final approval of manuscript: All authors.

Data Availability

The data underlying this article cannot be shared publicly due to the privacy of individuals that participated in the study. The data will be shared on reasonable request to the corresponding author.

Supplementary Material

Supplementary material is available at *The Oncologist* online.

References

1. World Health Organization. *WHO Guideline for Screening and Treatment of Cervical Pre-cancer Lesions for Cervical Cancer Prevention*. 2nd ed. Geneva: WHO. 2021.
2. Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2021;71(3):209-249. https://doi.org/10.3322/caac.21660
3. World Health Organization. *Cervical Cancer country profiles – ETHIOPIA*. 2021. Accessed February 26, 2023. https://www.who.int/teams/noncommunicable-diseases/surveillance/data/cervical-cancer-profiles
4. Bruni L, Serrano B, Roura E, et al. Cervical cancer screening programmes and age-specific coverage estimates for 202 countries and territories worldwide: a review and synthetic analysis. *Lancet Global Health*. 2022;10(8):e1115-e1127. https://doi.org/10.1016/S2214-109X(22)00241-8
5. Yimer NB, Mohammed MA, Solomon K, et al. Cervical cancer screening uptake in Sub-Saharan Africa: a systematic review and meta-analysis. *Public Health*. 2021;195:105-111. https://doi.org/10.1016/j.puhe.2021.04.014
6. Federal democratic republic of Ethiopia. Ministry of Health (2021) Guideline for Cervical Cancer Prevention and Control in Ethiopia
7. Go Further Factsheet Ethiopia. 2022. Accessed December 6, 2023. https://www.state.gov/go-further-country-fact-sheets/
8. Ayenew AA, Zewdu BF, Nigussie AA. Uptake of cervical cancer screening service and associated factors among age-eligible women in Ethiopia: systematic review and meta-analysis. *Infect Agent Cancer*. 2020;15(1):67. https://doi.org/10.1186/s13027-020-00334-3
9. Desta M, Getaneh T, Yeserah B, et al. Cervical cancer screening utilization and predictors among eligible women in Ethiopia: a systematic review and meta-analysis. *PLoS One*. 2021;16(11):e0259339. https://doi.org/10.1371/journal.pone.0259339
10. Federal democratic republic of Ethiopia. Ministry of Health (2015) Guideline for Cervical Cancer Prevention and Control in Ethiopia. Accessed December 6, 2023. https://www.iccp-portal.org/resources-search
11. Mittal S, Basu P, Lucas E. Atlas of Visual Inspection of the Cervix With Acetic Acid for Screening, Triage, and Assessment for Treatment. 2020. Accessed February 26, 2023. https://screening.iarc.fr/atlasvia.php
12. Wasiyhun T, Beyene MG, Deghebo AD, et al. Availability and readiness of cervical cancer screening service at health facilities in Ethiopia. *Ethiop J Public Health Nutr.* 2021;4(2):141-145. Accessed December 6, 2023. https://ejphn.ephi.gov.et/index.php/ejphn/article/view/87

13. Cremer ML, Conzuelo-Rodriguez G, Cherniak W, Randall T. Ablative therapies for cervical intraepithelial neoplasia in low-resource settings: findings and key questions. *J Glob Oncol*. 2018;4:1-10. https://doi.org/10.1200/JGO.18.00093
14. Lott BE, Halkiyo A, Kassa DW, et al. Health workers' perspectives on barriers and facilitators to implementing a new national cervical cancer screening program in Ethiopia. *BMC Womens Health*. 2021;21(1):185. https://doi.org/10.1186/s12905-021-01331-3
15. Shiferaw N, Salvador-Davila G, Kassahun K, et al. The single-visit approach as a cervical cancer prevention strategy among women with HIV in Ethiopia: successes and lessons learned. *Glob Health Sci Pract*. 2016;4(1):87-98. https://doi.org/10.9745/GHSP-D-15-00325
16. Anderson J, Wysong M, Estep D, et al. Evaluation of cervical cancer screening programs in Côte d'Ivoire, Guyana, and Tanzania: effect of HIV status. *PLoS One*. 2015;10(9):e0139242. https://doi.org/10.1371/journal.pone.0139242
17. Li ZG, Qian DY, Cen JM, Chen GD, Shu YH. Three-step versus "see-and-treat" approach in women with high-grade squamous intraepithelial lesions in a low-resource country. *Int J Gynaecol Obstet*. 2009;106(3):202-205. https://doi.org/10.1016/j.ijgo.2009.04.011
18. Debeaudrap P, Sobngwi J, Tebeu P-M, Clifford GM. Residual or recurrent precancerous lesions after treatment of cervical lesions in human immunodeficiency virus-infected women: a systematic review and meta-analysis of treatment failure. *Clin Infect Dis*. 2019;69(9):1555-1565. https://doi.org/10.1093/cid/ciy1123
19. Bogale AL, Teklehaymanot T, Ali JH, Kassie GM, Medhin G. The recurrence of cervical precancerous lesion among HIV positive and negative Ethiopian women after cryotherapy: a retrospective cohort study. *Cancer Control*. 2022;29:10732748221129708. https://doi.org/10.1177/10732748221129708
20. Fouw M de, Oosting RM, Rutgrink A, et al. A systematic review and meta-analysis of thermal coagulation compared with cryotherapy to treat precancerous cervical lesions in low- and middle-income countries. *Int J Gynaecol Obstet*. 2019;147(1):4-18. https://doi.org/10.1002/ijgo.12904
21. Central Statistic Agency (CSA) [Ethiopia] and ICF. Ethiopia Demographic and Health Survey 2016, Addis Ababa, Ethiopia, and Rockville, Maryland, USA. 2016. Accessed December 6, 2023. https://dhsprogram.com/pubs/pdf/FR328/FR328.pdf
22. Hartung C, Lerer A, Anokwa Y, Tseng C, Brunette W, Borriello G. Open data kit. In: Unwin T, Kleine D, Toyama K. Proceedings of the 4th ACM/IEEE International Conference on Information and Communication Technologies and Development. ICTD '10: International Conference on Information and Communication Technologies and Development. London United Kingdom, 13-12-2010 to 16-12-2010. New York, NY, USA: ACM, S. 2010; 1–12.
23. Harris PA, Taylor R, Minor BL, et al; REDCap Consortium. The REDCap consortium: building an international community of software platform partners. *J Biomed Inform*. 2019;95:103208. https://doi.org/10.1016/j.jbi.2019.103208
24. Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42(2):377-381. https://doi.org/10.1016/j.jbi.2008.08.010
25. Manga S, Kiyang E, DeMarco RF. Barriers and facilitators of follow-up among women with precancerous lesions of the cervix in Cameroon: a qualitative pilot study. *Int J Womens Health*. 2019;11:229-239. https://doi.org/10.2147/IJWH.S196112
26. Jeong SJ, Saroha E, Knight J, Roofe M, Jolly PE. Determinants of adequate follow-up of an abnormal Papanicolaou result among Jamaican women in Portland, Jamaica. *Cancer Epidemiol*. 2011;35(2):211-216. https://doi.org/10.1016/j.canep.2010.07.004
27. Khanna N, Phillips MD. Adherence to care plan in women with abnormal Papanicolaou smears: a review of barriers and interventions. *J Am Board Fam Pract*. 2001;14(2):123-130.
28. Penchansky R, Thomas JW. The concept of access: definition and relationship to consumer satisfaction. *Med Care*. 1981;19(2):127-140. https://doi.org/10.1097/00005650-198102000-00001
29. R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical; 2021
30. Python Software Foundation. Accessed December 6, 2023. https://www.python.org/
31. SankeyMATIC. Accessed December 6, 2023. https://sankeymatic.com/
32. Historical currency converter: ETB to USD. 2022. Accessed December 6, 2023. https://fxtop.com/en/historical-currency-converter.php
33. Gebremariam A, Assefa M, Addissie A, et al. Delayed initiation of adjuvant chemotherapy among women with breast cancer in Addis Ababa, Ethiopia. *Breast Cancer Res Treat*. 2021;187(3):877-882. https://doi.org/10.1007/s10549-021-06131-9
34. Wakwoya EB, Gemechu KS. Prevalence of abnormal cervical lesions and associated factors among women in Harar, Eastern Ethiopia. *Cancer Manag Res*. 2020;12:12429-12437. https://doi.org/10.2147/CMAR.S279712
35. Ezechi OC, Petterson KO, Gbajabiamila TA, et al. Predictors of default from follow-up care in a cervical cancer screening program using direct visual inspection in south-western Nigeria. *BMC Health Serv Res*. 2014;14:143. https://doi.org/10.1186/1472-6963-14-143
36. Midaksa M, Destaw A, Addissie A, Kantelhardt EJ, Gizaw M. Women's sexual autonomy as a determinant of cervical cancer screening uptake in Addis Ababa, Ethiopia: a case-control study. *BMC Womens Health*. 2022;22(1):236. https://doi.org/10.1186/s12905-022-01829-4
37. Oh JH. Educational expansion and health disparities in Ethiopia, 2005–2016. *Soc Sci Med*. 2019;235:112316. https://doi.org/10.1016/j.socscimed.2019.05.021
38. Hui S-KA, Miller SM, Wen K-Y, et al. Psychosocial barriers to follow-up adherence after an abnormal cervical cytology test result among low-income, inner-city women. *J Prim Care Community Health*. 2014;5(4):234-241. https://doi.org/10.1177/2150131914529307
39. Chapola J, Lee F, Bula A, et al. Barriers to follow-up after an abnormal cervical cancer screening result and the role of male partners: a qualitative study. *BMJ Open*. 2021;11(9):e049901. https://doi.org/10.1136/bmjopen-2021-049901
40. Peterson NB, Han J, Freund KM. Inadequate follow-up for abnormal Pap smears in an urban population. *J Natl Med Assoc*. 2003;95(9):825-832.
41. Paolino M, Arrossi S. Análisis de los motivos del abandono del proceso de seguimiento y tratamiento por parte de mujeres con lesiones precursoras de cáncer de cuello uterino en la provincia de Jujuy: implicancias para la gestión (Analysis of the reasons for abandoning the follow-up and treatment process in women with pre-cancerous cervical lesions in the province of Jujuy: implications for health management). *Salud Colect*. 2012;8(3):247-261. https://doi.org/10.18294/sc.2012.165
42. Lim JNW, Ojo AA. Barriers to utilisation of cervical cancer screening in Sub Sahara Africa: a systematic review. *Eur J Cancer Care (Engl)*. 2017;26(1):e12444. https://doi.org/10.1111/ecc.12444
43. Woldetsadik AB, Amhare AF, Bitew ST, et al. Socio-demographic characteristics and associated factors influencing cervical cancer screening among women attending in St. Paul's Teaching and Referral Hospital, Ethiopia. *BMC Womens Health*. 2020;20(1):70. https://doi.org/10.1186/s12905-020-00927-5
44. Brandt T, Wubneh SB, Handebo S, et al. Genital self-sampling for HPV-based cervical cancer screening: a qualitative study of preferences and barriers in rural Ethiopia. *BMC Public Health*. 2019;19(1):1026. https://doi.org/10.1186/s12889-019-7354-4
45. Binka C, Doku DT, Nyarko SH, Awusabo-Asare K. Male support for cervical cancer screening and treatment in rural Ghana. *PLoS One*. 2019;14(11):e0224692. https://doi.org/10.1371/journal.pone.0224692

46. Munthali AC, Ngwira BM, Taulo F. Exploring barriers to the delivery of cervical cancer screening and early treatment services in Malawi: some views from service providers. *Patient Prefer Adherence*. 2015;9:501-508. https://doi.org/10.2147/PPA.S69286
47. Thomson KA, Sandoval M, Bain C, et al. Recall efforts successfully increase follow-up for cervical cancer screening among women with human papillomavirus in Honduras. *Glob Health Sci Pract*. 2020;8(2):290-299. https://doi.org/10.9745/GHSP-D-19-00404
48. Mabachi NM, Wexler C, Acharya H, et al. Piloting a systems level intervention to improve cervical cancer screening, treatment and follow up in Kenya. *Front Med (Lausanne)* 2022;9:930462. https://doi.org/10.3389/fmed.2022.930462
49. Nwankwo TO, Okoro SO, Ukekwe FI, Ajah LO, Ozumba BC. Cervical cancer screening, adherence to and challenges of follow-up in resources poor setting. *OJPM* 2019;09(09):105-114. https://doi.org/10.4236/ojpm.2019.99010
50. Abdul Rashid RM, Mohamed M, Hamid ZA, Dahlui M. Is the phone call the most effective method for recall in cervical cancer screening?—results from a randomised control trial. *Asian Pac J Cancer Prev*. 2013;14(10):5901-5904. https://doi.org/10.7314/apjcp.2013.14.10.5901

Supplementary Table 1. Sample size calculation

Objective	Assumptions	Calculated sample size
Adherence to treatment	98% [12]	31
Adherence to follow-up	51% [12]	383
Influence of variables from the logbook on follow-up	Common variables with influence (% $_{adherend}$ in exposed vs. unexposed) - Education: 65.5% vs 39.7% [32] - Younger age: 46% vs 24% [37] Enrolment ratio: 1	 188 238
Influence of variables from the phone interviews on follow-up	- Reminder calls: 3.6% vs 71.3% [45] Enrolment ratio: 5 Non-response rate: 50%	60

Supplementary Table 2. English version of the questionnaire used for the phone interviews.

Date of the interview	
Study ID from data extraction tool	

Part 1: Socio-Demographic Information

101	Age in years	
102	Place of residence	
103	Educational status	1. Illiterate 2. Can read and write 3. Elementary (Grade 1 – 8th) 4. Secondary (Grade 9 – 12th) 5. College and above
104	Occupational status	1. Government employee 2. Private employee 3. Merchant 4. Daily labourer 5. Retired 6. housewife 7. Unemployed 8. Other, please specify: _____
105	Marital status	1. Single 2. Married 3. Cohabitating 4. Divorced 5. Separated 6. Widowed
106	Average monthly income	_____ Ethiopian birr
107	Have you given birth?	1. Yes

		2. No
108	*If yes in Q107*, how many times did you give birth?	_____ times

Part 2: Treatment of the precancerous lesion

Before the start of this part, please, make sure that you are talking about the cervical cancer screening of the day that we found in the logbook. *For example:* "In the documentation of this health facility we saw that you went to cervical cancer screening in November 2008. There you had an abnormal result. I would like to talk to you about this screening experience."		
201	Did you receive treatment for the detected suspicious cervical lesion? (*Explain treatment*)	1. Yes 2. No -> *continue with Q.204*
202	Did you receive treatment for the detected lesions at the day of screening?	1. Yes -> *continue with part 3.* 2. No
203	How many days passed between screening and treatment? *(If the exact number of days unknown, please estimate)*	_____
204	Why didn't you receive treatment? *(Only if the answer for Q201 is `No`)*	_____
- If the patient didn't receive any treatment for the precancerous lesion, please end the interview here!		

Part 3: Follow-up after treatment of precancerous lesions

301	Did you receive any cervical follow-up examination around a year after you received treatment?	1. Yes -> *continue with part 4.* 2. No
302	*If no,* what were the reasons for not receiving your follow-up examination? (*multiple choice is possible*)	1. Lack of time 2. Travel costs 3. I forgot. 4. I didn't think I needed follow-up. 5. Fear of outcome 6. Un-supportive spouse

		7. Not told to do so. 8. Preference of other treatments 9. Other: _____
303	What was your number 1 reason for not coming back?	1. Lack of time 2. Travel costs 3. I forgot. 4. I didn't think I needed follow-up. 5. Fear of outcome 6. Un-supportive spouse 7. Not told to do so. 8. Preference of other treatments 9. Other

Part 4: Individual barriers to follow-up after treatment of precancerous lesions

401	Did you fear an adverse outcome of your follow-up screening? *(Advancement of the lesion or treatment failure)*	1. Yes 2. No
402	Did you fear the screening procedure? *(Pain or embarrassment)*	1. Yes 2. No
403	Did you know the need for follow-up screening?	1. Yes 2. No
404	Did you forget the follow-up appointment?	1. Yes 2. No
405	Did you find it easy to reach the health facility for cervical cancer screening?	1. Yes 2. No
406	How did you see the transportation cost for visiting the health facility?	1. Affordable 2. Unaffordable
407	Did you have time to attend the follow-up appointment?	1. Yes 2. No
408	*If your answer is no*, what was your reason?	1. Could not miss work. 2. Childcare 3. Other, please specify: _____
501	What is your husband's/male partner's attitude on your cervical cancer screening? *(If married or cohabitating)*	1. Denied support. 2. Didn't give any feedback. 3. Gave support
502	Did you receive traditional/spiritual treatment for your cervical cancer screening results?	1. Yes 2. No
503	How far is your home from health facility to get cervical cancer screening service?	_____ km

Part 5: Health facility related barriers to follow-up after primary screening and treatment.

