

Who's WHO in guidelines: Structuring vignette responses on national and international recommendations to measure provider knowledge of HIV testing and counseling practice in four sub-Saharan countries

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Introduction

HIV testing and counseling (HTC) is the gateway to HIV prevention, treatment, and care and is central to HIV programs around the world. For a service that has been standardized through guidelines, is there actual variation among health workers for how they respond to a scenario where an individual arrives seeking HIV testing at a facility? In order to explore the outcome of health worker knowledge based on international and national guidelines for HTC, we take advantage of the use of vignettes within the Optimizing the Response to Prevention: HIV in Africa (ORPHEA) Project, a multi-country study conducted during 2011-2013.

Methods

The objective of the ORPHEA Project was to evaluate the technical efficiency of HIV prevention interventions, including HTC. Within the ORPHEA sample of 223 health facilities in Kenya, Rwanda, South Africa, and Zambia, we conducted vignettes for health workers involved in HTC service provision (1). At each facility, respondents for vignette interviews were selected on the criterion that they interact directly with HTC clients and subsequently provided informed consent for interview. For each facility that offered HTC services in the ORPHEA sample, up to five vignettes were completed. The HTC vignette presented respondents with the same scenario capturing a hypothetical HTC client, and the respondent was asked about how she or he would counsel the hypothetical client. Responses to the scenario for pre-test counseling, testing, and post-test counseling were never prompted by the interviewer, who had been trained to code common responses and include notes on responses in an 'other' category. The presented results do not include the categorization of the 'other' notes.

To assess process quality measures for estimating health worker knowledge, vignette responses were evaluated based on WHO guidelines for HTC, as well as national guidelines for HTC in each of the respective countries (2-6). Health workers in each country were graded on indices constructed on a scale of 0 to 1 (“knowledge scores” or “provider competence”) based on WHO and their respective national guidelines, where the resulting score refers to the proportion of variables under each guideline that was offered by the health worker as a response to pre-test counseling, testing, and post-test counseling services. All HTC recommendations from WHO are included with the exception of one related to quality assurance to ensure the provision of correct test results, which could not be captured as a natural limitation of the vignette methodology. We choose to explore knowledge score distributions at the country, provider type, and facility type levels with smooth Kernel density estimations. Lastly, multiple regressions were conducted on the outcome of knowledge scores constructed from WHO guidelines and combined national guidelines (since scores based on national guidelines are not comparable across countries as some indices may be constructed with components that are more complex to achieve) on provider and facility characteristics.

Results

Table 1 lists all the variables captured in the HTC vignettes and whether or not they appear in WHO and national guidelines. These variables were entirely unsolicited during the interview process. Across the four ORPHEA project countries, a total of 828 health workers were interviewed for HTC vignettes (see Table 2 for their characteristics). Among these health workers, 1.45% were medical doctors or medical officers; 36.11% were nurses; 52.54% were counselors, and 9.9% were of a different provider type. In Kenya, 107 health workers were interviewed; 232, in Rwanda; 287, in South Africa; and 202 in Zambia.

Table 3 displays the average knowledge scores for WHO and national guidelines by country. On average for all the countries, providers had knowledge scores that were insignificantly higher based on country guidelines than the international recommendations. Kernel density estimations suggest bimodal densities in South Africa and among counselors and wide bandwidths for both public and private health centers.

Tables 4 and 5 show multiple regression analysis results. Table 4 presents the predictors for the quality score based on the WHO guidelines. Medical or health-related training appears to be the strongest positive predictor of higher knowledge scores. The number of HTC clients per year does not seem to have a significant effect on the score, but the quantity of clients per day attended by a provider has a negative strong effect. Public hospitals have a positive effect, as well as Kenya. Facility and provider types do not seem to have a significant effect. Table 5 displays the same models but the response variable is the score based on national guidelines for each country. As expected, medical or related training has a positive effect on the score and also years of education. Kenya has a positively significant effect on scores, while facility and provider types do not seem to significantly predict knowledge. Number of clients attended by provider per day has a negative effect on scores.

