



ACTION

Addressing global inequities in breast
cancer genetic testing, counselling,
and management among breast
cancer patients in Nigeria

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MBBS, CHM, FWACS

LONDON GLOBAL CANCER WEEK
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Principal Investigator

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Breast Surgeon (MD, MEd, FRCS(C), FACS)

Gattuso Chair in Breast Surgical Oncology

University Health Network, Princess Margaret Cancer Centre

Associate Professor, Department of Surgery, University of
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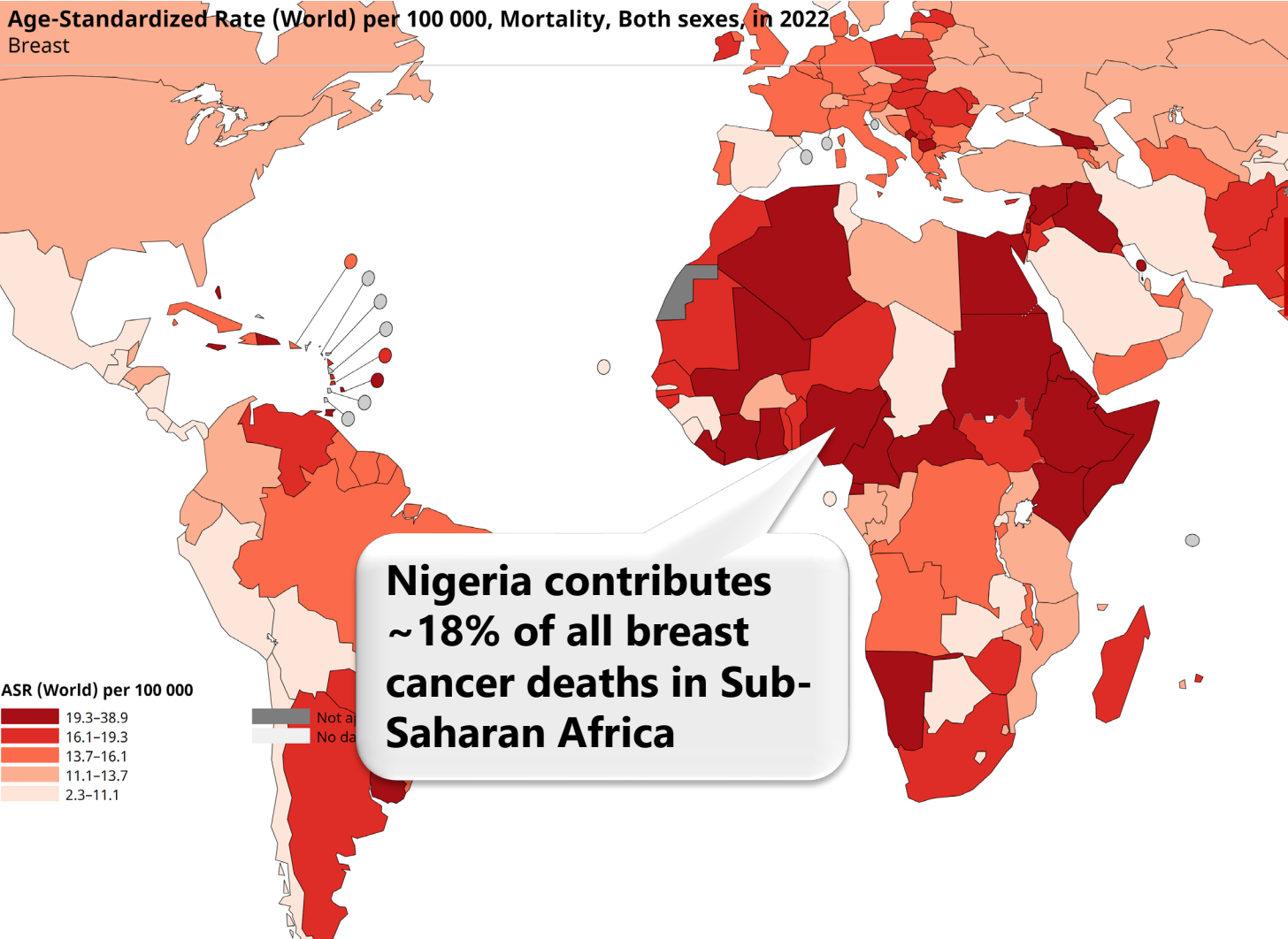
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Toronto in Breast Surgical Oncology



BREAST CANCER BURDEN IN SUB-SAHARAN AFRICA



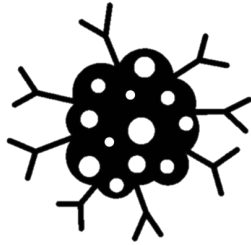
Country	Mortality Rank	Prop of SSA BC Deaths
Nigeria	1	17.9%
Ethiopia	2	10.5%
Egypt	3	10.5%
South Africa	4	5.7%
Algeria	5	5.4%
Democratic Republic of Congo	6	4.7%
Morocco	7	4.4%
Kenya	8	3.7%
Sudan	9	3.5%
Ghana	10	2.6%