601	Did you receive counselling about follow- up from the care provider?	1. Yes 2. No
602	Did the care provider explain the timing of your follow-up appointment?	1. Yes 2. No

603	How did you see the waiting time in the health facility to get cervical screening service?	1. Long waiting time 2. Medium waiting time 3. Short waiting time
604	What was the gender of care provider?	1. Male 2. Female
605	How did you see the behaviour of staff providing cervical cancer screening and treatment?	1. Unhappy with staff behaviour 2. Happy with staff behaviour
606	Have you ever missed follow-up screening due unavailability of the service when you went to the facility?	1. Yes 2. No
607	Did you receive a reminder card with the date of the follow up appointment during your first visit?	1. Yes 2. No
608	Did you receive a call from staff in the health facility to remind you of your follow-up appointment date?	1. Yes 2. No
609	How would you feel about receiving text messages to remind you of the follow-up examination?	1. I would find it helpful. 2. I would not mind it. 3. I would not like it.
610	Did you experience any challenges at the health facility?	1. Yes 2. No
611	*If yes in Q 44,* what were the challenges you experienced? (*Multiple answers possible*)	1. Shortages of health commodities 2. Shortage of staff 3. Staff attitude (lack of friendliness) 4. Long waiting time 5. Privacy 6. Other, specify: _____
Thanks for participating in the phone interview! Is there anything you can think of what could be changed to make your follow-up experience better?		

Supplementary Table 3. Overview of imputations before applying the generalized linear models.

Variable	**Value**	**Observations in Model 1 (n = 671)**	**%$_{model1}$**	**Observations in Model 2 (n = 371)**	**%$_{model2}$**
Age	Logbook value	664	99	365	98.4
	Phone interview value (minus years between phone interview and screening)	6	0.9	6	1.6
	IMPUTED (Median = 34)	1	0.1	0	0
Marital status	Logbook value	664	99	366	98.7
	Phone interview value	5	0.7	5	1.3
	IMPUTED ("Married")	2	0.3	0	0
Parity	Logbook value	652	97.2	357	96.2
	Phone interview value	8	1.2	8	2.2
	IMPUTED (Median = 2)	11	1.6	6	1.6
Education	Logbook value	657	97.9	362	97.6
	Phone interview value	9	1.3	9	2.4
	IMPUTED ("Primary education")	5	0.7	0	0
Occupation	Phone interview			366	98.7
	IMPUTED ("Other")			5	1.3
Income	Phone interview			358	96.5
	IMPUTED (Median = 3000 ETB)			13	3.5

Supplementary Table 4. Basis for the calculation of the scores for barriers and enablers

	Impact on the score	**Total** n = 371	**Rescreened** n = 210	**Not rescreened** n = 167
Individual barriers – Score				
Fearing an adverse outcome	+1	184 (49.6%)	133	51
Fearing screening procedure	+1	169 (45.6%)	118	51
Not knowing the need for follow-up	+1	62 (16.7%)	8	54
Forgetting follow-up appointment	+1	104 (28%)	47	57
Not reaching the health facility easily	+1	58 (15.6%)	28	30
Difficulty affording transportation costs	+1	54 (14.6%)	28	26
Not having time for attending the follow-up	+1	31 (8.4%)	1	30
Male partner denied support	+1	11 (3%)	7	4
Male partner gave support	-0.5	149 (40.2%)	96	53
Receiving traditional treatment	+1	20 (5.4%)	10	10
Distance home to health facility >5km	+1	163 (43.9%)	80	83
Health facility barriers – Score				
Not receiving counselling	+1	72 (19.4%)	17	55
Not receiving counselling about timing of follow-up	+1	58 (15.6%)	13	45
Having to wait for a medium to long time	+0.5	131 (35.3%)	70	61
Being unhappy with the staff behaviour	+0.5	20 (5.4%)	12	8
Experiencing unavailability of the service	+1	26 (7%)	16	10
<u>Challenges</u> - Shortage of health commodities	+1	7 (1.9%)	6	1
- Shortage of staff	+1	10 (2.7%)	7	3
- Long waiting time	+0.5	4 (1.1%)	2	2
- Lack of privacy	+1	20 (5.4%)	14	6
- Staff attitude	+0.5	13 (3.5%)	9	4
- Other challenges	+1	9 (2.4%)	4	5

The Oncologist, 2024, **XX**, 1–9
https://doi.org/10.1093/oncolo/oyae305
Advance access publication 18 November 2024
Original Article

Barriers to adherence of posttreatment follow-up after positive primary cervical cancer screening in Ethiopia: a mixed-methods study

Rahel Alemayehu[*,1,2], Clara Yolanda Stroetmann[2], Abigiya Wondimagegnehu[1,2,3], Friedemann Rabe[2], Adamu Addissie[1,2,3], Eva Johanna Kantelhardt[2,4], Muluken Gizaw[1,2,3]

[1]Department of Epidemiology and Biostatistics, School of Public Health, College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia
[2]Global Health Working Group, Institute of Medical Epidemiology, Biometrics and Informatics, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany
[3]NCD Working Group, School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia
[4]Department of Gynaecology, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany

[*]Corresponding author: Rahel Alemayehu, School of Public Health, College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia (alemayehurahel471@gmail.com).

Abstract

Background: Even though it is preventable, cervical cancer contributes significantly to cancer-related mortality among Ethiopian women. Follow-up visits after treatment of precancerous lesions are essential to monitor lesion recurrence. In our previous study, we found a level of adherence to follow-up of 44.7%, but the reasons for low adherence have not been comprehensively explored within the Ethiopian context. This study aimed to identify these reasons by interviewing 167 women who had missed their follow-up appointments as well as 30 health professionals with experience in the field.

Methods: The study employed a mixed-methods approach: Quantitative data were collected through a telephone questionnaire conducted with 167 women who had a positive visual inspection with acetic acid (VIA) and had missed their follow-up appointments. Subsequently, in-depth interviews were conducted with 30 healthcare professionals, and an inductive content analysis was carried out.

Results: In the patient interviews, the reasons given most often were "lack of information about the follow-up" (35; 21.1%), "forgetting the appointment" (30; 18.1%), and "not seeing the need for follow-up" (24; 14.5%). Healthcare professionals identified various reasons such as lack of knowledge, living in a remote area/changing living area, forgetfulness, fear, poor counseling, a shortage of trained healthcare providers to give counseling and follow-up, and reminder-related barriers.

Conclusion: Lack of knowledge, forgetfulness, poor health-seeking behavior, and a lack of reminders were identified as barriers contributing to the low uptake of rescreening. Further interventions should target these by creating community awareness, improving patient counseling, tracing patients in need of follow-up, and making reminder calls or using SMS.

Key words: cervical cancer screening; adherence to follow-up; barriers; cryotherapy; Ethiopia.

Implications for Practice

This study may inform the development of healthcare policies and interventions tailored to address specific challenges faced by patients with visual inspection with acetic acid (VIA)–positive lesions. It has highlighted areas where posttreatment follow-up services can be improved and can help integrate follow-up services more seamlessly into existing healthcare systems. Our results may help in adjustments to be made to interventions based on emerging challenges. By addressing the barriers to posttreatment follow-up after positive VIA screening, healthcare systems can improve the effectiveness of cervical cancer screening programs and reduce the burden of the disease.

Introduction

In high-resource countries, cervical cancer screening has been shown to reduce the incidence and mortality of the disease.[1-3] However, in Ethiopia, cervical cancer is still the second leading cause of cancer death among women, with an estimated 7445 new cases and 5338 deaths in 2020.[4] The Ethiopian Ministry of Health (MoH) recommends cervical cancer screening (CCS) via visual inspection with acetic acid (VIA) every 5 years and intensified screening for women living with HIV (every 2 years). Those with a previous positive screening should rescreen 1 year after treatment.[5] If precancerous lesions are found, those are usually treated with

Received: 27 May 2024; Accepted: 9 September 2024.

cryotherapy or thermal ablation, preferably in a single-visit approach.

Approximately 15% of women encounter recurrent or residual precancerous lesions after treatment.[6] The influence of the HIV status on recurrence rates has been discussed, but while some studies have shown higher recurrence rates in women living with HIV, clear evidence is still lacking.[7-10]

Studies in different settings have indicated high rates of loss to follow-up after screening and treatment of precancerous lesions, ranging from 32% to 80.3%.[11-15] The level of adherence to follow-up found in our previous study among a cohort of 741 Ethiopian women in Oromia and Addis Ababa was 44.7%.[16] Due to resource limitations and poor organization of healthcare systems, limited adherence to follow-up continues to be a problem in low- and middle-income countries and is associated with an elevated risk of developing cervical cancer.[17]

Previous studies in other countries have identified various barriers to compliance with follow-up requirements. These include socio-demographic factors such as the women's educational level, the influence of male companions or partners, financial constraints per transportation to healthcare facilities, and fear of adverse effects such as infertility. Furthermore, facility-related barriers such as staff attitude, cost of service, and inadequate counseling have also emerged.[18-21]

Identifying barriers to adhering to posttreatment follow-up can help policy-makers and program managers address those obstacles through designing effective interventions. This, in turn, may enhance women's adherence to posttreatment follow-up to prevent the recurrence of precancerous cervical lesions and their progression into invasive cancer. As of now, little is known about barriers associated with nonadherence in Ethiopia. Therefore, this study aimed to fill the gap by exploring barriers to posttreatment follow-up in Addis Ababa and the Oromia region of Ethiopia.

Methods

Study design and setting

This study was a continuation of a 2022 study involving 10 health centers located in 4 subcities of Addis Ababa and 4 hospitals in the Oromia region. The results from logbook reviews and phone interviews were detailed in our previous paper, which also provides a comprehensive overview of the methodologies employed for the phone interviews, including questionnaire and sampling procedures.[16] This paper specifically explores reasons for nonadherence to follow-up from patients. The in-depth interviews (IDIs) focused on health professionals' experiences with facility and community-related barriers.

Quantitative data collection and analysis

All women with registered phone numbers (574 patients) were invited to participate in a questionnaire-based phone interview, and 399 responded. Of these, 365 received initial treatment of their precancerous lesion. The adherence to post-treatment follow-up among our phone interview participants was 54.2%; the remaining 167 women were questioned about the reasons for nonadherence to follow-up; 166 responded. As part of the quantitative questionnaire-based interview, 9 choices based on our literature review were provided: lack of time, travel costs, "I forgot," "I didn't think I needed follow-up," fear of outcome, unsupportive spouse, "not told to do so," preference of other treatments, and the option "other" where women could elaborate. The responses to the "other" question were categorized by the 2 principal investigators which led to the result in Figure 1.

Qualitative data collection and analysis

The qualitative IDIs with 30 healthcare professionals working in the field of CCS were conducted by a team of 2 trained research assistants and 1 of the principal investigators. Our interview partners included medical directors of hospitals, CCS service providers or focal personnel, noncommunicable disease (NCD) team leaders, and maternal and child health coordinators. The interviews were conducted in the local language Amharic, audio-recorded, and supported by field notes. The interview guide (Supplement 1) developed by the principal investigators aimed to explore barriers linked to post-treatment follow-up adherence following CCS.

All the recorded interviews were transcribed and translated into English verbatim. These translated data were uploaded onto qcamap.org[22] and subjected to coding using inductive content analysis techniques, first led by the principal investigator and then cross-checked by the research team. The content analysis was geared toward synthesizing findings and identifying key themes, aligning with inductive category formation methodology.[23] The research question was: "What aspects lead to loss of follow-up after treatment of precancerous cervical lesions from a health worker's perspective?" A coding-recoding evaluation agreement was achieved.

Ethical approval

Our study adhered to ethical standards with clearance granted by the School of Public Health, Addis Ababa University (Ref. No.SPH/1321/14). All the interviewed participants were informed about the study's objectives, and their consent to participate was obtained.

Results

Patients' characteristics

In Table 1, an overview of the socio-demographic characteristics of the 166 patients is presented. The median age was 34 years. Almost three-fourths (120, 72.3%) of the interviewed women were currently married, and most (148, 89.2%) had at least 1 child. The majority were either illiterate (32, 19.3%) or had only primary education (48, 28.9%). More than one-third were "housewife/unemployed" (57, 34.3%), while the private sector (42, 25.3%) and government employees (39, 23.5%) also participated. The median self-reported income was 3000 ETB (52.8 USD) per month.

Patients' reasons for not attending follow-up

The most common predefined reasons selected were not being informed about the follow-up (35, 21.1%) and forgetting the appointment (30, 18.1%). Other common reasons chosen by respondents included not perceiving the follow-up as necessary/feeling healthy (24, 14.5%) and lack of time (19, 11.4%). Among the reasons, participants cited independently included having moved or being temporarily away (20, 12%), which were significant factors in missing appointments (Figure 1).

Health professionals' perspectives

Characteristics of the 30 interviewed health professionals are displayed in Table 2. Eighteen (60%) were females, with

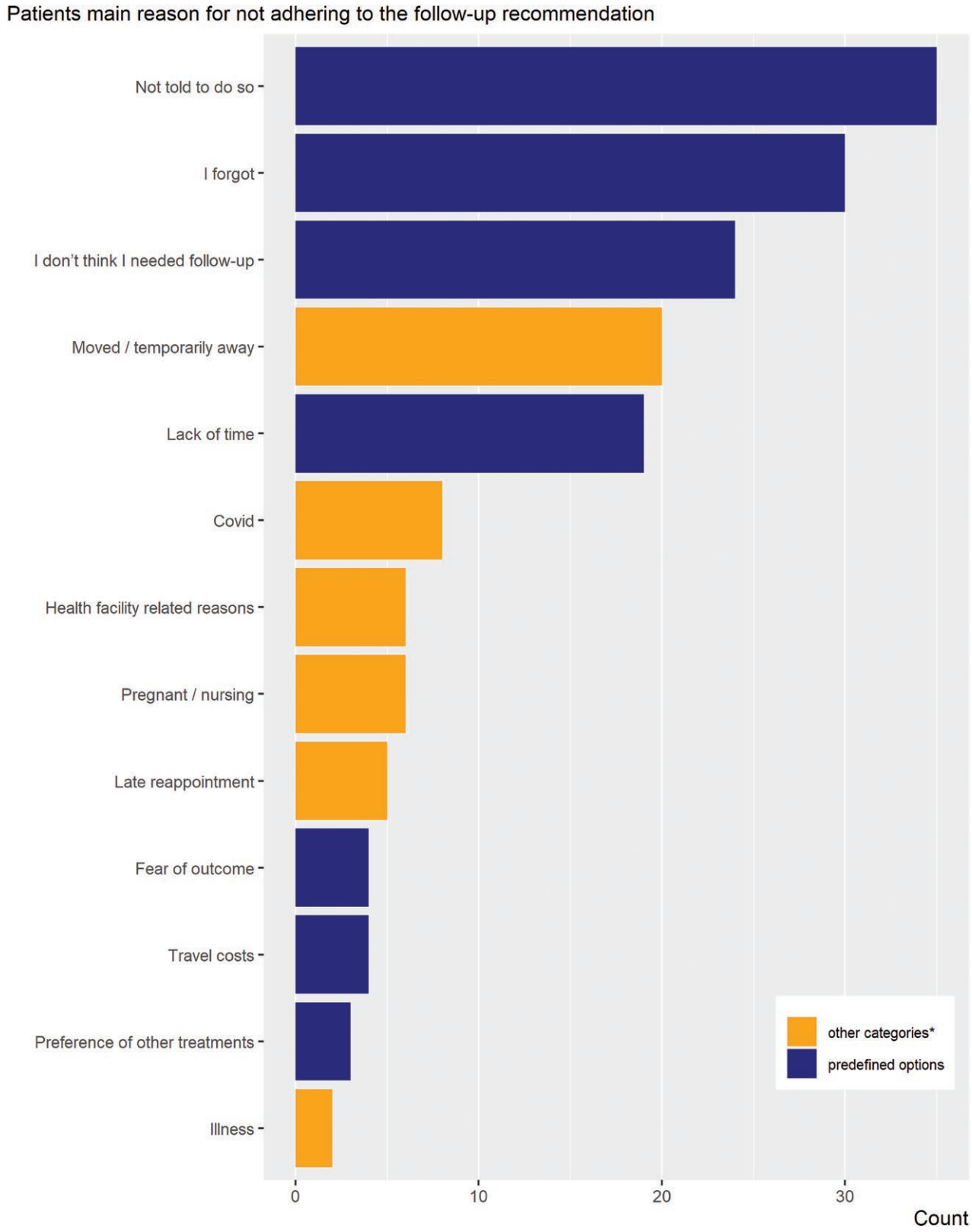

Figure 1. Reasons for not adhering to follow-up appointments as stated by patients (n = 166; one answer per patient).

a median age of 32.5 years. More than three-fourths (23, 76.7%) received special training on CCS.

Barriers to adhering to follow-up were categorized into 2 distinct groups: patient-related and facility-related barriers (Supplement 2). Patient-related barriers included socioeconomic hindrances, lack of awareness, poor health-seeking behavior, residency-related barriers (like living in a very remote area/changing living area, or difficulty taking public transport to the health facility), forgetfulness, and fear. Facility-related barriers included a shortage of trained

Table 1. Socio-demographic characteristics of patients who did not adhere to follow-up (n = 166).

