RESEARCH ARTICLE



HIV knowledge and access to testing for people with and without disabilities in low- and middle-income countries: evidence from 37 Multiple Indicator Cluster Surveys

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Abstract

Introduction: Disability and HIV are intricately linked, as people with disabilities are at higher risk of contracting HIV, and living with HIV can lead to impairments and disability. Despite this well-established relationship, there remains limited internationally comparable evidence on HIV knowledge and access to testing for people with disabilities.

Methods: We used cross-sectional data from 37 Multiple Indicator Cluster Surveys. Surveys were from six UNICEF regions, including East Asia and Pacific (n = 6), East and Central Asia (n = 7), Latin America and the Caribbean (n = 6), Middle East and North Africa (n = 4), South Asia (n = 2) and sub-Saharan Africa (n = 12). A total of 513,252 people were eligible for inclusion, including 24,695 (4.8%) people with disabilities. We examined risk ratios and 95% confidence intervals for key indicators on HIV knowledge and access to testing for people with disabilities by sex and country. We also conducted a meta-analysis to get a pooled estimate for each sex and indicator.

Results: Men and women with disabilities were less likely to have comprehensive knowledge about HIV prevention (aRR: 0.74 [0.67, 0.81] and 0.75 [0.69, 0.83], respectively) and to know of a place to be tested for HIV (aRR: 0.95 [0.92, 0.99] and 0.94 [0.92, 0.97], respectively) compared to men and women without disabilities. Women with disabilities were also less likely to know how to prevent mother-to-child transmission (aRR: 0.87 [0.81, 0.93]) and ever have been tested for HIV (aRR: 0.90 [0.85, 0.94]).

Conclusions: Men and women with disabilities have lower overall HIV knowledge and in particular women with disabilities also indicate lower testing rates. Governments must include people with disabilities in HIV programmes by improving disability-inclusion and accessibility to HIV-related information, education and healthcare services.

Keywords: HIV testing; HIV knowledge; disability; health equity; accessibility; people with disabilities

Additional information may be found under the Supporting Information tab of this article.

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1 | INTRODUCTION

Globally, there are 1.3 billion people with disabilities [1]. There is a close relationship between HIV and disability, as research suggests that people with disabilities are at higher risk of contracting HIV (e.g. due to poverty, exclusion and discrimination) and HIV can lead to impairments and disability (e.g. due to direct effect of the virus, opportunistic infections or exclusion, and discrimination) [2–4]. While HIV control efforts have centred around expanding access to prevention, testing and treatment, these programmes often fail to consider accessibility for people with disabilities and peo-

ple living with HIV who develop disabling conditions [4, 5]. People with disabilities experience poorer health, on average, including a higher prevalence of communicable diseases, such as acute respiratory infection, sexually transmitted infections, diarrhoeal disease and tuberculosis [6–9]. People with disabilities also face barriers in accessing healthcare, and these are amplified for HIV care by a lack of knowledge and accessible information about HIV, lack of access to sexuality education; cultural beliefs around disability and HIV; lack of affordable, accessible, acceptable and quality HIV care; and health workers' beliefs that people with disabilities are asexual [10–14].

Data on HIV knowledge among people with disabilities vary across surveys [15–18]. While early disability-focused studies suggested that people with disabilities had lower knowledge about HIV [2, 19–22], recent studies using populationbased surveys show more diverse result. For instance, the 2017 HIV Impact Survey in Tanzania suggests that women with disabilities are more likely to know their HIV status [23]. In South Africa, the 2012 National HIV Prevalence, Incidence and Behavior surveys found that people with disabilities had less knowledge about HIV and were less likely to find testing sites [24]. Analysis of the 2011 Demographic Health Survey in Uganda showed equal knowledge of transmission for delivery and breastfeeding, but wide gaps in knowledge about HIV acquisition or transmission risk and misconceptions about HIV [18].

Beyond these data, indicators on HIV prevention, testing and treatment are rarely disaggregated by disability status in large-scale household surveys and country surveillance data and internationally comparable data on disability and HIV data are lacking. Hence, the UNICEF-supported Multiple Indicator Cluster Surveys (MICS) conducted across a large number of low- and middle-income countries (LMICs) is an opportunity to assess the HIV knowledge and testing practices among people with disabilities. While the Disability Data Initiative reports suggest some differences in HIV knowledge or testing among women with disabilities, these reports only discuss descriptive statistics for women [25]. More country-specific and sex-disaggregated analysis is needed to further understand inequities.

This paper presents sex-disaggregated, internationally comparable evidence on HIV knowledge and testing among adults 15–49 from the MICS conducted in 37 LMICs. The aim is to compare in access to knowledge about prevention between people with disabilities and those without disabilities in access to knowledge about prevention and testing for HIV by disability status. Efforts to improve access to knowledge, testing and treatment are central to UNAIDS 95-95-95 targets by 2030 and so these data provide evidence on how these efforts are reaching people with disabilities [3].

2 | METHODS

This study is a secondary analysis of the MICS. We describe the methods used to conduct the MICS, as well as our methods to analyse the published datasets.

2.1 | MICS programme methods

The MICS are cross-sectional, population-based survey conducted in LMICs. The MICS use a multi-stage sampling approach to sample clusters of households selected from a previous national sample frame (i.e. census, national survey) to generate nationally representative data on indicators for tracking the Sustainable Development Goals, health and development [26, 27].

Trained data collectors conducted interviews with adults aged 15-49 living in the randomly selected households. All men and women aged 18-49 were eligible, while participants aged 15-17 may have been one of the children aged 5-17 randomly selected from the household roster. Data were col-

lected for both individual women and men, where countries have opted-in to including the individual men's questionnaire. Questions were standardized across countries, allowing comparisons across all the countries where MICS6 has been completed. We selected countries that had anonymized individual data on all variables of interest and were publicly available as of March 2023, though data were collected between 2017 and 2021.

2.2 Secondary analysis methods

This analysis focuses on the 37 countries where HIV and disability data were available for women (and a subset of 29 countries that had men's disability and the HIV questionnaire). Countries included in this study were geographically diverse, with 12 in sub-Saharan Africa, 7 in East and Central Asia, 6 in Latin and Central America, 6 in East Asia and Pacific, 4 in Middle East and North Africa, and 2 in South Asia.

2.3 | Exposure

Disability was measured in the child and adult functioning modules for adults 15-17 and 18-49, respectively. Both modules use the standardized definition of disability, as assessed by Washington Group Questions, which have been validated for use in the MICS across settings [28]. These questions assess the participants' impairments based on their self-reported level of functional difficulty in functional domains (Table 1). We defined disability as the highest two thresholds of impairment, including only those who answered "cannot do at all" or a "lot of difficulty" in at least one functional domain as disabled. However, it does mean our comparison group includes individuals who have reported "some" functional difficulty in one or more functional domains. This threshold of disability was selected in accordance with the Washington Group syntax, so that the indicators aligned with the UNICEF reports, and to preserve the specificity of the disability measure. Individuals without fully completed functioning modules were excluded from analysis, unless they had met the threshold for disability in one or more domains, since the missing data would not have impacted their disability status.

2.4 | Outcomes and co-variates

Outcomes related to HIV knowledge and testing behaviour were measured through five indicators. We used the standard MICS definitions to calculate each outcome (Table 1 and Appendix S1). Responses were reported by the individual participants, and those unable to participate independently were recorded as "incapacitated" [29]. Not all countries included had all HIV indicators or data on both sexes, which is why we did not conduct an "overall" result that included both sexes. We adjusted the analysis by age (years), wealth quintile and residence area (urban vs. rural).

2.5 | Statistical analysis

All analyses were completed using R 4.2.2. We described all outcomes, exposures, and covariates by country and overall. Continuous data were reported as mean (standard deviation

Table 1. Definitions of HIV and disability indicators

Indicators	MICS indicator	Definition
Comprehensive knowledge about HIV prevention	TM.29	% of people who know of the two ways of HIV prevention (having only one monogamous, uninfected partner and using a condom every time), who know that a healthy-looking person can be HIV positive and who reject the country-specific two most common misconceptions about HIV transmission.
Knowledge of mother-to-child-transmission (MTCT)	TM.30	% of people who can identify that HIV can be transmitted from mother to child (during pregnancy, during delivery and by breastfeeding).
People who know where to get tested for HIV	TM.32	% of people who know where they can get tested for HIV.
People who have ever been tested for HIV and know the results	TM.33	% of people who report ever being tested for HIV and know the results of the most recent test.
People who have been tested for HIV in the last year and know the results	-	% of people who report being tested for HIV in the last 12 months and know the results of the most recent test.
Disability	_	% of adults aged 18–49 with functional difficulty as assessed by the Washington Group Short Set ("cannot do at all" or "a lot of difficulty" in at least one of the following domains: 1) seeing, 2) hearing, 3) walking, 4) remembering/concentrating, 5) self-care, 6) communication) and adults 15–17 with functional difficulty as assessed by the Child Functioning Module ("cannot do at all" or "a lot of difficulty" in at least one of the following domains: 1) seeing, 2) hearing, 3) walking, 4) remembering, 5) concentrating, 6) self-care, 7) making friends, 8) controlling behaviour, 9) accepting change, 10) learning, 11) communication or "daily" in either 12) anxiety, and 13) depression.

[SD]), and categorical data were reported as numbers (percentage).

To estimate the relative inequities of each outcome between people with and without disabilities, we first modelled the probability of each outcome by sex and by country, using a modified Poisson model [30]. Results were reported as (adjusted) risk ratio (RR or aRR) and its 95% confidence interval (CI). The complex survey design and sample weights were also accounted for using the "survey" package in R [31]. We then pooled the country-specific estimations by meta-analysis with the inverted standard error as the weight. The heterogeneity of estimates across countries was assessed by Cochran's Q test [32]. For the presence of significant heterogeneity (p < 0.1), a random-effect meta-analysis was performed to pool the estimates, and for those where p >0.1, a fixed-effects meta-analysis was conducted. We excluded cases with missing values instead of any imputation when we fitted the data for each outcome. To reduce the bias due to the small sample size, we excluded countries with fewer than 25 respondents with disabilities when we pooled the country-specific estimations.

2.6 | Ethical approval

The London School of Hygiene and Tropical Medicine Research Ethics Committee approved this project on the 9th of November 2020 (reference number: 22719). Before data collection begins, UNICEF also obtains ethical approval from each country's national Ethics Committee. Consent was obtained by MICS interviewers at the time of the survey and only participants who consent to have their data shared anonymously are made publicly available on the MICS website. We accessed the anonymized data from the MICS website in January 2023.

3 | RESULTS

3.1 | Overall sample

Our sample included 513,252 people across 37 countries, with sample sizes ranging from 1031 in Tuvalu to 57,585 in Bangladesh (Table 2). The overall prevalence of disability in the sample was 4.8% (n = 24,695), but the prevalence ranged from 0.8% of the sample in Turkmenistan (n = 58) to 10.8% in Central African Republic (n = 1235) and Costa Rica (n = 743). The overall sample was predominantly female (82.5%, n = 423,615) and there was a slightly larger proportion of rural participants (55.6%, n = 285,454).

