Leveraging AI to improve outcomes in people living with cancer

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National Minority Quality Forum
Globalization, urbanization are driving lifestyle changes that are causing a rise in chronic conditions.

1 million cancer deaths expected in Africa by 2030.

40–60% WRA with overweight/obesity in urban and peri-urban Nigerian areas.

1 Number of Nigerian doctors per 10,000 while WHO recommends 10:10,000.

2% Minimal competency from cancer screening to care given only 2% of health funding flows prioritize chronic conditions.

The ecosystem does not exist to screen, diagnose or effectively support people with cancer.

Source: Lancet Commission, BMJ Open: Prevalence of NCDs and Risk Factors…2023
Breast examination ever by a health worker

<table>
<thead>
<tr>
<th>Location</th>
<th>Answered No</th>
<th>Answered Yes</th>
<th>I Don't Know</th>
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<tbody>
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<td>IKORODU</td>
<td>86%</td>
<td>78%</td>
<td>3%</td>
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<tr>
<td>AMAC</td>
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<tr>
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<td>22%</td>
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<tr>
<td>BWARI</td>
<td>75%</td>
<td>12%</td>
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</tr>
<tr>
<td>IKORODU</td>
<td>24%</td>
<td>24%</td>
<td>1%</td>
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</tbody>
</table>
Cervical cancer screening – ever

**ANSWERED NO**
- ANSWERED NO
  - IKORODU: 11%
  - ALIMOSHO: 5%
  - AMAC: 5%
  - BWARI: 95%

**ANSWERED YES**
- ANSWERED YES
  - BWARI: 5%
  - ALIMOSHO: 5%
  - IKORODU: 11%

**I DON’T KNOW**
- IKORODU: 1%
- ALIMOSHO: 1%
- BWARI: 1%
- AMAC: 1%
HIV

TESTED FOR HIV

68% AMAC
67% ALIMOSHO
61% BWARI
70% IKORODU
mDoc optimizes the end-to-end self-care experience for people living with or at risk for chronic health conditions by harnessing quality improvement methodologies, behavioral science, data and technology.
We offer a four-pillar high tech, high touch approach to whole-person centred self-care

Virtual coaches and digital nudges through AI-enabled CompeletHealth™

In-person community based NudgeHubs™ + roving community ambassadors

Digital patient navigation via NaviHealth.ai™ with feedback systems aligned with quality domains

Tele-education of providers and patients through MQN™
Who We Serve

People living with or at risk for chronic diseases including mental health conditions
- Cancer
- Diabetes and pre-diabetes
- Hypertension
- Obesity
- Depression and Anxiety

Women’s Wellness
Men’s Health

Members on Complete Health™

>110,000

82% are women
Majority make less than $3 a day
67% with smartphones
We support people living with or at risk of cancer in medically underserved communities with a “phygital” approach to promote access to screening, selfcare support and financing for care.

**Innovative financing mechanisms**

We create and deploy innovative funding mechanisms using our digital affordability algorithm to provide access to treatment through our partners.

**AI powered selfcare support**

Members are enrolled on the CompleteHealth™ platform and assigned a coach-led care team - a nutritionist, fitness and emotional wellness coaches. Caregivers are supported too.

**Community outreach programs and tech-enabled NudgeHubs™**

We engage with the community through outreach programs and NudgeHubs™ for cancer screening. Hubs provide meeting points to build digital and AI literacy.
Through partnerships, our community outreach programs provide people with free cancer screenings. They are onboarded onto our CompleteHealth™ platform and can access virtual health coaching services and self care support.
We provide members and their caregivers with an integrated personalized approach to care and support.

Sign up on CompleteHealth™

Innovative access to treatment via digital affordability assessment

Access to AI-enabled ChatBot Kem for intake and support

Health coaching with digital nudges and selfcare support

Coaches involve the member’s care network, i.e., caregivers and managing physicians in care delivery

Health education on positive lifestyle changes to improve quality of life and patient outcome

Appointment reminders and medication adherence support

Co-morbidity support and continuous health status monitoring using the Complete Health™ platform

Adverse event tracking and reporting

Nutritional counselling, emotional wellness and fitness coach support
Members benefit from hybrid exercise sessions to improve their quality of life

Our members virtually engage the fitness coaches on one-on-one sessions as well as group exercise classes.

Members average weekly exercise duration after joining the program for 8 months

- 23 min.
- 78 mins

When I started my exercise classes with Coach Mike, I was only able to do it on the bed, but right now I’m able to exercise on my feet and move around. And now I don’t miss any exercise class and even carry out my exercise in my own time.

Mr. S living with metastatic prostate cancer
Our virtual multidisciplinary selfcare team also provides emotional wellness guidance to our members and their caregivers.

“After I was diagnosed with breast cancer, I signed on to mDoc’s oncology service and was assigned to a health coach. My coach helped me stop seeing cancer as a death sentence and I’m doing better.”