Variable	Units	Frequency (%) n = 166
Age	≤29 years	35 (21.1%)
	30–34 years	53 (31.9%)
	35–39 years	47 (28.3%)
	≥40 years	31 (18.7%)
	Median age (IQR)	34 years (8)
Marital status	Married	120 (72.3%)
	Divorced	25 (15.1%)
	Single	13 (7.8%)
	Widowed	8 (4.8%)
Parity	0	18 (10.8%)
	1	52 (31.3%)
	2	45 (27.1%)
	3	22 (13.3%)
	>3	29 (17.5%)
Educational Status	Illiterate	32 (19.3%)
	Can read and write	13 (7.8%)
	Primary education	48 (28.9%)
	Secondary education	38 (22.9%)
	College	35 (21.1%)
Occupation	Housewife/unemployed	57 (34.3%)
	Private employee	42 (25.3%)
	Government employee	39 (23.5%)
	Daily laborer	14 (8.4)
	Merchant	9 (5.4%)
	Farmer	1 (0.6%)
	Unknown	4 (2.4%)
Monthly income	Median	3000 ETB (52.8 USD)[a]

[a]Converted using http://www.forbes.com.

healthcare providers, deficient counseling practices, and reminder-related barriers, such as a lack of staff to facilitate reminder calls, no telephone in the CCS unit, frequent change of logbook, and improper documentation of patient data.

Patient-related barriers

During the IDIs, the participants emphasized socioeconomic factors that impeded women from attending follow-up appointments. They described heavy workloads at home that prevented most women from leaving, with insufficient time for their own health. An NCD team leader portrayed this situation, stating: "Women's burden in the community is high from performing different activities including child raising, social activity, community engagement, and income-generating activities. So, they are too busy to take the screening and treatment programs" (age 32). Participants discussed the influence of husbands in women's health decisions, with 1 CCS service provider noting: "[The] husbands' influence is another factor since most women economically depend on their husbands. So, they have to respect their husbands' decisions to undergo treatment and follow-up" (age 30). Also, transportation costs were identified as a possible challenge to accessing follow-up services. An NCD team leader pointed out: "They may also have an economic problem such as lack of money for transportation" (age 52).

The geographical distance to the health facility was also considered an impeding factor for both patients and healthcare providers, as illustrated in the following quote: "We try to contact them directly in person by searching for their permanent residence location based on the contact information from the patient's card collaboratively with the health extension workers. This process works for only those clients whose location is in our woreda[administrative region]" (CCS service provider, age 34). A medical director expressed the belief that women who frequently change their place of residence are at higher risk of missing their follow-up screening, saying: "They may move after screening and treatment. But the permanent residents return for follow-up. One factor for not coming back for their follow-up is being a non-permanent resident" (age 35).

Another prevalent subtheme was the lack of awareness about cervical cancer preventive measures, as expressed by 1 participant: "The biggest barrier on the patient side is the awareness gap, because most of the clients' awareness about the importance of follow-up is very low" (CCS focal person, age 34). The lack of awareness was particularly problematic because women undergoing screening typically remain asymptomatic and perceive themselves as healthy. The absence of noticeable symptoms and the limited understanding of the screening's preventive effect were recognized as significant

Table 2. Characteristics of interviewed health professionals ($n = 30$).

Variables	Categories	Frequency
Sex	Male	12
	Female	18
Age	≤29 years	5
	30–34 years	14
	35–39 years	5
	≥40 years	6
	Median age (IQR)	32.5 (6)
Work position	CCS focal or service provider	16
	Medical director	3
	NCD team leader	9
	MCH coordinator	2
Work experience on the position in years	≤2 years	17
	3–5 years	9
	6–10 years	4
CCS training	Yes	23
	No	7
Cryotherapy training	Yes	22
	No	8

Abbreviation: MCH: maternal and child health.

barriers by various interviewees, expressed in the following statements: "Especially those who come from rural areas, if they don't understand the importance or if they don't see any signs, they may be left behind" (medical director, age 43), and "since there are no physical symptoms, they see if they live far from the hospital, they decide not to spend the transport fee and conclude that they are fine" (CCS service provider, age 45).

Another interviewee explained that, when asking patients why they delayed the follow-up screening, "they used to mention that they were fine; they observed no symptoms or they forgot their appointment" (CCS focal person, age 34). This statement also emphasized the absence of symptoms as a predicament and additionally introduced forgetting the follow-up appointment as a common explanation for missing or delaying the follow-up screening. A perception that was shared by another interviewee who said, when asking his clients "why they didn't show up for their follow-up appointment on the scheduled date, the majority of them said they had forgotten" (CCS service provider, age 28).

Finally, a fear of pain during examination or treatment emerged as a recurring motive. One NCD team leader claimed: "The major barrier [is] the fear the clients have towards the metal speculum. Some of them even after taking the screening for the first time won't come again for follow-up since they remember the procedure with the metal speculum" (age 30). Another participant shared: "When we conduct cryotherapy, there might be some kind of pain or bleeding in some cases, so due to the fear of such kinds of symptoms, they didn't want to receive the treatment" (NCD team leader, age 29). In 1 specific case, when an NCD team leader asked a client for her reasons not to come back for the follow-up screening, "the answer was fear of the pain of the [cryotherapy] process" (age 29).

Health facility-related barriers

The second group of barriers discussed during the IDIs was factors related to the structure and equipment of the health facilities, and on a grander scale, the healthcare system. One central topic was poor counseling by healthcare providers. Interview partners expressed the belief that clients are willing to follow the advice given by healthcare professionals but often do not receive adequate counseling. For example, 1 NCD team leader stated: "From my experience, our community believes and accepts advice from health professionals if well informed. But if in-depth counseling is not given, and if it is given in a rush, it could be one reason" (age 52). Some of the health professionals argued that poor counseling was related to an insufficient number of healthcare providers. A medical director said: "[Patients do not] get good counseling due to the lack of health care providers in cervical cancer screening units. […] There are only two healthcare providers there. Even there was one previously. There is a lack of time, so I don't think they give attention to counseling" (age 36).

According to most of the interviewed partners, the shortage of trained staff did not only affect the quality of the counseling but also the provision of the follow-up screening itself. As pointed out in the following remark, most health centers employed only 1 person providing CCS, without a backup: "In most health facilities, in health centers that have a shortage of personnel, there is only one trained health care provider. Most of the time, they are nurses or midwives. When the nurse or midwife placed there has night duty and becomes the day off, the clients lose the service due to this" (CCS service provider, age 35). Furthermore, the participants explained that the health professionals providing CCS were often required to assist in other parts of the health facility and were therefore unable to provide the service. Examples included: "Due to different campaign programs like vaccination programs which include polio and COVID-19 vaccination[…]the precancerous cervical cancer screening program may halt the service for the duration of the campaign work" (CCS service provider, age 28), and "during these times [when I am working on another hospital task], this room is closed; mothers won't be able to find me, and as a result, they leave without being rescreened" (CCS service provider, age 45). Especially those clients who came to the health center for screening but did not encounter anyone, there were often lost to follow-up.

Another frequently mentioned issue was the insufficient reminder system. While many health professionals described solely relying on appointment cards, only a minority said they called patients regularly. The reasons for not being able to call clients touched on different aspects. Lacking the necessary telephone was pointed out by 1 NCD team leader: "The first thing that I want to mention in this area is that health professionals in the department didn't make phone calls as reminders for follow-up examinations. Maybe they have different reasons for that including a lack of office telephone access and a mobile card" (age 29). One CCS provider even described using her private phone to make the phone calls: "In my previous experience, I called clients as a reminder for their appointment date, and they came for their follow-up. But later, they saved my phone number and called me outside of working hours, including midnight, just to discuss other medical conditions" (age 32). Some participants also related the deficient reminder system with the shortage of staff: "Since only one health care provider is working here, there is

a problem with tracking and calling appointed women. […] If there are two healthcare providers, it may be easier to select post-treatment follow-up mothers or untreated mothers and make calls to remind them" (CCS service provider, age 29)

A third aspect mentioned regularly in relation to the reminder system was the quality of the documentation. Difficulties regarding the logbook documentation were described by this CCS service provider: "I occasionally come across documentation issues such as illegible handwriting, unregistered phone numbers, incorrectly addressed names, and missing appointment dates" (age 30). Additionally, frequent changes of the logbook format were mentioned: "Sometimes, it [the logbook] is changed after we use only the first page. It is extra work to find the old one. […] If it is changed within months or weeks, we lose mothers in between because we don't focus on the old logbooks" (CCS service provider, age 29).

Actions to be taken by responsible bodies of the healthcare system

The IDI participants suggested different strategies (Figure 2) for all involved stakeholders to address the given barriers across all levels of the healthcare system to subsequently improve the adherence to follow-up. The stakeholders include the MoH, health bureaus, health facilities, and health professionals who work in CCS departments. The MoH is responsible for providing high-quality beginner and refresher trainings for CCS and cryotherapy; in those trainings, the importance of follow-up and in-depth counseling should be stressed, and guideline adherence promoted. Subsequently, the MoH might offer a system of supervision and allow feedback discussions with health professionals and health facilities. Together with the health facilities, the MoH should ensure that the materials necessary for CCS and treatment are available. Besides those materials, health facilities should provide rooms that are easy to locate and allow appropriate privacy while conducting CCS as well as phone access for reminder calls in all CCS units. What is more, some of the interviewed staff shared their disappointment about missing linkage with other departments within the same health facility, such as gynaecology, out patient department (OPD), and HIV departments. The health professionals providing CCS should uphold a high standard of care, provide good information and counseling, track women in need of follow-up, and make reminder calls. Finally, all stakeholders were encouraged to work together to raise community awareness.

Discussion

In this study, the most common reasons given by women who did not attend rescreening 1 year after treatment for precancerous lesions were not being aware of the follow-up, forgetfulness, perceiving follow-up as not needed, feeling healthy, moving to another place, being temporarily away, and lack of time. The findings from the IDIs conducted with health professionals aligned around barriers to posttreatment follow-up, including lack awareness, forgetfulness, poor health-seeking behavior, residency-related barriers, and lack of time due to household responsibilities. Moreover, the health professionals reported health-facility-related barriers such as a shortage of trained healthcare providers, a poor counseling service, and the lack of a reminder system.

The telephone participants mentioned not being aware of the follow-up as a common reason for not adhering to follow-up recommendations. A cohort study conducted in Cameroon also reported the lack of information as a main barrier to rescreening.[24] Most of our IDI participants also agreed that the lack of awareness was one of the main barriers to women's adherence to their posttreatment follow-up. Poor health-seeking behavior was another barrier discussed. Health professionals stressed that women might think that there is no need to go to the health facility if they do not feel sick, which can be explained by a lack of awareness and poor understanding of the importance of posttreatment follow-up.

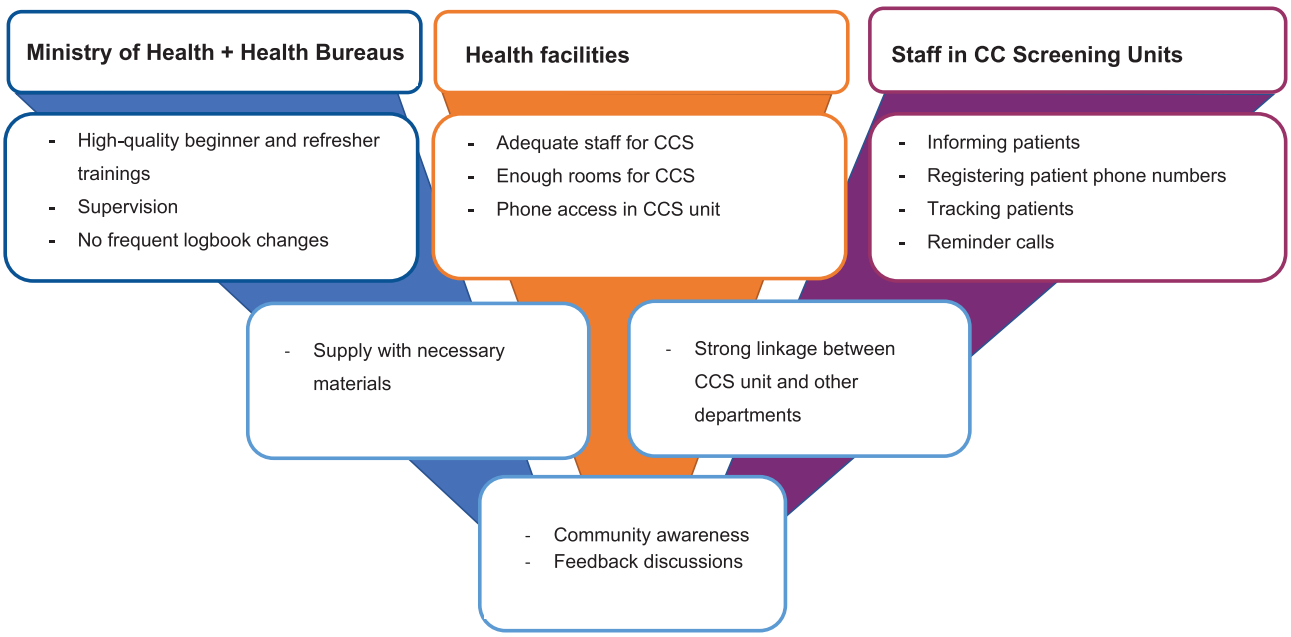

Figure 2. Recommended actions by responsible bodies in the healthcare system to improve cervical cancer screening follow-up adherence mentioned by the health professionals.

Studies conducted in southwest Nigeria,[25] the United States,[26] and a multicountry research project in Bolivia, Peru, Kenya, South Africa, and Mexico[20] also support this finding. This issue can probably be minimized by effective counseling.

Conversely, poor counseling services were cited as a barrier. This is supported by a qualitative study in Cameroon that found inadequate counseling as a barrier to follow-up of precancerous lesion treatment.[21] A study in Jamaica showed that women who were given advice on follow-up timing were 6 times more likely to seek appropriate follow-up.[27] Other studies also showed that adherence to follow-up was associated with effective communication, being informed of their screening results, and having correct awareness of the outcome.[28] Hence, counseling can serve as a tool for educating patients on the necessity of follow-up procedures, addressing fear, providing emotional support, and overcoming barriers. Adequate and culturally adaptive counseling should be given to patients to improve adherence to follow-up.

Forgetting the appointment was mentioned by both the patients and health professionals as one of the main reasons for the loss of follow-up. This might be due to patients' lack of attention due to other responsibilities or the lack of a reminder. These findings align with a study based on a review of several studies showing "forgetting appointments" as one of the most common barriers to follow-up.[28] Apart from good counseling, reminder systems could be one effective way of diminishing this barrier; the Ethiopian cervical cancer prevention and control guideline recommends "telephone women at home or at work" and "health extension workers and case managers to contact women directly at home."[5] A study in Honduras found that reminder phone calls were highly successful at recalling women for HPV retesting.[29] Another study conducted in Kenya revealed that sending SMS reminders for revisits resulted in a 5-fold rise in the number of patients who received clinically appropriate care following a positive screening result.[30] The Tanzanian study also found that the majority of HPV-positive women attended their follow-up appointment after receiving a text message.[31] However, despite the guideline suggesting to telephone women who do not return for follow-up, in the IDIs, it became clear that these reminder systems are not yet well implemented due to various reasons, including missing telecommunication equipment, difficulties in tracking eligible patients due to frequent changes of screening logbooks, and a shortage of staff.

Staff shortage was also discussed as a key problem in providing the required services for follow-up; in particular, the absence of healthcare providers conducting the screening during operation hours, insufficient personnel to ensure adequate documentation, and a lack of time to provide adequate counseling posed as major challenges. Problems with trained staff not working at respective sites and additional responsibilities of service providers other than CCS and treatment were already identified in the health facility assessment of the Addis tesfa project in Ethiopia.[14] A study that summarizes the experiences of research projects in different countries came to similar conclusions regarding staff shortages and their effect on follow-up.[20]

Another identified barrier was the fear of pain during an examination or therapy. This finding is consistent with a review of several studies that identified "fear of diagnosis and treatment" as one of the obstacles to follow-up.[28] Some people may skip rescreenings out of fear of experiencing pain. Severe pain during these procedures is not generally anticipated. Women who experience severe pain on their first visit should receive extra attention and counseling for the following visits, and it is critical for patients to express their fears and discomfort in order to receive appropriate support and treatment.

During the IDIs, geographical distance from the health facility, transport costs, and changing the place of residence were frequently discussed as patient-related barriers to adhering to a follow-up screening. A study in Honduras also mentioned moving away from the clinic area as a barrier to follow-up adherence.[29]

Another barrier in this study was the husband's influence on the health-seeking behavior of the clients, in line with studies in Cameroon[21] and Mexico[20] that showed male partners' influence and lack of support to attend follow-up visits as barriers to follow-up. In another study conducted in rural Lilongwe, Malawi, male companions were mentioned as both barriers and valuable sources of support including encouragement, emotional support, and assistance in overcoming transportation obstacles.[32] The clients' responsibilities such as childcare were also discussed in our study. Research to identify hurdles to follow-up in Latina women with abnormal Pap smears who were referred for colposcopy also identified childcare responsibility as a barrier.[26]

Strengths and limitations

To our knowledge, this mixed-methods study was the first of its kind to give insight into barriers to adherence to follow-up recommendations in Addis Ababa and the Oromia region. The findings from both methods complement each other, including perspectives from different health professionals that allow for a broad picture of the health facility-related barriers. However, IDIs were conducted only with healthcare providers since we were unable to interview patients in person. We tried to tackle this issue by addressing reasons for not attending follow-up during the quantitative telephone interviews.