3.2 Comprehensive knowledge about HIV prevention

Thirty-two countries reported data on comprehensive knowledge about HIV prevention in women (Figure 1). Overall, the pooled showed that women with disabilities have significantly lower knowledge about HIV prevention than women with-

Total sample513.252 $24,695 (4.8)$ $227,798 (44.4)$ $31.46 (8.96)$ $89,637 (17.5)$ $423,615 (6.6)$ Fiji 6827 $206 (30)$ $3849 (56.4)$ $33.16 (8.87)$ $2261 (33.1)$ $4566 (6.6)$ Finibati 5669 $297 (5.2)$ $2402 (42.4)$ $31.24 (8.86)$ $1865 (32.9)$ $3804 (77.1)$ Mongolia $13,898$ $1198 (8.6)$ $77 (1.6)$ $1147 (31.5)$ $31.24 (8.86)$ $1865 (72.2)$ $761 (73.1)$ Samoa 4696 $77 (1.6)$ $1147 (31.5)$ $31.28 (9.37)$ $1047 (22.3)$ $3649 (77.1)$ Samoa 3525 $79 (2.2)$ $2402 (42.4)$ $31.78 (9.37)$ $1047 (22.3)$ $3649 (77.1)$ Samoa 3525 $79 (2.2)$ $2407 (27.1)$ $4902 (25.2)$ $761 (73.1)$ Sumoa 8894 $807 (9.1)$ $5516 (74.3)$ $33.91 (7.66)$ $2167 (292.2)$ $761 (73.1)$ Belarus $742 (8.1)$ $33.91 (7.66)$ $2167 (292.2)$ $761 (73.1)$ $761 (73.1)$ Samoa 8894 $807 (9.1)$ $4254 (47.8)$ $34.47 (86.1)$ $2767 (27.7)$ $6427 (77.7)$ Belarus $742 (8.1)$ $33.91 (7.66)$ $2363 (28.4)$ $6017 (71.1)$ Kregsztan 5162 $134 (2.6)$ $33.27 (8.90)$ 857 $751 (26.4)$ $2097 (73.1)$ Wontenegro 2848 $36(1.3)$ $1720 (60.4)$ $33.77 (8.6)$ $32.47 (27.7)$ $6427 (77.1)$ Kregsztan 5162 $1347 (26.6)$ $2374 (26.6)$ $2361 (26.4)$ $2097 (73.1)$ Wontenegro 2848	Age, mean Urban, n (%) (SD) Male, n (%)	Female, <i>n</i> (%)	Knowledge about HIV, <i>n</i> (%)	Knowledge about MTCT, n (%)	Know of a place to be tested for HIV, n (%)	Ever tested for HIV and know the results, <i>n</i> (%)	Tested for HIV in the last 12 months and know the results, <i>n</i> (%)
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o 8400 587 (7.0) 3910 (46.5) 32.49 (9.52) 2383 (28.4) zstan 5162 134 (2.6) 2355 (45.6) 33.07 (8.90) a znegro 2848 36 (1.3) 1720 (60.4) 33.90 (8.57) 751 (26.4) enegro 2848 36 (1.3) 1720 (60.4) 33.90 (8.57) 751 (26.4) enistan 6959 58 (0.8) 36.31 (52.2) 32.21 (8.74) a istan 4385 289 (6.6) 2146 (48.9) 32.76 (8.63) a fistan 4385 289 (6.6) 2146 (62.6) 31.99 (8.63) a fistan 43316 (62.6) 31.99 (8.63) a fican 19,992 803 (4.0) 13,905 (69.6) 32.11 (9.16) a ublic 11,847 151 (1.3) 8392 (70.8) 33.17 (8.76) 3453 (29.1) ican 19,995 (69.6) 32.11 (9.16) a 23.13 (29.2) a ublic 19,992 (8.70) 32.11 (9.16) 33.11 (9.16) a a	34.47 (8.61)	6427 (72.3)	1220 (13.7)	1859 (20.9)	3974 (44.7)	2031 (22.9)	651 (22.2)
zstan 5162 134 (2.6) 2355 (45.6) 33.07 (8.90) a negro 2848 36 (1.3) 1720 (60.4) 33.90 (8.57) 751 (26.4)enistan 6959 58 (0.8) 36.31 (52.2) 32.21 (8.74) a istan 4385 289 (6.6) 2146 (48.9) 32.76 (8.63) a fica 6894 743 (10.8) 4316 (62.6) 31.99 (8.63) a Rica 6894 743 (10.8) 4316 (62.6) 31.99 (8.63) a nublic $11,847$ 151 (1.3) 8392 (70.8) 33.17 (8.76) 3453 (29.1)nublic $19,992$ 803 (4.0) $13,905$ (69.6) 32.11 (9.16) a ublic 7209 233 (3.2) 2016 (280) 31.77 (9.31) 1962 (27.2)a 7209 233 (3.2) 2016 (280) 31.77 (9.31) 1962 (27.2)a 7209 233 (3.2) 9680 (40.5) 31.77 (9.31) 1962 (27.2)	32.49 (9.52)	6017 (71.6)	768 (9.1)	1264 (15.1)	Ð	ŋ	æ
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Rica 6894 743 (10.8) 4316 (62.6) 31.99 (8.63) a 11.847 151 (1.3) 8392 (70.8) 33.17 (8.76) 3453 (29.1) nican 19,992 803 (4.0) 13,905 (69.6) 32.11 (9.16) a ublic 7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) a 7209 233 (3.2) 9680 (40.5) 31.77 (9.31) 1962 (27.2)		4385 (100.0)	726 (16.6)	745 (17.0)	2800 (63.9)	2062 (47.6)	807 (27.5)
Rica 6894 743 (10.8) 4316 (62.6) 31.99 (8.63) a 11,847 151 (1.3) 8392 (70.8) 33.17 (8.76) 3453 (29.1) nican 19,992 803 (4.0) 13,905 (69.6) 32.11 (9.16) a ublic 7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) a 7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) a 7209 233 (3.2) 9680 (40.5) 31.27 (9.31) 1962 (27.2)		and the Caribbea	u				
11.847 151 (1.3) 8392 (70.8) 33.17 (8.76) 3453 (29.1) nican 19,992 803 (4.0) 13,905 (69.6) 32.11 (9.16) a ublic 7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) a 7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) a 7209 1983 (8.3) 9680 (40.5) 31.28 (9.14) 6776 (28.4)		6894 (100.0)	2098 (30.4)	1250 (18.1)	5743 (83.3)	4234 (61.8)	879 (19.1)
an 19,992 803 (4.0) 13,905 (69.6) 32.11 (9.16) ^a blic 7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) as 23.893 1983 (8.3) 9680 (40.5) 31.28 (9.14) 6776 (28.4)	33.17 (8.76)	8394 (70.9)	6708 (56.7)	4213 (35.6)	11,304 (95.4)	10,014 (84.9)	3510 (32.8)
Dilic 7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) as 23,893 1983 (8.3) 9680 (40.5) 31.28 (9.14) 6776 (28.4)		19,992 (100.0)	7616 (38.1)	8846 (44.3)	19,106 (95.6)	16,778 (84.1)	6361 (36.7)
7209 233 (3.2) 2016 (28.0) 31.77 (9.31) 1962 (27.2) as 23,893 1983 (8.3) 9680 (40.5) 31.28 (9.14) 6776 (28.4)							
23,893 1983 (8.3) 9680 (40.5) 31.28 (9.14) 6776 (28.4)	31.77 (9.31)	5247 (72.8)	2679 (37.2)	2419 (33.6)	6465 (89.8)	5021 (70.0)	1973 (35.9)
	31.28 (9.14)	17,117 (71.6)	4861 (20.3)	8217 (34.4)	17,272 (72.3)	11,733 (49.3)	3008 (21.3)
Suriname 8649 459 (5.3) 5966 (69.0) 32.25 (9.01) 2420 (28.0) 6229 (72	32.25 (9.01)	6229 (72.0)	3327 (38.5)	2926 (33.9)	7357 (85.1)	5454 (63.3)	1984 (31.9)

											HIV in the
									Know of a	Ever tested	last 12
		Prevalence of disability. n		Age. mean			Knowledge about HIV. n	Knowledge about MTCT.	place to be tested for	for HIV and know the	months and know the
Country	Sample size	(%)	Urban, n (%)	(SD)	Male, n (%)	Female, n (%)	(%)	n (%)	HIV, n (%)	results, n (%)	results, n (%)
					Middle East a	Middle East and North Africa					
Algeria	31,368	1444 (4.6)	21,152 (67.4)	32.62 (8.95)	IJ	31,368 (100.0)	ŋ	5255 (16.8)	8037 (25.7)	3035 (9.7)	915 (8.7)
Iraq	26,724	1338 (5.0)	17912 (67.0)	31.20 (9.07)	IJ	26,724 (100.0)	1314 (4.9)	2257 (8.4)	3854 (14.4)	1218 (4.6)	358 (2.5)
Palestine	9777	221 (2.3)	5800 (59.3)	30.73 (8.93)	IJ	9777 (100.0)	631 (6.5)	1286 (13.2)	ŋ	ŋ	ŋ
Tunisia	11,993	908 (7.6)	7949 (66.3)	33.31 (9.04)	2232 (18.6)	9761 (81.4)	1695 (14.1)	1989 (16.6)	3421 (28.5)	336 (2.8)	96 (4.6)
					Sout	South Asia					
Bangladesh	57,585	1773 (3.1)	11,791 (20.5)	31.59 (8.87)	ŋ	57,585 (100.0)	5067 (8.8)	5912 (10.3)	9443 (16.4)	ŋ	ŋ
Nepal	18,166	362 (2.0)	10,716 (59.0)	31.04 (8.74)	4853 (26.7)	13,313 (73.3)	3781 (20.8)	2371 (13.1)	10,467 (57.6)	2676 (14.8)	640 (9.5)
					Sub-Sah	Sub-Saharan Africa					
Central	11,462	1235 (10.8)	5052 (44.1)	30.05 (8.64)	3357 (29.3)	8105 (70.7)	1717 (15.0)	3880 (33.9)	6761 (59.0)	4721 (41.3)	2143 (28.5)
African											
Republic											
Chad	24,931	1294 (5.2)	5502 (22.1)	29.96 (8.66)	5661 (22.7)	19,270 (77.3)	4783 (19.2)	8387 (39.8)	13,265 (53.3)	6244 (25.2)	2771 (25.5)
Democratic	24,160	953 (3.9)	7836 (32.4)	30.17 (8.70)	5187 (21.5)	18,973 (78.5)	4209 (17.4)	4971 (20.6)	11,455 (47.4)	5033 (20.9)	2122 (22.5)
Republic of	f										
Congo											
Gambia	15,520	470 (3.0)	7929 (51.1)	30.06 (8.53)	3743 (24.1)	11,777 (75.9)	3678 (23.7)	6502 (41.9)	11,228 (72.4)	6439 (41.6)	2165 (31.3)
Ghana	16,821	1355 (8.1)	8111 (48.2)	31.17 (9.31)	4305 (25.6)	12,516 (74.4)	2792 (16.6)	6894 (41.0)	11,862 (70.5)	6832 (40.7)	2340 (26.7)
Guinea	11,992	252 (2.1)	4078 (34.0)	30.03 (8.62)	2391 (19.9)	9601 (80.1)	1606 (13.4)	5022 (41.9)	6299 (52.5)	3824 (31.9)	1256 (23.4)
Bissau											
Madagascar	21,333	1608 (7.5)	6029 (28.3)	30.27 (9.08)	6467 (30.3)	14,866 (69.7)	4754 (22.3)	4459 (20.9)	7236 (33.9)	2512 (11.8)	665 (6.9)
Malawi	26,724	1523 (5.7)	4428 (16.6)	30.21 (8.89)	5610 (21.0)	21,114 (79.0)	11,366 (42.6)	16,159 (60.5)	26,236 (98.2)	24,555 (91.9)	15,565 (62.3)
Sao Tome	3794	268 (7.1)	2177 (57.4)	31.23 (8.98)	1159 (30.5)	2635 (69.5)	1448 (38.2)	914 (24.1)	3560 (93.9)	3043 (80.7)	1651 (50.9)
and											
Principe											

2262 (17.0) 1730 (30.6) 7620 (67.7)

8060 (36.8) 4925 (58.9)

14,509 (66.0)

8458 (38.5) 3990 (47.7) ŋ

5298 (24.1) 2067 (24.7) σ

15,628 (71.0) 6408 (76.6) 8889 (72.1)

6371 (29.0) 1959 (23.4) 3441 (27.9)

30.33 (8.75) 31.37 (8.74) 31.27 (8.96)

8678 (39.4) 3478 (41.6) 4872 (39.5)

286 (1.3) 629 (7.5) 502 (4.1)

21,999

Sierra Leone

11,079 (89.9)

12,125 (98.3) 6719 (80.3)

^aCountry did not have data available.