Discussion

Provider knowledge is on average greater when the provider competence score is based on national guidelines rather than international guidelines. WHO guidelines provide an easy way to compare provider knowledge across countries where guidelines differ in the case of HTC.

Possible further research in this topic include comparing provider knowledge to provider performance as measured by exit interviews, provider knowledge assessments in more complicated HIV prevention interventions (e.g., male circumcision and PMTCT), and further analyses into provider knowledge as they relate to specific trainings (e.g., topics and lengths), urban / rural areas, facility size and type, and the history of HIV prevention programs in each country.

References

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Tables and figures

Table 1. Variables for HTC health worker knowledge for international and national guidelines.

VARIABLE	GUIDELINES				
	WHO ¹	KENYA	RWANDA	SOUTH AFRICA	ZAMBIA
1. IMPORTANCE OF GETTING TESTED FOR HIV		x	x		
2. MEANS OF HIV PREVENTION			x		x
3. DIFFERENCE BETWEEN BEING HIV+ AND HAVING AIDS			x		
4. DIFFERENT WAY HIV CAN BE TRANSMITTED			x		
5. HIV/AIDS MYTHS					x
6. MEANING OF WINDOW PERIOD			x	x	x
7. POSSIBLE TEST RESULTS		x	x		x
8. CHECK FOR PATIENT UNDERSTANDING				x	
9. OTHER, SPECIFY					
10. COST OF THE TEST					
11. VOLUNTARY NATURE OF TESTING	x	x		x	x
12. CONFIDENTIALITY OF TESTING AND RESULTS	x				
13. MEANING OF HIV+, HIV-NEGATIVE, AND INDETERMINATE RESULTS		x			x
14. HOW THE RESULTS ARE GIVEN					x
15. MEANING OF THE "WINDOW PERIOD"			x	x	x
16. WHEN THE RESULTS WILL BE READY					x
17. POST-COUNSELLING PERIOD	x			x	
18. DISCUSS THE MEANING OF TEST RESULTS		x		x	x
19. OTHER SPECIFY					
20. DISCUSS IMPLICATIONS FOR FAMILY					
21. DISCUSS SOURCES OF SOCIAL SUPPORT	x	x		x	x
22. DISCUSS SHARING THE RESULTS WITH PARTNER		x		x	
23. DISCUSS THE PREVENTION OF HIV EXPOSURE TO OTHERS					x
24. DISCUSS CONDOM USE AND SAFE SEX				x	x
25. DISCUSS THE DIFFERENCE BETWEEN BEING HIV+ AND HAVING AIDS			x		
26. REFERRAL AND SUPPORT SERVICES AVAILABLE	x	x	x	x	
27. AVAILABILITY OF ANTIRETROVIRAL TREATMENT (ART)		x			x

¹ All HTC recommendations from WHO are included with the exception of one related to quality assurance to ensure the provision of correct test results.