Conclusion

This mixed-methods study assessed various barriers to follow-up after treatment for cervical precancerous lesions in Ethiopia. We identified that the lack of a patient tracking system and a lack of reminders contributed to the low uptake of rescreening. Forgetfulness, fear, lack of awareness, poor health-seeking behavior, residency-related barriers like living in a remote area or changing living area, and socioeconomic barriers such as lack of time due to household responsibilities, the husband's influence, and a lack of money to travel were identified as patient-related barriers, while a shortage of trained healthcare providers, poor counseling, and an insufficient reminder system were the health facility-related barriers to follow-up adherence.

Effective interventions, such as creating community awareness, improving patient counseling, improving the system of tracing patients in need of follow-up, and making reminder calls should be targeted by different stakeholders to tackle these barriers. In line with efforts to up-scale the digitalization of health systems, patients should also directly benefit. Health workers could directly inform patients 1 year after the treatment of suspicious cervical findings, for instance, through SMS reminders. Given the massive governmental efforts in Ethiopia to offer primary screening, rescreening compliance in high-risk patients should be a priority to ensure the success of the whole program.

Acknowledgments

The authors would like to thank the data collectors and patients for their participation.

Author contributions

Rahel Alemayehu: Study design, provision of patients, collection and assembly of data, data analysis and interpretation, manuscript writing, final approval of the manuscript. Clara Yolanda Stroetmann: Study design, provision of patients, collection and assembly of data, data analysis and interpretation, manuscript writing, final approval of the manuscript. Abigiya Wondimagegnehu: Study design, data analysis and interpretation, manuscript writing, final approval of the manuscript. Friedemann Rabe: Study design, data analysis and interpretation, manuscript writing, final approval of the manuscript. Adamu Addissie: Study design, data analysis and interpretation, final approval of the manuscript. Eva Johanna Kantelhardt: Study design, data analysis and interpretation, manuscript writing, final approval of the manuscript. Muluken Gizaw: Study design, data analysis and interpretation, manuscript writing, final approval of the manuscript.

Funding

This work was supported through the German Ministry of Research and Education (grant 01KA2220B) and the Else Kroener-Fresenius-Foundation (grant 2018_HA31SP). The study was also supported by a grant from Hospital Partnership through Deutsche Gesellschaft für InternationaleZusammenarbeit, funded by the Ministry for Economic Cooperation and Development (ID 81281315). This research was also funded in part by the Science for Africa Foundation to the Developing Excellence in Leadership, Training and Science in Africa program (Del-22-008), with support from Wellcome Trust and the UK Foreign, Commonwealth & Development Office, and is part of the EDCPT2 program supported by the European Union.

Conflicts of interest

None declared.

Data availability

Due to confidentiality, the data are not available publicly but can be made available upon reasonable request to the first author.

Supplementary material

Supplementary material is available at *The Oncologist* online.

References

1. World Health Organization. Cervical cancer [Internet]. Accessed November 9, 2021. https://www.who.int/westernpacific/health-topics/cervical-cancer
2. Rerucha CM, Caro RJ, Wheeler VL. Cervical cancer screening. *Am Fam Physician*. 2018;97:441-448.
3. Perkins RB, Guido RS, Castle PE, Chelmow D, Einstein MH, Garcia F, et al. 2019 ASCCP Risk-Based Management Consensus Guidelines for abnormal cervical cancer screening tests and cancer precursors. *J Low Genit Tract Dis*. 2020;24:102-131. https://doi.org/10.1097/LGT.0000000000000525
4. Bruni L, Albero G, Serrano B, et al. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Ethiopia. Summary Report October 22, 2021.
5. Federal Democratic Republic of Ethiopia Ministry of Health. Guideline for cervical cancer prevention and control in Ethiopia, April 2021.
6. Kocken M, Helmerhorst TJM, Berkhof J, et al. Risk of recurrent high-grade cervical intraepithelial neoplasia after successful treatment: a long-term multi-cohort study. *Lancet Oncol*. 2011;12:441-450. https://doi.org/10.1016/S1470-2045(11)70078-X
7. Adam Y, Gelderen CJ van, Bruyn G de, et al. Predictors of persistent cytologic abnormalities after treatment of cervical intraepithelial neoplasia in Soweto, South Africa: a cohort study in a HIV high prevalence population. *BMC Cancer*. 2008;8:211.
8. Zeier MD, Nachega JB, Van Der Merwe FH, et al. Impact of timing of antiretroviral therapy initiation on survival of cervical squamous intraepithelial lesions: a cohort analysis from South Africa. *Int J STD AIDS*. 2012;23:890-896. https://doi.org/10.1258/ijsa.2012.012040
9. Oga EA, Brown JP, Brown C, et al. Recurrence of cervical intraepithelial lesions after thermo-coagulation in HIV-positive and HIV-negative Nigerian women. *BMC Womens Health*. 2016;16:25. https://doi.org/10.1186/s12905-016-0304-8
10. Bogale AL, Teklehaymanot T, Ali JH, Kassie GM, Medhin G. The recurrence of cervical precancerous lesion among HIV positive and negative Ethiopian women after cryotherapy: a retrospective cohort study. *Cancer Control J Moffitt Cancer Cent* [Internet]. 2022;29:10732748221129708. [cited February 29, 2024]. https://doi.org/10.1177/10732748221129708
11. Phongsavan K, Phengsavanh A, Wahlström R, Marions L. Safety, feasibility, and acceptability of visual inspection with acetic acid and immediate treatment with cryotherapy in rural Laos. *Int J Gynaecol Obstetrics*. 2011;114:268-272. https://doi.org/10.1016/j.ijgo.2011.03.009
12. Barchi F, Winter SC, Ketshogile FM, Ramogola-Masire D. Adherence to screening appointments in a cervical cancer clinic serving HIV-positive women in Botswana. *BMC Public Health*. 2019;19:318. https://doi.org/10.1186/s12889-019-6638-z
13. Vet JNI, Kooijman JL, Henderson FC, et al. Single-visit approach of cervical cancer screening: see and treat in Indonesia. *Br J Cancer*. 2012;107:772-777. https://doi.org/10.1038/bjc.2012.334
14. Shiferaw N, Salvador-Davila G, Kassahun K, et al. The single-visit approach as a cervical cancer prevention strategy among women with HIV in Ethiopia: successes and lessons learned. *Glob Health Sci Pract*. 2016;4:87-98. https://doi.org/10.9745/GHSP-D-15-00325.
15. World Health Organization, International Agency for Research on Cancer, African Population and Health Research Center. Prevention of cervical cancer through screening using visual inspection with acetic acid (VIA) and treatment with cryotherapy. A demonstration project in six African countries: Malawi, Madagascar, Nigeria, Uganda, the United Republic of Tanzania, and Zambia [Internet]. World Health Organization; 2012. iv, 33 p. Accessed December 7, 2021. https://apps.who.int/iris/handle/10665/75250
16. Stroetmann CY, Gizaw M, Alemayehu R, et al. Adherence to treatment and follow-up of precancerous cervical lesions in Ethiopia. *Oncologist*. 2024;29:e655-e664. https://doi.org/10.1093/oncolo/oyae027
17. Peterson NB, Han J, Freund KM. Inadequate follow-up for abnormal Pap smears in an urban population. *J Natl Med Assoc*. 2003;95:825-832.
18. Sharp L, Cotton S, Thornton A, et al. Who defaults from colposcopy? A multi-centre, population-based, prospective cohort study of predictors of non-attendance for follow-up among women with low-grade abnormal cervical cytology. *Eur J Obstet*

Gynecol Reprod Biol. 2012;165:318-325. https://doi.org/10.1016/j.ejogrb.2012.08.001
19. Kiptoo S, Otieno G, Tonui P, et al. Loss to follow-up in a cervical cancer screening and treatment program in Western Kenya. *J Global Oncol*. 2018;4:97s-97s. https://doi.org/10.1200/jgo.18.41300
20. Bingham A, Bishop A, Coffey P, et al. Factors affecting utilization of cervical cancer prevention services in low-resource settings. *Salud Pública de México*. 2003;45:408-416. https://doi.org/10.1590/s0036-36342003000900015
21. Manga S, Kiyang E, DeMarco RF. Barriers and facilitators of follow-up among women with precancerous lesions of the cervix in Cameroon: a qualitative pilot study. *Int J Womens Health*. 2019;11:229-239. https://doi.org/10.2147/IJWH.S196112
22. Qcamap.org [Internet]. Accessed April 24, 2021. https://www.qcamap.org/ui/en/home
23. Mayring P. *Qualitative Content Analysis: Theoretical Foundation, Basic Procedures and Software Solution*. 2014:143.
24. Evina Bolo S, Kenfack B, Wisniak A, et al. Factors influencing cervical cancer re-screening in a semi-rural health district of Cameroon: a cohort study. *BMC Womens Health*. 2024;24:76. https://doi.org/10.1186/s12905-024-02917-3
25. Ezechi OC, Petterson KO, Gabajabiamila TA, et al. Predictors of default from follow-up care in a cervical cancer screening program using direct visual inspection in south-western Nigeria. *BMC Health Serv Res*. 2014;14:143.
26. Percac-Lima S, Aldrich LS, Gamba GB, Bearse AM, Atlas SJ. Barriers to follow-up of an abnormal Pap smear in Latina women referred for colposcopy. *J Gen Intern Med*. 2010;25:1198-1204. https://doi.org/10.1007/s11606-010-1450-6
27. Jeong SJ, Saroha E, Knight J, Roofe M, Jolly PE. Determinants of adequate follow-up of an abnormal Papanicolaou result among Jamaican women in Portland, Jamaica. *Cancer Epidemiol*. 2011;35:211-216. https://doi.org/10.1016/j.canep.2010.07.004
28. Khanna N, Phillips MD. Adherence to care plan in women with abnormal Papanicolaou smears: a review of barriers and interventions. *J Am Board Fam Pract*. 2001;14:123-130.
29. Thomson KA, Sandoval M, Bain C, et al. Recall efforts successfully increase follow-up for cervical cancer screening among women with Human Papillomavirus in Honduras. *Glob Health Sci Pract*. 2020;8:290-299. https://doi.org/10.9745/GHSP-D-19-00404
30. Mabachi NM, Wexler C, Acharya H, et al. Piloting a systems level intervention to improve cervical cancer screening, treatment and follow up in Kenya. *Front Med*. 2022;9:930462. https://doi.org/10.3389/fmed.2022.930462
31. Mremi A, Linde DS, Mchome B, et al. Acceptability and feasibility of self-sampling and follow-up attendance after text message delivery of human papillomavirus results: a cross-sectional study nested in a cohort in rural Tanzania. *Acta Obstet Gynecol Scand*. 2021;100:802-810. https://doi.org/10.1111/aogs.14117
32. Chapola J, Lee F, Bula A, et al. Barriers to follow-up after an abnormal cervical cancer screening result and the role of male partners: a qualitative study. *BMJ Open*. 2021;11:e049901. https://doi.org/10.1136/bmjopen-2021-049901

INTERVIEW GUIDE (ENGLISH VERSION)

Date of In-depth interview: ____/_____/_____

Name of Note Taker: _____

Start time:

End time:

INFORMATION ON THE INTERVIEWEE

Age in years: _____

Sex: ○ MALE ○ FEMALE

Responsibility/position in the clinic: _____

Work experience on the position: _____

Have you ever received training for cervical cancer screening?

○ YES ○ NO

Have you ever received training for cryotherapy/?

○ YES ○ NO

IN-DEPTH INTERVIEW

1. Please, tell me about your experiences giving service for women who have suspicious cervical lesions in VIA screening.

2. How do you see the skills of the health professionals working in the health facility? Are they able to screen-and-treat?

   Probe: Training and supervision programs?

3. How do you describe the level of adherence to follow-up among patients, one year after treatment for precancerous cervical lesions?

Probe: Please estimate, how many of patients come one year after treatment for precancerous cervical lesions.

What do you think are possible reasons for loss of follow-up?

4. What actions are you taking after treatment with cryotherapy?

   Probe: How much emphasis do you give for follow-up recommendation?

   Follow-up reminders?

   Link with health extension workers?

5. What are barriers to precancerous cervical lesions post-treatment follow-up adherence do you see in general?

   Probe: Barriers to precancerous cervical lesions post-treatment follow-up adherence in your facility?

6. Please tell me about the documentation in the cervical cancer screening logbook in your health facility?

   Probe: Do you report adherence to follow-up?

   New policies /guidelines? Training?

7. What do you recommend for improvement of post-treatment follow-up adherence?

Supplement 2: Themes, subthemes and categories of barriers to follow-up

Themes	Subthemes	Categories
Patient-related barriers	Socio-economic barriers	● Household responsibilities/lack of time ● Not getting husbands permission ● Lack of travel cost
	Lack of awareness/knowledge	● Lack of awareness ● Not understanding the importance
	Poor health seeking behavior	● Denial ● Feeling healthy ● Not giving attention for prevention
	Residency related barriers	● Living in distant/remote areas ● Changing living area ● Being non-permanent resident
	Forgetfulness	● Forgetting
	Fear	● Fear of screening procedure ● Fear of speculum ● Fear of metal speculum ● Fear of pain ● Fear of treatment pain
Health facility related barriers	Shortage of trained health care provider	● Lack of health care provider ● Additional tasks on the health care provider ● Unavailability of the health care provider during their visit
	Poor counseling and approach during the first visit	● Poor counseling ● Bad reception at the former visit
	Reminder related barriers	● Lack of staff to facilitate calling to remind ● Not calling to remind ● Lack of telephone in the unit ● Frequent change of logbook ● Improper documentation of patient data ● Non-functional phone numbers

The Oncologist, 2025, **30**, oyaf111
https://doi.org/10.1093/oncolo/oyaf111
Advance access publication 16 May 2025
Original Article

Barriers to adherence to cervical cancer screening care in Northern Tanzania

Tecla Lyamuya[1,2,3], Bariki Mchome,[1,2], Clara Yolanda Stroetmann[3], Rogathe Machange[1,2,4], Muluken Gizaw[3,5], Rahel Alemayehu[5], Adamu Addissie[3,5], Pendo Mlay[1,2], Alex Mremi[1,2,3], Eva Johanna Kantelhardt[3,6], Blandina T. Mmbaga[1,2,3,4]

[1]Department of Obstetrics and Gyneacology, Kilimanjaro Christian Medical Centre, Moshi, Tanzania,
[2]Department of Obstetrics and Gynaecology, Kilimanjaro Christian Medical University College, Moshi, Tanzania,
[3]Global Health Working Group, Institute for Medical Epidemiology, Biometrics and Informatics, Martin-Luther-University, Halle-Wittenberg, Germany,
[4]Kilimanjaro Clinical Research Institute, Moshi, Tanzania,
[5]Department of Epidemiology and Biostatistics, School of Public Health, College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia,
[6]Department of Gynaecology, Martin-Luther-University, Halle-Wittenberg, Germany

*Corresponding author: Tecla Lyamuya, Master of Medicine in Obstetrics and Gynaecology, Longuo B, Moshi town, Kilimanjaro, P.O. Box 3010, Moshi, Tanzania (lyamuyatecla@gmail.com).

Abstract

Background: Cervical cancer disproportionately affects women in low- and middle-income countries compared to those in high-income countries because of the difference in quality and effectiveness of cervical cancer screening programs. An essential part of effective cervical cancer prevention is the continuum of care for a woman with a suspicious cervical lesion (SCL) consisting of appropriate treatment and, in Tanzania, a follow-up screening one year after treatment. This study aimed at identifying factors associated with non-adherence to the scheduled follow-up after treatment of a SCL. Additionally, the cervical cancer screening results one year after treatment were evaluated.

Methods: A total of 219 clients treated for a SCL between 2017 and 2021 from 8 centres in the Kilimanjaro region were interviewed. Contact and medical information of the clients was obtained at the facilities. Additionally, 11 in-depth interviews with healthcare providers were conducted.

Results: In the quantitative study, 143 (65.3%) clients treated for suspicious cervical lesions adhered to the recommended follow-up appointment. Significant factors associated with poor adherence were individual barriers such as failure to understand why they should return and access barriers to the health facility. The health workers mentioned a lack of awareness and financial challenges regarding transportation.

Conclusion: The complete journey of high-risk women needs attention, otherwise the primary screening will not be effective. Additional efforts are needed to address knowledge gaps and socio-economic problems during the follow-up.

Keywords: cervical cancer screening; follow-up; recurrence; suspicious cervical lesion; adherence.

Operational definitions

Adherence refers to all women who kept their planned follow-up appointment or came within 30 days of the scheduled appointment.
A suspicious cervical lesion referred to documentation of an aceto-white lesion or an abnormal cytology result using a Pap smear in the registry.