12,330 8367

Zimbabwe

Togo

Tested for

	Disa	bled	Non-d	isable	Unadjusted risk ra	atio Adjusted risk ra
Country	Int +	Int -	Int +	Int –	[95% CI]	[95% CI]
EAP						
Tuvalu	15	23	166	556	1.71 [1.13, 2.60]	1.62 [1.05, 2.49]
Samoa	0	56	333	3260	0.38 [0.06, 2.59]	0.36 [0.05, 2.45]
Kiribati	58	133	1603	2009	0.65 [0.52, 0.82]	0.64 [0.51, 0.81]
Fiji	43	104	1734	2683	0.74 [0.56, 0.98]	0.73 [0.56, 0.96]
ECA						
Uzbekistan	36	253	690	3406	0.61 [0.42, 0.89]	0.71 [0.49, 1.02]
Turkmenistan	12	46	2154	4742	0.69 [0.39, 1.20]	0.64 [0.37, 1.12]
Kosovo	16	506	507	4988	0.35 [0.21, 0.59]	0.47 [0.28, 0.79]
Georgia	66	574	835	4951	0.80 [0.57, 1.14]	0.81 [0.58, 1.13]
Belarus	15	45	2881	2316		0.51 [0.31, 0.84]
LAC	15	40	2001	2310	0.49 [0.30, 0.80]	0.51 [0.51, 0.64]
	0.4	047	0007	0074		0.07 10.00 4.40
Suriname	94	217	2237	3671	0.81 [0.64, 1.03]	0.87 [0.69, 1.10]
Honduras	266	1319	3123	12406	0.80 [0.70, 0.91]	0.85 [0.75, 0.97]
Guyana	44	131	1863	3198	0.66 [0.47, 0.92]	0.71 [0.51, 0.98]
Dominican Republic	249	552	7367	11818	0.77 [0.67, 0.90]	0.81 [0.70, 0.94]
Cuba	61	72	4671	3574	0.88 [0.66, 1.17]	0.90 [0.68, 1.18]
Costa Rica	168	575	1930	4219	0.66 [0.54, 0.81]	0.72 [0.59, 0.90]
MENA						
Tunisia	91	743	1239	7687	0.74 [0.60, 0.91]	0.88 [0.71, 1.08]
State of Palestine	6	215	625	8929	0.49 [0.20, 1.22]	0.53 [0.21, 1.31]
Iraq	35	1303	1279	24103	0.58 [0.32, 1.05]	0.71 [0.39, 1.30]
SA						
Nepal	33	257	2508	10514	0.71 [0.47, 1.07]	0.85 [0.58, 1.25]
Bangladesh	68	1705	4999	50802	0.41 [0.31, 0.53]	0.55 [0.42, 0.72]
SSA	00	1700	4000	00002	0.41 [0.01, 0.00]	0.00 [0.42, 0.72]
Togo	85	467	1311	4543	0.62 [0.49, 0.80]	0.66 [0.52, 0.84]
5	15	207				
Sierra Leone			3469	11931	0.29 [0.17, 0.51]	0.33 [0.20, 0.57]
Sao Tome and Principe	80	151	908	1495	0.96 [0.80, 1.17]	0.99 [0.82, 1.20]
Malawi	393	769	8360	11586	0.83 [0.74, 0.93]	0.84 [0.75, 0.94]
Madagascar	275	1071	2773	10747	1.05 [0.93, 1.20]	1.12 [0.99, 1.28]
Guinea Bissau	13	215	944	8429	0.60 [0.33, 1.10]	0.54 [0.30, 0.97]
Ghana	95	1030	1621	9770	0.56 [0.41, 0.75]	0.70 [0.52, 0.95]
Gambia	59	259	2667	8791	0.76 [0.57, 1.02]	0.81 [0.61, 1.09]
Democratic Republic of Congo	71	734	2819	15349	0.45 [0.32, 0.63]	0.47 [0.34, 0.66]
Chad	115	1009	3185	14956	0.59 [0.48, 0.72]	0.61 [0.50, 0.75]
Central African Republic	122	962	845	6174	1.01 [0.82, 1.25]	1.11 [0.90, 1.36]
EAP						
Test for heterogeneity: tau^2=0.21; chi^2=16.65, df=3	, P=0.001; I^2=8	87%			0.87 [0.51, 1.48]	-
Test for overal unadjusted random effect: Z=-0.52, P Test for heterogeneity: tau^2=0.19; chi^2=14.61, df=3	=0.601 , P=0.002; T^2=8	35%				0.84 [0.50, 1.40]
Test for overall adjusted random effect: Z=-0.67, P=0 ECA	.504					0.04 [0.00, 1.40]
Test for heterogeneity: tau^2=0.05; chi^2=7.77, df=4,	P=0.100; I^2=49	9%			Adjusted 0.60 [0.50, 0.73]	_
Test for overall unadjusted fixed effect: Z=-5,11, P<0, Test for heterogeneity: tau^2=0.01; chi^2=4.22; df=4,	001 P=0.377; P2=12	2%			Unadjusted 0.60 [0.50, 0.73]	-
Test for overall adjusted fixed effect: Z=-4.30, P<0.00	1				-	0.66 [0.54, 0.80]
LAC Test for heterogeneity: tau^2<0.01; chi^2=4.22, df=5,	P=0.518: IA2=09	%				
Test for overall unadjusted fixed effect: Z=-6.61_P<0. Test for heterogeneity: tau^2<0.01; chi^2=3.15, df=5,					0.77 [0.71, 0.83]	-
Test for overall adjusted fixed effect: Z=-5.08, P<0.00		70			-	0.82 [0.76, 0.89]
MENA						
Test for heterogeneity: tau^2<0.01; chi^2=1.22, df=2, <u>Test for overal unadjusted fixed effect: Z=-3.54, P<0</u> Test for heterogeneity: tau^2<0.01; chi^2=1.47, df=2,	P=0.543; I^2=09 001	%		WIND OF BUILDING	0.71 [0.58, 0.86]	-
Test for heterogeneity: tau^2<0.01; chi^2=1.47, df=2, Test for overall adjusted fixed effect: Z=-1.77, P=0.07	P=0.479; IA2=04	<u>~</u>			-	0.84 [0.69, 1.02]
SA						
Test for heterogeneity: tau^2=0.13; chi^2=4.96, df=1,	P=0.026; I^2=80	0%			0.53 [0.30, 0.91]	-
Test for overall unadjusted random effect: Z=-2.30, P Test for heterogeneity: tau^2=0.07; chi^2=3.23, df=1,	=0.022 P=0.072, I^2=69	5%			-	0.67 [0.44, 1.02]
Test for overall adjusted random effect: Z=-1.87, P=0	.061					0.07 [0.44, 1.02]
SSA Test for heterogeneity: tau^2=0.10; chi^2=69.01, df=1	0, P<0.001; I^2=	=89%				
Test for overall unadjusted random effect: Z=-3.48, P Test for heterogeneity: tau^2=0.09; chi^2=68.77, df=1	=0.001 0. P<0.001 i™>				0.69 [0.56, 0.85]	-
Test for overall adjusted random effect: Z=-2.97, P=0					-	0.74 [0.60, 0.90]
Pooled	20. 0.40.004	2=9-20/				
Test for heterogeneity: tau^2=0.07; chi^2=129.65, df= <u>Test for overall unadjusted random effect: Z=-6.41.</u> P Test for heterogeneity: tau^2=0.05; chi^2=108.46, df=	<0.001	-02%			0.69 [0.62, 0.78]	-
Test for heterogeneity: tau^2=0.05; chi/2=108.46, df= Test for overall adjusted random effect: Z=-5.72, P<0	30, P<0.001; T^2 .001	2=76%			-	0.75 [0.69, 0.83]

Figure 1. Meta-analysis comparing comprehensive knowledge about HIV prevention among women with disabilities compared to women without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

out disabilities (aRR: 0.75, 95% C.I.: 0.69, 0.93). For example, no women with disabilities in Samoa had comprehensive knowledge of HIV prevention and, in Sierra Leone, women with disabilities were less likely to have comprehensive HIV knowledge than women without disabilities (aRR: 0.33, 95% C.I.: 0.20, 0.57). Bangladesh (aRR: 0.55, 95% C.I.: 0.42, 0.72), Belarus (aRR: 0.51, 95% C.I.: 0.31, 0.84), Chad (aRR: 0.61, 95% C.I.: 0.34, 0.56) and Kosovo (aRR: 0.47, 95% C.I.: 0.28, 0.79) also had evidence of substantial relative inequities for women with disabilities. In Tuvalu, however, women with disabilities had more knowledge about HIV prevention than women without disabilities (aRR: 1.62, 95% C.I.: 1.05, 2.49).

Nineteen countries reported data on comprehensive HIV knowledge for men (Figure 2). Men with disabilities were significantly less likely to have comprehensive knowledge of HIV prevention than men without disabilities (aRR: 0.74, 95% C.I.: 0.67, 0.81). This difference was most pronounced in Ghana (aRR: 0.46, 95% C.I.: 0.27, 0.78) and Chad (aRR: 0.53, 95% C.I.: 0.33, 0.84). Most countries had smaller sample sizes and wider confidence intervals.

3.3 Knowledge of mother-to-child transmission

Women with disabilities were less likely to have knowledge of mother-to-child transmission (MTCT) than women without disabilities for the pooled sample of 37 countries (aRR: 0.87, 95% C.I.: 0.81, 0.93) (Figure 3). Palestine (aRR: 0.39, 95% C.I.: 0.21, 0.72), Kyrgyzstan (aRR: 0.60, 95% C.I.: 0.44, 0.82) and Sierra Leone (aRR: 0.59, 95% C.I.: 0.46, 0.77) had the most marked differences between women with and without disabilities, while most other countries had wide confidence intervals and uncertain results. Conversely, women with disabilities were more likely to have knowledge of MTCT in Madagascar (aRR: 1.31, 95% C.I.: 1.16, 1.47).

By contrast, across 21 countries, there was no evidence that men with disabilities had less knowledge about MTCT than men without disabilities (Figure 4). Exceptions were Malawi (aRR: 0.77, 95% C.I.: 0.65, 0.93) and Suriname (aRR: 0.62, 95% C.I.: 0.40, 0.96), where men with disabilities were less likely to have MTCT knowledge.

3.4 | People who know where to be tested for HIV

Data from 32 countries suggested that women with disabilities were less likely to know where to be tested for HIV than women without disabilities (aRR: 0.94, 95% C.I.: 0.92, 0.97) (Figure 5). This difference was most substantial in Turkmenistan (aRR: 0.59, 95% C.I.: 0.42, 0.82). In contrast, in Tunisia (aRR: 1.23, 95% C.I.: 1.10, 1.37) and Madagascar (aRR: 1.12, 95% C.I.: 1.03, 1.21), women with disabilities were more likely to know where to be tested for HIV than women without disabilities. Results for men, across 21 countries, also showed men with disabilities were less likely to know where to get tested for HIV than men without disabilities (aRR: 0.95, 95% C.I.: 0.92, 0.99) (Figure 6).

3.5 | People who have ever been tested for HIV and know the results

Across 32 countries, women with disabilities were less likely to have ever been tested and know their results for HIV than women without disabilities (aRR: 0.90, 95% C.I.: 0.85, 0.94) (Figure 7). This difference was most pronounced in Guinea-Bissau (aRR: 0.62, 95% C.I.: 0.49, 0.79). Most countries showed strong evidence of relative inequities. However, in Tunisia, women with disabilities were more likely to have ever been tested for HIV than women without disabilities (aRR: 1.57, 95% C.I.: 1.07, 2.26).

Men with disabilities were not less likely to have ever been tested for HIV and know their results (aRR: 0.94, 95% C.I.: 0.86, 1.03) (Figure 8). Most countries showed no difference between men with and without disabilities, except in Fiji (aRR: 0.20, 95% C.I.: 0.06, 0.65) and Georgia (aRR: 0.57, 95% C.I.: 0.34, 0.95). As for women, men with disabilities in Tunisia were found to be more likely to have ever been tested for HIV and know their results (aRR: 2.81, 95% C.I.: 1.17, 6.72).

3.6 | People who have been tested for HIV in the past 12 months and know the results

There was some evidence women with disabilities were less likely to have been tested for HIV in the past 12 months and know the results compared to women without disabilities (aRR: 0.95, 95% C.I.: 0.90, 1.02) (Figure 9). There was evidence that women with disabilities were less likely to be tested and know the results in the past 12 months in Algeria (aRR: 0.51, 95% C.I.: 0.32, 0.83), Chad (aRR: 0.72, 95% C.I.: 0.57, 0.90) and Mongolia (aRR: 0.76, 95% C.I.: 0.62, 0.93).

Across 17 countries, men with disabilities were no less likely to have been tested and know the results of the test in the last 12 months than men without disabilities (aRR: 1.02, 95% C.I.: 0.87, 1.20) (Figure 10). This differed in Mongolia, where men with disabilities were less likely to have been tested (aRR: 0.51, 95% C.I.: 0.27, 0.96), while in Suriname (aRR: 1.74, 95% C.I.: 1.28, 2.36) and Togo (aRR: 1.59, 95% C.I.: 1.02, 2.47), men with disabilities were more likely to have been tested in the past 12 months and know the results.