28. ANY CURRENT ILLNESSES			X		X	
29. ANY CURRENT OR PREVIOUS STI			X		X	
30. HAS BEEN TESTED FOR HIV BEFORE			X		X	X
31. EXISTING KNOWLEDGE ABOUT HIV TESTING			X	X	X	X
32. AGE AT FIRST SEXUAL INTERCOURSE			X		X	X
33. NUMBER OF SEXUAL PARTNERS IN LAST 12 MONTHS			X		X	X
34. HAD SEX UNDER THE INFLUENCE OF DRUGS OR ALCOHOL			X		X	X
35. CONDOM USE DURING LAST SEXUAL ENCOUNTER			X		X	X
36. EVER HAD UNPROTECTED SEX			X		X	X
37. OTHER EXPOSURE TO BLOOD PRODUCTS (E.G. BLOOD TRANSFUSION, BLOOD PRICK)			X		X	X
38. RECENT PREGNANCY TEST			X			X
39. PARTNER'S HIV STATUS			X		X	X
40. TYPE OF TEST - BLOOD DRAW				X		
41. TYPE OF TEST - FINGER PRICK				X		
42. PROVIDE CONDOMS			X			
43. ENCOURAGE PARTNER TO GET HIV TEST				X	X	
44. SET UP A FOLLOW-UP APPOINTMENT			X			
45. PROVIDE INFORMATION ABOUT FURTHER TESTING AT THIS FACILITY						X
46. PROVIDE INFORMATION ABOUT FURTHER TESTING AT ANOTHER FACILITY						X
47. REFERRAL FOR OTHER HIV TESTS	X	X	X	X	X	
48. PROVIDE INFORMATION ABOUT ANTIRETROVIRAL TREATMENT (ART) AND OTHER MEDICAL REFERRAL	X	X	X			X
49. CHECK FOR UNDERSTANDING					X	
50. NOTHING MENTIONED						
51. WELCOME TO POST-TEST COUNSELLING SERVICES AT THIS FACILITY				X	X	
52. ANNOUNCEMENT OF TEST RESULTS			X	X	X	X
53. EXPLANATION OF TEST RESULTS			X		X	X
54. CLIENT SUPPORT FOR RISK AND SECONDARY PREVENTION PLAN FOR HIV	X	X	X	X	X	X
55. AVAILABILITY OF PSYCHOSOCIAL SUPPORT SERVICES, INCLUDING HOME VISITS	X	X	X	X	X	
56. DISCUSSION OR INFORMATION ON TUBERCULOSIS AND TUBERCULOSIS TEST			X		X	X
57. SCHEDULE A FOLLOW-UP APPOINTMENT			X			
58. ENCOURAGE THE WOMAN TO RETURN TO GET TESTED						
59. DISCUSS CONFIDENTIALITY IN COUPLES COUNSELLING	X					
60. DISCUSS THE MEANING OF MUTUAL DISCLOSURE			X			X
61. DISCUSS SHARING THE RESULTS WITH YOUR PARTNER			X		X	
62. ENCOURAGE HER AND HER HUSBAND TO ENROL IN COUPLES COUNSELLING						
63. DISCUSS IMPLICATIONS FOR THE FAMILY						

64. DISCUSS IMPLICATIONS ON GETTING PREGNANT					
65. REFER HER AND HER HUSBAND FOR COUPLES COUNSELLING	x	x			
66. DISCUSS GENDER-BASED VIOLENCE					
67. INFORM HER OF AVAILABLE PSYCHOLOGICAL AND OTHER SUPPORT SERVICES	x	x	x	x	
68. REFER HER AND HER HUSBAND FOR PSYCHOLOGICAL OR OTHER SUPPORT SERVICES	x	x	x	x	
69. DISCUSS ANY MYTHS REGARDING HIV TRANSMISSION					x

Table 2. Characteristics of health workers responding to HTC vignettes.

Variable	N	Mean	Std. Dev.	Min	Max
How old are you?	820	36.96	9.26	20	69
How many total years of education did you complete (since primary school)?	822	14.36	2.79	1	32
Have you ever received any medical or health-related training?	823	0.95	0.23	0	1
For how many years have you been seeing patients?	823	8.85	8.06	0	42
Do you currently work in another facility or location in addition to this one?	822	0.03	0.17	0	1
How long have you been working in this position at your present job?	823	4.23	4.22	0	34
How long have you been working in your present department?	822	4.22	3.95	0	34
How many patients do you typically see in one day?	818	23.33	18.97	1	90
How many days per week do you typically work?	800	5.22	0.93	1	7

Table 3. Average knowledge scores by country for WHO guidelines vs. national guidelines.

Country	Variable	Obs	Mean	Std. Dev.	Min	Max
Kenya	WHO guidelines	107	0.48	0.18	0.07	0.89
	Country guidelines	107	0.68	0.16	0.29	1
Rwanda	WHO guidelines	225	0.29	0.13	0.04	0.67
	Country guidelines	225	0.53	0.18	0.17	1
South Africa	WHO guidelines	299	0.47	0.24	0.04	1
	Country guidelines	299	0.56	0.21	0.12	1
Zambia	WHO guidelines	205	0.34	0.17	0.04	0.81
	Country guidelines	205	0.52	0.18	0.16	1

Graph 1. Kernel density histograms for knowledge scores based on WHO guidelines by country, facility type, and provider type.