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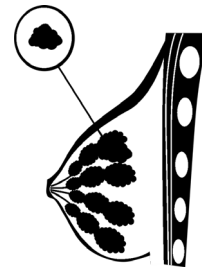
CHALLENGES OF TREATING BREAST CANCER IN NIGERIA



Early onset
15-39
years at
diagnosis



Late stage
III/IV
diagnosis



About
40%
aggressive
TNBC



Overall
43.6%
survival



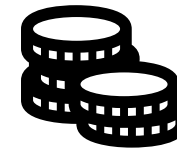
Estimated
220M+
people



About
20%
women
have CBE
each year



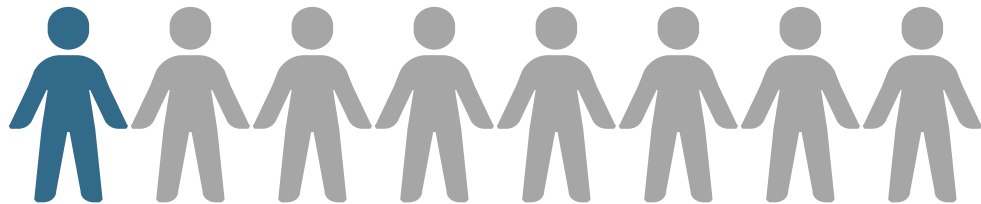
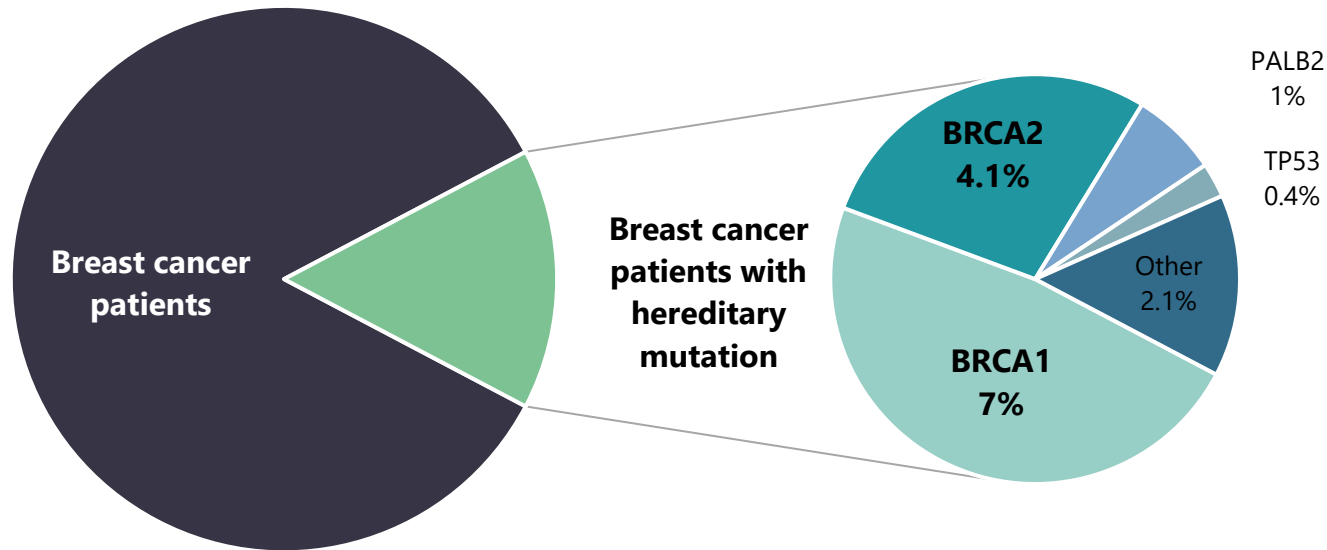
About
2.3%
women have
mammograms
each year



Government
funded
\$\$\$
Public Health
care system

HEREDITARY PREDISPOSITION IN NIGERIA:

Findings From Ibadan



- **11.1% (127 of 1,136) were found to have an inherited mutation in *BRCA1*, *BRCA2***
- **Unlike in North America and Europe:**
 - Access to genetic testing + counselling to evaluate the lifetime risk and inform management is extremely limited in Nigeria → **major oncologic health disparity**



SCREENING HIGH RISK WOMEN

- Population-based screening is impractical in most resource limited settings
- A more feasible approach is to target screening efforts toward women at higher risk