4 | DISCUSSION

This study is the largest body of evidence on the HIV knowledge and testing gap for people with disabilities in 37 countries to date. Our findings suggest that women with disabilities are less likely to have comprehensive knowledge about HIV prevention, knowledge of MTCT, know where to be tested for HIV, and have ever been tested for HIV and know the results compared to women without disabilities. Men with disabilities were less likely to have comprehensive knowledge about HIV prevention and know of a place to be tested. There was limited evidence that men with disabilities were less likely to have ever been tested for HIV and that women with disabilities had been tested for HIV in the past 12 months and know the results. By contrast, our overall estimates found no differences in having been tested for HIV in the past 12 months and know the result and knowledge of MTCT for men. However, this estimate varied substantially by country and

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	Disa	abled	Non-d	lisable	Unadjusted	l risk ratio	Adjusted risk rat
Country	Int +	Int –	Int +	Int –	[95%	, CI]	[95% CI]
EAP							
Kiribati	41	65	594	1165	1.15 [0.8	9, 1.49]	1.09 [0.83, 1.43]
Fiji	12	47	738	1463	0.71 [0.4]	2, 1.22]	0.70 [0.42, 1.18]
ECA							
Kosovo	1	64	244	2073	0.13 [0.02	2, 0.89]	0.15 [0.02, 1.10]
Georgia	14	153	305	1994	0.62 [0.3	3, 1.17]	0.73 [0.39, 1.37]
LAC							
Suriname	45	103	951	1316	0.59 [0.4]	2, 0.83]	0.59 [0.42, 0.82]
Honduras	52	346	1420	4957	0.63 [0.4]	7, 0.84]	0.68 [0.51, 0.91]
Guyana	13	45	759	1143	0.69 [0.3	7, 1.30]	0.70 [0.37, 1.32]
MENA							
Tunisia	6	68	359	1799	0.48 [0.2]	2, 1.06]	0.55 [0.25, 1.22]
SA							
Nepal	7	65	1233	3546	0.36 [0.1	6. 0.781	0.46 [0.21, 1.01]
SSA							
Тодо	18	58	653	1229	0.63 [0.3]	7. 1.081	0.69 [0.41, 1.17]
Sierra Leone	12	52	1802	4501			0.77 [0.45, 1.30]
Sao Tome and Principe	13	24	447	675	0.95 [0.55		0.91 [0.57, 1.45]
Malawi	133	227	2480	2764			0.79 [0.65, 0.95]
Madagascar	40	222	1666	4537			0.66 [0.45, 0.95]
Ghana	25	205	1051	3024			0.46 [0.27, 0.78]
				2662			
Gambia	24	128	928				0.80 [0.54, 1.21]
Democratic Republic of Congo	26	122	1293	3745			0.65 [0.39, 1.08]
Chad	20	150	1463	4027	0.51 [0.32		0.53 [0.33, 0.84]
Central African Republic	25	126	725	2480	0.79 [0.5	3, 1.17]	0.83 [0.56, 1.23]
EAP Test for heterogeneity: tau^2=0.07; chi^2=2.54, df=1, F	9=0.111; I^2=6	1%				0 4 001	
Test for overall unadjusted fixed effect Z=0.44, P=0.66 Test for heterogeneity: tau*2=0.05; chi*2=2.17, df=1, F Test for overall adjusted fixed effect: Z=-0.07, P=0.945 ECA	i3 9=0.141; l^2=5				1.05 [0.8:	3, 1.33]	- 0.99 [0.78, 1.26]
Test for heterogeneity: tau^2=0.73; chi^2=2.32, df=1, F		7%			0.53 [0.2	0 0 071	_
Test for overall unadjusted fixed effect: Z=-2.05, P=0.0 Test for heterogeneity: tau ² =0.66; chi ² =2.20, df=1, F Test for overall adjusted fixed effect: Z=-1.49, P=0.137	=0.138; 1^2=5	4%				9, 0.97]	0.64 [0.35, 1.15]
LAC	-0.000 140-01				·		
Test for heterogeneily: tau ⁴ 2<0.01; ch ⁴ /2=0.19, df=2, F. Test for overall unadjusted fixed effect: Z=-4.50, P<0.0 Test for heterogeneily: tau ⁴ 2<0.01; ch ⁴ /2=0.46, df=2, F Test for overall adjusted fixed effect: Z=-4.16, P<0.001	01 =0.794; l^2=0				Adjusted 0.62 [0.5	1, 0.77]	- 0.64 [0.52, 0.79]
MENA							
Test for heterogeneity: tau ⁴ 2<0.01; chi ⁴ 2=0.00, df=0, F Test for overall unadjusted fixed effect: Z=-1.81, P=0,0 Test for heterogeneity: tau ⁴ 2<0.01; chi ⁴ 2=0.00, df=0, F	070 P=1.000; l^2=0				0.48 [0.2	2, 1.06]	- 0.55 [0.25, 1.22]
Test for overall adjusted fixed effect: Z=-1.48, P=0.140 SA							
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, F		%			0.36 [0.1	6 0 781	-
Test for overall unadjusted fixed effect: Z=-2.60, P=0.0 Test for heterogeneity: tau ² 2<0.01; chi ² 2=0.00, df=0, F Test for overall adjusted fixed effect: Z=-1.95, P=0.052	=1.000; I^2=0	%			-	-,	0.46 [0.21, 1.01]
SSA	B-0.200 140	004					
Test for heterogeneity: tau*2<0.01; chi*2=10.58, df=9, Test for overall unadjusted fixed effect: Z==6.13, P<0. Test for heterogeneity: tau*2<0.01; chi*2=7.58, df=9, F Test for overall adjusted fixed effect: Z=-5.22, P<0.001	01 =0.577; l^2=0				0.69 [0.6	1, 0.77]	- 0.73 [0.65, 0.82]
Pooled							
Test for heterogeneity: tau ² =0.04; chi ² =33.37, df=18 Test for overall unadjusted random effect: Z=-5.75, P< Test for heterogeneity: tau ² =0.01; chi ² =22.03, df=18	0.001				0.67 [0.5	8, 0.77]	- 0.74 [0.67, 0.81]

Figure 2. Meta-analysis comparing comprehensive knowledge about HIV prevention among men with disabilities compared to men without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

Country	Disa Int +	Int -	Non-d Int +	Isablec Int –	Unadjusted ri: [95% Cl	sk ratio Adjusted risk ra I] [95% Cl]
EAP					i	
Tuvalu	9	29	151	571	1.16 [0.64, 2	.10] 1.14 [0.62, 2.09]
Tonga	16	38	605	1817	1.18 [0.69, 2	.03] 1.17 [0.68, 2.00]
Samoa	8	48	759	2829	0.58 [0.29, 1	
Vongolia	56	903	473	8432	1.06 [0.71, 1	
						the set of
Kiribati	45	146	1201	2412	0.69 [0.52, 0	
Fiji	35	112	966	3451	1.08 [0.79, 1	.48] 1.08 [0.79, 1.47]
ECA					i i i i i i i i i i i i i i i i i i i	
Jzbekistan	42	247	703	3391	0.76 [0.53, 1	
Furkmenistan	9	49	1700	5196	0.50 [0.24, 1	.03] 0.46 [0.23, 0.96]
Kyrgyz Republic	44	90	2390	2638	0.60 [0.44, 0	.82] 0.59 [0.43, 0.80]
Kosovo	76	446	877	4604	0.94 [0.75, 1	.18] 0.94 [0.75, 1.19]
Georgia	132	508	1330	4452	0.87 [0.68, 1	.11] 0.87 [0.68, 1.11]
Belarus	10	50	1235	3963	0.59 [0.28, 1	
_AC						
Suriname	89	221	2192	3721	0.65 [0.50, 0	.85] 0.66 [0.51, 0.86]
londuras	521	1062	5664	9857	0.89 [0.82, 0	
Buyana	49	126	1919	3148	0.63 [0.44, 0	teres a factor and the second s
Dominican Republic	302	500	8544	10633	0.93 [0.82, 1	
Cuba	24	109	3077	5179	0.53 [0.31, 0	.92] 0.54 [0.32, 0.93]
Costa Rica	141	602	1109	5037	0.91 [0.70, 1	.18] 0.86 [0.65, 1.13]
IENA						
unisia	135	698	1533	7393	0.91 [0.77, 1	.07] 0.94 [0.79, 1.11]
State of Palestine	12	209	1274	8276	0.39 [0.21, 0	
	99	1238	2158	23220		and and because a second
raq						
Ngeria	193	1251	5062	24804	0.70 [0.58, 0	.84] 0.79 [0.66, 0.95]
SA						
lepal	38	252	1904	11116	1.10 [0.76, 1	.59] 1.24 [0.85, 1.79]
Bangladesh	142	1630	5770	50027	0.75 [0.62, 0	.90] 0.92 [0.77, 1.11]
SSA					1	
ōgo	263	290	3018	2836	0.92 [0.82, 1	.03] 0.92 [0.82, 1.03]
Sierra Leone	53	169	6268	9113	0.59 [0.46, 0	.77] 0.62 [0.48, 0.80]
Sao Tome and Principe	62	167	531	1869	1.28 [1.01, 1	
/alawi	698	464	12644	7300	0.97 [0.92, 1	
Madagascar	332	1013	2699	10814		
						and the second s
Guinea Bissau	67	161	3868	5505	0.70 [0.54, 0	
Shana	442	683	4841	6550	0.87 [0.77, 0	
Gambia	157	159	5446	6008	1.15 [1.00, 1	.33] 1.07 [0.92, 1.23]
Democratic Republic of Congo	118	685	3765	14401	0.91 [0.71, 1	.16] 0.92 [0.72, 1.17]
Chad	322	586	6380	8124	0.86 [0.77, 0	.95] 0.86 [0.78, 0.96]
Central African Republic	330	754	2630	4386	0.83 [0.74, 0	.93] 0.87 [0.78, 0.97]
AP						
est for heterogeneity: tau^2=0.03; chi^2=8.91, df=5, F					0.90 [0.77, 1	061 -
est for overall unadjusted fixed effect: Z=-1,23, P=0,2 est for heterogeneity: tau^2=0.04; chi/2=9.59, df=5, F		6			5.56 [0.77, 1	0.91 [0.72, 1.16]
est for overall adjusted random effect: Z=-0.78, P=0.4	436					0.81 [0.72, 1.10]
ECA fest for heterogeneity: tau^2=0.02; chi^2=7.90, df=5, F	P=0.162; I^2=40%	6				011
est for overall unadjusted fixed effect: Z=-3.39, P=0.0 est for heterogeneity: tau 2=0.03; chi 2=8.81, dt=5, F					0.80 [0.70, 0	E the start sector management of the
est for overall adjusted fixed effect: Z=-3.45, P=0.001					-	0.79 [0.69, 0.90]
AC	D-0.000-140-70	0/			1	
est for heterogeneity: tau^2=0.02; chi^2=12.13, df=5, est for overall unadjusted random effect: Z=-2.84, P= est for heterogeneity: tau^2=0.01; chi^2=10.36, of=5,					0.80 [0.69, 0	.93] –
est for heterogeneity: tau^2=0.01; chi^2=10.36, df=5, est for overall adjusted random effect: Z=-3.18, P=0.0		%			- · · · · · · · · · · · · · · · · · · ·	0.80 [0.70, 0.92]
MENA					Adjusted Unadjusted	
est for heterogeneity: tau^2=0.04; chi^2=9.40, df=3, F					0.74 [0.58, 0	.94] –
est for overall unadjusted random effect: Z=-2.45, P= est for heterogeneity: tau^2=0.03; chi^2=8.22; df=3, F		6			-	0.81 [0.66, 1.01]
est for overall adjusted random effect: Z=-1.91, P=0.0	006					0.01 [0.00, 1.01]
est for heterogeneity: tau^2=0.05; chi^2=3.39, df=1, F						271 -
est for overall unadjusted random effect: Z=-0.70, P= est for heterogeneity: tau*2=0.02; chi*2=1.95, df=1, P				·	0.88 [0.60, 1	
est for overall adjusted fixed effect: Z=-0.29, P=0.775					-	0.98 [0.83, 1.15]
SSA Fost for betaragaanaitu taut02=0.04: abi02=67.10. df=10	B-0.004-140	4.04				
est for heterogeneity: tau^2=0.04; chi^2=67.19, df=10 est for overall unadjusted random effect: Z=-1.16, P= est for heterogeneity: tau^2=0.03; chi*2=60.64, df=10					0.93 [0.82, 1	.05] –
est for heterogeneity: tau*2=0.03; chi*2=60.64; df=10 est for overall adjusted random effect: Z=-1.22; P=0.2		19%			-	0.93 [0.82, 1.05]
Pooled						
est for heterogeneity: tau^2=0.03; chi^2=127.99, df=3						.921 –
est for overall unadjusted random effect: Z=-4.13. P< est for heterogeneity: tau*2=0.03; chi*2=113.39, df=3		77%			-	0.87 [0.81, 0.93]
est for overall adjusted random effect: Z=-3.90, P<0.0						0.07 [0.01, 0.93]