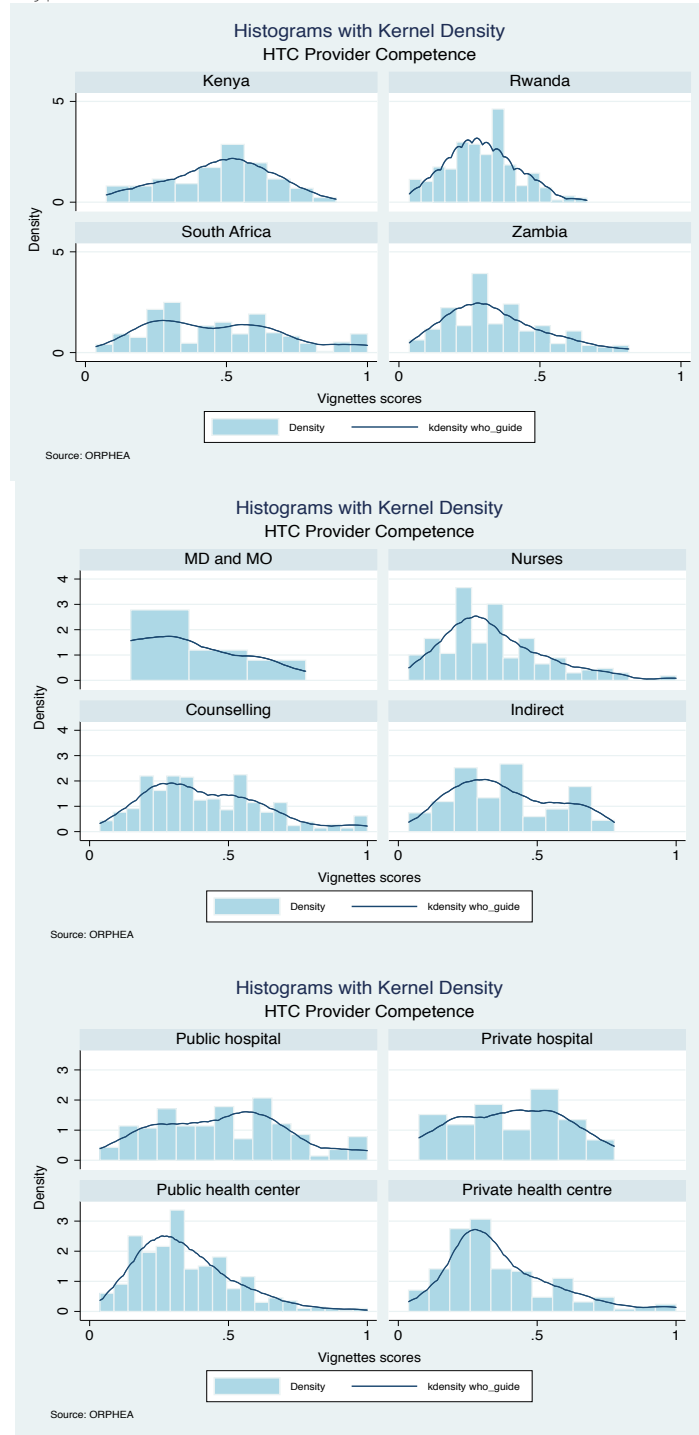


Table 4. Multiple regressions of provider and facility variables on the outcome for knowledge scores based on WHO guidelines. For I-V, country of reference is Kenya; Facility type of reference is a public hospital; and the provider type of reference is a doctor.