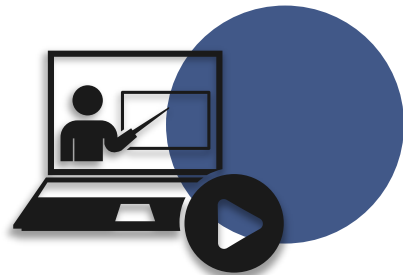
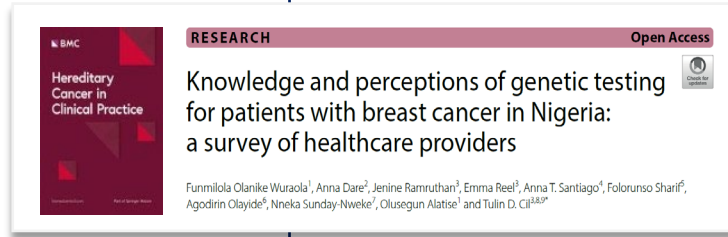
PURPOSE



**To develop a program to
enable genetic testing
for breast cancer patients
in Nigeria**

ACTION STUDY OBJECTIVES

EDUCATION



Aim 1

Develop and assess an educational curriculum to train Nigerian providers in genetic counselling



Aim 2

Develop patient education materials for enabling genetic testing

IMPLEMENTATION

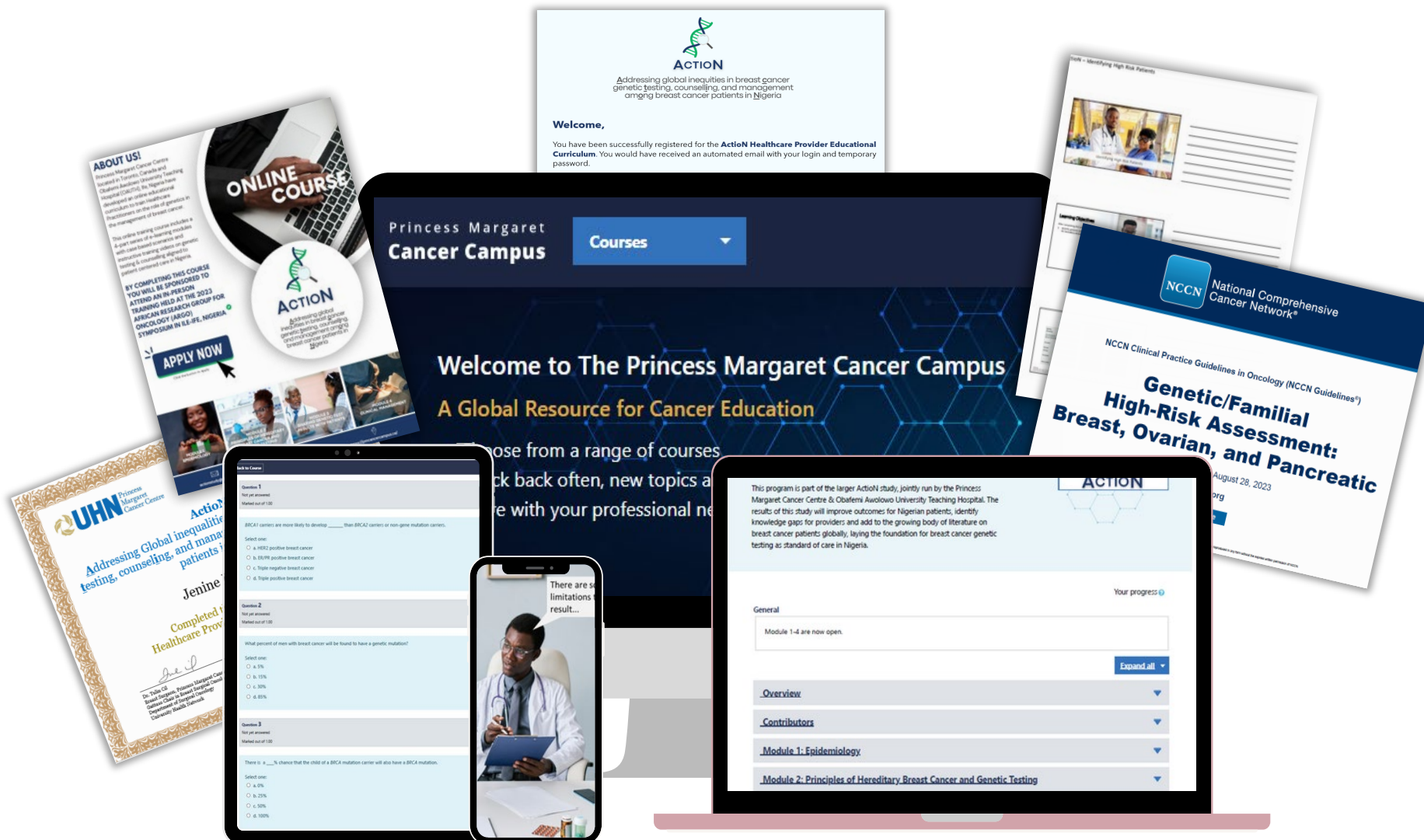


Aim 3

Assess the feasibility of BRCA 1/2 testing of breast cancer patients in Nigeria

AIM 1: ONLINE COURSE

HEREDITARY BREAST CANCER GENETIC TESTING



AIM 1: TRAINING WORKSHOP

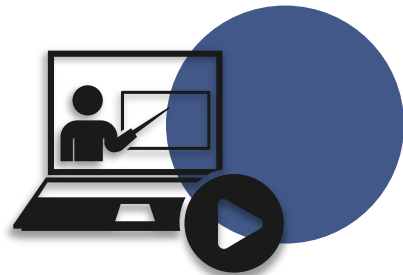
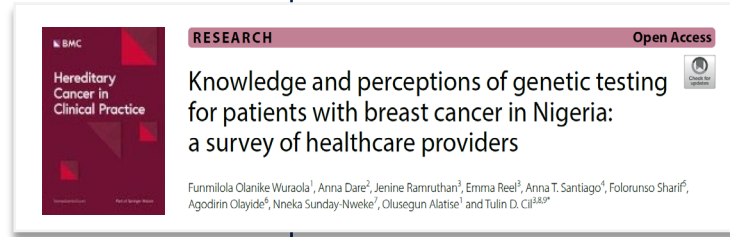
- 27th September 2023
- 31 providers from across all geo-political zones in Nigeria attended the training

Ile-Ife, Nigeria



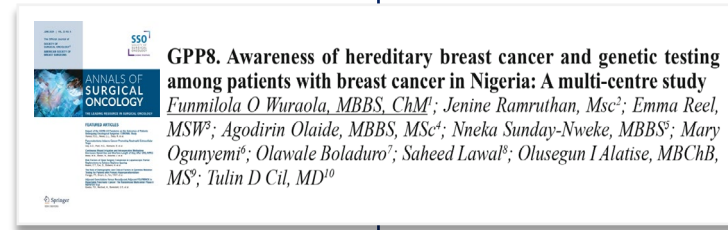
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AIM 2 – PATIENT EDUCATION

Bawo ni ayewo ajemo-odo-ara se le ran mi lowo?

Ayewo ajemo-odo-ara le ran o lowo lopo ona. Ayewo ajemo-odo-ara le ran o lowo lati:

1. Mo idi ti o fi ni aisan jejele

2. Pinnu lori itoju aisan jejele ti o fe



Dindin ewu ku tumo si dindin ewu aisan jejele ku. Fun asere, won le gbe ile omo abirin to ba ni ewu to po nla jejele ile omo kuro ki aisan jejele to gbe lara re. Gbogbe ile omo re kuro yoo se idinku nini aisan jejele.