Figure 3. Meta-analysis comparing knowledge of mother-to-child transmission among women with disabilities compared to women without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

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	Disa	bled	Non-d	lisablec	Unadjusted risk rati	o Adjusted risk rat
Country	Int +	Int –	Int +	Int –	[95% CI]	[95% CI]
EAP						
Tonga	7	18	269	753	1.08 [0.50, 2.33]	0.91 [0.42, 2.00]
Mongolia	13	226	200	3593	1.54 [0.75, 3.19]	1.44 [0.69, 3.00]
Kiribati	34	72	429	1329	1.37 [1.01, 1.86]	1.29 [0.94, 1.75]
Fiji	6	53	319	1882	0.54 [0.23, 1.27]	0.56 [0.24, 1.29]
ECA						
Kosovo	12	53	299	2019	1.40 [0.80, 2.46]	1.26 [0.73, 2.17]
Georgia	30	137	367	1926	0.94 [0.56, 1.57]	0.94 [0.56, 1.58]
LAC						0.0 . [0.00,]
Suriname	26	122	619	1647	0.62 [0.40, 0.96]	0.62 [0.40, 0.96]
Honduras	113	284	1919	4455	1.02 [0.84, 1.23]	1.00 [0.83, 1.22]
Guyana	10	48	441	1461		
	10	40	441	1401	0.74 [0.33, 1.67]	0.73 [0.32, 1.66]
MENA	10	50	005	4050	4 47 10 04 0 001	4 55 10 00 0 541
Tunisia	16	58	305	1852	1.47 [0.91, 2.36]	1.55 [0.96, 2.51]
SA	-					
Nepal	5	67	424	4355	0.73 [0.27, 1.96]	0.85 [0.32, 2.29]
SSA						
Тодо	25	51	684	1199	0.89 [0.59, 1.34]	0.94 [0.63, 1.42]
Sierra Leone	15	49	2122	4176	0.66 [0.41, 1.07]	0.67 [0.41, 1.11]
Sao Tome and Principe	12	25	309	812	1.27 [0.75, 2.16]	1.27 [0.75, 2.15]
Malawi	149	211	2668	2576	0.77 [0.64, 0.92]	0.77 [0.65, 0.93]
Madagascar	67	194	1361	4840	1.28 [1.00, 1.65]	1.25 [0.97, 1.61]
Ghana	81	149	1530	2544	1.12 [0.85, 1.46]	1.18 [0.92, 1.53]
Gambia	30	122	869	2720	0.87 [0.60, 1.28]	0.80 [0.55, 1.16]
Democratic Republic of Congo	26	122	1062	3975	0.68 [0.40, 1.16]	0.76 [0.44, 1.29]
Chad	38	132	1647	3844	0.73 [0.52, 1.03]	0.74 [0.53, 1.04]
Central African Republic	44	107	876	2328	1.02 [0.77, 1.36]	1.05 [0.79, 1.39]
EAP						
Test for heterogeneity: tau^2=0.03; chi^2=4.52, df=3, Test for overall unadjusted fixed effect: Z=1.70, P=0.0		%			1.25 [0.97, 1.61]	-
Test for heterogeneity: tau^2=0.03; chi^2=4.03, df=3, Test for overall adjusted fixed effect: Z=1.15, P=0.250	P=0.259; I^2=209	%			-	1.16 [0.90, 1.50]
ECA						
Test for heterogeneity: tau^2<0.01; chi^2=1.06, df=1, Test for overall unadjusted fixed effect: Z=0.61, P=0.5	P=0.304; I^2=5%				1.13 [0.77, 1.64]	-
Test for heterogeneity: tau^2<0.01; chi^2=0.60, df=1, Test for overall adjusted fixed effect: Z=0.41, P=0.684	P=0.439; I^2=0%				-	1.08 [0.74, 1.57]
LAC	•					
Test for heterogeneity: tau^2=0.06; chi^2=4.36, df=2,		%			Adjusted 0.93 [0.78, 1.10]	-
Test for overall unadjusted fixed effect: Z=-0.86, P=0. Test for heterogeneity: tau^2=0.05; chi^2=4.28, df=2,	P=0.117; I^2=549	%				0.92 [0.77, 1.09]
Test for overall adjusted fixed effect: Z=-0.99, P=0.32 MENA	24					0.02 [0.11, 1.00]
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0,					1.47 [0.91, 2.36]	_
Test for overall unadjusted fixed effect: Z=1.58, P=0.1 Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0,	P=1.000; I^2=0%				1.47 [0.31, 2.30]	1.55 [0.96, 2.51]
Test for overall adjusted fixed effect: Z=1.80, P=0.072 SA	2			_		1.55 [0.80, 2.51]
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0,	P=1.000; I^2=0%				0.70.00.77.4.001	
Test for overall unadjusted fixed effect: Z=-0.63, P=0. Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0,	.531 P=1.000; I^2=0%				0.73 [0.27, 1.96]	-
Test for overall adjusted fixed effect: Z=-0.32, P=0.75	52				-	0.85 [0.32, 2.29]
SSA	P=0.024 M2=5	2%				
					0.92 [0.79, 1.07]	-
Test for heterogeneity: tau^2=0.03; chi^2=19.16, df=9 Test for overall unadjusted random effect: Z=-1.08, P	2, r=0.023; l*2=52	2.70			-	0.93 [0.80, 1.09]
Test for overall unadjusted random effect: Z=-1.08, P Test for heterogeneity: tau^2=0.03; chi^2=19.30, df=9	0.381					
Test for overall unadjusted random effect. Z=-1.08, P Test for heterogeneity: tau'2=0.03; chi'2=19.30, df=5 Test for overall adjusted random effect. Z=-0.88, P=0 Pooled						
Test for overall unadjusted random effect: Z=-1.08, P Test for heterogeneity: tau^2=0.03; chi^2=19.30, df=5 Test for overall adjusted random effect: Z=-0.88, P=0	20, P=0.009; I^2=4 =0.579				0.97 [0.86, 1.09]	-

Figure 4. Meta-analysis comparing knowledge of mother-to-child transmission among men with disabilities compared to men without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

Country	Disa Int +	Int –	Non-d Int +	isablec Int -	Unadjuste [95%]		Adjusted risk rat [95% Cl]
EAP							
Tuvalu	23	15	429	293	1.03 [0.7	79 1 331	1.00 [0.76, 1.30]
Tonga	32	22	1361	1061			0.90 [0.65, 1.26]
	15	41					
Samoa			1099	2491			0.83 [0.52, 1.32]
Mongolia	527	432	6260	2645	0.83 [0.7		0.88 [0.82, 0.94]
Kiribati	139	52	2920	693	0.91 [0.8		0.92 [0.85, 1.00]
Fiji	98	47	3349	1067	0.90 [0.7	′9, 1.01]	0.88 [0.78, 0.99]
ECA							
Uzbekistan	158	131	2642	1454	0.90 [0.8	30, 1.02]	0.99 [0.88, 1.12]
Turkmenistan	22	36	4524	2374	0.61 [0.4	14, 0.86]	0.59 [0.42, 0.82]
Kyrgyz Republic	102	32	4404	624	0.91 [0.8	32, 1.01]	0.91 [0.82, 1.00]
Georgia	309	331	2691	3095	1.03 [0.9	contract of contraction	1.01 [0.90, 1.14]
Belarus	59	1	5152	49	0.99 [0.9		0.99 [0.94, 1.03]
LAC			5152	43		, 1.04J	0.00 [0.04, 1.00]
	050	50	5407	700		7 4 001	0.07 (0.00, 4.05)
Suriname	259	52	5127	789	0.94 [0.8	and a second	0.97 [0.90, 1.05]
Honduras	1156	428	11612	3918	0.96 [0.9		0.96 [0.93, 0.99]
Guyana	142	33	4589	476	0.82 [0.7		0.83 [0.73, 0.94]
Dominican Republic	750	52	18356	823	1.00 [0.9	98, 1.02]	0.98 [0.97, 1.00]
Cuba	120	13	8016	244	0.85 [0.7	73, 0.99]	0.85 [0.73, 0.99]
Costa Rica	593	150	5150	1000	0.96 [0.9	and the second	0.95 [0.89, 1.01]
MENA		0.00.00					• Contract of Contract
Tunisia	260	574	2480	6445	1.10 [0.9	0 1 231	1.23 [1.10, 1.37]
	171	1166	3683	21659			
Iraq							0.87 [0.69, 1.09]
Algeria	306	1135	7731	22127	0.71 [0.6	52, 0.81]	0.80 [0.70, 0.91]
SA							
Nepal	114	176	6903	6119	0.80 [0.6	38, 0.95]	0.91 [0.78, 1.08]
Bangladesh	227	1546	9216	46499	0.76 [0.6	6, 0.88]	0.95 [0.83, 1.09]
SSA							
Zimbabwe	394	9	8365	121	0.99 [0.9	98, 1.01]	0.99 [0.97, 1.00]
Тодо	441	112	4726	1128	1.00 [0.9		0.99 [0.94, 1.03]
Sierra Leone	121	101	10583	4815			0.85 [0.76, 0.96]
Sao Tome and Principe	214	17	2245	156	0.99 [0.9	and the second	0.99 [0.95, 1.03]
Malawi	1129	34	19653	295	0.99 [0.9		0.98 [0.97, 1.00]
Madagascar	491	855	4592	8928	1.07 [0.9	<i>3</i> 8, 1.16]	1.12 [1.03, 1.21]
Guinea Bissau	104	124	5355	4017	0.77 [0.6	35, 0.91]	0.74 [0.63, 0.86]
Ghana	708	417	8161	3230	0.86 [0.8	30, 0.92]	0.88 [0.82, 0.95]
Gambia	222	96	8455	3003	0.94 [0.8	36, 1.03]	0.93 [0.85, 1.02]
Democratic Republic of Congo	295	510	8256	9911	0.88 [0.7		0.90 [0.81, 1.00]
Chad	595	528	9521	8603	0.95 [0.8		0.97 [0.91, 1.05]
Central African Republic	579	503	4053	2966	0.93 [0.8	37, 1.00]	1.01 [0.94, 1.08]
EAP Test for heterogeneity: tau^2<0.01; chi^2=5.11, df=5, F	D-0 402: 142-279						
Test for overall unadjusted fixed effect: Z=-5.62, P<0.0 Test for overall unadjusted fixed effect: Z=-5.62, P<0.0 Test for heterogeneity: tau^2<0.01; chi*2=1.63, df=5.1					- 0.87 [0.8	33, 0.91]	-
Test for overall adjusted fixed effect: Z=-4.61, P<0.001							0.90 [0.85, 0.94]
ECA					Adjusted Unadjusted		
Test for heterogeneity: tau^2<0.01; chi^2=11.68, df=4,					0.94 [0.8	38, 1.01]	-
Test for overall unadjusted random effect: Z=-1.62, P= Test for heterogeneity: tau^2<0.01; chi*2=11.47, df=4, Test for overall adjusted random effect: Z=-1.39, P=0.					-		0.96 [0.91, 1.02]
LAC	165						
Test for heterogeneity: tau^2<0.01; chi^2=15.79, df=5,	P=0.007; I^2=73	1%			0.95 [0.9	01 0 001	
Test for overall unadjusted random effect: Z=-2.39, P= Test for heterogeneity: tau^2<0.01; chi^2=12.02, df=5,	=0.017 P=0.035;T^2=53	w			0.95 [0.8	JI, 0.99]	-
Test for overall adjusted random effect: Z=-2.85, P=0.					-		0.95 [0.92, 0.99]
MENA Test for heterogeneity: tau^2=0.06; chi^2=28.96, df=2,	R<0.001-102-02	107					
Test for overall unadjusted random effect: Z=-1.23, P= Test for overall unadjusted random effect: Z=-1.23, P= Test for heterogeneity: tau^2=0.05; chi^2=26.72, df=2,	=0.217				0.84 [0.6	33, 1.11]	-
Test for heterogeneity: tau^2=0.05; chi^2=26.72, df=2, Test for overall adjusted random effect: Z=-0.34, P=0.		19%				-	0.95 [0.73, 1.25]
SA							
Test for heterogeneity: tau^2<0.01; chi^2=0.23, df=1, F					0.78 [0.7	70, 0.871	-
Test for overall unadjusted fixed effect: Z=-4.54, P<0.0 Test for heterogeneity: tau^2<0.01; chi/2=0.11, df=1, f					0.70 [0.7	-	0.93 [0.84, 1.04]
Test for overall adjusted fixed effect: Z=-1.27, P=0.203	3						0.00 [0.04, 1.04]
SSA Test for heterogeneity: tau^2<0.01; chi^2=45.68, df=11	1. P<0.001: I^2=9	2%					
Test for overall unadjusted random effect: Z=-2.66, P= Test for overall unadjusted random effect: Z=-2.66, P= Test for heterogeneity: tau^2<0.01; chi*2=42.55, df=11					0.94 [0.9	10, 0.98]	-
Test for heterogeneity: tau ² 2<0.01; chi ² 2=42.55, df=1 Test for overall adjusted random effect: Z=-1.96, P=0.		10 /0			-	-	0.96 [0.91, 1.00]
Pooled							
Test for heterogeneity: tau^2=0.01; chi^2=153.87, df=3					◆ ↓ 0.92 [0.8	39, 0.95]	-
Test for overal unadjusted random effect: Z=-4.94, P< Test for heterogeneity: tau^2=0.01; chi^2=111.36, df=3 Test for overall adjusted random effect: Z=-3.73, P<0.1		90%			•	-	0.94 [0.92, 0.97]