Implications of practice

This study shows that a considerable proportion of women fail to return for follow-up after one year. Obstacles include lack of information and lack of understanding on the need for follow-up. This could be tackled by in-depth counseling during the first visit as well as reminders closer to the follow-up appointment. The findings of this study may be used by policymakers and program managers to address obstacles and to develop effective interventions to solve problems related to non-adherence after treatment of a SCL.

Received: 29 May 2024; Accepted: 4 February 2025.

Introduction

Cervical cancer is one of the most frequently occurring cancers in women worldwide.[1] It is preventable if diagnosed and treated early by adequate cervical cancer screening programs.[2] In low- and middle-income countries the burden of cervical cancer is larger than in high-income countries[3] -mainly due to the lack of effective screening programs and low awareness concerning the disease and its prevention measures (Mchome et al, 2020).[4]

In Tanzania, the first screening program was implemented in 2004. The Tanzanian cervical cancer screening guideline advocates for yearly screenings of women living with HIV and once in 3 years for the general population using either VIA or Pap smear. Patients with suspicious cervical lesions (SCL) should receive treatment in the form of cryotherapy, thermocoagulation, or loop electrosurgical excision procedure (LEEP). If possible, treatment should be provided in a single-visit-approach (SVA) meaning right after the initial screening. One year after treatment, all patients are required to return for a follow-up to check for a recurrence or persistence of the lesion.[5]

This study intended to explore the challenges within the continuum of care in cervical cancer prevention by examining the pathways of women with a SCL. It focused on the factors affecting adherence to the recommended one-year follow-up screening after primary treatment for a SCL and the recurrence or persistence of a SCL during the follow-up screen. As the continuum of care is key to a successful screening program, our insights may help enhance the quality of cervical cancer screening programs in Tanzania and other low- and middle-income countries.

Methods

Study setting

This study combined qualitative and quantitative methods to examine the continuum of care in cervical cancer screening in 8 health facilities in the Kilimanjaro region. Kilimanjaro is one of Tanzania's 31 administrative regions, with a population of 1,861,934.[6] It has a total of 53 health facilities providing cervical cancer screening and treatment of SCL. The participants in this study were recruited from a tertiary hospital, a regional hospital, and 6 health centers.

Data collection

The data were collected between November 2022 and April 2023. Contact information for all the women with a SCL was taken from the cervical cancer screening logbooks. Women with a SCL were called and asked to participate in a questionnaire-based phone interview. The participants were considered unreachable after more than 3 phone calls were made without success. The questionnaire included sociodemographic characteristics, details of treatment provided for the suspicious cervical lesion, and perceived barriers or enablers to follow-up attendance. This questionnaire had previously been used in a study done in Ethiopia.[7] For use in Tanzania, we translated it to Kiswahili.

For the qualitative part, we conducted in-depth interviews (IDIs) with 11 nurses who provided cervical cancer screening in the included health facilities. Open-ended questions were used to obtain information on facility-related barriers to follow-up after primary screening and treatment, which were based on a study conducted in Cameroon.[8] All interviews were conducted in Kiswahili, audio-recorded, transcribed, and then translated into English.

Data analysis

For data analysis, questions on barriers were grouped into individual barriers and health facility barriers. The questions compiled under individual barriers included: fear of an adverse outcome, fear of the screening procedure, not knowing why they should return for follow-up, forgetting the appointment, not finding it easy to access the health facility, lack of transportation money, lack of time to return for screening, lack of support from their companions, and the preference for other methods of healing such as spiritual or traditional methods. The questions compiled in the health facility-related barriers group included: not receiving counseling, not being counseled on timing, a long wait time, being unhappy with staff behavior, service not being available, and other challenges. Each factor was assigned a positive or negative value depending on whether it was a barrier or enabler. The total barrier score for each participant was calculated. Those scoring equal to or greater than the median were categorized as high and those below the median as low. (Supplementary Table S1).

The quantitative data were analyzed in STATA (Version 15). Logistic regressions were used to determine the association of the study's variables with the outcomes. For the IDIs, the translated transcripts were imported to NVivo software for coding and generation of themes using thematic content analysis techniques.

Ethical considerations

Permission was obtained from the Regional Medical Officer of the Kilimanjaro region and thereafter from the College Research Ethical Review Committee. The study participants' consents were obtained prior to data collection.

Results

Between 1 January 2017 and 31 December 2021, 33,197 women were screened in the 8 health facilities. Of the screened women, 521 (1.6%) had a SCL, and 572 (1.7%) were suspected to have cervical cancer. Of those with a SCL, 400 had their phone numbers recorded and 219 were reachable and therefore included in this study (Figure 1). 181women with SCL were not reached and therefore were termed as lost to follow-up.

Sociodemographic and clinical characteristics of the interviewed patients

The average age of the 219 study participants was 45 years (SD = 11.5); 144 (65.8%) women had primary education; 131 (60.1%) were married or cohabiting; 113 (52.3%) were unemployed, and most (n = 90; 56.3%) had an income of less than $61 USD per month. Regarding clinical characteristics, 211 (96.3%) had given birth, with a median of 3 births; 148 women (69.2%) had their first sexual intercourse at 19 years or older, and 135 (61.6%) were HIV-negative. A total of 139 (64.4%) were treated by cryotherapy and 104 (47.5%) of the treated women adhered to the SVA (Table 1).

Level of adherence to follow-up and the clinical cervical status one year after treatment

Of the 219 interviewed women treated for SCL, 143 (65.3%) adhered to their recommended follow-up, while 76 (34.7%) did not (Figure 2). Subsequently, among those 143 women,

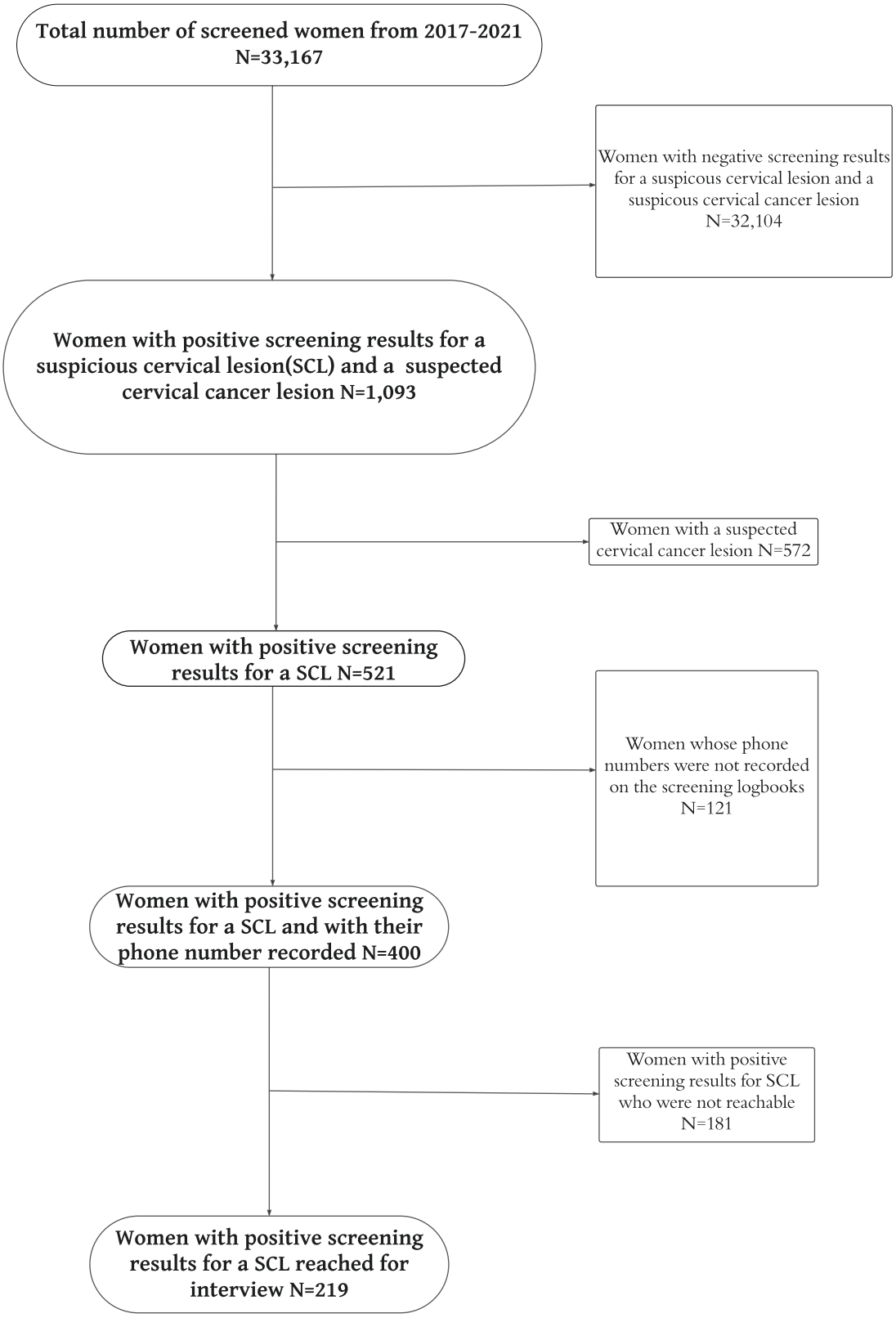

Figure 1. Participants enrollment flowchart.

119 (83%) had negative results, and 24 (17%) had positive re-screening results.

In the IDIs, some of the health care providers perceived the level of adherence to the recommended follow-up to be good: "*A large percentage of them return to the clinic; some forget, and may forget within months, but a large percentage do return.*" Others disagreed: "*To be honest, the follow-up rate is not good. It is quite poor, in my understanding. Since I started working here and with the patients we have assessed and treated, their follow-up is not satisfactory.*"

Table 1. Distribution of the participants' socio-demographic and clinical characteristics.

Variable	Frequency	Percentage
Age		
18-29	16	7.3
30-50	142	64.8
>50	61	27.9
Education level		
Primary education	144	65.8
Secondary education	46	21
Higher education level	29	13.2
Occupation*		
Un- employed	113	52.3
Business	76	35.2
Employed	27	12.5
Marital status*		
Married/ cohabiting	131	60.1
Single	25	11.5
Divorced	22	10.1
Widow	40	18.4
Monthly income USD*		
No income	16	10
< 61	90	56.3
61-194	33	20.6
>194	21	13.1
Ever given birth		
Yes	211	96.3
No	8	3.7
Parity*		
0	8	3.7
1-3	111	51.6
4-5	76	35.4
6 or more	20	9.3
Sexual debut*		
12-18	66	30.8
≥19	148	69.2
HIV status		
Positive	76	34.7
Negative	135	61.6
Unknown	8	3.7
Treatment*		
Cryotherapy/thermal ablation	139	64.4
LEEP	77	35.7
Days elapsed from screening to treat		
Single visit approach	104	47.5
See and treat	115	52.5

*Frequency does not tally due to missing variables.
Abbreviations: IQR, interquartile range; LEEP, loop electrosurgical procedures; SD, standard deviation; USD, United States Dollar.

Factors associated with adherence to follow-up after primary screening

Adjusted for other variables, individual barriers, occupation, and type of treatment were significantly associated with follow-up adherence. Women who scored high on individual barriers had 0.34 times lower odds of adhering to follow-up as compared to those who scored low (AOR = 0.34; 95% CI [0.15-0.69]). The most common individual barriers limiting adherence among clients were "not knowing why they should return for follow-up" and access barriers to the facility (Supplementary Table S2). Compared to those who were not employed, women who were employed were less likely to adhere to follow-up (AOR = 0.22; 95% CI [0.06-0.73]). Women who were treated by LEEP had lower odds of adherence to follow-up compared to those treated by cryotherapy/thermal ablation (AOR = 0.46; 95% CI [0.21-0.99]) (Table 2).

Barriers to adherence to follow-up from the health professionals' perspective

During the IDIs, we identified various replies to the question: "What are barriers for women adhering to the follow-up recommendation after treatment for a precancerous lesion?" The responses were coded and subsequently grouped into themes and categories (Table 3).

Low level of awareness about the need for follow-up

Some of the healthcare providers mentioned a low level of understanding and a lack of education as barriers to adherence to follow-up. Often, this was linked to the absence of symptoms in the SCL. For instance, one healthcare provider stated: "*The community still lacks sufficient understanding because these lesions show no symptoms. […] If they were educated all the time, they would understand that they need to get screened even if they have no symptoms.*" Adding to that, another healthcare provider insisted: "*Education plays a significant role because people have different levels of understanding. You may tell them about the importance of follow-up in medical treatment, but they may not grasp it.*" Another mentioned the trouble of explaining why follow-up is needed: "*…They think what they have received is a complete treatment.*" Many suspected that low awareness increases the likelihood of forgetting about the follow-up: "*Sometimes, you call them, and they say they will come but then keep postponing. When you ask them later why they didn't come, they might say they had to travel or simply forgot.*"

Some women had stigma relating to their HIV status, and this could affect their adherence, as well. One healthcare provider was quoted as describing difficulties while she tried to remind a client from an HIV care and treatment clinic: "*Those who trouble us are from HIV Care and Treatment Clinic (CTC), and when you call, they might say they don't know you, and you have to inform them that you were given the number by someone else. Later on, they might say they didn't want to talk or they were in a place where they couldn't speak.*"

Barriers to reaching the clinic

Another frequently mentioned barrier to follow-up was the cost of transportation. One healthcare provider stated: "*The main contributing factor is the cost, money, to be precise. Many people can't afford the cost of getting to the treatment centres from where they live.*" This is often related to the relatively long distance between home and health facility, as one health care provider claimed: "*The major challenge is that they lack transportation or say they are far away. You find that many come from distances of 5, 10, or even 20 kilometres.*" Another added: "*The main reason …, I think, is the distance. You can*

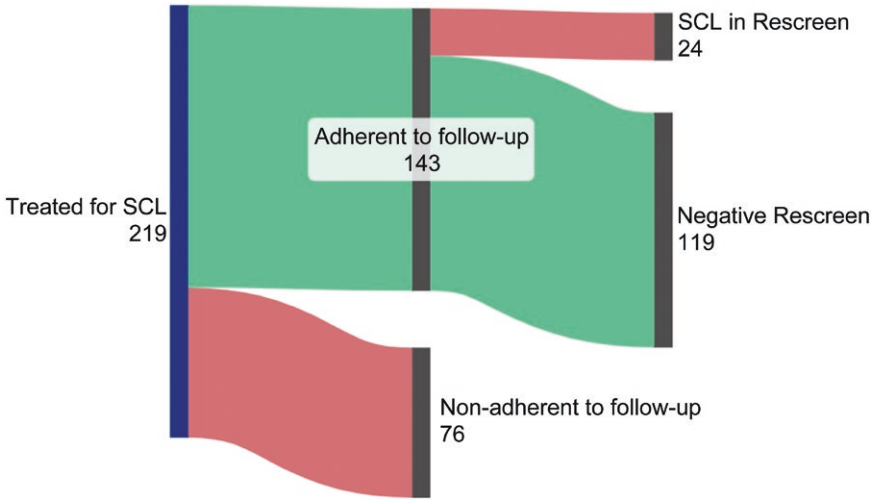

Figure 2. Adherence of study participants to one-year follow-up screening (*N* = 219).

Table 2. Factors associated with adherence to follow-up after one year among women after positive primary screening (*n* = 187).

Variable	Total	Adjusted	
		AOR(95%CI) adherence to follow-up	*P*-value
Individual related barriers			
Low individual-score	125	1	
High individual-score	62	0.34 (0.15-0.69)	<.001
Health facility-related barriers			
Low health facility-score	122	1	
High health facility-score	65	0.33 (0.56-2.17)	.78
Age			
18-29	14	1.14 (0.27-4.86)	.86
30-50	121	1	
>50	52	0.46 (0.20-1.04)	.06
Education level			
Higher education level	27	1	
Primary education	120	1.03 (0.36-2.91)	.96
Secondary education	40	0.90 (0.27-3.03)	.87
Occupation status			
Un-employed	98	1	
Business	66	0.58 (0.28-1.20)	.14
Employed	23	0.22 (0.06-0.74)	.01
Marital status			
Married/ cohabiting	109		
Single/ divorced	44		
Widow	34		
Age at first intercourse			
12-18	57	1	
19 or more	130	1.77 (0.83-3.74)	.140
HIV			
Negative	126	1	
Positive	61	0.66 (0.31-1.37)	.26
Treatment given			
Cryotherapy/thermal ablation	116		
LEEP	71	0.46 (0.21-0.99)	.04
Days elapsed from screening to treatment			
Single visit approach	82	1	
See and treat approach	105	0.83(0.37-1.85)	.65

Abbreviations: AOR, adjusted odd's ratio;(where < 1 = less odds > 1 = more odds); HIV, human immune deficiency syndrome; LEEP, loop electrosurgical excision procedure; USD:United States Dollar.

Table 3. Themes and categories identified in the in-depth interviews.