3. Mo ewu to wa ninu nini awon irufe aisan jejele miiran



4. Sise ipinnu nipa ayewo aisan jejele ati didin ewu ku.

Bawo ni ayewo ajemo-odo-ara se le ran idile mi lowo?

Bi o ba ni ayipada ayewo odo ara, o seese ki awon molebi re naa ni ayipada odo ara. O seese ki o je wi pe lati odo okan ninu awon obi re ni o ti gba odo ara re.

Ayipada yii naa yoo koja sori awon omo re. Awon arakunrin re, awon arabinrin re, awon aunti re, awon aburo baba re, ati awon omo egbon awon obi re naa le ni ayipada odo ara.

Bi o ba ni ayipada odo ara, isayewo ajemo-odo ara le wa fun awon molebi re. Ayewo yii yoo safihan boya awon molebi re wa ninu ewu nini aisan jejele. Bi awon molebi re ba ni ayipada odo ara, awon iko olutoju won le dabaa ayipada ayipada fun itoju won. Ayipada itoju gbigba won le je mo isayewo aisan jejele ati dindin ewu ku.



Kin lo seese ko je ayorisi ayewo ajemo-odo-ara ti mo ba se?

O seese ki ayorisi ayewo ajemo-odo-ara je meta yii.

1 Isafihan Ayipada



O ni ewu pupo fun awon irufe jejele kan



Ayipada le de ba ayewo jejele, itoju, ati/tabi eto dindinwo ewu ku



Awon molebi re le da a ro lati sayewo ajemo-odo-ara

2 Won ko ri ayipada kankan



O seese ki o ma ni aisan jejele ajogunba



Aisan jejele re kii se ajogunba ninu idile bi ko se eyi to sadeede wa



O seese ki won ma so pe ki awon molebi re se ayewo ajemo-odo-ara

Video 1:

Understand Hereditary Cancer

Video 2:

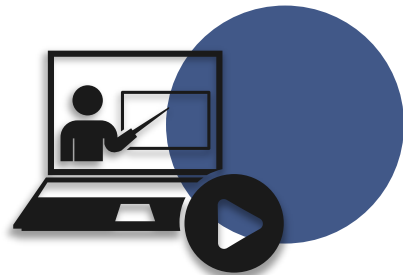
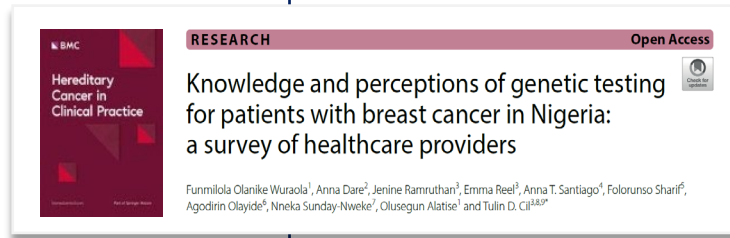
Understand Genetic Testing

Video 3:

Possible Results of Genetic Testing

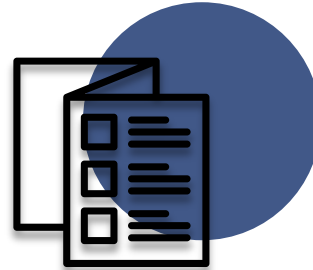
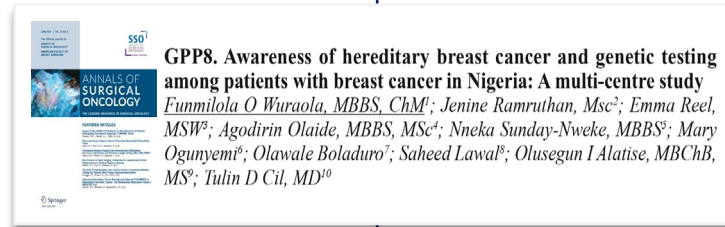
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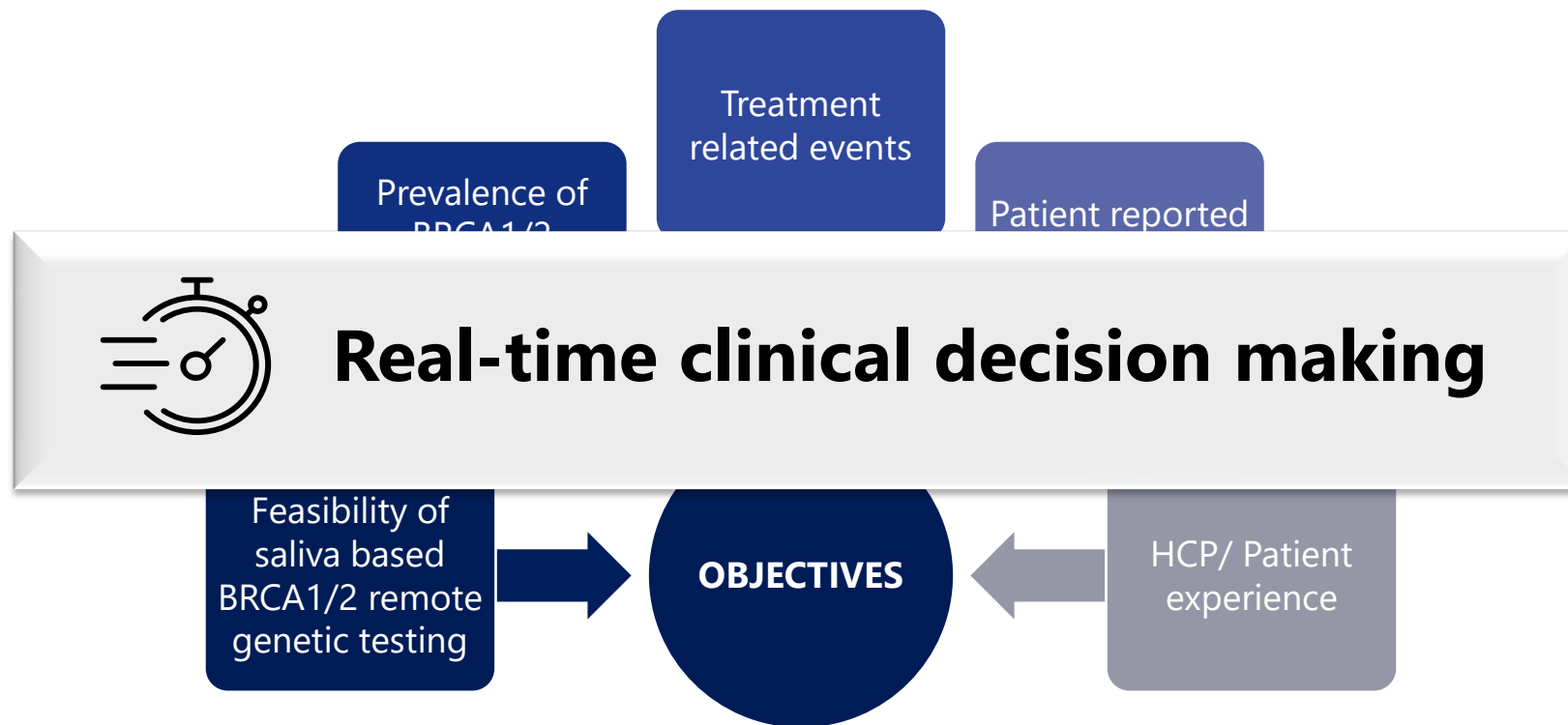