Figure 5. Meta-analysis of women with disabilities who know of a place to be tested for HIV compared to women without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

	Disa	bled	Non-d	isablec	Unadj	Charles and a second se	Adjusted risk rat
Country	Int +	Int –	Int +	Int –		[95% CI]	[95% CI]
EAP							
Tonga	17	8	620	402	1.	.08 [0.76, 1.54]	1.04 [0.74, 1.47]
Mongolia	106	133	2081	1712		.85 [0.71, 1.02]	0.89 [0.75, 1.06]
Kiribati	90	16	1523	235	1.	.01 [0.94, 1.08]	1.01 [0.94, 1.08]
Fiji	29	30	1385	817	0.	.69 [0.51, 0.95]	0.68 [0.50, 0.92]
ECA							
Georgia	62	105	912	1383	0.	.79 [0.58, 1.09]	0.83 [0.61, 1.14]
LAC							
Suriname	123	25	1848	424	1.	.05 [0.96, 1.15]	1.04 [0.95, 1.13]
Honduras	237	161	4267	2109		.90 [0.82, 0.99]	0.90 [0.83, 0.98]
Guyana	45	12	1689	211		.82 [0.64, 1.06]	0.81 [0.64, 1.04]
MENA	40	12	1000	211		02 [0:04, 1:00]	0.01 [0.04, 1.04]
Tunisia	23	51	658	1500		12 [0 90 1 56]	1 22 10 27 1 721
	23	51	050	1500	· · · · · · · · · · · · · · · · · · ·	.12 [0.80, 1.56]	1.22 [0.87, 1.72]
SA				1007		74 10 55 0 001	0 70 70 04 4 001
Nepal	36	36	3414	1367	U.	.71 [0.55, 0.92]	0.78 [0.61, 1.00]
SSA					i		
Zimbabwe	97	2	3269	73		.01 [0.99, 1.03]	1.00 [0.98, 1.03]
Тодо	51	25	1501	382	0.	.84 [0.69, 1.02]	0.89 [0.74, 1.07]
Sierra Leone	33	31	3772	2534	0.	.90 [0.70, 1.15]	0.91 [0.73, 1.14]
Sao Tome and Principe	35	2	1066	56	1.	.02 [0.96, 1.08]	1.01 [0.95, 1.07]
Malawi	339	21	5115	135	0.	.94 [0.89, 0.99]	0.94 [0.89, 0.99]
Madagascar	82	179	2071	4123		.03 [0.84, 1.26]	1.01 [0.81, 1.26]
Ghana	139	91	2854	1221	• · · · · · · · 0.	.79 [0.64, 0.96]	0.86 [0.69, 1.07]
Gambia	97	55	2454	1137	1.	.00 [0.87, 1.15]	0.98 [0.85, 1.14]
Democratic Republic of Congo	68	80	2836	2201	0.	.89 [0.72, 1.09]	0.98 [0.81, 1.18]
Chad	83	87	3066	2421	• • • • • • • • • • • • • • • • • • •	.80 [0.66, 0.97]	0.82 [0.67, 0.99]
Central African Republic	85	66	2044	1162	0.	.87 [0.74, 1.03]	0.90 [0.78, 1.04]
EAP					· · · · · · · · · · · · · · · · · · ·		
Test for heterogeneity: tau^2=0.01; chi^2=7.81, df=3, Test for overall unadjusted random effect: Z=-1.13, Pa		6			0.	.91 [0.78, 1.07]	-
Test for heterogeneity: tau^2=0.01; chi^2=7.80, df=3,	P=0.050; I^2=639	6				_	0.92 [0.78, 1.07]
Test for overall adjusted random effect: Z=-1.09, P=0. ECA	.276						
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0,						.79 [0.58, 1.09]	-
Test for overall unadjusted fixed effect: Z=-1.42, P=0. Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0,	P=1.000; I^2=0%					-	0.83 [0.61, 1.14]
Test for overall adjusted fixed effect: Z=-1.14, P=0.25	5			_	1		0.00 [0.01, 1.14]
LAC Test for heterogeneity: tau^2=0.01; chi^2=6.94, df=2,	P=0.031; I^2=719	6			Adjusted	04 [0 02 4 00]	
Test for overall unadjusted random effect: Z=-0.86, P= Test for heterogeneity: tau^2=0.01; chi^2=6.97, df=2, l					Unadjusted 0.	.94 [0.83, 1.08]	-
Test for overall adjusted random effect: Z=-0.96, P=0.		-				-	0.94 [0.83, 1.07]
MENA Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, I	D=1 000: M2=0%				1		
Test for overall unadjusted fixed effect: Z=0.66, P=0.5	12				1.	.12 [0.80, 1.56]	-
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, Test for overall adjusted fixed effect: Z=1.16, P=0.246						-	1.22 [0.87, 1.72]
SA					1		
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, Test for overall unadjusted fixed effect: Z=-2.63, P=0.	009				— 0.	.71 [0.55, 0.92]	-
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, Test for overall adjusted fixed effect: Z=-1.95, P=0.05	P=1.000; I^2=0%					-	0.78 [0.61, 1.00]
SSA							
Test for heterogeneity: tau^2<0.01; chi^2=22.50, df=1 Test for overall unadjusted random effect: Z=-2.18, Pa		4%			•	.94 [0.90, 0.99]	-
Test for heterogeneity: tau^2<0.01; chi^2=14.52, df=1	0, P=0.150; I^2=4	10%			•	-	0.99 [0.97, 1.01]
Test for overall adjusted fixed affect: 7=_0.0F D=0.34	-						
Test for overall adjusted fixed effect: Z=-0.95, P=0.34 Pooled Test for heterogeneity: tau*2<0.01; chi*2=46.88, df=2 Test for heterogeneity: tau*2<0.01; chi*2=46.88, df=2	0, P=0.001; I^2=6	7%			♦ 1	93 [0.89, 0.98]	_
Pooled	=0.003 0, P=0.013; I^2=4				0.	.93 [0.89, 0.98]	- 0.95 [0.92, 0.99]

Figure 6. Meta-analysis of men with disabilities who know of a place to be tested for HIV compared to men without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

	Disa	bled	Non-d	isablec	Unadjusted risk ra	atio Adjusted risk ra
Country	Int +	Int -	Int +	Int -	[95% CI]	[95% CI]
EAP						
Гuvalu	13	25	182	539	1.36 [0.86, 2.16]	1.26 [0.80, 1.99]
Tonga	6	48	289	2133	1.13 [0.41, 3.10]	1.06 [0.39, 2.90]
Samoa	1	55	189	3397	0.55 [0.08, 3.79]	0.56 [0.08, 3.81]
Mongolia	419	534	5176	3701	0.78 [0.71, 0.86]	0.83 [0.76, 0.91]
Kiribati	17	174	262	3346	1.35 [0.84, 2.16]	1.37 [0.85, 2.20]
Fiji	47	97	1698	2699	0.89 [0.70, 1.14]	0.83 [0.65, 1.06]
ECA	-1	01	1000	2000	0.00 [0.10, 1.14]	0.00 [0.00, 1.00]
Uzbekistan	108	176	1954	2093	0.80 [0.67, 0.95]	0.92 [0.78, 1.09]
Turkmenistan	11	46	1985	4811	0.63 [0.34, 1.16]	0.66 [0.36, 1.21]
Kyrgyz Republic	86	45	3843	1156	0.91 [0.80, 1.04]	0.91 [0.80, 1.03]
Georgia	167	473	1453	4313	1.03 [0.85, 1.26]	1.02 [0.84, 1.24]
Belarus	48	12	4810	380	0.82 [0.68, 0.99]	0.80 [0.66, 0.96]
.AC	40	12	4010	500	0.02 [0.00, 0.99]	0.00 [0.00, 0.30]
	213	05	4184	1714		0.06 [0.94 1.09]
Suriname		95			0.99 [0.87, 1.12]	0.96 [0.84, 1.08]
Honduras	841	720	8734	6740	0.95 [0.90, 1.00]	0.92 [0.87, 0.97]
Guyana	106	68	3805	1252	0.74 [0.62, 0.89]	0.72 [0.60, 0.86]
Dominican Republic	658	144	16120	3030	1.02 [0.98, 1.06]	0.95 [0.92, 0.99]
Cuba	95	38	7412	812	0.68 [0.53, 0.86]	0.68 [0.53, 0.86]
Costa Rica	448	288	3786	2327	1.01 [0.91, 1.13]	0.95 [0.85, 1.06]
/IENA						St. Schemenner and schemen and
lunisia	35	798	232	8680	1.52 [1.05, 2.19]	1.56 [1.07, 2.26]
raq	52	1284	1166	24092	0.57 [0.40, 0.81]	0.66 [0.43, 1.01]
Algeria	117	1317	2918	26847	0.72 [0.58, 0.89]	0.75 [0.60, 0.92]
SA						
Nepal	27	263	1887	11115	0.75 [0.47, 1.19]	0.89 [0.56, 1.42]
SSA						
Zimbabwe	369	34	7925	560	0.99 [0.96, 1.02]	0.97 [0.94, 1.00]
Годо	354	198	3749	2096	1.00 [0.93, 1.08]	0.98 [0.92, 1.06]
Sierra Leone	72	148	6788	8549	0.69 [0.56, 0.86]	0.72 [0.58, 0.89]
Sao Tome and Principe	192	38	2036	352	1.00 [0.94, 1.06]	0.98 [0.92, 1.04]
Malawi	1077	85	18785	1162	0.98 [0.96, 1.01]	0.97 [0.95, 0.99]
Madagascar	191	1155	1863	11651	1.02 [0.86, 1.20]	1.08 [0.92, 1.26]
Guinea Bissau	64	163	3393	5973	0.68 [0.53, 0.88]	0.62 [0.49, 0.79]
Ghana	465	656	5382	5996	0.87 [0.78, 0.96]	0.88 [0.79, 0.97]
Gambia	145	173	5352	6085	0.93 [0.79, 1.09]	0.86 [0.73, 1.02]
Democratic Republic of Congo	143	667	3933	14221		
					0.73 [0.60, 0.89]	0.74 [0.62, 0.87]
Chad	226	886	4731	13349	0.77 [0.67, 0.88]	0.81 [0.71, 0.92]
Central African Republic	428	653	3118	3894	0.91 [0.83, 1.00]	1.02 [0.94, 1.11]
EAP lest for heterogeneity: tau^2=0.05; chi^2=11.11, df=5,	P=0.049; I^2=62	!%				
Test for overall unadjusted random effect: Z=-0.17. P= Test for heterogeneity: tau*2=0.03: chi*2=7.32. df=5. F					0.98 [0.76, 1.26]	-
est for overall adjusted fixed effect: Z=-3.66, P<0.001						0.86 [0.79, 0.93]
ECA fest for heterogeneity: tau^2<0.01; chi^2=5.63, df=4, F	P=0 228: IA2=239	6			Adjusted Unadjusted	
Test for overall unadjusted fixed effect: Z=-3.02, P=0.0 est for heterogeneity: tau^2<0.01; chi^2=4.28, df=4. F					0.88 [0.81, 0.96]	-
est for overall adjusted fixed effect: Z=-2.48, P=0.013					-	0.90 [0.83, 0.98]
LAC						
Test for heterogeneity: tau ² =0.02; chi ² =23.41, df=5, Test for overall unadjusted random effect: Z=-1.53, P= Test for heterogeneity: tau ² =0.01; chi ² =16.48, df=5,					0.91 [0.81, 1.03]	-
Fest för heterogeneity: tau^2=0.01; chi^2=16.48; df=5; Fest for overall adjusted random effect: Z=−2.52; P=0.0		1%			-	0.88 [0.80, 0.97]
MENA						
est for heterogeneity: tau^2=0.22; chi^2=16.37, df=2, est for overall unadjusted random effect: Z=-0.57, P=					0.85 [0.48, 1.49]	-
est for overall unadjusted random effect: Z=-0.57, P= est for heterogeneity: tau^2=0.17; chi^2=12.86; df=2, est for overall adjusted random effect: Z=-0.35, P=0.		sw 			_	0.91 [0.55, 1.52]
SA						
est for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, F	P=1.000; I^2=0%				0.75 [0.47, 1.19]	-
est for overall unadjusted fixed effect: Z=-1.22, P=0.2 est for heterogeneity: tau*2<0.01; chi*2=0.00, df=0, F	5 1.000; M2=0%					0.89 [0.56, 1.42]
Test for overall adjusted fixed effect: Z=-0.48, P=0.633	5					2.30 [0.00, 1.42]
Fest for heterogeneity: tau*2=0.01; chi*2=47.78, df=11					0.90 [0.83, 0.97]	_
Test for overall unadjusted random effect: Z=−2.89, P= lest for heterogeneity: tau^2=0.01; chi^2=46.29, df=11	0.004 1, P<0.001; I*2=9	3%			0.90 [0.63, 0.97]	
est for overall adjusted random effect: Z=-2.73, P=0.0	006				-	0.90 [0.83, 0.97]
Pooled Fest for heterogeneity: tau^2=0.02; chi^2=131.88, df=3	32, P<0.001; I^2=	89%			0.0010.04.0.013	
est for overall unadjusted random effect: Z=-4.11. P< est for heterogeneity, tau 2=0.01; chi/2=101.35, dt=3					0.89 [0.84, 0.94]	-
						0.90 [0.85, 0.94]