Themes	Categories
Low level of awareness	Low level of understanding and lack of education
	Feeling healthy
	Thinking "Complete treatment"
	Forgetting
	Stigma related
Barriers for reaching the clinic	Long distance
	Transportation cost
	Travel and migration
	Late clinic arrival
Personal barriers	Local medicines
	Not liking the experience/not ready to expose private parts
	Male gender
	Have no time
Barriers of service at the Health Facility	Scarcity of health service providers
	Inadequate counselling by service providers
	Late reappointment due to pregnancy
	Shortage of equipment
	Lack of allowances
	Lack of a separate clinic
Lack of reminders	Unreachable phone numbers
	Lack of vouchers

call someone, and they say they will come, but perhaps they don't have the fare to get here." Additionally, some health care providers stated that patients had traveled or migrated after the initial screening and hence were unable to attend the follow-up screening: "*What I see [as] the biggest challenge is that customers sometimes move, they move from Boma, others come for business, so when they come across announcements there, they come; we test them, we find them, and we treat them. At the same time, she returns to her place of origin where she came from, so finding her again becomes difficult.*" Other healthcare providers described clients skipping or delaying follow-up visits because of job or business-related issues: "*They say that I don't have time. I am at work.*"

Personal barriers

Another described barrier was the preference for traditional medicines. A health provider shared: "*Most women do not return, and [they] prefer going to traditional medicine providers after.*" One healthcare worker emphasized that some patients perceived themselves as healed after those visits: "*Others will say they have already been to a traditional healer and are using traditional remedies, so they are doing well.*"

Barriers at the health facility

Hindering adherence at the health facility was the scarcity of healthcare providers. One health professional explained: "*The staff who have received training are few, so when he is on vacation …, the service is unavailable. The staff who received training are few but still do other jobs, as well.*" Other health care providers stressed the need for training more staff to improve care: "*Another suggestion is to provide more training for other staff members so that those with skills become more numerous. Currently, we don't have enough staff, which means that if we increase knowledge among more people, it will be easier to reach others.*"

Some healthcare providers recommended an allowance. One reported: "*If we health providers are at least well supported in terms of extra allowances, we would be able to trace these women. The allowance would be for tracing these women and encouraging them to return.*"

Another barrier to adherence was inadequate counseling. One health provider suggested that some healthcare providers do not counsel their clients properly, leading to client default at follow-up. "*Some are better at explaining to the client and emphasizing the importance of returning for check-ups, while others may not stress it enough. So, the quality of education provided by service providers is inconsistent.*"

Reminders

Some healthcare providers traced clients by calling them but frequently faced the issue that numbers were inactive, and hence those clients missed their follow-up visits. A health care provider said: "*Other challenges are they give you phone numbers, but later when they change them, you can't find them again.*" Another barrier was a lack of credit or vouchers by the health care providers. One said: "*At the centre, I can say that sometimes I might not have sufficient airtime to call them, and we don't get support from the centre to say that we will be given airtime vouchers.*"

Factors associated with persistence or recurrent cervical lesions during follow-up screening

After adjusting for other factors, age was the only variable significantly associated with the persistence/recurrence of cervical lesions. Compared to young women (18-29 years), mature women aged 30-50 years had lower odds of persistence or recurrence of a cervical lesion (AOR = 0.21; 95% CI [0.05-0.91]), and post-menopausal women (>50 years) were less likely to have a persistent/recurrent cervical lesion (AOR = 0.14; 95% CI [0.02-0.85]) (Table 4).

Discussion

This study assessed the adherence of women, treated for a SCL to the recommended follow-up screening after 1 year. An adherence rate of 65.3% was found, which is slightly higher in comparison to 2 studies done in Ethiopia, which reported adherence rates of 51% and 44.7%.[7,9] Interestingly, most of the interviewed healthcare providers stated that the level of perception toward adherence after treatment was good. Other studies had shown the percentage of adherence to be between 38% and 75%, with those with higher rates employing more strategies (eg, reminder phone calls or text messages) to enhance adherence in the subsequent, planned follow-up.[10,11] In this study, the high level of adherence generally could be attributed to the recruitment at a large tertiary teaching hospital. Possibly in these tertiary centres, patients are more likely to meet more doctors who could explain to them the fundamental reasons for why they should return.

Barriers to follow-up examinations

Concerning the factors affecting adherence, reporting many individual barriers, being employed, and treatment by LEEP were factors associated with poor patient adherence. Our

Table 4. Factors associated with persistence/recurrent cervical lesion during follow-up screening (n = 130).

Variable	Total	Adjusted	
		AOR(95%CI) persistent/recurrent lesion	*P*-value
Age			
18-29	11	1	
30-50	90	0.16 (0.03-0.78)	.02
> 50	29		.16
Marital status			
Married/ cohabiting	81	1	
Single/ divorced	25	1.14 (0.32-4.05)	.84
Widow	24	0.57 (0.03-2.08)	.19
Parity			
0	5	1	
1-3	65	0.36 (0.06-2.02)	.24
4-5	47	0.85 (0.16-4.55)	.85
6 or more	13	0.29 (0.02-5.25)	.40
Age at first sex			
12-18	40	1	
19 or more	90	1.61(0.43-5.94)	.48
HIV			
Negative	85	1	
Positive	45	0.73(0.21-2.61)	.62
Treatment type			
Cryotherapy/thermo ablation	94	1	
LEEP	36	0.33(0.07-1.60)	.17

Abbreviations: AOR, adjusted odd's ratio (where < 1 = less odds > 1 = more odds); HIV, human immune deficiency syndrome; LEEP, loop electrosurgical excision procedure.

qualitative findings allowed deeper insights into the individual barriers, for example, the impact of long and costly journeys between home and health facility was stressed. Similarly, a cross-sectional study in Nigeria showed that those residing more than 10 km away from the facility were less likely to adhere to the recommended follow-up.[12]

Interestingly, we found that women who were employed were less likely to adhere to screening recommendations, similar to the findings of a study in Thailand.[13] This may seem counter-intuitive as employed women might often have a higher education and more money available. However, health workers in the IDIs stressed that it is often difficult to take time off work to attend the screening.

Another individual barrier discussed in other qualitative research is fear.[8,14] In our study, fear did not occur as a dominant topic in the IDIs. Still, it is one possible explanation for the finding that women treated with LEEP were less likely to adhere to follow-up compared to those treated with cryotherapy. Unlike cryotherapy, LEEP requires local anesthesia and a trained doctor. These are often unavailable and require a future visit, all can bring additional stress to the patient. We were unable to find a study that assessed follow-up adherence after LEEP compared to cryotherapy, but it might be a factor to bear in mind for future research.

Instead, healthcare workers expressed concerns that patients sought help from traditional healers and then perceived themselves as healed not seeing the need for further cervical cancer screenings.

It is known that patients tend to forget about follow-up appointments—this aspect was also stressed in the study in Ethiopia (Stroetmann et al, 2024). Therefore, it has been shown that reminders, for example via phone call can help to improve follow-up adherence.[8,11] Until now, there is no standard reminder system for following up women with a SCL after treatment that established in Tanzania, but some healthcare workers explained that they tried already to call women in need of follow-up. They described that this is often difficult due to unreachable phone numbers. This observation is very much reflected in our own experience as only 54.8% of all women treated for SCL could be reached via phone call.

Recurrence of cervical lesions

Of the participants who returned for follow-up screening, 17% were still positive for suspicious cervical lesions. This finding is similar to other studies that reported a 17.6% recurrence or persistence of an SCL following LEEP, and a 20% recurrence rate following ablative treatment (cryotherapy, laser ablation, and electrocauterization).[15,16] The found recurrence or persistence rate stresses the importance of follow-up for those treated with precancerous lesions.

HIV status did not affect the recurrence or persistence of the lesion in this study. According to the WHO, sufficient data on the effect of HIV on the rate of SCL at rescreening is still lacking; some studies have reported higher rates in women living with HIV, while others have found no effect, in

line with our study.[3,17] Since most of our HIV patients were recruited at a tertiary hospital, we hope that a large majority were receiving sufficient treatment. However, we did not assess this factor (viral load).

Older women (ie, those greater or equal to 30 years old) had lower odds of persistence/recurrence of a cervical lesion compared to younger women. Similar findings were reported from studies in Nigeria and Taiwan.[18,19]

Strengths and limitations

This is one of the first studies in East Africa to investigate adherence to follow-up after treatment for an SCL. We identified several factors limiting adherence through a combination of quantitative and qualitative methods and revealed high rates of recurrent or persistent cervical lesions, underscoring the need to address these barriers.

As we used secondary data from screening registry books, missing documentation and phone numbers and miss-entries were present. Also, some important predisposing factors for persistence or recurrence could not be assessed because of the lack of other important screening tests in health facilities, like HPV-DNA tests. This study researched the combined effects of the treatment options in the light of recurrence or persistence, unlike other studies where the outcomes of each treatment procedure were researched separately.

Conclusion

One in 8 women who had a SCL during screening had a recurrent suspicious finding; this underscores the need to support the annual re-screening of these high-risk patients. Still, only 2 out of 3 women adhered to recommended follow-up. Individual factors such as "not knowing the need to return" and challenges of reaching the health facility were the most important drivers of non-adherence. Interventional studies to address these barriers perhaps including patient-centered counseling and addressing the socio-economic problems and use of reminder phone calls or text messages are needed to improve the situation in Tanzania. Given the huge, recent efforts and resources from governmental and non-governmental institutions leveraging primary screening across the continent, our results certainly emphasize a need for similar efforts to assure the re-screening of identified high-risk groups.

Acknowledgments

We thank all our study participants for their time and openness to talk about the issue. Second, we are thankful to the data collectors without whom we could not have completed the study so quickly.

Author contributions

Tecla Lyamuya: conceptualization, data curation, methodology, investigation, writing – original draft, writing review, editing. Bariki Mchome: conceptualization, methodology, investigation, supervision, writing – original draft, writing review, editing. Clara Yolanda Stroetmann: conceptualizations, data curation, methodology, software, visualization, writing – original draft, writing review, editing. Rogathe Machange: conceptualization, data curation, investigation, project administration, resources. Muluken Gizaw: conceptualizations, methodology and editing. Rahel Alemanyehu: conceptualizations, methodology, editing. Adamu Addisie: conceptualizations, methodology, supervision. Pendo Mlay: supervision. Alex Mremi: supervision. Eva Johanna Kantelhardt: conceptualization, project administration, funding acquisition, writing – review, editing. Blandina T. Mmbaga: conceptualization, funding acquisition, project administration, resources, writing review, editing

Funding

The project on which this publication is based was in part funded by the German Federal Ministry of Education and Research (01KA2220B). Also, this research was funded in part by the Science for Africa Foundation to the Developing Excellence in Leadership, Training and Science in Africa programme (DEL-22-008), with support from Wellcome Trust and the UK Foreign, Commonwealth & Development Office, and is part of the EDCPT2 programme supported by the European Union. We acknowledge the financial support of the Open Access Publication Fund of the Martin-Luther-University Halle-Wittenberg.

Conflicts of interest

The authors indicated no financial relationships.

Data availability

The data underlying this article cannot be shared publicly due to the privacy of individuals that participated in the study. The data shall be shared on a reasonable request to the corresponding author.

Supplementary material

Supplementary material is available at *The Oncologist* online.

References

1. Lin S, Gao K, Gu S, et al. Worldwide trends in cervical cancer incidence and mortality, with predictions for the next 15 years. *Cancer*. 2021;127:4030-4039. https://doi.org/10.1002/cncr.33795
2. Pimple SA, Mishra GA. Global strategies for cervical cancer prevention and screening. *Minerva Ginecol*. 2019;71:313-320. https://doi.org/10.23736/S0026-4784.19.04397-1
3. Hu S, Zhao X, Zhang Y, Qiao Y, Zhao F. Interpretation of "WHO Guideline for Screening and Treatment of Cervical Pre-Cancer Lesions for Cervical Cancer Prevention, Second Edition". *National Medical Journal of China*. 2021;101:2653-2657. https://doi.org/10.3760/cma.j.cn112137-20210719-01609
4. Mchome B, Swai P, Wu C, et al. Comprehensive Cervical Cancer Prevention in Tanzania (CONCEPT) study: Cohort profile. *BMJ Open*. 2020;10:e038531-e038513. https://doi.org/10.1136/bmjopen-2020-038531
5. MOHSW-Tanzania. Tanzania service delivery guidelines for cervical cancer prevention and control. 2011;1:1-78. https://extranet.who.int/ncdccs/Data/TZA_B5_Cervical%20Cancer%20Strategic%20Plan2011.pdf
6. TDHS. Demographic and Health Survey and Malaria Indicator Survey. *Pap Knowl Towar a Media Hist Doc*. 2022;6(FR321):1-23.
7. Stroetmann CY, Gizaw M, Alemayehu R, et al. Adherence to Treatment and follow-up of precancerous cervical lesions in Ethiopia. The Oncologist 2024;29:e655-e664. https://doi.org/10.1093/oncolo/oyae027

8. Manga S, Kiyang E, DeMarco RF. Barriers and facilitators of follow-up among women with precancerous lesions of the cervix in Cameroon: a qualitative pilot study. *Int J Womens Health*. 2019;11:229-239. https://doi.org/10.2147/IJWH.S196112
9. Shiferaw N, Salvador-Davila G, Kassahun K, et al. The single-visit approach as a cervical cancer prevention strategy among women with HIV in Ethiopia: successes and lessons learned. *Glob Health Sci Pract*. 2016;4:87-98. https://doi.org/10.9745/GHSP-D-15-00325
10. Nwankwo TO, Okoro SO, Ukekwe FI, Ajah LO, Ozumba BC. Cervical cancer screening, adherence to and challenges of follow-up in resources poor setting. *Open J Prev Med*. 2019;09:105-114. https://doi.org/10.4236/ojpm.2019.99010
11. Thomson KA, Sandoval M, Bain C, et al. Recall efforts successfully increase follow-up for cervical cancer screening among women with human papillomavirus in Honduras. *Glob Health Sci Pract*. 2020;8:290-299. https://doi.org/10.9745/GHSP-D-19-00404
12. Ezechi OC, Petterson KO, Gabajabiamila TA, et al. Predictors of default from follow-up care in a cervical cancer screening program using direct visual inspection in south-western Nigeria. *BMC Health Serv Res*. 2014;14(143):1. https://doi.org/10.1186/1472-6963-14-143
13. Visanuyothin S, Chompikul J, Mongkolchati A. Determinants of cervical cancer screening adherence in urban areas of Nakhon Ratchasima Province, Thailand. *J Infect Public Health*. 2015;8:543-552. https://doi.org/10.1016/j.jiph.2015.04.018
14. Percac-Lima S, Aldrich LS, Gamba GB, Bearse AM, Atlas SJ. Barriers to follow-up of an abnormal Pap smear in Latina women referred for colposcopy. *J Gen Intern Med*. 2010;25:1198-1204. https://doi.org/10.1007/s11606-010-1450-6
15. Abdulaziz AMA, You X, Liu L, et al. Management of high-grade squamous intraepithelial lesion patients with positive margin after LEEP conization: a retrospective study. *Med (United States)*. 2021;100:e26030. https://doi.org/10.1097/MD.0000000000026030
16. Srisuttayasathien M, Manchana T. Adherence to follow-up in women with cervical intraepithelial neoplasia grade 1. *Taiwan J Obstet Gynecol*. 2021;60:56-59. https://doi.org/10.1016/j.tjog.2020.11.008
17. Debeaudrap P, Sobngwi J, Tebeu PM, Clifford GM. Residual or recurrent precancerous lesions after treatment of cervical lesions in human immunodeficiency virus-infected women: a systematic review and meta-analysis of treatment failure. *Clin Infect Dis*. 2019;69:1555-1565. https://doi.org/10.1093/cid/ciy1123
18. Tai YJ, Chen YY, Hsu HC, et al; Taiwan Cervical Cancer Control Task Force. Risks of cervical intraepithelial neoplasia grade 3 or invasive cancers in ASCUS women with different management: A population-based cohort study. *J Gynecol Oncol*. 2018;29:1-11. https://doi.org/10.3802/jgo.2018.29.e55
19. Oga EA, Brown JP, Brown C, et al. Recurrence of cervical intraepithelial lesions after thermo-coagulation in HIV-positive and HIV-negative Nigerian women. *BMC Womens Health*. 2016;16:1-8. https://doi.org/10.1186/s12905-016-0304-8

Supplemental Table S1.

INDIVIDUAL BARRIERS	**SCORE**
Fearing an adverse outcome	+1
Fearing the screening procedure	+1
Not knowing the need for follow-up	+1
Forgetting the follow-up appointment	+1
Not reaching the health facility easily	+1
Difficulty affording transportation costs	+1
Not having time for attending follow-up	+1
Male partner giving support	-0.5
Receiving traditional treatment	+1
Distance from home to the health facility > 5 km	+1
Median score, individual barriers	3.5
HEALTH FACILITY RELATED BARRIERS	**SCORE**
Not receiving counselling	+1
Not receiving counselling about the timing of follow-up	+1
Having to wait a moderately long time	+0.5
Having to wait a long time	+0.5
Being unhappy with staff behaviour	+0.5
Experiencing unavailability of the service	+1
<u>Challenges</u> • Shortage of heath commodities • Shortage of staff • Long wait time • Lack of privacy • Bad attitude of the staff • Other challenges	 +1 +0.5 +05 +0.5 +1 +1
Median score, health facility related barriers	0.5

Supplemental Table S2.