Aim 3

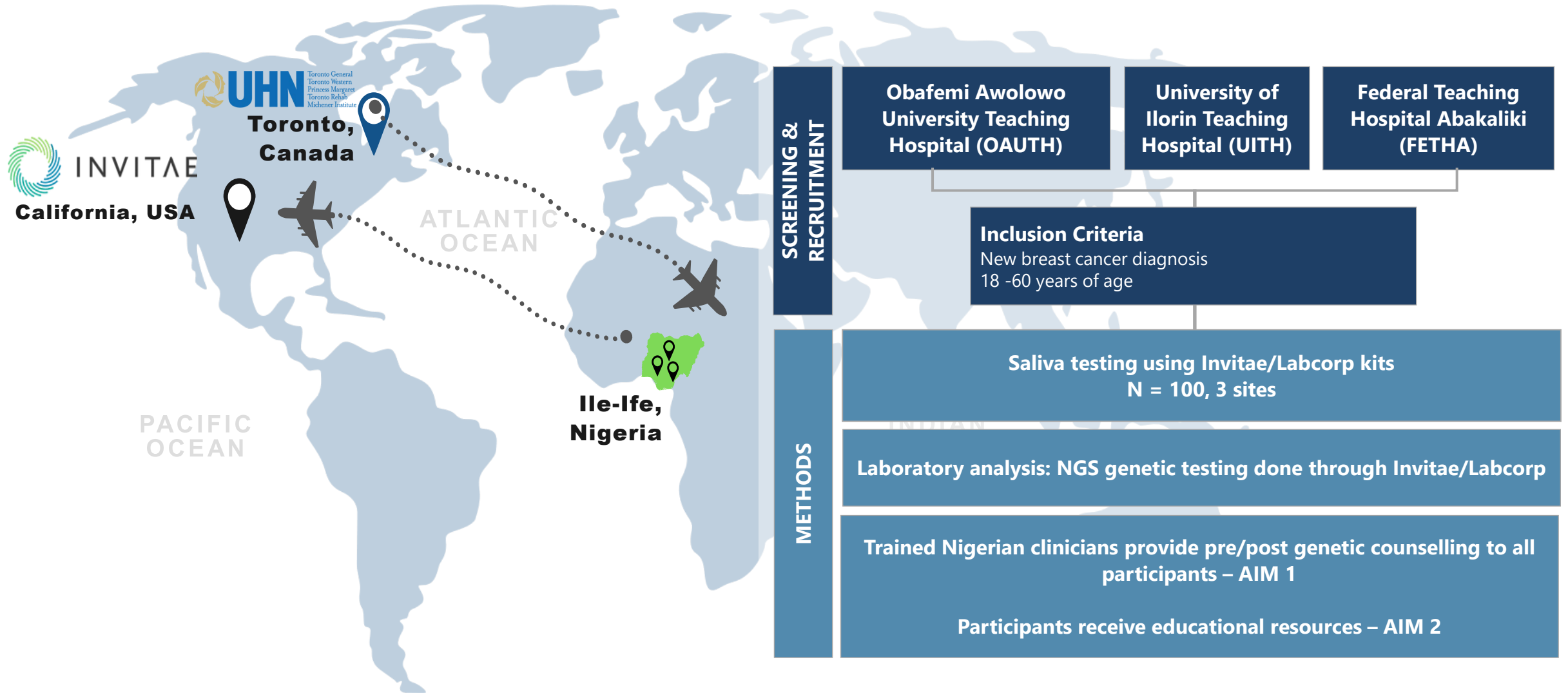
Assess the feasibility of *BRCA* 1/2 testing of breast cancer patients in Nigeria

PILOT STUDY

- Aim: Assess the feasibility of *BRCA* 1/2 testing among Nigerian women with breast cancer
- First ever multi-center study, serving as the largest pilot study for *BRCA* clinical testing in Nigeria, which will investigate treatment & patient outcomes



METHODS



RESULTS: FEASIBILITY OF BRCA1/2 TESTING



Logistics

- ❖ 23 days (3-week) turnaround from sample collection to result receipt
- ❖ Saliva samples shipped from Nigeria to California using DHL
- ❖ No additional duties were incurred