Model	I	II	III	IV	V	VI	VII	VIII	IX
WHO Guidelines	All countries	All countries	All countries	All countries	All countries	Kenya	Rwanda	South Africa	Zambia
HTC clients	-6.77e-05 (0.000111)	0.000565*** (0.000165)	5.26e-05 (0.000166)	-0.000162 (0.000198)	-0.000160 (0.000198)	0.00104 (0.000966)	-0.000864 (0.000998)	-0.00098** (0.000455)	0.000724 (0.00325)
Age		0.118 (0.114)	0.0122 (0.109)	0.0164 (0.109)	0.0155 (0.110)	-0.450 (0.350)	0.0799 (0.203)	0.0573 (0.231)	0.163 (0.174)
Years of education		0.801*** (0.275)	0.435* (0.263)	0.413 (0.263)	0.421 (0.267)	0.352 (0.845)	1.087** (0.419)	0.0128 (0.593)	0.903* (0.540)
Medical or related training		4.752 (3.113)	7.192** (2.962)	7.078** (2.957)	7.002** (2.985)	-3.824 (19.27)	6.969 (4.701)	9.656* (4.975)	6.344 (6.022)
How long seeing patients		-0.0150 (0.134)	-0.0290 (0.128)	-0.0357 (0.127)	-0.0412 (0.131)	0.472 (0.378)	-0.0542 (0.207)	0.0352 (0.283)	-0.294 (0.246)
How many patients per day		-0.223*** (0.0402)	-0.116*** (0.0396)	-0.116*** (0.0397)	-0.115*** (0.0414)	-0.0176 (0.257)	-0.103** (0.0483)	-0.115 (0.106)	-0.0547 (0.0647)
How many days per week		1.053 (0.810)	2.202*** (0.773)	2.404*** (0.775)	2.426*** (0.786)	3.074 (3.630)	0.953 (0.868)	7.112*** (2.388)	0.619 (1.371)
Facility type * size		-0.000376*** (7.41e-05)	-0.000142* (7.62e-05)	-6.22e-05 (9.05e-05)	-6.17e-05 (9.07e-05)	-0.000991 (0.000907)	0.000163 (0.000285)	0.000299 (0.000330)	-0.000534 (0.00113)
Rwanda			-14.84*** (2.566)	-14.02*** (2.715)	-14.30*** (2.909)				
South Africa			2.695 (2.260)	2.266 (2.303)	2.278 (2.324)				
Zambia			-11.72*** (2.495)	-10.70*** (2.626)	-10.79*** (2.678)				
Private hospital				-6.329** (3.059)	-6.274** (3.075)	-0.749 (6.776)		-10.99* (6.333)	9.110 (6.390)
Public health center				-5.164** (2.180)	-5.067** (2.187)	0.258 (7.515)	0.461 (6.445)	-15.72*** (4.527)	12.31* (7.054)
Private health center				-4.059 (2.612)	-3.989 (2.622)	13.19 (8.923)	-0.683 (6.608)	-16.52*** (5.622)	19.99* (10.56)
Nurses					4.043 (5.919)	-5.865 (21.29)	6.074* (3.288)	26.30 (17.04)	2.752 (6.562)
Counseling					3.777 (5.949)	-5.599 (19.83)	4.204 (3.898)	29.90* (17.83)	-0.895 (6.523)
Indirect					4.964 (6.149)	-10.04 (20.74)		27.58 (18.25)	8.893 (6.836)
Constant	39.22*** (0.918)	19.92*** (7.343)	24.37*** (7.201)	27.14*** (7.295)	23.12** (9.868)	48.62 (36.23)	-1.198 (12.93)	-14.96 (25.80)	-1.645 (16.19)
Observations	789	758	758	758	758	99	219	263	177
Adjusted R-squared	-0.001	0.083	0.186	0.191	0.188	-0.051	0.039	0.083	0.070

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Multiple regressions of provider and facility variables on the outcome for knowledge scores based on national guidelines. For I-V, country of reference is Kenya; Facility type of reference is a public hospital; and the provider type of reference is a doctor.