Barriers to follow-up adherence mentioned by patients in phone interviews

Individual related barriers	Frequency	Percent (%)
Fearing outcome		
Yes	169	77.2
No	50	22.8
Fearing procedure		
No	154	70.3
Yes	65	29.7
Not knowing the need to follow-up		
Yes	194	90.2
No	21	9.8
Forgetting the follow-up		
Yes	167	76.3
No	52	23.7
Not easy to reach the HF		
No	180	82.2
Yes	39	17.8
Can afford the transport cost		
Yes	182	83.1
No	37	16.9
Not having time		
No	177	80.8
Yes	42	19.2
Partner support		
Yes	214	97.7
No	5	2.3
Using traditional treatment		
No	185	84.5
Yes	34	15.5
Distance to the HF		
<= 5 km	53	25.9
> 5 km	151	74.0

Health facility related barriers		
Shortage of staff	15	6.9
Attitude of health care provider	1	0.5
Long waiting time	12	5.5
Lack of privacy	1	0.5
Limited commodities	16	7.3
Missed service at health facility	16	7.31
Staff behaviour		
Satisfied	172	78.5
Not satisfied	47	21.5
Waiting time		
Short time	47	21.5
Long time	172	78.5
Told of the follow-up date		
Yes	211	96.4
No	8	3.6
Counselled about the follow-up		
Yes	214	97.7
No	5	2.3

medicina

MDPI

Article

Characteristics of Women Seeking Cervical Cancer Cytology Screening in a Private Health Facility

Tizita Ashenafi [1,2], Clara Y. Stroetmann [2], Sefonias Getachew [1,2], Adamu Addissie [1,2] and Eva J. Kantelhardt [2,3,*]

[1] Department of Preventive Medicine, School of Public Health, Addis Ababa University, Addis Ababa 366, Ethiopia
[2] Global Health Working Group, Institute for Medical Epidemiology, Biometrics and Informatics (IMEBI), Martin-Luther-University Halle, 06112 Halle, Germany
[3] Department of Gynecology, Martin-Luther-University Halle, 06120 Halle, Germany
* Correspondence: eva.kantelhardt@uk-halle.de

Abstract: *Background and Objectives*: Over 80% of cervical cancer cases in sub-Saharan Africa are detected at late stages, predominantly due to the lack or inaccessibility of prevention services. Public health facilities in Ethiopia offer free cervical cancer screening for eligible women. Besides the public health facilities, private providers also offer a variety of screening services at the patients' expense. As the overall cervical cancer screening uptake in Ethiopia is still far below the 90% WHO target, coordination between all actors of the health system is key. This includes a close cooperation between the public and private sectors to combine the advantages of both to the benefit of all patients as well as media campaigns and community involvement to promote the self-initiation of screening. *Materials and Methods*: To gain insights into the utilization of cervical cancer screening in the private health sector, we conducted an institution-based cross-sectional study at Arsho medical laboratories in Addis Ababa. Every woman who came there for cervical cancer screening between 1 May and 30 June 2020 was asked to participate in a questionnaire-based, face-to-face interview about their socio-demographic background, cervical cancer screening experience and self-initiation of screening. A total of 274 women participated in the interviews. We further assessed the reproductive status of the patients, their risk factors for cervical cancer, source of information about the screening and barriers to cervical cancer screening. *Results*: The ages of the participants ranged between 20–49 years. The majority (over 70%) were married. A total of 37.6% reported self-initiating the screening. More than three-quarters of all interviewed women reported mostly using the private health care sector for all kinds of health services. *Conclusions*: While the Ethiopian government efforts on scaling up cervical cancer screening focus mainly on public health facilities, the private sector often does not get as much attention from policy makers. Efforts should be made to extend the government's interest in cervical cancer screening and implementation research to the private healthcare sector.

Keywords: cervical cancer screening; cervical cancer screening uptake; private health sector; Ethiopia; self-initiation

Citation: Ashenafi, T.; Stroetmann, C.Y.; Getachew, S.; Addissie, A.; Kantelhardt, E.J. Characteristics of Women Seeking Cervical Cancer Cytology Screening in a Private Health Facility. *Medicina* **2023**, *59*, 1624. https://doi.org/10.3390/medicina59091624

Academic Editor: Udo Jeschke

Received: 27 July 2023
Revised: 28 August 2023
Accepted: 5 September 2023
Published: 8 September 2023

1. Introduction

While cervical cancer has been declared a preventable disease targeted for elimination by the World Health Organization, it is still one of the most prevalent cancers in women worldwide [1,2]. Most cervical cancer cases, and related deaths, occur in low- and middle-income countries [2]. While screening and vaccination programs helped to drastically reduce the incidence of cervical cancer in Europe and North America, it is a major health threat for women in Sub-Saharan Africa—in some countries, it is the main cause of mortality by cancer in women [1,2]. Due to the lack or inaccessibility of prevention services, cervical cancer cases in sub-Saharan Africa are often detected at late stages, with lower survival rates and the need for aggressive treatment [1–4]. Without a massive increase in primary

and secondary prevention, sub-Saharan countries are bound to face a growing burden of cervical cancer cases due to demographic and lifestyle changes within the population [1–4].

1.1. Cervical Cancer Screening Uptake in Ethiopia

The standard method for cervical cancer screening in Ethiopia is visual inspection with acetic acid (VIA), and the Ethiopian cervical cancer screening guideline aims for 80% of women to be screened at least once in their lifetime [5]. However, a systematic review in 2020 found that in Ethiopia only 13.46% of women aged 30–49 years had received at least one screening [6]. In order to upscale cervical cancer screening in the future, various improvements have to be made, including raising community awareness about cervical cancer and its prevention, training and equipping health care professionals to provide screening services, exploring alternative screening approaches and coordinating all measures on a national level [2,5–7].

1.2. Public vs. Private Health Facilities

In Ethiopia, cervical cancer screening is available in public as well as in private health facilities. There are major differences between both sectors: A. Public health facilities in Ethiopia offer cervical cancer screening free of cost [5], whereas private health facilities charge a fee that has to be covered by the patients themselves or their health insurance. B. Public health facilities often exclusively offer VIA, whereas women using the private sector can often choose between various screening methods (VIA, HPV-DNA-Testing, cytology: Pap smear or liquid-based) [5]. C. Especially due to the related costs and perceived benefits of the private sector, such as shorter waiting times, it can be assumed that the clientele of both sectors differs. Existing studies on cervical cancer screening often focus on public health facilities or it is not identifiable whether the included health facilities are public or private [6–14].

1.3. Objectives

This study was conducted in a private health facility to shed light on cervical cancer screening in the private sector as there are not sufficient data on the number of women using private cervical cancer screening services and their socio-demographic characteristics. Women might choose to receive screening in a private health facility due to the perceived benefits of the private health sector. What is more, women who are referred from the public to the private sector might receive care without being captured in the public monitoring and reporting system. To tackle cervical cancer in a nation-wide comprehensive approach, differences between the private and public health sectors should be identified and a strong collaboration formed.

The objective of this study is to assess cervical cancer screening experiences among women of reproductive age at Arsho medical laboratories (AML) in Addis Ababa, Ethiopia, to better understand the characteristics of women utilizing the private health sector for cervical cancer screening and to generate evidence for program and policy level action.

2. Materials and Methods

2.1. Study Setting

We conducted an institution-based cross-sectional study at AML. AML has two cytology-based collection sites in Addis Ababa. The geographical area served by AML includes five sub-cities (Arada, Addis Ketema, Bole, Kirkos and Yeka). The general services rendered at AML are clinical chemistry, pathology, histo- and cytopathology, microbiology, molecular diagnostics, serology and virology tests.

2.2. Data Collection

Two nurses interviewed all of the women who came to AML for a liquid-based cytology of the cervix between 1 May 2020 and 30 June 2020, apart from those women who came for a cervical cancer follow-up and those who did not agree to participate in

the study. The consecutive sampling method was used to obtain the study population. The calculated sample size of 274 was reached, despite the patient flow being low, partly due to the COVID-19 pandemic. Informed written consent was obtained from every study participant.

The face-to-face interviews were based on a semi-structured questionnaire which had been developed after an extensive literature review. Primarily developed in English, the questionnaire was then translated to Amharic and back to check for consistency. The Amharic version was pretested in a comparable setting (at International Clinical Laboratories) on 5% of the calculated sample size, and a few questions were modified afterwards to ensure easy understanding. The final questionnaire consisted of five parts: A. socio-demographics, B. cervical cancer screening experience and self-initiation, C. reproductive status and risk factors for cervical cancer, D. information source and E. barriers to cervical cancer screening. The two nurses conducting the interviews had received a 1-day training by the principal investigator and were supervised daily during the data collection. The principal investigator also reviewed all records for plausibility.

2.3. Ethical Approval

Before the start of data collection, ethical approval was obtained from the Addis Ababa University School of Public Health and the Addis Ababa health bureau. Informed consent was secured from all the study participants.

2.4. Data Analysis

The collected data were entered into Epi data, cleaned, and checked for validity and completeness. Missing data are shown as "missing" in the tables. The reasons for missing data are that women declined to answer questions, were unsure how to answer correctly or were not asked. In some cases, obvious corrections were applied. RStudio was used for data analysis. Frequency and proportions were computed for a description of socio-demographic and other variables. Based on information about whether women self-initiated the screening or received a recommendation for screening by a health professional, we split our sample into two groups, and we want to describe the characteristics of both. We will refer to them as the "self-initiated" group and the "non-self-initiated" group.

3. Results

3.1. Socio-Demographic Characteristics of the Study Population

The "self-initiated" group consists of 103 women with a median age of 39 years; the "non-self-initiated" group consists of 171 women with a median age of 35 years (Table 1).

Table 1. Socio-demographic characteristics among women of reproductive age using cervical cancer cytology screening at Arsho Medical Laboratories in Addis Ababa, Ethiopia, 2020.

		Women Who Self-Initiated the Screening		**Women Who Were Recommended Screening by a Health Professional**	
		***n* = 103**		***n* = 171**	
		Frequency	**Proportion**	**Frequency**	**Proportion**
Age	<30 years	10	10%	34	20%
	30–34 years	19	18%	44	26%
	35–39 years	25	24%	43	25%
	40–44 years	31	30%	32	19%
	45–49 years	18	17%	18	11%
	MEDIAN	39		35	

Table 1. *Cont.*

		Women Who Self-Initiated the Screening		Women Who Were Recommended Screening by a Health Professional	
		***n* = 103**		***n* = 171**	
		Frequency	**Proportion**	**Frequency**	**Proportion**
Religion	Catholic	3	3%	7	4%
	Muslim	13	13%	39	23%
	Orthodox	75	73%	111	65%
	Protestant	12	12%	14	8%
Marital	Married	71	69%	127	74%
	Widowed	14	14%	13	8%
	Unmarried	6	6%	18	11%
	Divorced	9	9%	10	6%
	Separated	3	3%	3	2%
Educational status	Illiterate	14	14%	21	12%
	Literate	4	4%	14	8%
	Primary education	15	15%	34	20%
	Secondary education	30	29%	41	24%
	Diploma and above	40	39%	61	36%
Monthly income	Low income (<61 USD [1])	12	12%	36	21%
	Middle income (61–194 USD [1])	67	65%	104	61%
	High income (>194 USD [1])	24	23%	31	18%
	MEDIAN in ETB	4500		3600	

[1] Conversion rate 30 May 2020 1 USD = 34.156 ETB.

Patients aged 20–29 years constituted 10% of our self-initiated study sample, but 20% of the non-self-initiated group. Most participants in both groups were orthodox and most women were currently married. In both groups, the educational status as well as the monthly income of the participants were high, with a median income of 4500/3600 Ethiopian birr per month and less than 15% illiterate women.

3.2. Experience with Cervical Cancer Screening, Reproductive Status and Risk Factors

As Table 2 shows, most women at AML usually use private health facilities for their cervical cancer screening instead of public institutions. Most women who self-initiated the screening had their last screening within the last 2 years (56%), and 82% of the self-initiated group had been to any health facility within this time.

Reproductive status and selected risk factors for cervical cancer were also assessed—those are shown in Table 3. Less than 15% of women in both groups reported not having children.

Overall, 16.1% of women reported knowing someone with cervical cancer. Nearly half of the women who self-initiated the screening stated health facilities as their main source of information about cervical cancer. Of those who had used family planning, 75% (127 out of 169) reported use of oral contraceptives; 32 women reported taking OCP for 5 or more years. In both groups, about half of the participants stated that they have had only one sexual partner in their lifetime, while 95.2% reported three or fewer sexual partners. In total, 12.5% self-reported having experienced a sexually transmitted disease.

Table 2. Health-seeking behavior among women of reproductive age using cervical cancer cytology screening at Arsho Medical Laboratories in Addis Ababa, Ethiopia, 2020.

		Women Who Self-Initiated the Screening		**Women Who Were Recommended Screening by a Health Professional**	
		***n* = 103**		***n* = 171**	
		Frequency	**Proportion**	**Frequency**	**Proportion**
Most-visited health facility for CCS	Public	21	20%	39	23%
	Private	82	80%	128	75%
	Missing	0		4	2%
When was the most recent screening?	<1 year ago	18	17%		
	1–2 years ago	40	39%		
	2–4 years ago	25	24%		
	5 years ago	12	12%		
	>5 years ago	8	8%		
Last health facility visit?	<1 year	39	38%	37	22%
	1–2 years	45	44%	59	35%
	>5 years	19	18%	74	43%
	Missing	0		4	2%

Table 3. Reproductive status and risk factors among women of reproductive age using cervical cancer cytology screening at Arsho Medical Laboratories in Addis Ababa, Ethiopia, 2020.

		Women Who Self-Initiated the Screening		**Women Who Were Recommended Screening by a Health Professional**	
All		***n* = 103**		***n* = 171**	
		Frequency	**Proportion**	**Frequency**	**Proportion**
Number of children	0	12	12%	22	12%
	1–2	51	50%	62	36%
	3–4	25	24%	52	30%
	5–6	9	9%	14	8%
	7–8	4	4%	15	9%
	9–10	2	2%	6	4%
Age at first sexual intercourse	<16 years	6	6%	21	12%
	16–20	50	49%	93	54%
	21–25	31	30%	41	24%
	>25	15	15%	15	9%
	Missing	1	1%	1	1%
	MEDIAN	20		19	
Use of family planning	Yes	66	64%	103	60%
	No	37	36%	68	40%
Use of OCP	Yes	58	55%	70	41%
	No	19	19%	46	27%
	Missing	26	25%	54	3%
If OCP used, how long?	<5 years	43	74%	52	74%
	≥5 years	15	26%	17	24%
	Unknown	0	0%	1	1%

Table 3. *Cont.*

All		Women Who Self-Initiated the Screening		Women Who Were Recommended Screening by a Health Professional	
		n = 103		*n* = 171	
		Frequency	**Proportion**	**Frequency**	**Proportion**
Lifetime sexual partner(s)	1	58	56%	98	57%
	2–3	42	41%	67	39%
	4–5	3	3%	4	2%
	6–7	0	0%	2	1%
History of STD	Yes	19	18%	16	9%
	No	84	82%	155	91%

3.3. Barriers and Enablers to Uptake of Cervical Cancer Screening

Various barriers and enablers to screening uptake were assessed. In total, 44 women reported personally knowing someone with cervical cancer. Most women stated health professionals as their primary source of information on the issue (Table 4).

Table 4. Cervical cancer screening barriers and enablers among women of reproductive age using cervical cancer cytology screening at Arsho Medical Laboratories in Addis Ababa, Ethiopia, 2020.

		Women Who Self-Initiated the Screening		Women Who Were Recommended Screening by a Health Professional	
		n = 103		*n* = 171	
		Frequency	**Proportion**	**Frequency**	**Proportion**
Know anyone with cervical cancer	Yes	18	17%	26	15%
	No	85	83%	145	85%
Information source	Health facilities	47	46%	46	27%
	Media	42	41%	88	51%
	Public health education	5	5%	16	9%
	Relatives	9	9%	21	12%
Service cost	Very expensive	5	5%	1	1%
	Expensive	19	18%	29	17%
	Fair	64	62%	120	70%
	Cheap	15	15%	21	12%
Transportation cost	Very expensive	3	3%	1	1%
	Expensive	24	23%	33	19%
	Fair	57	55%	110	64%
	Cheap	18	17%	24	14%
	Very cheap	1	1%	3	2%
Discussed screening with partner	Yes	44	43%	62	36%
	No	59	57%	109	64%
Support by the partner afte discussion	Yes	44	100%	62	100%
Support by the partner without discussion	Yes	28	48%	51	47%
	No	31	53%	57	53%
	Unknown	0	0%	1	1%

As services in private health facilities must usually be paid for, we assessed how women felt about the related costs. The cost for cervical cancer screening in AML was 450 ETH birr (about 13 USD) at the time of our study; most of our participants agreed that this price was either fair or cheap. As women might depend on their male partners' financial and/or emotional support, we asked whether the patients had discussed the issue with their partner; 106 participants had done so and all of those received their partners' supports. In contrast, from the women who had not discussed the issue with their partner, only 47% of women assumed that their partner supported their decision to have cervical cancer screening.