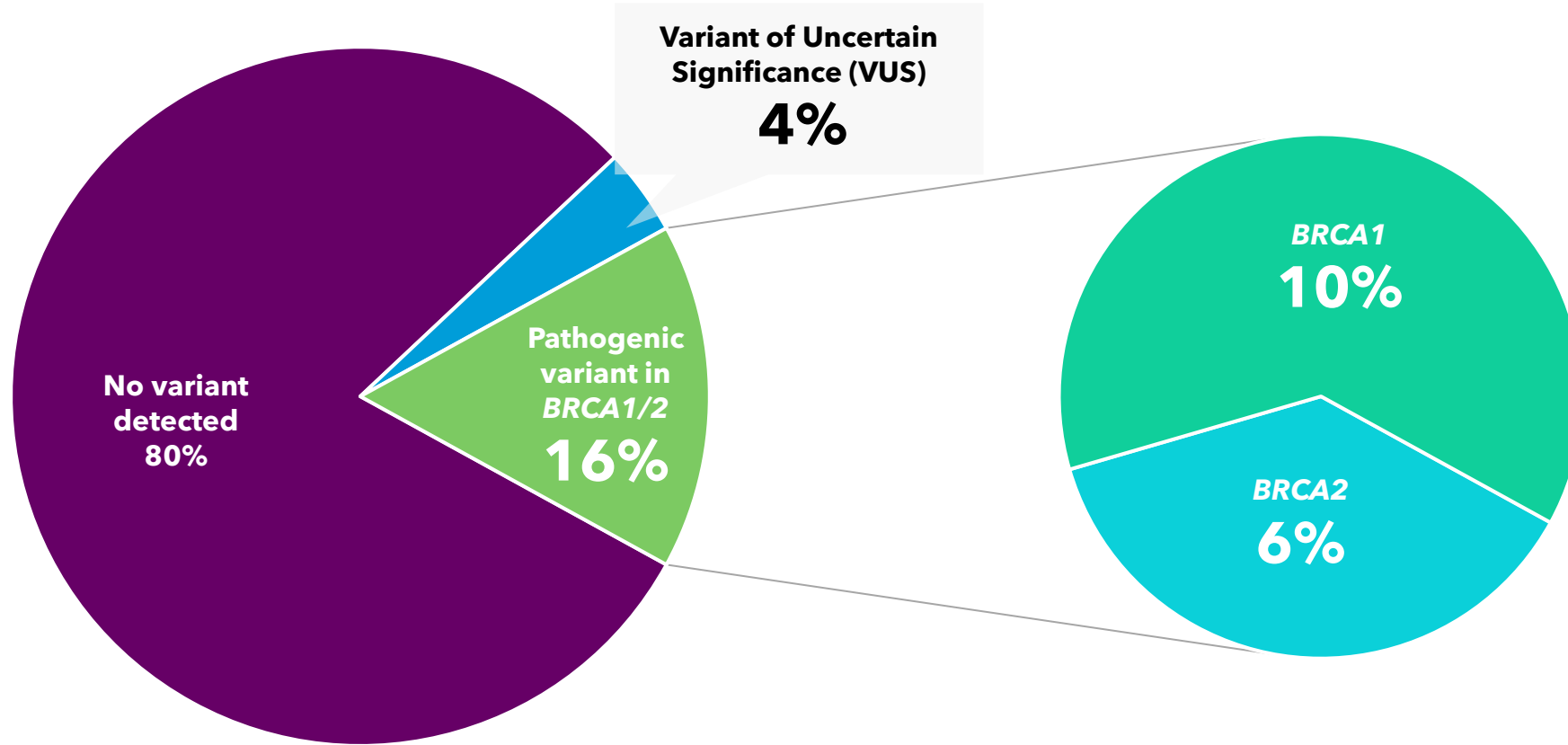


Quality Control

- ❖ 15% sample failure rate due to low DNA concentration or sample quality
- ❖ Retesting was successful

Our findings show genetic testing is feasible and practical in Nigeria, with a reliable logistic pathway

RESULTS: PREVALENCE OF *BRCA1/2*



In this study cohort ~1 in every 6 breast cancer patients carried a pathogenic *BRCA1/2* variant, confirming substantial inherited risk in this population

DEMOGRAPHICS

Characteristic	Non-Carrier N = 84 ¹	Carrier N = 16 ¹	p-value ²
Hospital, Site			0.7
OAU, Ile-Ife	56 (67%)	11 (69%)	
AEFUTHA, Abakaliki	17 (20%)	2 (13%)	
UIH, Ilorin	11 (13%)	3 (19%)	
Ethnicity			>0.9
Yoruba	63 (75%)	13 (81%)	
Igbo	17 (20%)	3 (19%)	
Cross River	4 (4.8%)	0 (0%)	
Religion			>0.9
Christianity	64 (76%)	13 (81%)	
Islam	20 (24%)	3 (19%)	

No significant differences were observed between BRCA carriers and non-carriers across site, ethnicity, or religious background within this cohort.