Model	I	II	III	IV	V	VI	VII	VIII	IX
National Guidelines	All countries	All	All countries	All countries	All countries	Kenya	Rwanda	South Africa	Zambia
HTC_clients	-1.52e-06 (1.03e-06)	2.65e-06* (1.56e-06)	2.40e-07 (1.63e-06)	-1.14e-06 (1.95e-06)	-1.13e-06 (1.95e-06)	1.03e-05 (8.46e-06)	-3.10e-05** (1.34e-05)	-7.87e-06* (4.05e-06)	-1.78e-05 (3.30e-05)
Age		-0.000123 (0.00107)	0.000221 (0.00107)	0.000230 (0.00108)	0.000243 (0.00109)	-0.00361 (0.00307)	0.00187 (0.00273)	0.000629 (0.00206)	0.000444 (0.00177)
Years of education		0.00689*** (0.00259)	0.00475* (0.00258)	0.00464* (0.00259)	0.00472* (0.00263)	0.00268 (0.00739)	0.0190*** (0.00564)	0.00214 (0.00527)	0.00469 (0.00549)
Medical training		0.0660** (0.0294)	0.0588** (0.0291)	0.0583** (0.0292)	0.0581** (0.0294)	-0.0520 (0.169)	0.0311 (0.0633)	0.0856* (0.0442)	0.0358 (0.0612)
How long seeing patients		-4.07e-05 (0.00127)	-0.000395 (0.00125)	-0.000427 (0.00126)	-0.000452 (0.00130)	0.00431 (0.00331)	-0.00144 (0.00279)	-0.000613 (0.00252)	-0.00126 (0.00250)
How many patients per day		-0.00188*** (0.000379)	-0.00138*** (0.000389)	-0.00139*** (0.000391)	-0.00138*** (0.000409)	-0.00178 (0.00225)	-0.00236*** (0.000650)	-0.000977 (0.000940)	7.08e-05 (0.000658)
How many days per week		0.0274*** (0.00764)	0.0298*** (0.00760)	0.0307*** (0.00765)	0.0305*** (0.00775)	0.00515 (0.0318)	0.0344*** (0.0117)	0.0473** (0.0212)	0.0105 (0.0139)
fac_type_size		-2.60e-06*** (6.99e-07)	-1.64e-06** (7.49e-07)	-1.07e-06 (8.93e-07)	-1.08e-06 (8.95e-07)	-9.80e-06 (7.94e-06)	7.77e-06** (3.84e-06)	2.85e-06 (2.93e-06)	1.60e-06 (1.15e-05)
Rwanda			-0.114*** (0.0252)	-0.110*** (0.0268)	-0.113*** (0.0287)				
South Africa			-0.0907*** (0.0222)	-0.0925*** (0.0227)	-0.0932*** (0.0229)				
Zambia			-0.137*** (0.0245)	-0.134*** (0.0259)	-0.133*** (0.0264)				
Private hospital				-0.0338 (0.0302)	-0.0343 (0.0303)	-0.00159 (0.0593)		-0.0448 (0.0563)	0.0560 (0.0650)
Public health center				-0.0251 (0.0215)	-0.0248 (0.0216)	0.0819 (0.0658)	0.119 (0.0868)	-0.129*** (0.0402)	0.0351 (0.0717)
Private health center				-0.0295 (0.0258)	-0.0295 (0.0259)	0.134* (0.0781)	0.0264 (0.0890)	-0.124** (0.0500)	0.144 (0.107)
Nurses					0.0286 (0.0584)	-0.132 (0.186)	0.0689 (0.0443)	0.267* (0.151)	0.0212 (0.0667)
Counselling					0.0259 (0.0587)	-0.138 (0.174)	0.0310 (0.0525)	0.306* (0.159)	0.00510 (0.0663)
Indirect					0.0250 (0.0607)	-0.188 (0.182)		0.310* (0.162)	0.0623 (0.0695)
Constant	0.568*** (0.00853)	0.322*** (0.0693)	0.423*** (0.0708)	0.440*** (0.0719)	0.414*** (0.0973)	0.911*** (0.317)	-0.0589 (0.174)	0.00612 (0.229)	0.339** (0.165)
Observations	789	758	758	758	758	99	219	263	177
Adjusted R-squared	0.002	0.067	0.102	0.101	0.097	-0.029	0.138	0.062	0.050

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1