Mrs. W, a member living with stage II breast cancer

Overall percentage of members who achieved sustained improvement in depressive symptoms over time.

The graph shows the average member on the program achieves sustained improvement in depressive symptoms after 5 months of emotional wellness support.
We offer tele-education sessions on various cancer care topics, reaching communities, patients, caregivers, and frontline health practitioners across Africa.
We believe in the power of responsible AI to transform the lives of members living with chronic conditions such as cancer.
We initially created a rules-based chatbot, *Kem* to answer the expansive inquiries of our members during the pandemic.

We recognized the limitations in our approach and began exploring the possibility of integrating Kem with LLMs to deliver a significantly enhanced and more meaningful experience.

Meet Kem

**Basic Info**
- Name: Kem
- Gender: Undefined
- Role: Health Coach and Intake Coordinator

**Goals**
- Helping to bridge the gap in knowledge on health topics
- Answering and guiding mDoc members

**Interests**
- Reading books to expand my mind
- Staying fit by exercising
- Hanging out with friends
- Eating suya and buka food

**Strengths**
- Confident
- Energetic
- Efficient
- Time-efficient

Greetings!
My name is KEM, your mDoc chatbot. I will be available to assist with your questions.
However, there were many limitations with a rules based chatbot...

- Limited conversational and engagement depth
- Scalability issues since it can’t handle large volumes of interactions simultaneously.
- Limited multilingual support
- Dependency on predefined questions and scenarios.

We recognized the limitations in our approach and began exploring the possibility of integrating Kem with LLMs to deliver a significantly enhanced and more meaningful experience.
With the advent of generative AI, we have been testing the capability of Kem 2.0 to truly meet people where they are.
We’re using our datasets reflecting organic conversations between member and coach to train Kem

Objective

1. Improve Kem’s ability to respond accurately and empathetically to a wide range of inquiries.

2. Investigate Kem’s enhanced capacity to act as an Intake Coordinator.

3. Evaluate the effectiveness of human health coaches using ChatGPT-4.0 as a resource for addressing questions from members. Highlighting the benefits of ChatGPT integration for both Kem and human coaching support staff.
We are intentional about co-designing with the communities we serve, building and maintaining trust

**Rapid cycle test 1**
Clinicians and members
Member test size: 35
Week of Sept 18

**Rapid cycle test 2**
Clinicians and members
Member test size: 70 (35 in Lagos and Abuja)
Week of Sept 18

**Rapid cycle test 3**
Controlled user testing with Clinicians and Members
Member Test size: 200 (100 each in Lagos and Abuja)
User testing followed by FGDs of 32 in each state followed by focus group discussion of 64
Deployment - A Snapshot of Kem
We have conducted iterative cycles of testing of Kem 2.0 with ~500 members.

Given our early results, we are hugely optimistic about the power of AI to revolutionize self-care for people living with cancer in underserved communities.
The coaches are better supported with their AI co-pilot, Kem, to provide self-care support working hand-in-hand with members, caregivers and providers to drive improved health outcomes.

Members with depression improved [72%]

Members with anxiety improved [64.7%]

Members with controlled blood pressure [72%]

Members with controlled blood glucose [50%]

Members with depression improved [62.5%]

Access to financing for medication in 2023 [200K USD]

96% Self efficacy scores recorded by members

64.7% Members with anxiety improved

50% Members with controlled blood glucose

62.5% Members with depression improved
We also support patients living with metastatic prostate cancer helping them navigate treatment cycle completion.

88% of patients completed their 6-months duration course of treatment while 16% of the population had a full 12-month course of treatment in the year (2 cycles).

Average treatment duration was 7.94 months in the year 2023 alone for patients on our support program with metastatic prostate cancer compared with the average 5.7 months in global publications.
A 2.1x increase in treatment cycles for members living with breast cancer

- Average number of cycles taken before mDoc's oncology program: 3
- Average number cycles taken on mDoc's oncology program: 6.3

Increase in number of treatment cycles for patients on our support program on treatment for breast cancer compared to before they joined the program.

2.1x
Our generative AI journey is teaching us a lot...

1. Building contextual relevance, cultural sensitivity and gender inclusivity into LLMs takes time and iteration

2. Ensuring comprehensive and complete local datasets for training takes investment, a strong multidisciplinary approach, cyclical testing and a recognition of our own biases

3. Experts are critical for pressure-testing, validation and insights into the building process

4. Investing in AI literacy as a subset of digital literacy is key. Developing informed content takes time as people initially did not fully understand capabilities and limitations of AI systems.
The future: **Three immediate next steps**

1. **Expand our use of AI beyond virtual assistance and personalized coaching care to risk prediction as well as referral navigation.**

2. **Incorporating additional African language and voice recognition for seamless Voice-to-Text and Text-to-Speech functionalities, into our system.**

3. **Developing AI resources and curriculum to educate individuals on digital literacy, encompassing comprehensive instruction on the utilization of AI chatbots.**
THANK YOU