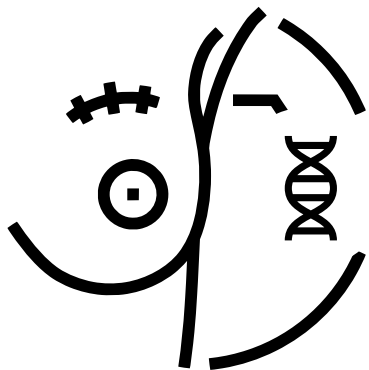
CLINICOPATHOLOGICAL OUTCOMES

Characteristic	Non-Carrier N = 84 ¹	Carrier N = 16 ¹	p-value ²
Age (median, IQR)		38 (38,49)	0.6
Premenopausal			0.8
Metastasis			0.2
Clinical stage (III–IV)			0.4
Histologic type (Invasive ductal carcinoma)			0.15
Subtype			> 0.9
ER-/HER2-			
ER-/HER2+			
ER+/HER2-		46 %	
ER+/HER2+	11 %	7.7 %	
Family history of cancer	3.6 %	25 %	0.012

Carriers and noncarriers were clinicopathologically similar - except for **family history of cancer**, which was markedly higher in carriers (p=0.012)

¹n (%); Median (Q1, Q3)

²Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test



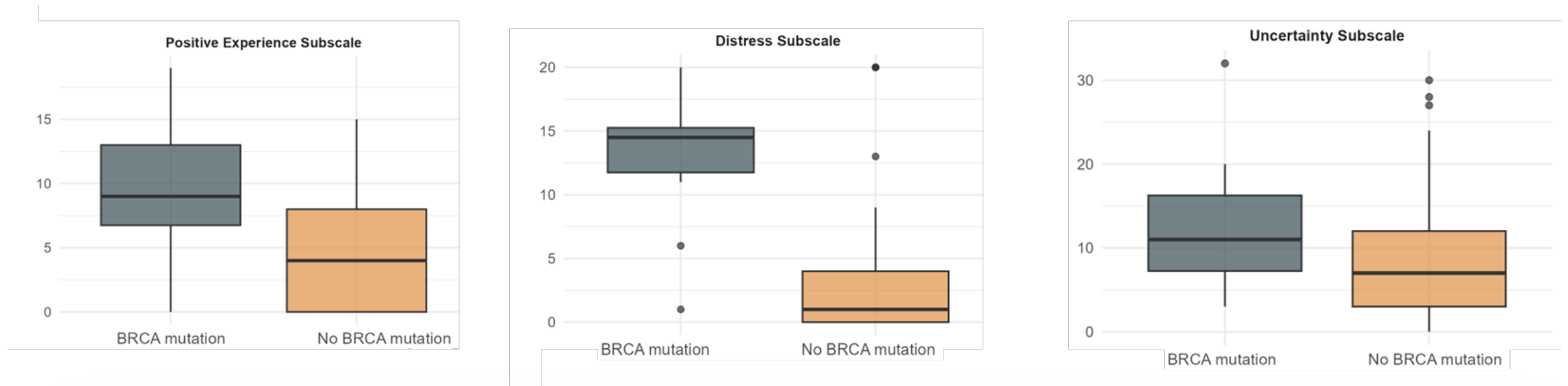
TREATMENT OUTCOMES

Treatment Summary (n=16 carriers)	n (%)
Final Surgery	
— Bilateral mastectomy	4 (25%)
— Unilateral mastectomy	4 (25%)
— Bilateral salpingo-oophorectomy	4 (25%)
— Metastatic Disease -not offered	6 (38%)
— Declined Surgery	2 (13%)
Adjuvant Treatment	
— Received Chemotherapy	11 (69%)
— No Chemotherapy	2 (13%)
— Declined Treatment	3 (19%)

First trial showing *BRCA* test results directly guided **treatment decisions & prophylactic surgery** in Nigeria

MULTIDIMENSIONAL IMPACT OF CANCER RISK ASSESSMENT (MICRA)

Patient Outcomes: MICRA tool measures impact of genetic testing



BRCA carriers reported higher distress and uncertainty, suggesting a greater emotional impact, although they also reported higher positive experience scores, indicating some benefit from knowing their results

CONCLUSION

- ❖ This study is the **first of its kind in Nigeria** which demonstrates that real-time *BRCA1/2* testing is feasible and directly informs patient care.
- ❖ In this cohort, **16% of patients harbored a pathogenic *BRCA1/2* variant**, and disclosure of results influenced uptake of surgery.
- ❖ **Family history was significantly higher among carriers**, underscoring the **potential for cascade testing** to identify asymptomatic high-risk relatives carrying the same variant as a strategy for community-level prevention.

Our findings provide early evidence that hereditary testing can be integrated into practice within resource-limited settings in sub-Saharan Africa

THANK YOU

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