Risk ratio

Figure 7. Meta-analysis of women with disabilities who have ever been tested for HIV and know the results compared to women without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

	Disa	bled	Non-d	isablec	Unadjusted risk rati	• • • • • • • • • • • • • • • • • • • •
Country	Int +	Int –	Int +	Int –	[95% CI]	[95% CI]
EAP						
Tonga	1	24	98	923	0.32 [0.04, 2.28]	0.26 [0.04, 1.95]
Mongolia	69	168	1378	2389	0.85 [0.65, 1.11]	0.91 [0.69, 1.18]
Kiribati	9	97	269	1487	0.61 [0.31, 1.20]	0.67 [0.34, 1.30]
Fiji	3	54	320	1872	0.24 [0.07, 0.79]	0.20 [0.06, 0.65]
ECA						
Georgia	24	142	387	1902	0.56 [0.34, 0.92]	0.57 [0.34, 0.95]
LAC						
Suriname	75	72	982	1276	1.37 [1.13, 1.68]	1.33 [1.10, 1.61]
Honduras	126	271	2032	4340	1.03 [0.87, 1.23]	1.02 [0.87, 1.20]
Guyana	31	26	1079	810	1.08 [0.79, 1.49]	1.01 [0.77, 1.33]
MENA						
Tunisia	5	68	64	2089	- 2.54 [1.05, 6.12]	2.81 [1.17, 6.72]
SA	÷					
Nepal	6	66	756	4016	0.68 [0.31, 1.51]	0.75 [0.34, 1.64]
SSA						
Zimbabwe	84	15	2701	640	1.04 [0.94, 1.15]	1.00 [0.91, 1.11]
Togo	30	46	792	1091	0.96 [0.68, 1.36]	1.10 [0.78, 1.56]
Sierra Leone	15	49	1185	5084	1.14 [0.72, 1.81]	1.12 [0.72, 1.76]
Sao Tome and Principe	20	16	795	324	0.82 [0.59, 1.14]	0.81 [0.59, 1.10]
Malawi	290	70	4403	842	0.91 [0.82, 1.00]	0.91 [0.83, 1.00]
Madagascar	15	246	443	5750	0.70 [0.41, 1.21]	0.67 [0.38, 1.16]
Ghana	40	190	945	3127	0.58 [0.38, 0.88]	0.67 [0.43, 1.03]
Gambia	30	120	943	2673		
	26	120	912	4091	0.80 [0.53, 1.21]	0.81 [0.56, 1.18]
Democratic Republic of Congo Chad	26	140	937 1261	4091	0.95 [0.60, 1.49]	1.10 [0.74, 1.64]
	48	140	1127	2072	0.74 [0.49, 1.12]	0.76 [0.51, 1.13]
Central African Republic EAP	40	103	1127	2072	0.89 [0.68, 1.16]	0.96 [0.76, 1.20]
Test for heterogeneity: tau^2=0.14; chi^2=5.40, df=3, l	P=0.144; I^2=509	%			0.76 [0.50, 0.07]	
<u>Test for overall unadjusted fixed effect: Z=-2.24, P=0.</u> Test for heterogeneity: tau^2=0.30; chi^2=7.65, df=3, Test for overall adjusted random effect: Z=-1.69, P=0.	P=0.054; I^2=689	~ 			0.76 [0.59, 0.97] –	- 0.55 [0.27, 1.10]
ECA						
Test for heterogeneity: tau ² <0.01; chi ² =0.00, df=0, Test for overall unadjusted fixed effect: Z=-2.29, P=0.	022				0.56 [0.34, 0.92]	-
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, Test for overall adjusted fixed effect: Z=-2.15, P=0.03					-	0.57 [0.34, 0.95]
LAC					d	
Test for heterogeneity: tau^2=0.02; chi^2=4.71, df=2, Test for overall unadjusted random effect: Z=1.49, P=(0.136				sted 1.16 [0.95, 1.41]	-
Test for heterogeneity: tau^2=0.01; chi^2=4.83, df=2, Test for overall adjusted random effect: Z=1.21, P=0.2		%			-	1.12 [0.93, 1.34]
MENA						
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, Test for overall unadjusted fixed effect: Z=2.08, P=0.0	38				- 2.54 [1.06, 6.12]	-
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, Test for overall adjusted fixed effect: Z=2.32, P=0.020	P=1.000; I^2=0%				-	2.81 [1.17, 6.72]
SA						
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, Test for overall unadjusted fixed effect: $Z=-0.95$, P=0. Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0,	342 P=1.000; I^2=0%				0.68 [0.31, 1.51]	- 0.75 [0.34, 1.64]
Test for overall adjusted fixed effect: Z=-0.73, P=0.46 SSA	8					0.70 [0.04, 1.04]
Test for heterogeneity: tau^2=0.01; chi^2=13.80, df=1		32%			0.04 10.00 4.001	_
Test for overall unadjusted fixed effect: Z=-2.06, P=0. Test for heterogeneity: tau^2<0.01; chi^2=10.71, df=1	0, P=0.381; I^2=8	3%			0.94 [0.88, 1.00]	-
Test for overall adjusted fixed effect: Z=-2.18, P=0.02					-	0.94 [0.88, 0.99]
Pooled Test for heterogeneity: tau^2=0.03; chi^2=47.08, df=2	0, P=0.001; I^2=6	50%				
Test for overall unadjusted random effect: Z=-1.74, P= Test for heterogeneity: tau^2=0.01; chi^2=43.16, df=2	=0.082 0, P=0.002: I^2=4	17%			0.91 [0.81, 1.01]	-
	.190				-	0.94 [0.86, 1.03]

Risk ratio

Figure 8. Meta-analysis of men with disabilities who have ever been tested for HIV and know the results compared to men without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

Country	Disa Int +	Int –	Int +	Int -		·····	Adjusted risk
	111. 7		nit T			[95% CI]	[95% CI]
EAP Tuvalu	2	26	61	202		0 40 10 12 1 051	0 52 10 12 2 0
			61	382		0.49 [0.12, 1.95]	0.52 [0.13, 2.0]
Samoa	0	25	75	1100		0.76 [0.11, 5.26]	0.73 [0.10, 5.3]
Mongolia	174	611	2283	4980		0.66 [0.53, 0.80]	0.76 [0.62, 0.93
Kiribati	4	76	92	1173		0.67 [0.25, 1.80]	0.95 [0.35, 2.6
Fiji	9	58	343	1776		0.85 [0.45, 1.63]	1.19 [0.63, 2.23
ECA							
Uzbekistan	32	156	775	1970	· · · · · · · · · · · · · · · · · · ·	0.60 [0.41, 0.87]	0.71 [0.49, 1.03
Turkmenistan	4	34	673	3913		0.73 [0.27, 1.97]	0.90 [0.33, 2.4]
Kyrgyz Republic	18	91	1086	3131		0.70 [0.43, 1.13]	0.90 [0.57, 1.43
Georgia	55	170	428	1573		1.04 [0.72, 1.51]	1.08 [0.75, 1.5
Belarus	23	27	1760	3103		1.14 [0.77, 1.67]	1.08 [0.73, 1.58
LAC							
Suriname	73	180	1531	3189		0.85 [0.65, 1.13]	0.95 [0.72, 1.24
Honduras	180	883	2121	8280		0.85 [0.72, 1.00]	1.03 [0.87, 1.23
Guyana	40	90	1500	2649	H	0.78 [0.54, 1.12]	0.94 [0.65, 1.3
Dominican Republic	262	433	6099	10517	HE CAN BE AN A REAL OF A R	1.03 [0.90, 1.18]	1.11 [0.98, 1.20
Cuba	36	77	2596	5206		0.94 [0.59, 1.51]	1.05 [0.65, 1.69
Costa Rica	85	416	794	3299		1.01 [0.71, 1.44]	1.15 [0.82, 1.6
MENA	00	410	194	5299		1.01 [0.71, 1.44]	1.15 [0.02, 1.0
Tunisia	9	172	70	1478	p	0.86 [0.39, 1.88]	0 00 10 11 1 00
			72				0.88 [0.41, 1.88
Iraq	19	771	339	13390		0.64 [0.36, 1.16]	0.72 [0.34, 1.50
Algeria	22	518	893	9076		0.34 [0.21, 0.56]	0.51 [0.32, 0.83
SA							
Nepal	7	137	476	4911		0.75 [0.31, 1.81]	1.24 [0.55, 2.8
SSA					_		
Zimbabwe	239	139	5583	2424		0.91 [0.84, 0.99]	0.96 [0.88, 1.0
Тодо	115	292	1271	3025		0.95 [0.77, 1.16]	1.03 [0.85, 1.26
Sierra Leone	17	152	1875	9306		0.56 [0.34, 0.91]	0.68 [0.42, 1.1]
Sao Tome and Principe	115	93	1062	1108		1.13 [0.97, 1.32]	1.17 [1.00, 1.3]
Malawi	649	453	11959	7129		0.93 [0.86, 0.99]	0.96 [0.89, 1.03
Madagascar	47	608	494	6213		1.02 [0.72, 1.45]	1.23 [0.89, 1.70
Guinea Bissau	28	77	1150	3467		1.00 [0.68, 1.47]	1.06 [0.73, 1.54
Ghana	135	514	1862	4981	H-B-41	0.76 [0.61, 0.94]	0.89 [0.72, 1.10
Gambia	45	113	1753	3903		0.97 [0.71, 1.33]	1.04 [0.76, 1.43
Democratic Republic of Co		299	1654	6136		0.78 [0.56, 1.07]	0.84 [0.62, 1.14
Chad	75	410	2095	6353		0.63 [0.49, 0.79]	0.72 [0.57, 0.90
Central African Republic	155	569	1487	3579		and the second se	0.87 [0.74, 1.03
EAP	155	569	1407	3579		0.75 [0.63, 0.88]	0.07 [0.74, 1.0
Test for heterogeneity: tau^2<0.01; chi^2=	=0.80, df=4, P=	0.938; 1^2=0	%			0.67 [0.55, 0.81]	_
Test for overall unadjusted fixed effect: Z= Test for heterogeneity: tau*2<0.01, chi*2=	-4.21, P≤0.00 2.27, at=4, P	1 0.686;1^Z=1	w -			0.07 [0.55, 0.61]	
Test for overall adjusted fixed effect: Z=-2	2.43, P=0.015			_		-	0.79 [0.65, 0.96
ECA Test for heterogeneity: tau^2=0.05; chi^2=	=7.51, df=4, P=	0.111; ^2=4	9%		Adjusted	0.05 10 70 4.001	
Test for overall unadjusted fixed effect: Z= Test for heterogeneity: tau^2<0.01; chi^2=						0.85 [0.70, 1.03]	-
Test for overall adjusted fixed effect: Z=-0		0.014,12-0	.,,,		-	-	0.93 [0.77, 1.13
LAC Test for heterogeneity: tau^2<0.01; chi^2=		0 420: 142-2	40/		I I		
Test for overall unadjusted fixed effect: Z= Test for heterogeneity: tau*2<0.01, chi*2=					➡	0.94 [0.86, 1.03]	-
Test for overall adjusted fixed effect: Z=1.3		0.859; 1^2=0	70		*	-	1.06 [0.97, 1.10
MENA					1		
Test for heterogeneity: tau^2=0.13; chi^2= Test for overall upadjusted random effect:						0.54 [0.32, 0.93]	-
Test for overall unadjusted random effect: Test for heterogeneity: tau*2<0.01, ch*2= Test for overall adjusted fixed effect: Z=-2		0.462,7^Z=0	%			-	0.63 [0.44, 0.9
SA					1		
Test for heterogeneity: tau^2<0.01; chi^2=	=0.00, df=0, P=	1.000; 1^2=0	%			0.75 [0.31, 1.81]	-
Test for overall unadjusted fixed effect Z= Test for heterogeneity: fau**2<0.01, chi*2=		ד.000,ר,000	%			-	1.24 [0.55, 2.8
Test for overall adjusted fixed effect: Z=0.9 SSA	52, P=0.604						
Test for heterogeneity: tau^2=0.02; chi^2=	=30.85, df=11,	P=0.001; I^2	=73%				-
Test for overall unadjusted random effect Test for heterogeneity: tau~2=0.01; chi~2=						0.87 [0.78, 0.96]	
Test for overall adjusted random effect: Z=	=-1.13, P=0.25	9		_	T	-	0.96 [0.88, 1.0
Pooled Test for heterogeneity: tau^2=0.03; chi^2=	=70.90. df=31	P<0.001 1/2	=66%			0.04/0.77	
Test for overall unadjusted random effect: Test for overall unadjusted random effect:					•	0.84 [0.77, 0.91]	-
							0.95 [0.90, 1.02