4. Discussion

Our study examined the socio-demographic composition of women using cervical cancer screening services in a private health facility and their screening experiences. The median age of our study participants was 36 years, and most had experienced a screening for cervical cancer before and preferred screening in a private health facility over a public facility.

4.1. Socio-Demographic Characteristics

We found that 47.8% of women using AML for cervical cancer screening mostly were in the primary target age group for screening (30–49 years), while 44 women were under 30 years old. According to the 2019 DHS survey, 69.3% of the urban female population in Ethiopia are under 30 [15]. A recent meta-analysis indicated an overall pooled prevalence of 13.46% for cervical cancer screening uptake in Ethiopia, reaching 18.38% in Addis Ababa. And, aligning with our results, it revealed a 4.58 times higher likelihood of screening for women aged 30–39 compared to those aged 21–29 [6], aligning with the higher risk of cervical cancer for women above 30 and the higher false-positive rates among the younger group [5]. Religious distribution mirrored the DHS survey, with Orthodox Christianity predominating [15]. Earlier research links religious beliefs to screening acceptability [10,16], warranting the inclusion of the variable in future study designs. Of our participants, 62.8% had completed secondary education or higher, compared to 27.4% of Addis Ababa's population, according to the 2019 DHS [15], and 78% of our participants earned more than the 30,000 ETB/year that has shown increased screening uptake in an Ethiopian WHO steps study [12]. As women must pay for cervical cancer screening in private health facilities while it is cost-free in public institutions, we would expect primarily women who can afford the services to come to a private health facility. This seems to be the case, as most of our participants agreed that the price for screening was either fair or cheap.

In summary, our sample was older, more highly educated and wealthier than the average woman in Addis Ababa. This is not surprising, as several studies have shown that those factors can increase uptake of cervical cancer screening [6,12]. To discover possible differences between our sample and people in public health facilities, it is interesting to compare our sample to another sample of women who came for cervical cancer screening in Addis Ababa using Gahandi Memorial Hospital, a public health facility [16].

In our study, only 47.8% of participants were in the primary target group for cervical cancer screening (between 30 and 49), compared to 71% in Gahandi Memorial Hospital. The educational status of women seeking screening at Gahandi Memorial Hospital was higher than in our sample, with 80% having at least secondary education. The study in Gahandi Memorial Hospital did not report on the religious and financial background of their participants. In summary, our sample was older and less educated than the women seeking cervical cancer screening in Gahandi Memorial Hospital, Addis Ababa [16].

4.2. Reasons for Initiation of Cervical Cancer Screening

About one-third of our participants reported self-initiating the cervical cancer screening, which is similar to a facility-based study that was conducted in Addis Ababa in 2019 and found self-initiated cervical cancer screening to be 33.3% [17]. Health literacy, based on

education and access to understandable health information, has been shown as one of the key factors for increasing the self-initiation of screening [6,8–13]. What is more, awareness is very important for self-initiated cervical screening. The women came by themselves because of the awareness they obtained from health professionals, the media, public health education and, in some cases, relatives. As most of our participants were married and all who discussed the screening with their partner received their partners' support, this stresses the importance of involving men in awareness and communication programs and decreasing the taboos surrounding women's health and cancer. A heightened awareness of cervical cancer prevention can contribute to increasing consciousness regarding cancers affecting this high-risk group, including vulvar, anal, and other forms of cancer [18,19].

The remaining two-thirds of the women participated in screening due to a recommendation by any health professional. Just like in a study by Bante et al. in northwestern Ethiopia, participants in our study reported health professionals as the most important source for information on cervical cancer [20]. This stresses the importance of the role of health professionals in educating patients about cervical cancer and its prevention—in this regard, the Ethiopian guideline for cervical cancer prevention advocates so-called Behavioral Change communication [7].

4.3. Experience with Cervical Cancer Screening, Reproductive Status and Risk Factors

In our study, 46.4% of participants used oral contraceptives and 12.8% reported having had any STD, compared to 36.4% oral contraceptive-users and 9.8% with a history of STD in a study from Mekelle, 2016 [11]. These discrepancies could potentially be attributed to differences in socio-demographic factors, access to healthcare, or awareness about contraception and sexual health between the population of both cities. The already-mentioned meta-analysis of Ethiopian studies found that women with multiple sexual partners as well as women with a history of STD were more likely to participate in screening [6]. Due to time and financial restrictions, STD testing could not be offered to our participants. About 27.7% of our participants had visited a health facility during the last year. The study from northwest Ethiopia that was mentioned earlier also found that visiting health institutions once or more per year increased the uptake of cervical cancer screening [20]. Status of HPV vaccination was not assessed in our sample, as vaccination programs in Ethiopia were only launched in 2018 and focused on 14-year-olds, whereas our sample was not in the target group.

4.4. Strengths and Limitations

Our study explicitly focuses on women receiving screening in a private health facility, which is a setting that has not received much attention in previous studies. By including all women who came for screening, we minimized selection bias. Initially, we aimed to assess factors in favor of self-initiation of cervical cancer screening, as we are aware of the importance of self-initiation for the national cervical cancer prevention strategy. However, as our study is lacking an appropriate comparison group, we decided to compare our results to the DHS survey as well as to a cervical cancer screening study conducted in a public hospital in Addis Ababa. As our study was conducted in Addis Ababa in an urban setting, this may not be generalizable to the wider population of the country. Due to the cross-sectional design of our study, it is not possible to show the temporal development of the assessed factors.

5. Conclusions

Our study sheds light on the characteristics of women using the private health sector for cervical cancer screening. Private and public health care services must form a strong collaboration to maximize the effectiveness of screening programs and monitoring and to assure good quality care in both sectors. In a next step, it would be interesting to explore patients' perceived benefits and barriers to the private as well as the public health sector, to

later generate interventions facilitating access to care for as many patients as possible and improving their experiences within the health system.

In general, it can be said that increasing the self-initiation of screening is an important approach to increase screening uptake. Community awareness should thus rise, possibly with the help of religious and community leaders. For health professionals, this means that they should be aware of the importance of counseling. Staff trainings should include explanations on how to convey understandable health information to the recipient. Soon, the structures built up for cervical cancer screening can be used for other health-related services such as breast examinations.

Author Contributions: Conceptualization, T.A. and S.G.; methodology, T.A. and S.G.; software, T.A.; validation, T.A.; formal analysis, C.Y.S.; investigation, T.A.; resources, A.A. and E.J.K.; data curation, T.A. and C.Y.S.; writing—original draft preparation, C.Y.S.; writing—review and editing, T.A., S.G., A.A. and E.J.K.; visualization, C.Y.S.; supervision, A.A. and E.J.K.; project administration, S.G.; funding acquisition, A.A. and E.J.K. All authors have read and agreed to the published version of the manuscript.

Funding: The work was supported through the German Ministry of Research and Education, Grant 01KA2220B. This study was also supported by Else Kroener-Fresenius Foundation Grant No. 2018_HA31SP. The study was also supported by a grant from Hospital Partnership through the Deutsche Gesellschaft für Internationale Zusammenarbeit funded by the Ministry for Economic Cooperation and Development (ID 81281915).

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Research and Ethical Committee (REC) at Addis Ababa University, School of Public Health (code: DPM/0023/19 on 20 November 2019).

Informed Consent Statement: Written informed consent has been obtained from the patients to publish this paper.

Data Availability Statement: The data underlying the results presented in the study are available from the corresponding author. Data are not presented publicly for privacy reasons.

Acknowledgments: We thank the two nurses who conducted the face-to-face interviews, the women involved in the study and Arsho medical laboratories (AML) in Addis Ababa for allowing us to conduct this research.

Conflicts of Interest: The authors declare no conflict of interest.

Abbreviations

AML	Arsho medical laboratories
DHS	Demographic and health survey
HPV	Human papilloma virus
OCP	Oral contraceptive pill
STD	Sexually transmitted disease
VIA	Visual inspection with acetic acid
WHO	World Health Organization

References

1. Sung, H.; Ferlay, J.; Siegel, R.L.; Laversanne, M.; Soerjomataram, I.; Jemal, A.; Bray, F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J. Clin.* **2021**, *71*, 209–249. [CrossRef] [PubMed]
2. World Health Organization. Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem. Geneva. 2020. Available online: https://www.who.int/publications/i/item/9789240014107 (accessed on 30 August 2023).
3. Yimer, N.B.; Mohammed, M.A.; Solomon, K.; Tadese, M.; Grutzmacher, S.; Meikena, H.K.; Alemnew, B.; Sharew, N.T.; Habtewold, T.D. Cervical cancer screening uptake in Sub-Saharan Africa: A systematic review and meta-analysis. *Public Health* **2021**, *195*, 105–111. [CrossRef] [PubMed]
4. Arbyn, M.; Weiderpass, E.; Bruni, L.; de Sanjosé, S.; Saraiya, M.; Ferlay, J.; Bray, F. Estimates of incidence and mortality of cervical cancer in 2018: A worldwide analysis. *Lancet Glob. Health* **2020**, *8*, e191–e203. [CrossRef] [PubMed]

5. Federal Democratic Republic of Ethiopia Ministry of Health. *Guideline for Cervical Cancer Prevention and Control in Ethiopia*; Federal Democratic Republic of Ethiopia Ministry of Health: Addis Ababa, Ethiopia, 2021.
6. Ayenew, A.A.; Zewdu, B.F.; Nigussie, A.A. Uptake of cervical cancer screening service and associated factors among age-eligible women in Ethiopia: Systematic review and meta-analysis. *Infect. Agents Cancer* **2020**, *15*, 67. [CrossRef] [PubMed]
7. Gizaw, M.; Teka, B.; Ruddies, F.; Abebe, T.; Kaufmann, A.M.; Worku, A.; Wienke, A.; Jemal, A.; Addissie, A.; Kantelhardt, E.J. Uptake of Cervical Cancer Screening in Ethiopia by Self-Sampling HPV DNA Compared to Visual Inspection with Acetic Acid: A Cluster Randomized Trial. *Cancer Prev. Res.* **2019**, *12*, 609–616. [CrossRef] [PubMed]
8. Kyounghae, K.; Hae-Ra, H. Potential links between health literacy and cervical cancer screening behaviors: A systematic review. *Psychooncology* **2016**, *25*, S122–S130.
9. Destaw, A.; Midaksa, M.; Addissie, A.; Kantelhardt, E.J.; Gizaw, M. Cervical cancer screening "see and treat approach": Real-life uptake after invitation and associated factors at health facilities in Gondar, Northwest Ethiopia. *BMC Cancer* **2021**, *21*, 1031. [CrossRef] [PubMed]
10. Atnafu, T.; Daka, D.W.; Debela, T.F.; Ergiba, M.S. Women's Satisfaction with Cervical Cancer Screening Services and Associated Factors in Maternal Health Clinics of Jimma Town Public Health Facilities, Southwest Ethiopia. *Cancer Manag. Res.* **2021**, *13*, 7685–7696. [CrossRef] [PubMed]
11. Bayu, H.; Berhe, Y.; Mulat, A.; Alemu, A. Cervical Cancer Screening Service Uptake and Associated Factors among Age Eligible Women in Mekelle Zone, Northern Ethiopia, 2015: A Community Based Study Using Health Belief Model. *PLoS ONE* **2016**, *11*, e0149908. [CrossRef] [PubMed]
12. Gelibo, T.; Roets, L.; Getachew, T.; Bekele, A. Coverage and Factors Associated with Cervical Cancer Screening: Results from a Population-Based WHO Steps Study in Ethiopia. *J. Oncol. Res. Treat.* **2017**, *2*, 115.
13. Dessalegn, M.B. Cervical Cancer Screening Uptake and Associated Factors among HIV-Positive Women in Ethiopia: A Systematic Review and Meta-Analysis. *Adv. Prev. Med.* **2020**, *2020*, 7071925. [CrossRef] [PubMed]
14. Taye, B.T.; Mihret, M.S.; Muche, H.A. Risk factors of precancerous cervical lesions: The role of women's socio-demographic, sexual behavior and body mass index in Amhara region referral hospitals; case-control study. *PLoS ONE* **2021**, *16*, e0249218. [CrossRef] [PubMed]
15. Ethiopian Public Health Institute (EPHI) [Ethiopia]; ICF. *Ethiopia Mini Demographic and Health Survey 2019: Final Report*; Ethiopian Public Health Institute (EPHI) [Ethiopia]; ICF: Rockville, MA, USA, 2021.
16. Mekuria, M.; Edosa, K.; Endashaw, M.; Bala, E.T.; Chaka, E.E.; Deriba, B.S.; Tesfa, B. Prevalence of Cervical Cancer and Associated Factors Among Women Attended Cervical Cancer Screening Center at Gahandi Memorial Hospital, Ethiopia. *Cancer Inform.* **2021**, *20*, 11769351211068431. [CrossRef]
17. Getachew, S.; Getachew, E.; Gizaw, M.; Ayele, W.; Addissie, A.; Kantelhardt, E.J. Cervical cancer screening knowledge and barriers among women in Addis Ababa, Ethiopia. *PLoS ONE* **2019**, *14*, e0216522. [CrossRef] [PubMed]
18. Preti, M.; Selk, A.; Stockdale, C.; Bevilacqua, F.; Vieira-Baptista, P.; Borella, F.; Gallio, N.; Cosma, S.; Melo, C.; Micheletti, L.; et al. Knowledge of Vulvar Anatomy and Self-examination in a Sample of Italian Women. *J. Low. Genit. Tract Dis.* **2021**, *25*, 166–171. [CrossRef] [PubMed]
19. Preti, M.; Rosso, S.; Micheletti, L.; Libero, C.; Sobrato, I.; Giordano, L.; Busso, P.; Gallio, N.; Cosma, S.; Bevilacqua, F.; et al. Risk of HPV-related extra-cervical cancers in women treated for cervical intraepithelial neoplasia. *BMC Cancer* **2020**, *20*, 972. [CrossRef] [PubMed]
20. Bante, S.A.; Getie, S.A.; Getu, A.A.; Mulatu, K.; Fenta, S.L. Uptake of pre-cervical cancer screening and associated factors among reproductive age women in Debre Markos town, Northwest Ethiopia, 2017. *BMC Public Health* **2019**, *19*, 1102. [CrossRef] [PubMed]

Erklärungen

(1) Ich erkläre, dass ich mich an keiner anderen Hochschule einem Promotionsverfahren unterzogen bzw. eine Promotion begonnen habe.

(2) Ich erkläre, die Angaben wahrheitsgemäß gemacht und die wissenschaftliche Arbeit an keiner anderen wissenschaftlichen Einrichtung zur Erlangung eines akademischen Grades eingereicht zu haben.

(3) Ich erkläre an Eides statt, dass ich die Arbeit selbstständig und ohne fremde Hilfe verfasst habe. Alle Regeln der guten wissenschaftlichen Praxis wurden eingehalten; es wurden keine anderen als die von mir angegebenen Quellen und Hilfsmittel benutzt und die den benutzten Werken wörtlich oder inhaltlich entnommenen Stellen als solche kenntlich gemacht.

_____

Halle (Saale), den 12.05.2025

Danksagung

Mein besonderer Dank gilt Frau Prof. Dr. med. Eva Johanna Kantelhardt für die Möglichkeit diese Doktorarbeit in diesem Rahmen zu erstellen, ihre unermüdliche Anleitung und Unterstützung während des gesamten Prozesses sowie für die vielen hilfreichen Diskussionen und vielfältigen Möglichkeiten im Rahmen der Arbeitsgruppe für *Global and Planetary Health* der Martin-Luther-Universität Halle-Wittenberg.

Mein ausgesprochener Dank gilt außerdem Dr. Muluken Gizaw, Rahel Alemanyehu, Dr. Abigiya Wondimagegnehu und Prof. Adamu Addissie von der *School of Public Health* der *Addis Abeba University*, sowie Yonas Abebe, Winini Belay und dem gesamten äthiopischen Team. Ebenso ein herzliches Dankeschön an das gesamte Team in Moshi (Tansania), insbesondere an Dr. Tecla Lyamuya, Dr. Bariki Mchome und Prof. Blandina Mmbaga. Außerdem bin ich sehr dankbar für die Menschen, die ich im Rahmen der Gründung des *Network for Oncology Research in Africa* kennenlernen durfte.

Aus der Arbeitsgruppe für Global and Planetary Health in Halle danke ich insbesondere Maria Eckenweber, Friedemann Rabe, Dr. Nikolaus Mezger und Dr. Pablo Santos. Außerdem möchte ich beim gesamten Team für die schöne Arbeitsatmosphäre, die inspirierenden Gespräche und die leckeren Mittagessen bedanken. Zu guter Letzt danke ich Jonas, meiner Mutter, meiner Schwester und all meinen Freund*innen für ihren konstanten Rückhalt.