Figure 9. Meta-analysis of women with disabilities who have been tested for HIV in the last 12 months and know the results compared to women without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

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	Disabled		Non-disabled		Unadjusted risk rat	
Country	Int +	Int –	Int +	Int –	[95% CI]	[95% (
EAP						
Mongolia	18	145	603	1764	0.42 [0.22, 0.80]	0.51 [0.27,
Kiribati	3	40	121	753	0.55 [0.17, 1.76]	0.63 [0.19,
ECA					1	
Georgia	9	38	159	497	0.68 [0.31, 1.52]	0.72 [0.32,
_AC						
Suriname	41	48	339	816	1.77 [1.31, 2.40]	1.74 [1.28,
Honduras	38	137	669	1841	0.79 [0.55, 1.13]	0.88 [0.62,
Guyana	15	22	418	766	1.32 [0.78, 2.22]	1.43 [0.86,
SA .						
Nepal	0	30	157	1015	0.27 [0.04, 1.85]	0.36 [0.05,
SSA	-				1	
Zimbabwe	55	33	1743	1032	1.03 [0.87, 1.23]	1.07 [0.90,
logo	15	21	329	591	1.44 [0.93, 2.24]	1.59 [1.02,
Sierra Leone	4	23	366	1544	0.66 [0.24, 1.78]	0.75 [0.27,
Malawi	192	116	2765	1722	1.04 [0.92, 1.17]	1.04 [0.92,
Madagascar	2	97	122	2036	0.32 [0.08, 1.35]	0.35 [0.09,
Ghana	14	43	329	874	0.77 [0.43, 1.39]	0.96 [0.54,
Gambia	12	31	355	707	0.94 [0.51, 1.74]	0.97 [0.53,
Democratic Republic of Congo	7	30	411	831	0.55 [0.24, 1.26]	0.59 [0.25,
Chad	12	43	589	1305	1.01 [0.62, 1.65]	1.02 [0.61,
Central African Republic	19	56	482	1163	0.94 [0.62, 1.42]	1.01 [0.68,
EAP						
Test for heterogeneity: tau^2<0.01; chi^2=0.15, df=1, l Test for overall unadjusted fixed effect: Z=-2.83, P=0.0					0.45 [0.26, 0.78]	-
Test for heterogeneity: tau^2<0.01; chi^2=0.11, df=1, I	P=0.745; I^2=0%				-	0.53 [0.30,
est for overall adjusted fixed effect: Z=-2.21, P=0.02						,
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, l					sted 0.68 [0.31, 1.52]	_
Test for overall unadjusted fixed effect: Z=-039, P=0.351 Test for heterogeneity: tau'2<0.01; chi'2=0.00, d=0, P=1.000; l/2=0% Test for overall adjusted fixed effect Z=-0.81, P=0.420				djusted 0.00 [0.01, 1.02]	0.72 [0.33,	
Test for overall adjusted fixed effect: 2=-0.81, P=0.420	J					(,
Test for heterogeneity: tau^2=0.15; chi^2=11.25, df=2,		9%			1.23 [0.75, 2.01]	_
Test for overall unadjusted random effect: Z=0.82, P=(Test for heterogeneity: tau^2=0.10; chi^2=8.58, df=2, I	=0.014; I^2=74	%			-	1.30 [0.85,
Test for overall adjusted random effect: Z=1.19, P=0.2	34					
Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, I		,			0.27 [0.04, 1.84]	_
Test for overall unadjusted fixed effect: Z=-1.34, P=0. Test for heterogeneity: tau^2<0.01; chi^2=0.00, df=0, f	P=1.000; I^2=0%					0.36 [0.05,
Test for overall adjusted fixed effect: Z=-1.07, P=0.28 SSA	·					5.00 [0.00,
Test for heterogeneity: tau^2<0.01; chi^2=8.92, df=9, I					1.02 [0.94, 1.12]	_
Test for overall unadjusted fixed effect: Z=0.48, P=0.6 Test for heterogeneity: tau^2<0.01; chi^2=8.17, df=9, k Test for overall adjusted fixed effect: Z=0.98, P=0.327						1.04 [0.96,
Pooled						
Test for heterogeneity: tau^2=0.07; chi^2=35.72, df=16 Test for overall unadjusted random effect: Z=-0.72, P=	0.468				0.93 [0.77, 1.13]	-
Test for heterogeneity: tau^2=0.04; chi^2=29.03, df=16	5, P=0.024; I^2= 14	55%			_	1.02 [0.87,

Figure 10. Meta-analysis of men with disabilities who have been tested for HIV in the last 12 months and know the results compared to men without disabilities. Int +, number of people with the indicator; Int-, number of people without the indicator; EAP, East Asia Pacific; ECA, East and Central Asia; LAC, Latin America and Caribbean; MENA, Middle East and North Africa; SA, South Asia; SSA, sub-Saharan Africa.

was impacted by small sample sizes, which may explain the result, rather than improved knowledge or access to testing.

These findings are largely consistent with the existing literature that highlight the gaps in HIV knowledge and testing for people with disabilities. For example, these results are similar to studies in South Africa that showed people with disabilities have less knowledge about HIV and testing sites [24], as well as Demographic and Health Survey data from Uganda that showed gaps in transmission [18]. However, these results present an overall picture for people with disabilities, rather than the sex-disaggregated results included in this study. Therefore, this novel analysis suggests a gap between men and women with disabilities and showcases the "double disadvantage" women with disabilities experience based on gender and disability. Across all five indicators, women had at least some evidence they were less likely to have knowledge about HIV and access to testing than women without disabilities, whereas this was only the case for two indicators for men. Importantly, this difference was most pronounced for knowledge about MTCT, since there was significantly less knowledge among women with disabilities compared to women without, but no differences among men with and without disabilities. This information is important for all women of childbearing age, but particularly populations where there is a higher prevalence of HIV, including among those with disabilities. This knowledge gap will not only hamper women with disabilities ability to prevent MTCT among their children, but also make the global goal of eliminating MTCT impossible. These gaps are significant, but unsurprising, due to people with disabilities' exclusion from HIV policies and programmes, comprehensive sexuality education and inaccessible information about HIV [4, 13].

While some of our results showed small relative differences and, therefore, suggest it may be possible to reduce these inequities, these results still emphasize and reinforce the concern that Global AIDS targets will not be met without more efforts to include people with disabilities in HIV programmes [3]. Efforts are, therefore, needed to reach people with disabilities who may be left behind in existing HIV programmes. Health systems can address these gaps by going beyond mentioning disability in their HIV policies, and, instead, integrating specific considerations into their programmes and national plans [4], and across each building block of the health system. To develop these plans fully, governments should look at their leadership, governance and financing structures to ensure people with disabilities involved in the development of HIV plans and specific budget item lines to address disability inclusion. Efforts should focus on improving the accessibility of sexuality education and HIV services for people with disabilities through ensuring physical and communication access of the facility and information material. Training health workers about disability (including destigmatizing disability and sexual activity) and ensuring public helath and patient information about HIV are available in accessible formats can further improve the quality of these services.

Finally, there needs to have more comparable data on disability within routine HIV surveys as well as other national and household surveys that look at HIV prevalence, knowledge and testing. Routine data on the prevalence of HIV among this population will help to monitor efforts to close gaps, as well as further elucidate the relationship between HIV and disability, and disaggregate further by other vulnerabilities (e.g. education, violence and social isolation). Indeed, analysis of the Demographic Health Survey in South Africa shows that women with disabilities, who were also living with HIV, were four times as likely to experience intimate partner violence than those without disabilities and HIV [33]. Together, these efforts will improve knowledge and testing among people with disabilities and so close the gaps. Good practice examples exist already of disability-inclusion in HIV services, such as in Jamacia, where HIV-focused civil society organizations are collaborating with organizations of persons with disabilities to reach people with disabilities [34], and South Africa, where health workers are being trained about disability and HIV [35], but these need to be scaled further.

4.1 | Strengths and limitations

This analysis is the largest examining HIV knowledge and testing by disability status. It allows cross-country comparison, providing new evidence from countries outside of sub-Saharan Africa, while also furthering the breadth of evidence in disability-based HIV knowledge and testing inequities in this region. Disaggregation of data by sex also allows us to examine the inequities by disability and sex, which revealed greater absolute inequities for women with disabilities. Given the global focus on improving gender-based inequities, this analysis provides important evidence on these gaps and how women with disabilities need to be further included in gendertargeted programmes. Combining this information with other studies also calls for more nuanced research to understand which people with disabilities are left behind and how this intersects with gender, age and mitigating factors (poverty, isolation, education and exposure to violence).

However, this analysis was limited by the definition of disability used in the MICS, which results in a lower prevalence than is estimated globally, and our analysis which focused only on people with at least a lot of difficulties in one domain. In addition, the Washington Group Short Set used for people aged 18-49 omit the full experience of disability, particularly those with psychosocial, intellectual, neurological, developmental and upper limb-based disabilities [36]. As these are cross-sectional surveys that do not test the onset of functional limitations, we also cannot understand if the individuals identified as having "disabilities" are those with preexisting disabilities or acquired because of HIV disease progression. Additionally, since the interview guide recommends only including people who can respond for themselves, it limits the level of functional difficulty captured in the survey. In particular, people with hearing or intellectual impairments may have been excluded. This bias may limit the applicability of our findings to those with only moderate functional limitations, rather than all people with disabilities, particularly those most likely to be excluded from HIV information and testing. Furthermore, the men's dataset is not only run in fewer countries, but also has a lower response rate (70-80% compared to the women's 90-95%). This, on top of the possible accessibility barriers to participating, introduces some non-response bias. Finally, we were limited by the covariates and outcomes we examined, particularly since there was no MICS estimate of

HIV prevalence, a limited definition of HIV prevention knowledge (i.e. excluding other important prevention tools, such as pre-exposure prophylaxis) and small sample sizes for some indicators.

5 | CONCLUSIONS

Overall, this study provides new data on the lower HIV knowledge and testing for people with disabilities. Without concerted efforts to reach people with disabilities in HIV programmes, we will not be able to achieve the global goals for HIV [3], and will leave those at most risk behind. With more data revealing these inequities, the gaps for people with disabilities are now well-understood and require urgent action to address.

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COMPETING INTERESTS

The authors declare no competing interests.

AUTHORS' CONTRIBUTIONS

SR conceived the study and wrote the first draft, SC conducted the analysis, JH-H, LMB, CD and HK edited the manuscript and provided crucial feedback on drafts.

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DATA AVAILABILITY STATEMENT

MICS data are publicly available on the UNICEF website.

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